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EFFECTS OF CORROSION ON UNPAINTED WEATHERING STEEL BRIDGES

R. L. McCrum
C. J. Arnold
R. P. Dexter

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Testing and Research Division
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Michigan Transportation Commission
William C. Marshall, Chairman;
Lawrence C. Patrick, Jr., Vice-Chairman;
Hannes Meyers, Jr., Carl V. Pellonpaa,
Weston E. Vivian, Rodger D. Young
James P. Pitz, Director
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ABSTRACT

Visual observation of the deteriorating condition of many of Michigan's weathering steel structures has prompted detailed qualitative and quantitative surveys of Michigan's unpainted bridges. Results of the qualitative survey although, for the most part, previously reported are briefly summarized. Observed problem areas included weathering steel surfaces under leaking expansion joints, weathering steel surfaces exposed to salt-laden traffic spray, build-up of moisture trapping debris on beam surfaces, lapped joints and connections (crevice corrosion), welds where composition differences from the base metal can promote galvanic (dissimilar metal) corrosion and high residual tensile stress can accelerate corrosion rates, and mill scale which galvanically encourages the corrosion of underlying base metal. The serious appearance--thick exfoliating rust scales and obviously pitted surfaces--observed for many environments prompted a moratorium (May 1979 and February 1980) on the further use of unpainted weathering steels, with painted A572 being recommended as a cost competitive alternative.

The quantitative stage of this investigation was initiated to help determine the actual corrosion losses taking place for various details (with special emphasis on the problem areas already mentioned) of weathering steel structures in the full range of Michigan's highway exposure environments. With this goal in mind, beam thickness measurements have been taken on over 50 different weathering steel bridges throughout Michigan's lower peninsula. While initial (before weathering) beam sizes were only known to be within a starting tolerance band, sufficient numbers of cases were examined so that a statistically significant analysis could be performed to determine meaningful trends in the data.

While it does appear (at least with respect to section loss) that for a salt-free and non-overlapping exposure weathering steels may be 'weathering' at close to the desired performance levels, for the more prevalent salt and debris laden Michigan highway environment this appears to be far from the case. Average corrosion losses for these two extremes go from a mere 0.2 to 0.6 mils/year/surface to a significant 1.20 mils/year/surface, with some portions of certain beams (for this latter environment) approaching a structurally serious 2.5 to 5.0 mils/year/surface with localized pitting of up to 16 mils/year/surface for the very worst exposures. There is still some uncertainty about the exact manner in which some of the observed corrosion rates are behaving with respect to time as well as the differences in corrosion rate that may occur for some differences in environment. Several possible models are presented and used to predict possible future beam sizes and properties with continued weathering.

Conclusions and Recommendations

Based on the present state of knowledge of all relevant factors, the following observations are made:

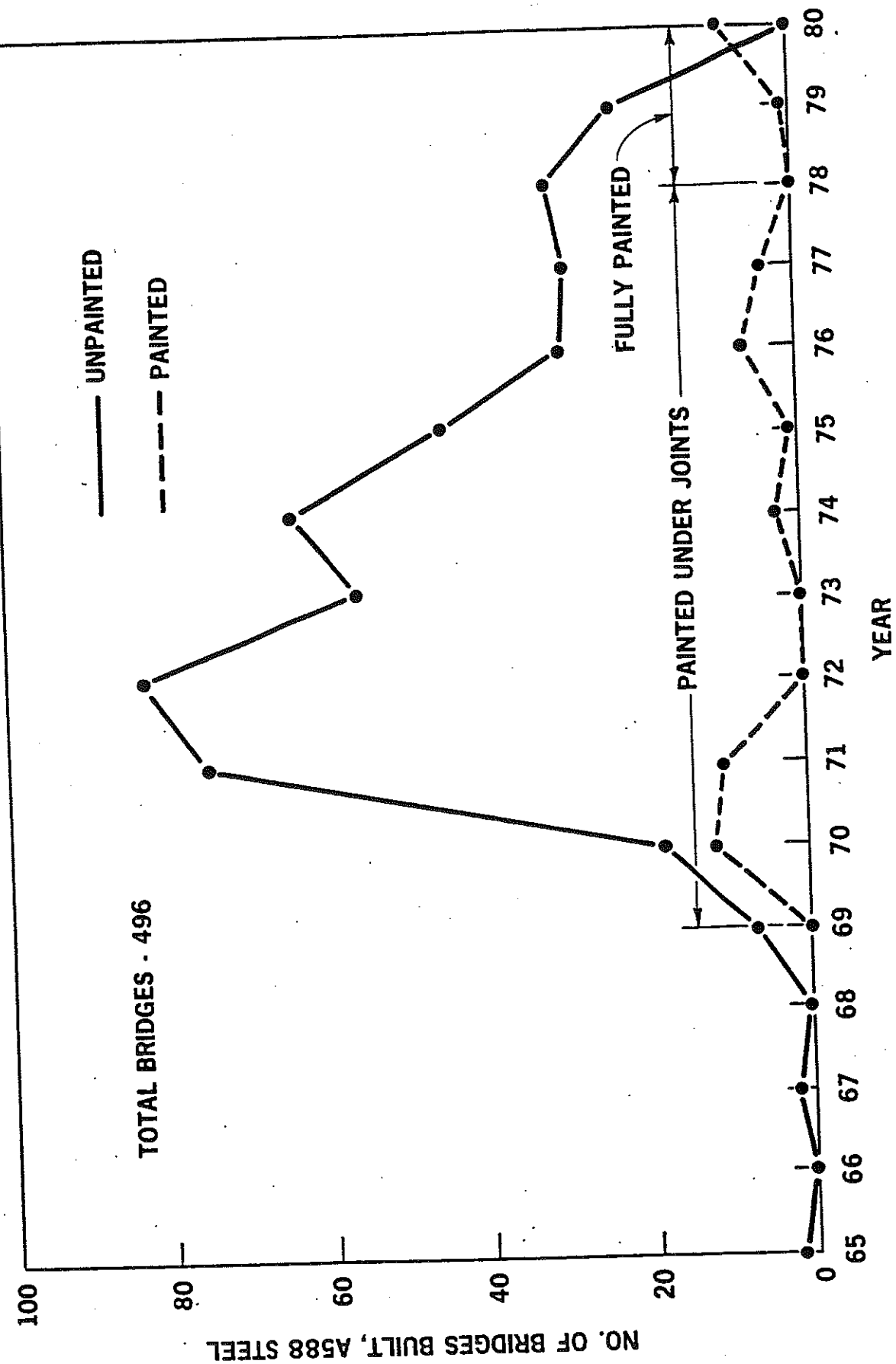


Figure 1. Number of unpainted weathering steel bridges constructed and year of construction.

1) Rates of corrosion have been measured that are sufficient to cause perforation of bridge members during their service lives.

2) Unpainted A588 steel should not be used in Michigan's highway environments.

3) An effort should be made to paint or otherwise protect those structures exposed to significant amounts of salt (from either leakage or spray) by the time they reach 15 or 20 years of age.

A more detailed summary and conclusions of the report are to be found on page 45.

INTRODUCTION

In the mid-sixties, Michigan began building bridges using weathering steels. These steels, which were first produced from naturally occurring iron ores, were found to develop a 'self protective' oxide coating under many exposure environments. Noting these effects, the major steel companies conducted research programs and experiments to produce steels of similar composition that displayed a similar behavior.

Gradually these steels, produced under a variety of trade names, found their way into architectural and structural applications. The potential advantages appeared to be very great since the dense self-protective oxide that formed was to virtually eliminate the need for the periodic maintenance painting that can add considerable expense to the cost of a structure during its lifetime.

The Michigan Department of Transportation first started using the weathering steels on a trial basis for several bridges in the Metropolitan Detroit area in 1965. When, after several years of exposure, there was no obvious deterioration of these structures, Michigan gradually began more widespread use of these steels in newly constructed bridges. Today the Michigan Department of Transportation has approximately 500 unpainted weathering steel bridges while Michigan counties have approximately another 100 such structures (Fig. 1). With this substantial investment to protect, it is hardly surprising that the Michigan Department of Transportation has maintained an ongoing interest in the performance of weathering steels in highway environments.

The Problem

After approximately seven years of exposure problem areas started to become apparent with even more evident changes taking place after 10 to 15 years of exposure. Within this time, visual observations gradually started to reveal definite problems.

Leaking roadway expansion joints that allowed deicing salt laden runoff water to contact beam surfaces resulted in the most obvious problem.

The thick exfoliating rust scales (up to 1/2 and 3/4 in. thick) that developed in these areas after 10 to 15 years left little doubt that for this type of exposure the weathering steels were not performing as desired (Fig. 2). Indeed the amount of rust present was sufficient to cause some concern about the structural integrity of these areas.

Urban bridges exposed to traffic spray, while not appearing quite as serious, also demonstrated a rather questionable appearance when compared with the manufacturers' description of an ideal weathering surface. Far from being the dense "fine grained" brownish-black protective layer desired, the beam surfaces (especially noticeable on the webs) were shedding large (up to 4 and 5 sq in. by 1/16 to 1/8 in. thick) flakes even after 12 to 15 years of exposure. While this phenomenon was often noticeably worse on the side of a beam facing oncoming traffic, the opposite side was usually only slightly better. In many instances this shedding oxide combined with vehicle-thrown debris to cover the lower flanges to depths of an inch or more (Fig. 3).

Even on bridges not exposed to pavement runoff water flowing downward from leaking expansion joints or thrown up as vehicle spray, the external appearance did not always appear consistent with the ideal dense protective layer. The majority of these structures were found to be covered with a very loosely packed reddish oxide layer that appeared to be getting thicker with age.

Visual Observation and General Knowledge

Prompted by this visually apparent failure of many of its unpainted weathering steel bridges to develop and/or maintain the "advertised protective patina" for all highway exposure environments, the Michigan Department of Transportation undertook a rather intensive qualitative survey of the condition of its weathering steel bridges.

This survey involved a visual inspection of urban and rural weathering steel bridges to better determine the exact extent of the problem. We were interested in which highway exposure environments were least successful at maintaining the "protective oxide coating," and which areas of a structure would be more likely to succumb to structurally harmful corrosion. Much of this stage of the investigation has been reported previously but the major findings are relevant to this discussion and are briefly summarized here along with a few new observations.

A review of available material from the steel companies and others interested in the performance of weathering steels revealed that these steels could not be expected to achieve their optimum corrosion resistance unless the following conditions prevailed:

1) Absence of heavy concentrations of corrosive pollutants, especially chlorides,

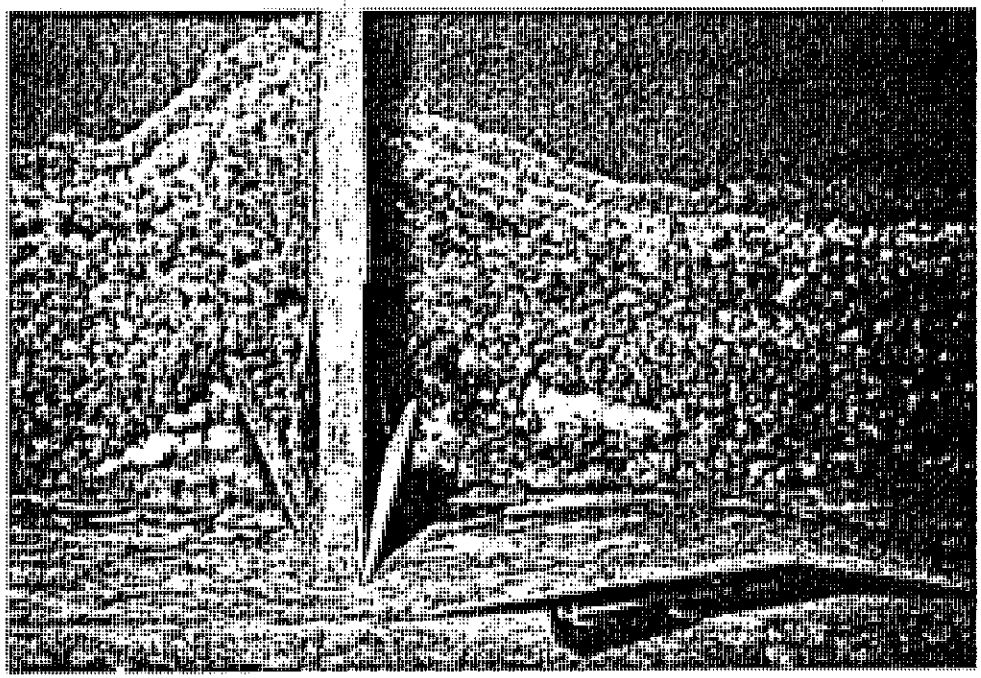


Figure 2. Thick exfoliating rust scales generated under leaking expansion joints.

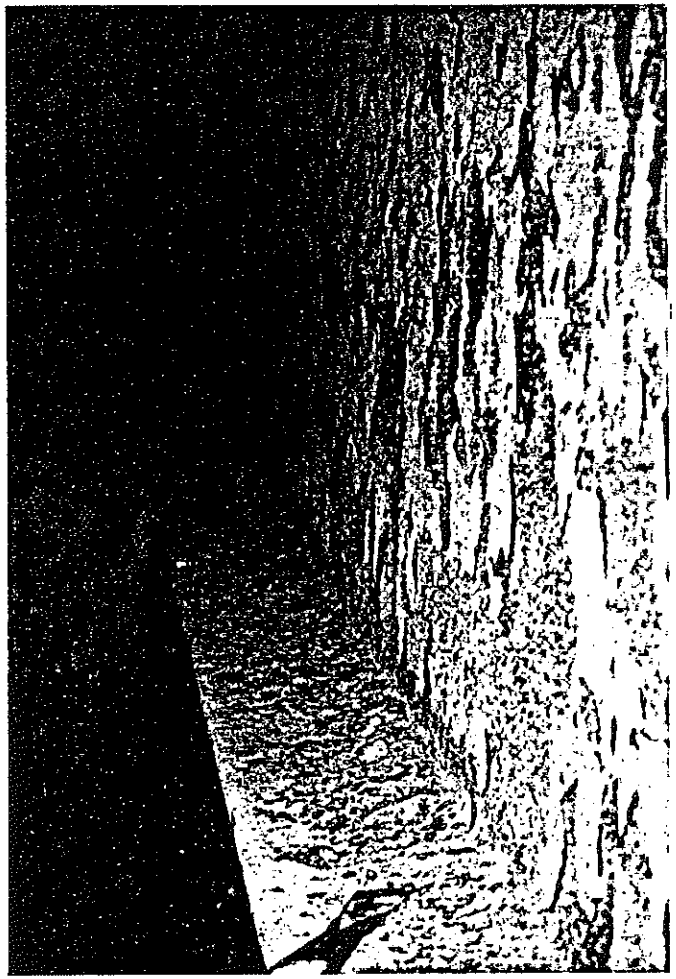


Figure 3. Traffic spray affected area and debris accumulation on lower flange (12 years exposure).

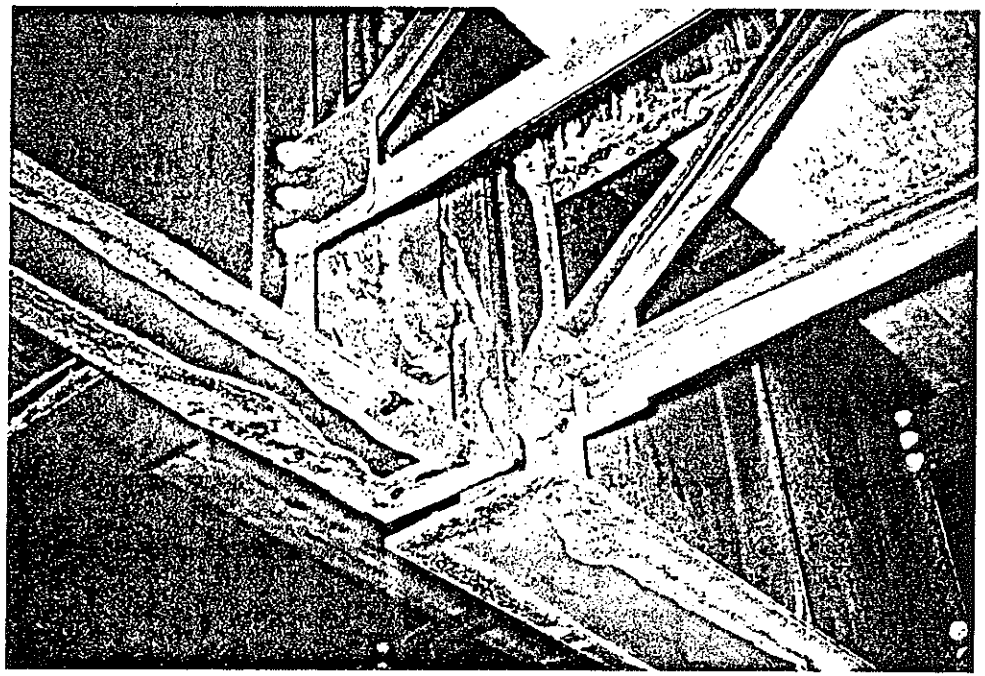
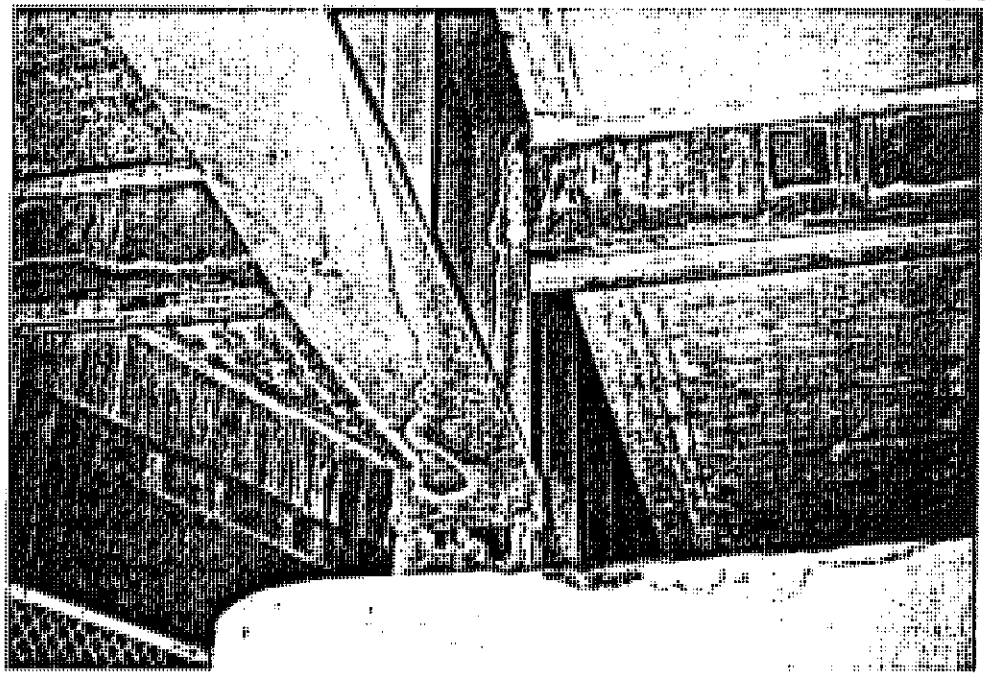


Figure 4. Leaking expansion joint - affected area.



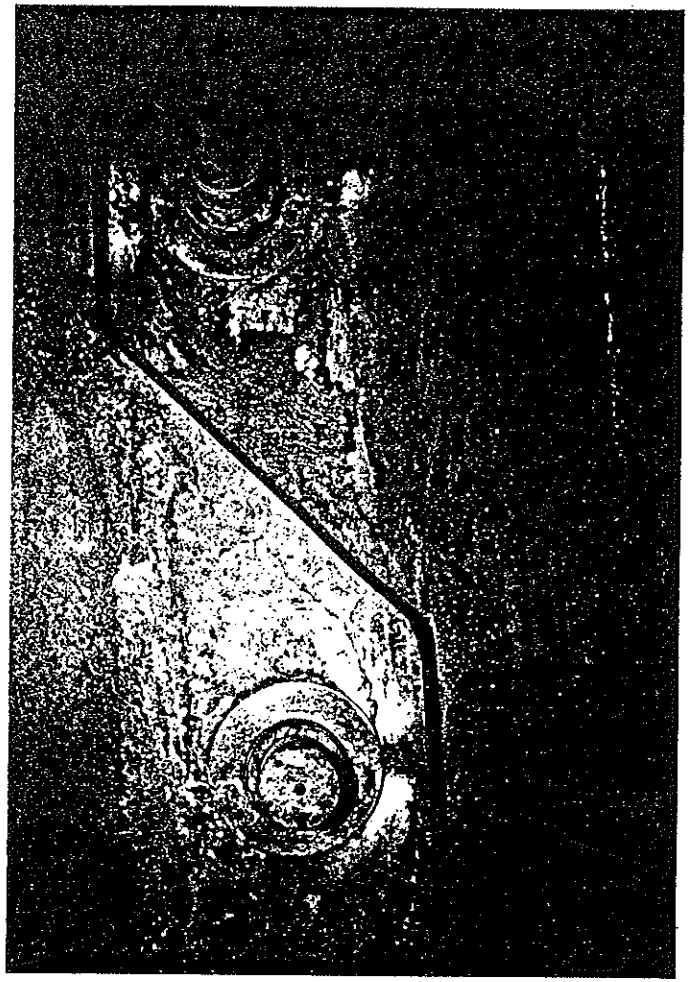


Figure 5. Weathered cantilevered expansion joint - disassembled.

2) Exposure to intermittent cycles of wetting and drying without prolonged wetting, and

3) Washing of (boldly exposed) surfaces by rainwater.

For almost all areas of a bridge these conditions seldom hold — the lower 'outside' portion of fascia beams being the only candidate, and then only when not exposed to vehicle spray containing deicing salt.

Thus, it appeared that the ideal protection that could, under ideal conditions, be afforded by weathering steels could not be counted on in typical highway exposures. The obvious visual differences that were found to occur for different types of exposure implied that some environments were worse than others and that these visual differences could be used to help pinpoint areas where corrosion damage was more likely to be serious. Such observations, as well as a general knowledge of factors that can further accelerate corrosion, helped to establish some of the potentially more serious corrosion problems.

A closer look at the leaking expansion joints revealed a situation even worse than originally anticipated. The porous nature of the corrosion products in many instances created a 'capillarity' that served to greatly increase the area affected by pavement runoff water (Fig. 4). This same 'porosity' was no doubt also aiding the retention of moisture making these areas more vulnerable to continuing corrosion for longer periods of time.

For expansion joints at the ends of cantilever spans, the crevice concentration cell corrosion and dissimilar (galvanic potential corrosion) metal contact (bronze-steel) produced by the pin-plate-washer-web interface interacted to effectively create an especially corrosive environment (Fig. 5). In addition to the accelerated corrosion that can occur in and around joints and crevices and adjacent dissimilar metals, the thick rust scales in some instances created problems of their own. The rust products in some cases gradually filled the space between the web and link plate and eventually packed tightly enough to lock the joint in place. The resulting headwall damage in one instance necessitated replacement of the locked joints (Fig. 6). (Anticipating the possibility of similar incidences in the future, the Department has developed a standard retrofit procedure for such joints.)

For those structures over heavily traveled routes, the vehicle-thrown spray of water and winter deicing salts created a situation similar to the leaking expansion joints. While these surfaces, in general, did not visually appear nearly as bad (Fig. 7), the potentially affected area was considerably larger—the entire portion of the structure directly above traffic lanes and for some distance to either side. Primarily the web and lower flange appeared to be affected (Fig. 3). Capillarity effects appeared to be operating here also as the lower web was found to be more severely corroded to a height of 3 to 8 in. above the lower flange. This portion of the lower web and the lower flange appeared (for a sand blasted surface) very similar in appearance. The accumulated vehicle-thrown debris

and loose rust was undoubtedly contributing to more severe corrosion problems on the lower portion of the beams. At the very least, such debris would help retain moisture over a longer duration than would otherwise occur—thereby extending the period of time over which corrosion could take place. In addition, some of the debris could possibly contribute to a crevice (concentration cell) type of accelerated corrosion by reducing oxygen levels or increasing metal ion levels under some areas of debris.

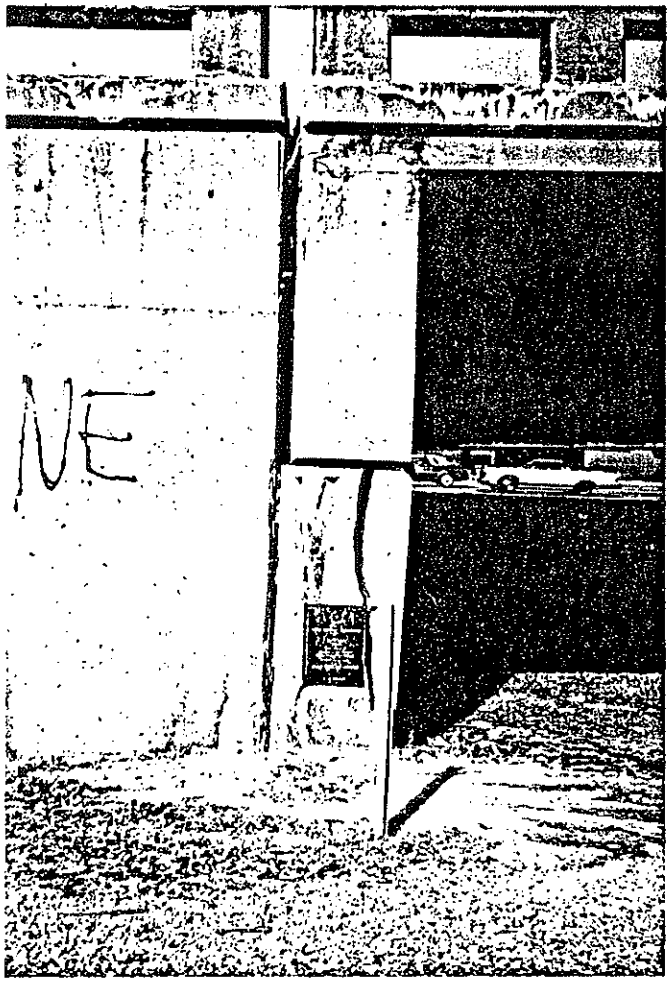
The lapped surfaces created by bolted splice joints, diaphragm connections, and bearing contact surfaces might also result in crevice (concentration cell) corrosion that can accelerate corrosion in and around joint areas. The extent and location of any corrosion damage (interior or exterior to the joint) is normally dependent upon the exposure conditions of a particular joint. When salt is present corrosion damage is normally exterior to the joint (metal ion concentration cell) and occurs between the lapped surfaces for most other exposures (oxygen concentration cell). A visual inspection of a number of these joints did not reveal any readily apparent corrosion above and beyond that occurring on adjacent surfaces. Corrosion within the joints, of course, could not be visually assessed. Past experience with such faying surfaces on painted steel structures suggests that these areas should continue to be viewed with suspicion on unpainted structures (Fig. 8).

Dissimilar metals when placed adjacent to one another can result in what is known as galvanic corrosion, a reaction where one of the metals corrodes faster than it otherwise would have without the presence of the other metal while the 'other metal' does not corrode as fast. For Michigan's highway bridges dissimilar metal contacts are present in cantilevered expansion joints (bronze washers), bearing plates (lead), and fastener connections (galvanizing-zinc). For both the bronze washer and the lead bearing plate contacts, it is the steel which becomes 'sacrificial' and, consequently, can be expected to corrode slightly faster.

A similar situation can develop for welds where composition differences between the weld metal and adjacent base metal can produce galvanic corrosion. If the compositions are similar enough no accelerated corrosion will occur for either region. When significant differences do exist either the weld metal or the base metal might be sacrificial depending on how the compositions vary. When the weld metal is sacrificial the situation can be particularly serious as the magnitude of the galvanic corrosion reaction increases as the amount of non-sacrificial metal present increases with respect to that of the sacrificial metal. Welds (after cooling) are also subject to high residual stresses which can also accelerate corrosion (Fig. 9). The special corrosion problems of bare (unpainted) welds represent an especially important subject that is being covered much more thoroughly as part of another research project within the Department. The results of this work will be reported separately.

Some concern was created over the mill scale that had been left on the vast majority of our weathering steel structures when it was discovered that the underlying base metal was galvanically sacrificial. As

Figure 6. Bridge - headwall separation resulting from rust frozen/ locked cantilevered expansion joint.



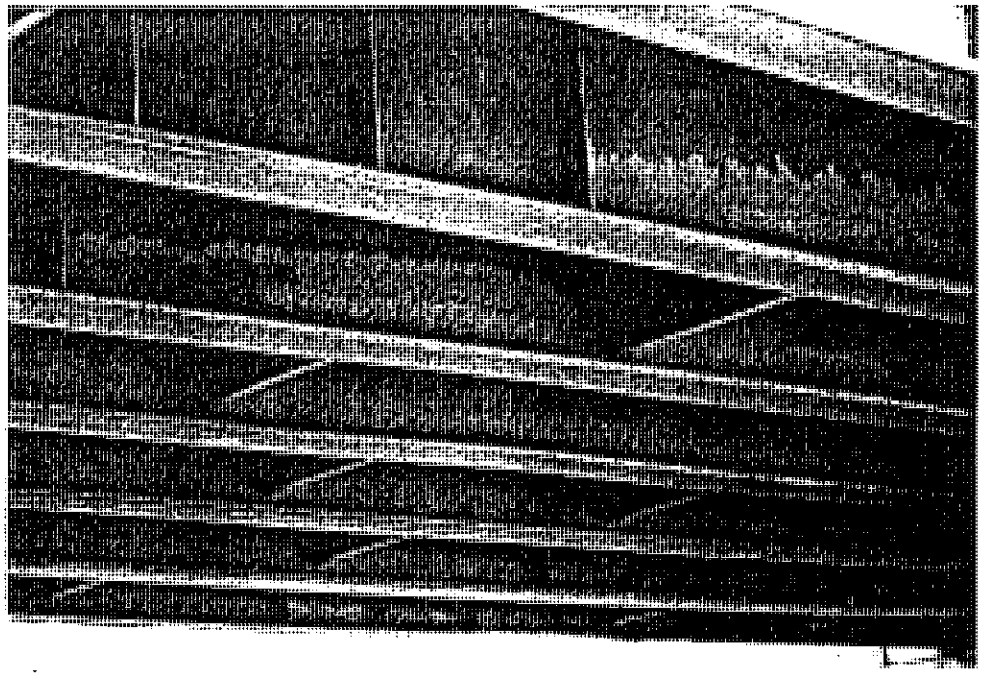
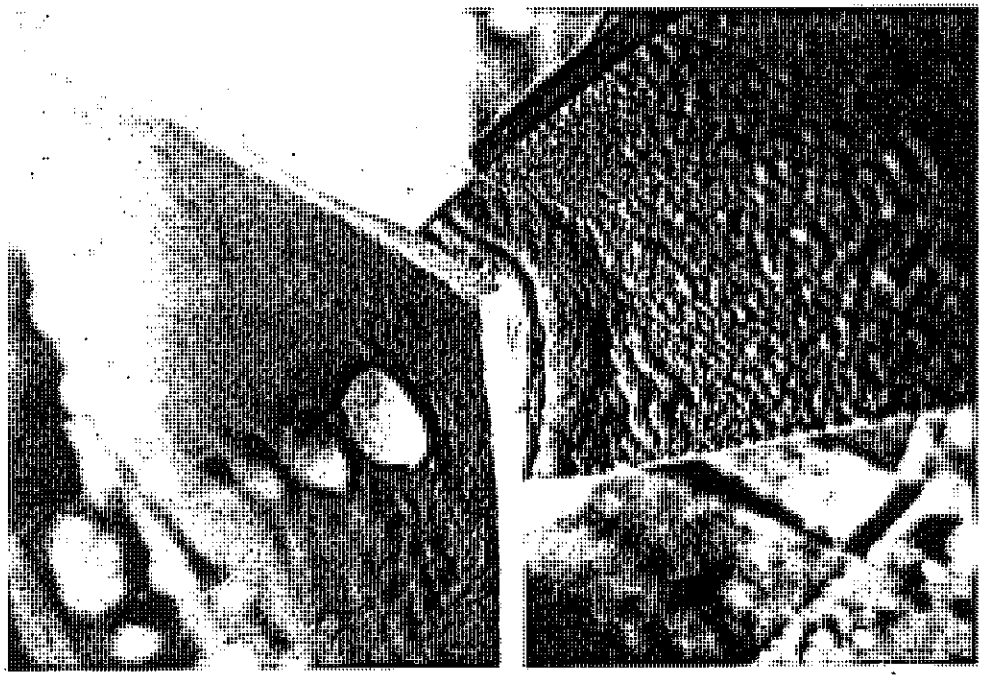


Figure 7. Traffic spray affected area (7 years exposure).

Figure 8. Painted lapped (cross-frame to gusset) joint (salted environment) with severe corrosion exterior to the lap (age not known).



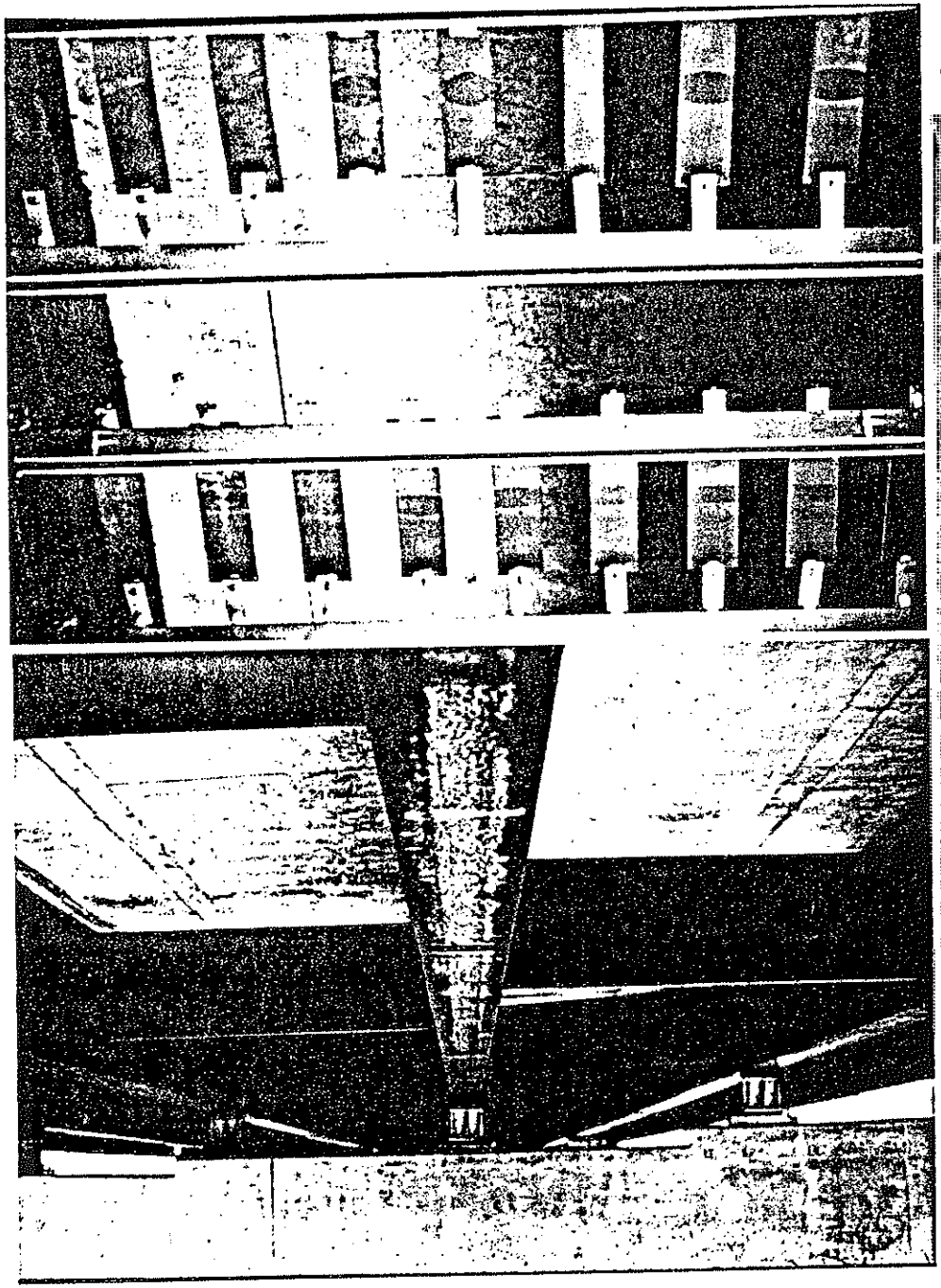


Figure 9. Preferential corrosion of welds (salted environment).

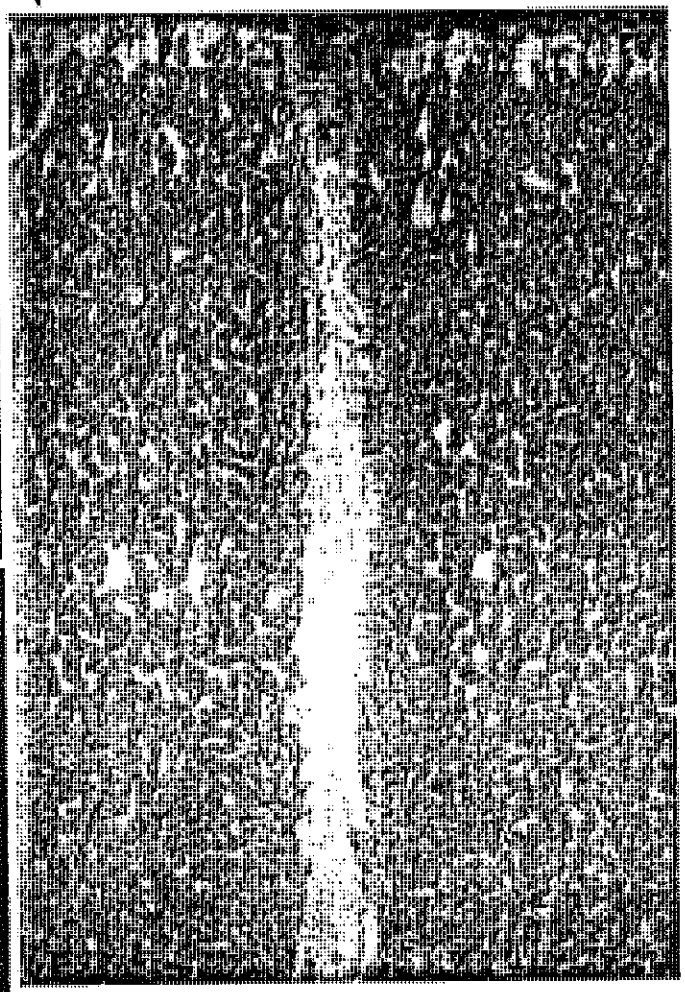


Figure 10. Mill scale accelerated pitting.

Figure 11. Transverse exposures of bare metal surrounded by mill scale.

perforations developed in the mill scale, considerably deeper pits (Fig. 10) could form in these areas as well as for the occasional transverse 'bare spots' (Fig. 11) which were observed. Even if the accelerated corrosion occurring in these bare spots did not proceed to structurally serious depths during the life of the mill scale (usually 3 to 10 years--rust undercutting removes most of the mill scale during this period at a rate proportional to the corrosive nature of the particular environment), these pitted areas might have suffered sufficient corrosive losses to effectively act as fatigue notches thereby reducing the fatigue strength or fatigue life of a structure or both.

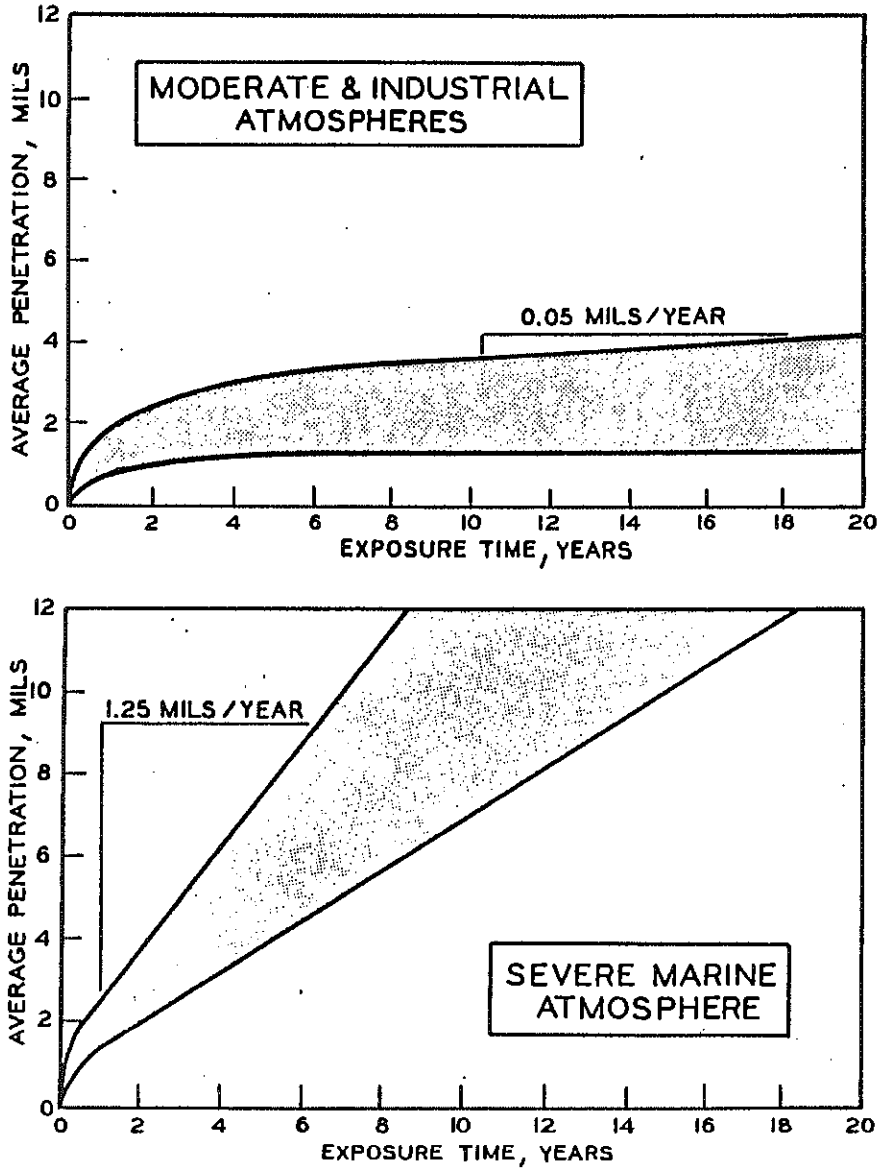
The combined effect of the visual observations of apparent problem areas combined with the existing knowledge of other possible accelerated corrosion problems proved overwhelmingly convincing. On May 2, 1979 the Department enacted a partial moratorium on the use of weathering steels for the most aggressively corrosive environments. On February 6, 1980 the moratorium was extended to include all uses of unpainted weathering steels in the state.

The Remaining Problem

While some of the observed problem areas such as the leaking expansion joints were readily agreed upon by all, other areas were less definite and open to debate. While some obvious rusting was occurring for these other exposures, the variability of the amount of rust that can be produced from a given amount of steel (2 to 14 mils of rust from 1 mil of steel--depending on the type of oxide formed and how tightly it is packed) makes this an uncertain yardstick, at best, for determining how much corrosion damage (metal loss) has taken place. Consequently, while some observers thought that a certain area might be in serious trouble others remained unconcerned.

Some knowledge did exist about the corrosion loss performance of weathering steels for several types of exposure (Fig. 12), but a great deal of uncertainty still remained about how Michigan's bridges were performing in Michigan's typical highway exposures. For even the mildest highway environments, the ideal patina did not appear to be forming—suggesting that worse than ideal corrosion losses might be occurring. While for leaking expansion joints where the thick, loosely adhering rust scales aided in moisture and salt retention, the corrosion losses might approach those for "any steel submerged in salt water" and perhaps worse. The possible performance of cases intermediate to the two greatest extremes covers a very broad range (Fig. 13).

While the qualitative observations had pointed out some definite problem areas, they had also raised questions that demanded more exacting answers than visual observation alone could provide. If the weathering steels were failing to provide optimum protection, what was the exact extent of this failure? Was the failure the same for all highway exposure



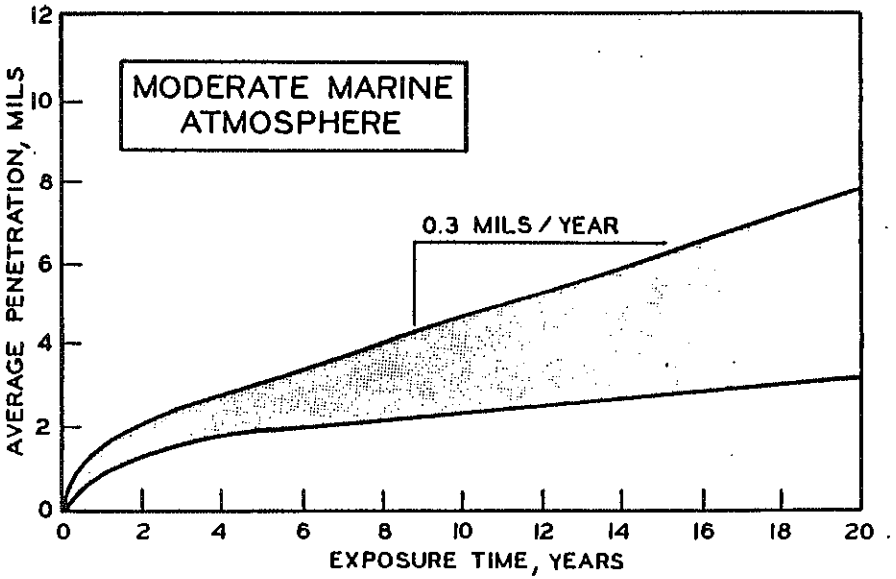


Figure 12. Corrosion of weathering steels in moderate and industrial atmospheres, moderate marine atmosphere, and severe marine atmosphere (after R. B. Madison).

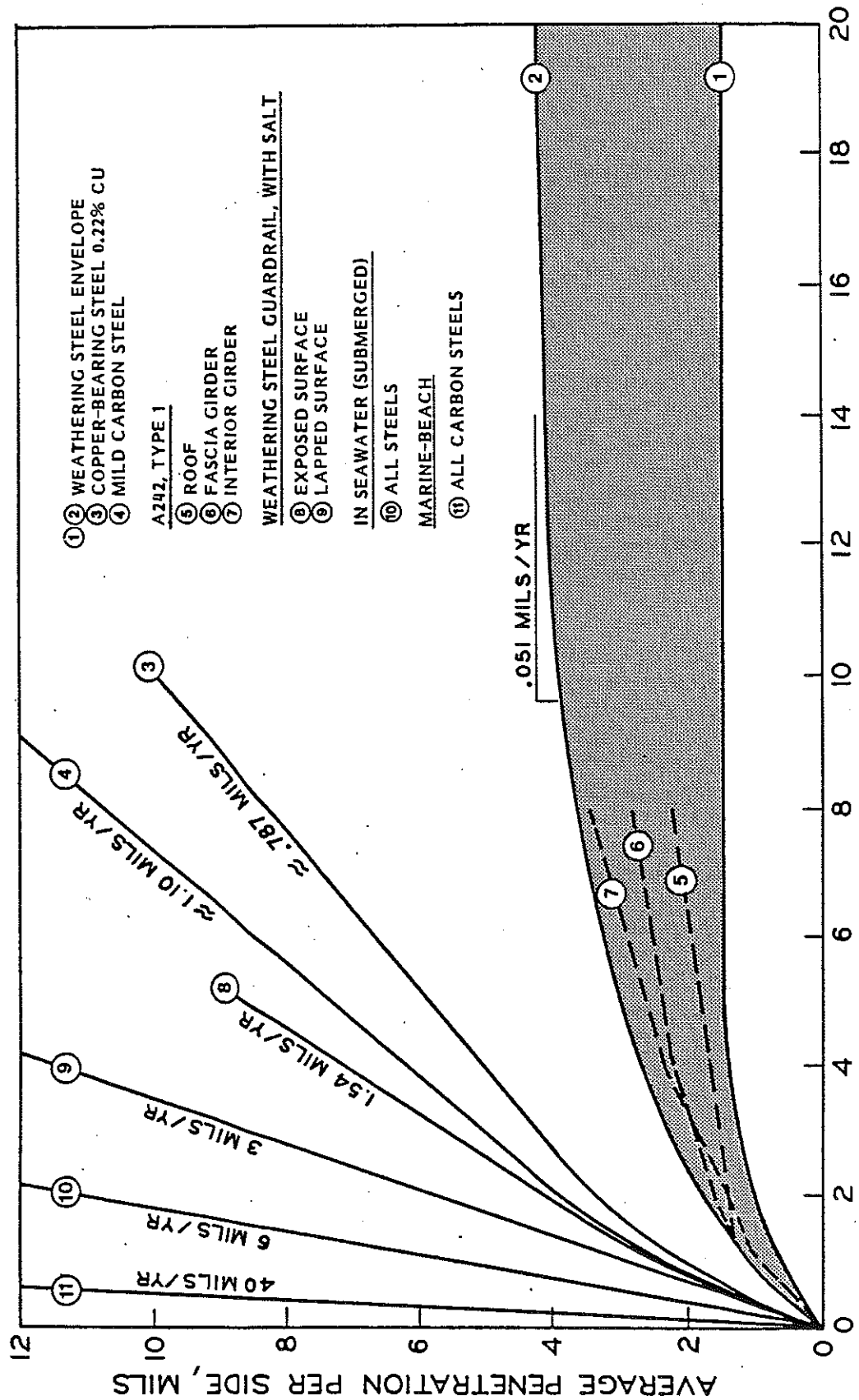


Figure 13. Corrosion rate of weathering steel as compared with copper-bearing and mild carbon steels (after P. Albrecht, etal).

environments or were some environments better than others? Were certain areas of a bridge or portions of a beam suffering more from this failure? If measurable corrosion losses were occurring, were these losses proceeding at a constant rate or were they changing, decreasing or increasing, with time? If corrosion losses were to continue unabated at rates consistent with past performance, what would the implications be for the eventual structural integrity of a bridge after 25, 50, 75, or 100 years of "weathering?" A fairly intensive survey would be necessary to resolve these essential, but as yet unanswered questions.

The Solution — Quantitative Measurement and Statistical Analysis

A quantitative survey was undertaken with the intention of establishing actual corrosion losses that were occurring for conspicuous problem areas and for the various Michigan highway exposure environments in general. Since original starting sizes were not known exactly, corrosion losses could not be measured or calculated directly, but could be inferred from thickness measurements. For localized severe problem areas comparisons could be made between the problem area and the adjacent area that was weathering more normally to determine a relative difference in corrosion losses. Establishing meaningful and accurate corrosion losses for different highway environments proved to be a more difficult, although not impossible task.

Although the nominal sizes of structural members were known, the allowed manufacturing tolerances were large compared to the corrosion losses that were expected to occur. Thus recorded thickness measurements might be well over nominal after many years of weathering or under nominal before any weathering occurs. Hence individual measurements, by themselves, were meaningless. As more data were accumulated, however, some meaningful inferences could be made.

Since during the era of our weathering steel bridges (1965 to the present) the size tolerances and the manufacturing procedures for rolled beams and flat plates do not appear to have changed appreciably, one would expect approximately the same distribution of starting thicknesses (around nominal) to have existed for all bridges constructed during this period. If, then, a random sampling of bridges produced data that varied noticeably with age, this difference (within statistical limits, of course) should be representative of changes that have occurred after these bridges were built (i.e., weathering). If differences exist in the 'weathering' produced for different environments, data from bridges at these different exposures should then show this variation. Standard means exist for analyzing such data to determine what magnitude of a relationship (i.e. corrosion losses vs. exposure age) if any exists, the limits of accuracy of this relationship, and the probability that this relationship is more than just a chance occurrence. With sufficient data, a regression (least squares) analysis could be performed and statistical parameters calculated to accurately estimate the upper and lower rate limits of any corrosion losses occurring.

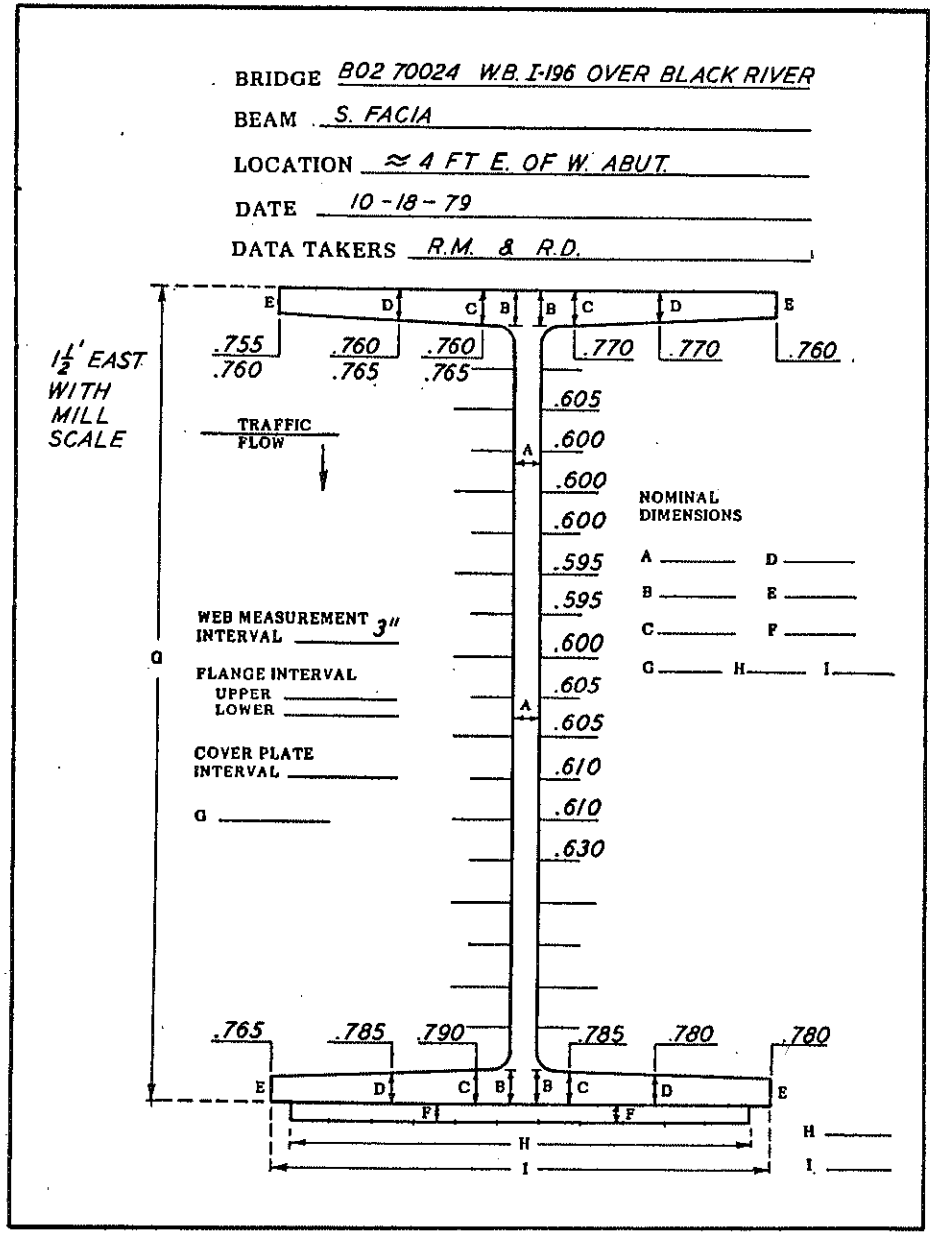
In just such a manner corrosion loss performance relationships were examined for Michigan's major highway exposure environments. Definite differences were found to exist (Figs. 19 and 20). The resulting differences among these relationships allow for the prediction of the possible future sizes and properties of bridge beams for Michigan's representative highway environments (Results Section, Tables 1 through 4).

Apart from the obvious value of this information in predicting the strength vs. age of a weathering bridge, there are other possible advantages. To the extent that the differences found between the various environments are a reflection of differences in the corrosive nature of an environment, a predictive method is provided for the relative ranking of corrosion damage (vs. environment) that may occur for special problem areas also (i.e., splice plate connections, expansion joints, welds, etc.) To the extent that corrosion related losses of fatigue strength and fatigue life are the result of loss of section (and hence increase in stress level for the same forces), possible future fatigue performance may be estimated.

PROCEDURE

In an effort to assess the condition of Michigan's unpainted weathering steel bridges, beam thickness measurements have been gathered from 52 bridges scattered over 16 counties in lower Michigan. An attempt has been made to select bridges in such a manner that rural and urban environments are represented equally and that both environments are approximately evenly distributed as to age. Measurements have been made on bridges ranging in exposure age from 3 months to 15 years, but the majority of our measurements were made on the 95 percent of our bridges with less than eight years' exposure. The prohibitive extra expense of traffic control prevented measurements on structures over roadways from being made directly over traffic lanes. Urban A588 bridges were first constructed in Michigan in 1965, although only a few bridges were built before 1969. Construction of rural A588 bridges began in 1972.

A primary aim has been to determine the difference in the performance of unpainted A588 steel with respect to environment and age. Of special interest was determining which portions, if any, of a beam and which portions of a bridge, corrode at a faster rate; and relating any differences to possible contributing factors. Special attention has been given to the obviously corrosive areas (i.e., leaking expansion joints and traffic spray susceptible exposures) as well as to suspected areas (i.e., bolt splices and other lap joints, debris accumulation, galvanic contact corrosion, and unpainted welds) and to the 'average' exposure case for all of Michigan's different exposure environments. With this knowledge, predictions could be made of future beam properties for the various relevant differences in exposure environment thereby helping to pinpoint and prioritize any necessary future remedial action.



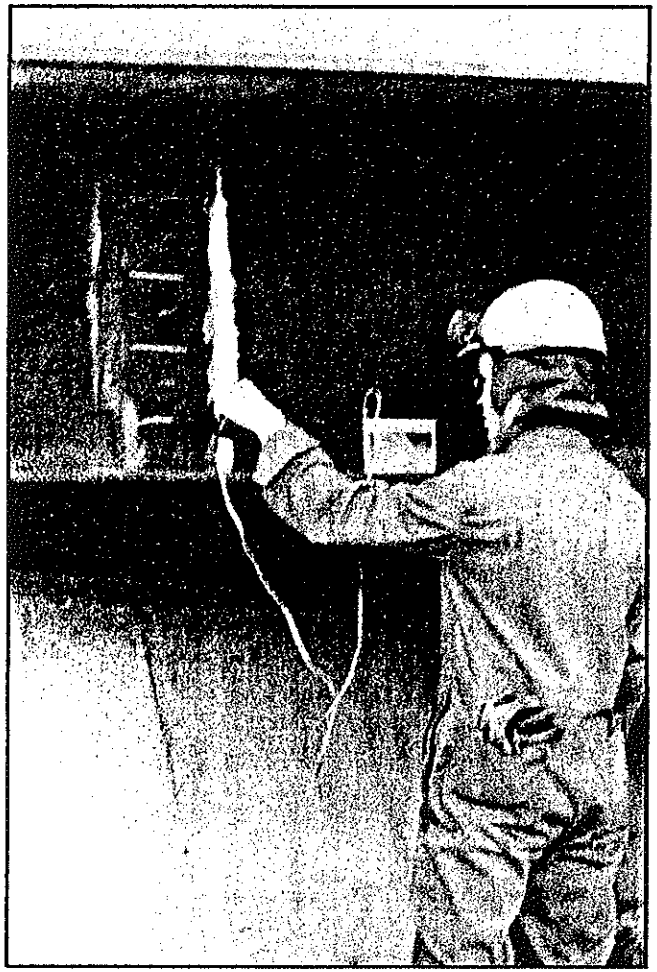


Figure 14. Corrosion loss measurement being taken on a typical rural structure. At left is a typical data sheet for beam cross-sectional measurements.

Measurements have been made with an ultrasonic thickness gage accurate to approximately ±2.5 mils. At least three points were read for each flange 'quadrant'; and readings on the web were taken at regular intervals with the size of the interval dependent upon the smoothness of the web surface (Fig. 14). The rust scale normally present necessitated some surface preparation to ensure accurate measurements. Surface sanding was normally performed until bare metal was exposed on the highest points of the rusted surface, leaving any depressions filled with dense oxide. Without this preparation much of the oxide on the probe side of the surface would have been included in the thickness measurement. The ultrasonic probe was then moved around in the general area until the smallest reading was obtained. The resulting peak-to-valley thickness measurement (Fig. 15) has been found to represent a good approximation to the average thickness (based on our laboratory testing of rusted tensile specimens). Examination of field measurements, however, suggests

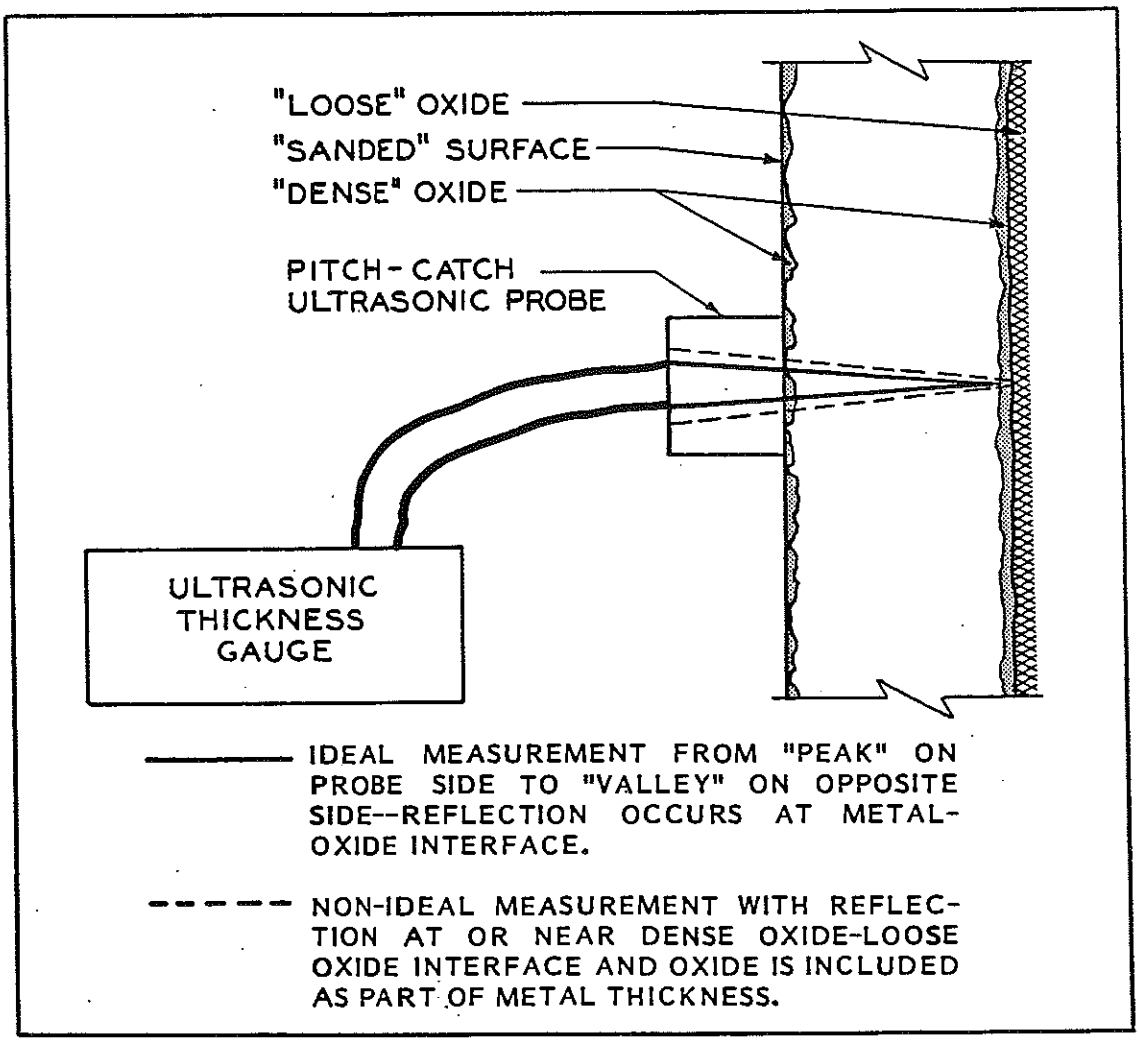


Figure 15. "Peak-to-Valley" ultrasonic thickness measurement.

that at least in some cases the ultrasonic signal may be penetrating some portion of the oxide layer of the opposite side, further complicating accurate measurement. For these particular instances, measurements might be slightly non-conservative in that they would indicate more metal remaining than there actually is.

Over 70 partial beam section measurements were made in an attempt to evaluate and quantify some of the known and suspected heavy corrosion areas. Comparison measurements were made for both the heavily corroding areas and for more normally corroding adjacent areas. These measurements were made almost exclusively on welded plate girders, where the original surfaces are in general more uniform than for wide flange beams.

To help assess differences due to different exposure environments an additional 302 complete beam sections have been measured, 120 beams from 25 rural bridges and 182 beams from 27 urban bridges. Of those beams where the complete cross-section has been measured, 181 are rolled wide flange beams and 121 are welded plate girders. The total cross-sectional area of a wide flange beam as produced, is required by specification to be within ±2.5 percent of nominal. While this tolerance is well maintained, individual flange quadrant thickness and web thickness can vary considerably—individual flange quadrant thicknesses often varying as much as 40 to 80 mils. The welded plate girder on the other hand has its cross-sectional area limited by the tolerance of the individual plates which may be up to 10 mils below nominal thickness or up to 4 to 10 percent (upper limit dependent on plate dimensions) more than nominal thickness. Lacking exact data on the initial (new) sizes poses some obvious problems. Since the initial sizes may vary by more than the corrosion losses expected to occur during the first few years of exposure, a fairly large number of data cases must be examined before measured corrosion losses approach statistical significance. The narrower starting size tolerance band of the wide flange beam makes it more ideal for measuring whole beam cross-section corrosion losses; while the uniformity of a rolled plate makes the welded plate girder more ideal for measuring differences in the relative corrosion of portions of an individual beam cross-section.

Repeat measurements of corrosion loss have been taken on some structures after two to four years of additional exposure to help determine how corrosion rates may vary with age for different environments. Such readings cannot be made in exactly the same spot each time since the first measurement has disturbed the first location and may possibly influence its future performance (rust and debris removal for UTG reading leaves a surface that will probably start rusting again at close to its initial rate, if differences with time do exist). Such repeat readings are made at locations just slightly removed from the first readings. While rolling differences do exist from one spot to another on a given beam they are considerably smaller than the initial starting size tolerances. So even though a statistical analysis is required of these data as well, a considerably smaller number of cases must be examined before statistically significant results are produced.

Beam thickness measurements were converted by means of a computer program (Appendix A) to total cross-sectional area (CSA), moment of inertia (Ixx and Iyy), section modulus (Sxx and Syy), etc. Comparison with the nominal beam of the same size allowed the calculation of such parameters as the average corrosion penetration, percent loss of area, and percent loss of Ixx and Iyy which is identical to the percent loss of Sxx and Syy, respectively. To aid in determining differences which might exist in the corrosion rates of different portions of a beam cross-section, percent loss of area was also calculated for each flange quadrant, the web, and the top, middle and bottom thirds of the web. While the beam cross-sectional area has become the basic unit of data for comparison purposes examination of smaller portions of the beam has revealed some important relationships that would have been obscured for the whole beam.

For those bridges exposed to traffic spray, the major corrosion appears to be taking place after the traffic exposure and hence the age of such a structure measured from this first exposure to traffic appears to be a more relevant basis for analysis and data extrapolation. For structures not exposed to traffic spray the data are analyzed with respect to their age since first exposure to the bridge site environment.

RESULTS

In some cases visual observation alone was sufficient to pinpoint problem corrosion areas, although thickness measurements were needed to better quantify the seriousness of the problem. In some instances comparison measurements between the suspected problem areas and adjacent more "normally" weathering areas of a beam were all that was required. In other instances statistical analysis of measurements from many beams were required.

Leaking Expansion Joints

The most obvious corrosion problem and one of the more serious found so far is related to leaking expansion joints, especially in urban areas, but occasionally in rural areas as well. Figure 16 illustrates a generalized representative (worst case) leaky joint showing the extent and levels of corrosion damage verified by actual measurement. In general, the areas of worst corrosion occur directly under the leaking joint with the most severe corrosion taking place behind the link plates at the ends of cantilever spans (Fig. 17) and for the lower flange and some inches up the web.

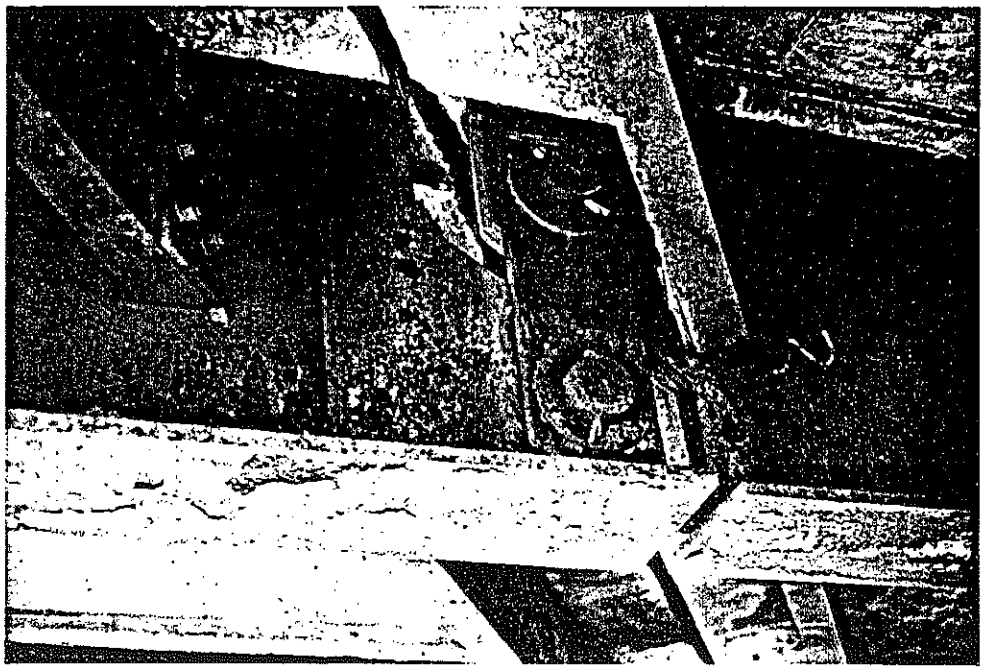
As can be seen from this figure, the worst areas on this 14 year old structure have average corrosion rates approaching 3 mils/year/surface. It should probably be stressed that these are the extreme cases. Other joints on even the same structure might be weathering no faster than the remainder of the structure, or they might be anywhere in between these two extremes. Physical appearance alone was not always a good indicator of the amount of corrosion taking place. While other bridges

with a similar distressed appearance around leaking expansion joints did not always measure up to these extreme corrosion rates, at least several other structures were found to have similar areas at expansion joints matching the 3 mils/year/surface corrosion rate (including one eight year old rural structure). In general these severe corrosion rates appeared (for both urban and rural structures) to be associated with leaking expansion joints that were located towards the lower end of fairly long sections of inclined bridge deck, where leakage would be greater and salt exposure more frequent.

For expansion joints in cantilevered spans both the link plate and web behind it are probably being subjected to approximately the same single surface corrosion rates where they lap. The most severe corrosion losses, which were found around the pin connections (combined effect of crevice corrosion and galvanic corrosion induced by the web-pin-bronze washer-link plate - nut contacts), were measured for a number of link plates that had been removed and replaced. (Such a replacement procedure was found to be necessary for several structures in Michigan after pack rust filling the joints eventually locked some expansion joints in place with structural damage resulting (Fig. 6)). Here the worst through thickness average corrosion approached just over 3.5 mils/year/surface, but most of the corrosion (in the worst cases) was obviously occurring on the inner (next to the web) surface of the plates. This indicated that a considerably higher rate (up to 5 to 6 mils/year) was apparently occurring for the worst areas on the inner surface. While actual measurements were not made on the web between the link plates, some reasonable inferences can be made. If the same worst corrosion rates that occur for the link plates are also present on the web sandwiched between them, then through thickness average corrosion losses may for the worst cases approach 5 to 6 mils/year/surface—since the worst areas on one side of the web will, in general, overlap with the worst areas on the opposite side. Outside of the worst areas, "average" corrosion is usually not worse than 1 to 2 mils/year/surface but within the worst areas up to approximately 1/4 in. diameter pits have been observed. Such a pit depth corresponds to a pitting rate of 16.5 mils/year/surface. While an occasional pit of these dimensions may not be immediately structurally serious, the possible long term reductions in fatigue life or strength might very well be.

For the remainder of the beam (exposed to leakage), the worst corrosion occurs for the lower web and flange with the very worst corrosion (3 to 4 mils/year/surface) occurring directly underneath the leaking joint. The corrosion rates observed were found to decrease as the distance from this worst area was increased—either by moving up the web or moving longitudinally along the lower flange. Additionally, for those instances where leakage was found to extend for greater distances along the lower flange, corrosion rates were normally found to be lower for a given distance from the joint.

For the worst cases, however, the 3 mils/year/surface average corrosion rate may be an underestimate of future trends. A number of factors contribute to one's suspicion that the corrosion rate may be increasing



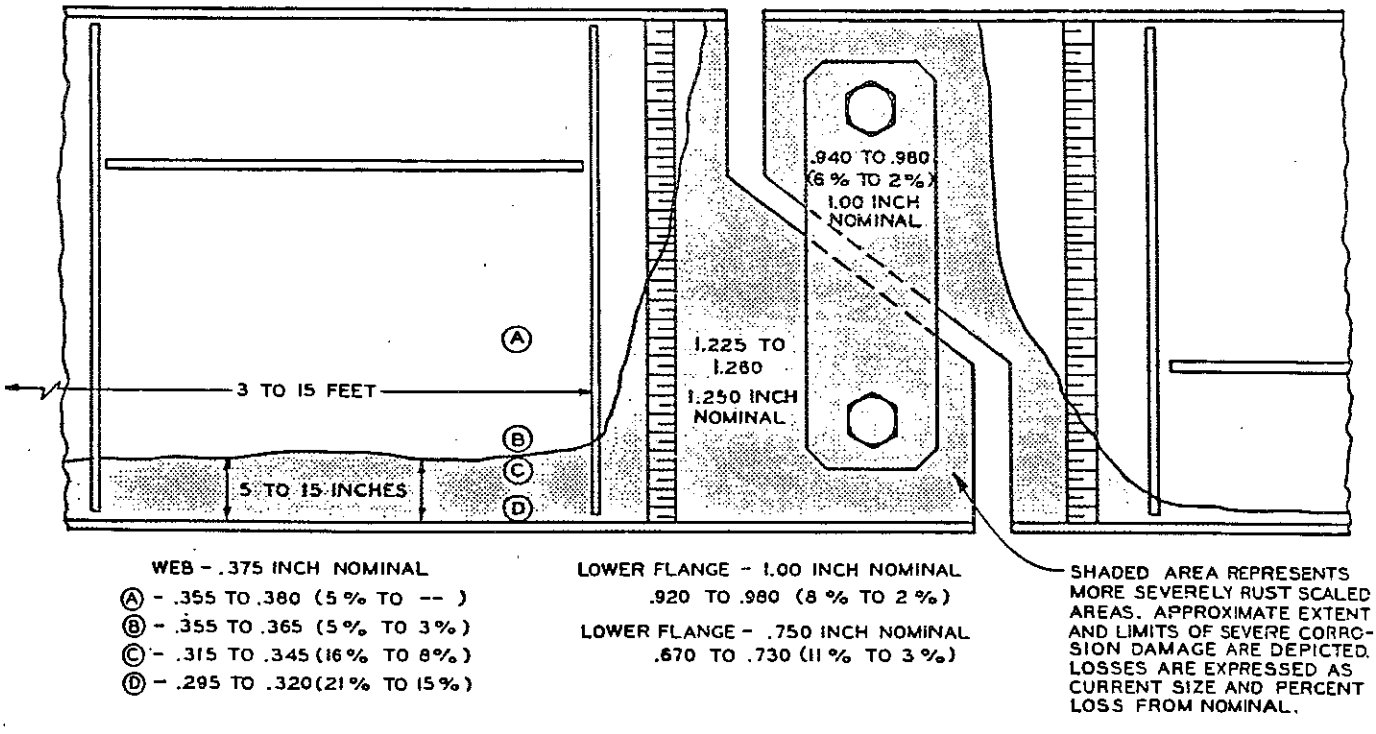


Figure 16. A representative leaking expansion joint.

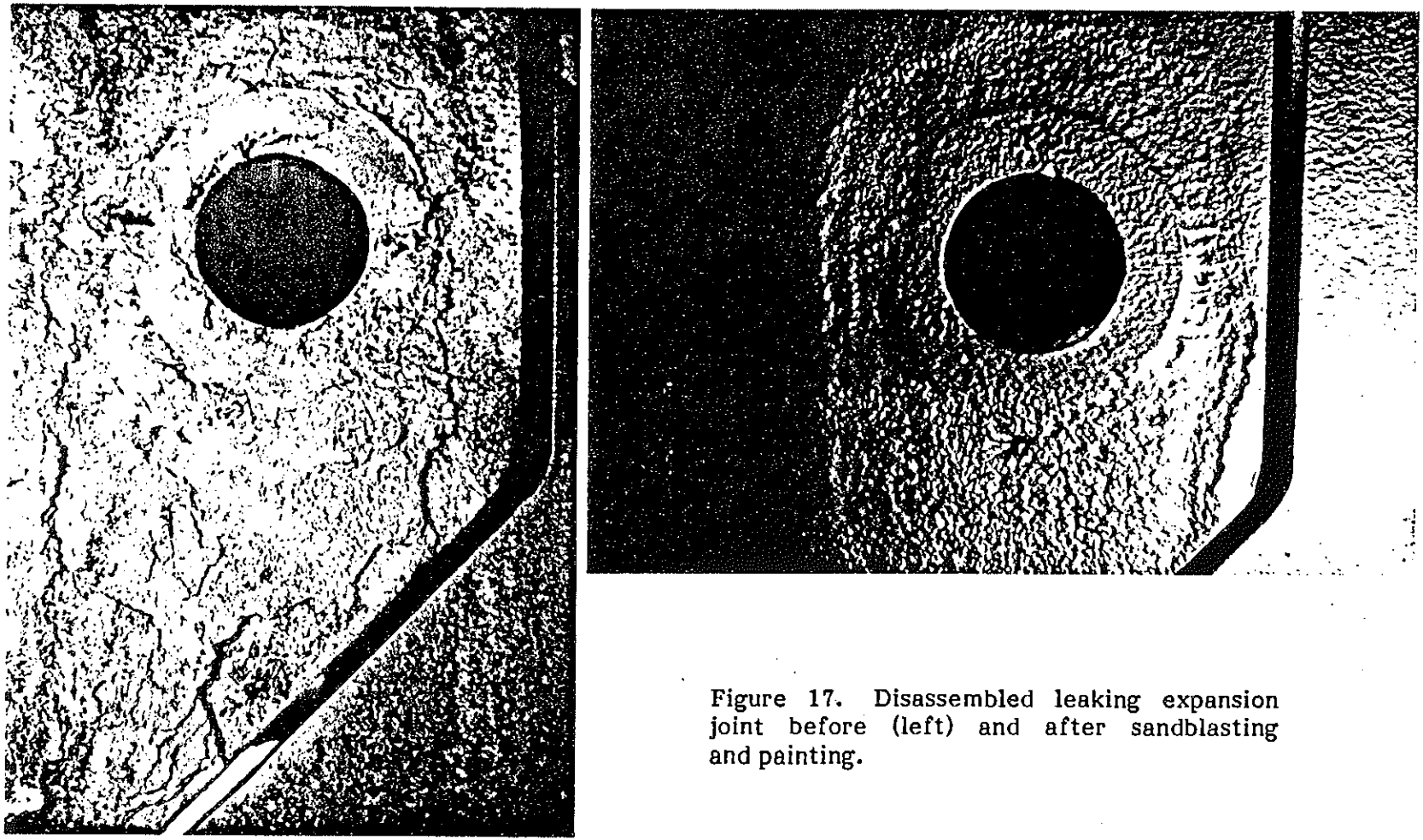


Figure 17. Disassembled leaking expansion joint before (left) and after sandblasting and painting.

with time. Simply viewed from the fact that corrosion is a surface-dependent phenomenon, as the pitting increases the surface area available, corrosion could be expected to increase. As corrosion continues to build up loose and porous corrosion products which aid in the retention of moisture and corrosive pollutants, corrosion could be expected to increase. Additionally, even the worst joints did not necessarily start leaking immediately after the structure was first built--implying that even if the corrosion is linear with time, perhaps the corrosion losses should have been averaged over a correspondingly reduced period of time. Attempts to either confirm or refute such an accelerated corrosion rate were thwarted by maintenance painting of the leaky joint areas on which our initial corrosion loss measurements were made.

Some recent evidence from repeat corrosion loss measurements on structures freely exposed to traffic-thrown spray (an exposure environment very similar to at least some portions of the leaking expansion joints) are suggestive (although not yet statistically significant) that under some circumstances corrosion of even salted weathering steel may decrease with time. If this does indeed happen, it would probably only be true for the freely exposed portions of the joint and not for the lapped surfaces. The high corrosion rates that have so far been found to occur in some of our leaking expansion joints stress the need for some further evaluation of these areas to determine whether or not an already serious problem is becoming more serious or stabilizing.

Other Lapped Surfaces

A number of other lapped areas on bridges were expected to show some serious corrosion potential as well and have been examined accordingly. Areas such as bolted splice connections and bearing contact surfaces as well as the areas where the beam ends are embedded in the abutment could be problem areas. Older exposures of painted bridges have sometimes demonstrated significant corrosion (1/3 to 2/3 section loss, Fig. 8) for just these types of lapped surface conditions. Repeated examinations of a number of examples of these exposure types have not revealed corrosion problems of a magnitude detectable by our ultrasonic thickness gage. Either these areas are being examined too early in their life cycles to find anything, or the particular exposure instances examined were not of a really critical nature, or possibly some other factors must be taken into consideration here.

Accelerated corrosion for lapped surfaces can occur either between the surfaces or exterior to them depending upon the conditions present. For moist salty environments the worst corrosion is normally exterior to the joint. For unpainted structures the larger reactive surface area exterior to the joint may partially explain why we have not discovered serious corrosion in these areas. The corrosive potential generated by the lapped surfaces is possibly being dissipated over a much larger area so that even though the same total amount of accelerated corrosion may be occurring the effective section loss is negligible.

For other environments the worst accelerated corrosion normally occurs between the lapped surfaces. While our measurements did not indicate any significant corrosion occurring between such lapped surfaces (for the cases examined), problems encountered with our ultrasonic thickness gage measuring back side rust make our results uncertain. Others who have studied internal joint corrosion indicate that this type of accelerated corrosion can continue essentially unabated as long as the structure of the lap cannot resist (without deformation) the internal forces generated by the rust growth. It is for precisely this reason that high strength bolted joints are often impervious to such corrosion. Obviously the strength, size, and spacing of the bolts, as well as the thickness of the plates have a significant effect here. Some sources indicate that the rust-generated forces can be at least 1,200 psi, and possibly greater. Continued observation of such areas would be a reasonable and desirable precaution to insure that significant corrosion does not go unnoticed.

Galvanic Couples

For those galvanic (dissimilar metal) couples where the steel is sacrificial, there will probably not be any serious corrosion. The non-ideal porous nature of the rust surfaces that are prevalent will help retain moisture over large surface areas keeping the effective sacrificial area large enough that through thickness corrosion losses for any one spot will be low. Exceptions to this will occur for situations where moisture around the galvanic couple is somehow restricted to much smaller areas—as occurs behind the link plates of expansion joints in cantilevered spans.

This same moisture retention could present serious problems when it is the other material of the couple that is sacrificial for now it is the larger area that is promoting the corrosion reaction (on a much smaller sacrificial area). Such would be the case if welds exist that are sacrificial (especially serious for welds perpendicular to the applied stress field).

While a number of transverse butt welds were examined and measured for thickness and some did come out 15-25 mils thinner (corresponding to a 0.6 to 1.0 mils/year/surface difference) than the adjacent beam material, the results were uncertain since the initial surface grinding of such welds can produce the same magnitude of surface differences. In general, the surface appearance, for those cases examined, did not reveal noticeable differences in corrosion between the weld and base metals. This does not, however, guarantee that there are not welds that are experiencing more serious corrosion losses. Since only one of a few grades of A588 wire generally is used to weld many grades of A588 plate, and since unalloyed wire generally has been used for fillet welds, many possible combinations exist. While there has not been time to adequately address this factor in the present study, it appears to be worthy of further investigation, based on the limited information presently available.

Mill Scale

Pitting depths obstensibly resulting from the effects of mill scale were examined for several structures that still retained approximately 90 percent of their mill scale. For those cases examined pit depths usually did not exceed 10 mils. This would correspond to pitting depths of approximately 2 to 3 mils/year/surface.

Section loss for the transverse bare spots will probably not be significant either. While initially the mill scale-steel galvanic couple will have a great corrosive potential for the steel when the ratio of mill scale surface to bare steel surface is at its highest, the corrosive environments (moist, salty) which could maximize such section losses are also those in which the mill scale will be rust undercut the fastest. Hence the corrosive couple will be acting on the smallest sacrificial areas for only a short time and will probably not be a serious problem.

While such mill scale influenced pitting may never proceed to structurally significant levels, the implications for possible loss in fatigue performance are not quite as clear.

Rolled-in Imperfections

Observation of the sand blasting and painting of one of Michigan's oldest weathering steel structures revealed a potential problem—rolled-in imperfections—which had not been previously given serious attention. Figure 18 illustrates severe pitting on the mid portion of the web of a facia beam that far exceeds corrosion levels that would normally be expected for the given exposure environment (urban exposed to traffic spray).

Figure 18. Pitting resulting from corrosion following the boundaries of a rolled-in defect.

The pitting which appears here to exceed half the web thickness (more than 0.300 in.) is apparently the result of corrosion preferentially following the pathway of impurities which have been rolled into the beam during its manufacture. In this instance the impurity was most likely mill scale from a lamination that was torn and folded back in the rolling process.

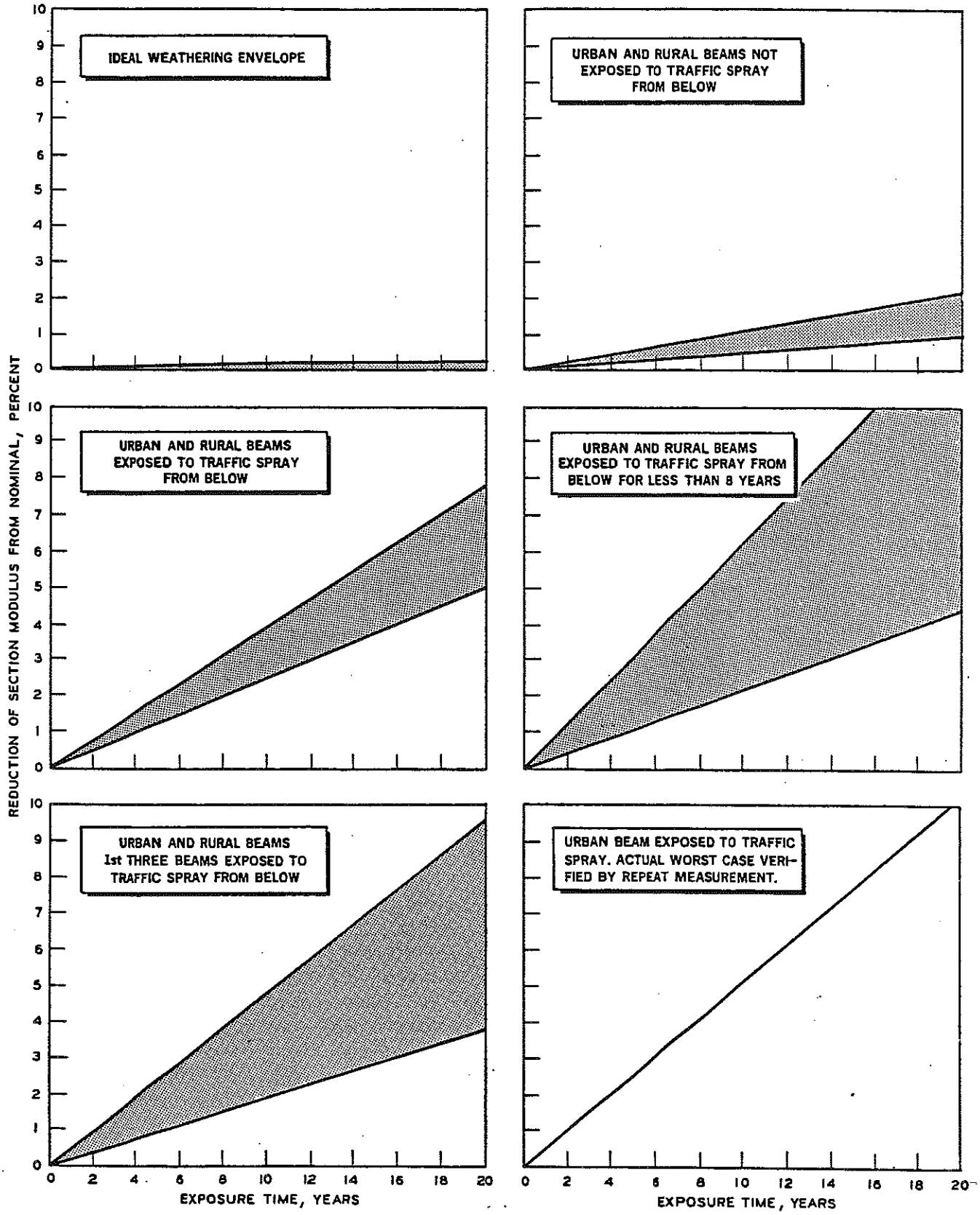
Statistical Analysis

Analysis of the bulk of our corrosion data has helped to determine the approximate general level of corrosion that is being experienced by the major portions of a bridge structure for various exposure environments and conditions (Fig. 19). This graph demonstrates the average corrosion rates that have been determined by our statistical analysis as well as worst case corrosion rates that have been found by adjacent and repeat measurements. A fairly large number of variables were included in the overall analysis to help discover which ones, if any, were significantly influencing observed corrosion. Among the variables examined were urban vs. rural exposure; tunneled, intermediate, or open exposure environment; low or high traffic volume over the bridge; traffic or no traffic under the bridge; bridge height; steel manufacturer; relative position with respect to the roadway below (near or far, readings taken directly over road shoulder or near abutment respectively); interior or fascia beam; position of beam in bridge; position of beam in bridge with respect to first exposure to oncoming traffic beneath; position of flange quadrants with respect to oncoming traffic beneath; and side of web (with respect to oncoming traffic) from which thickness measurements are taken.

The corrosion rates observed for the various environments listed in Figure 19 are translated into percent loss of section modulus in Figure 20.

Plots showing the penetration losses from nominal vs. exposure age are provided for the more significant relationships (Figs. 21 through 24). Drawn on the plots are the lines depicting the mean regression line (Penetration = A x Age + B). Above and below this mean are regression lines drawn using the upper and lower limits of the 95 percent confidence interval. The fan-like area produced demonstrates the approximate range of average penetration (from an initial value, B, which is representative of the average initial amount of over or under size of the beam), that may be expected to occur for the exposure conditions represented in the plot. The actual scatter plots and the results of the statistical analyses (linear regression) for each case are included in Figures B2 through B30 in Appendix B. Results reported are with only a few noted exceptions, significant at the 0.05 level (95 percent confidence level).

Attempts made to model a number of our statistically significant corrosion relationships with anything other than a straight line proved futile. Any changes in the corrosion rates with time that exist are probably being effectively camouflaged by the relatively great scatter (due principally to the wide tolerances in initial starting sizes) in our current CSA data.



NOTE: CALCULATIONS (EXCEPT WHERE OTHERWISE NOTED) ARE BASED ON THE STATISTICAL LIMITS (APPENDIX B) FOR CORROSION OCCURRING ON THE INDIVIDUAL SECTIONS OF A W36 x 135 BEAM SUBJECTED TO A GIVEN ENVIRONMENT.

Figure 20. Summary of the possible reductions in section modulus.

Consequently the timewise projection estimates are calculated using only straight line approximations. There is some evidence, however, that at least some corrosion rates are actually increasing with time while others may be decreasing.

A number of other interesting trends in the data were apparent. Fascia beams on the average faired slightly worse than interior beams, and webs in general appear to be corroding slightly slower than the remainder of the beam. For almost all environments top and bottom flanges appear to suffer approximately the same loss of cross-section even though the top flange is only "exposed" on one side. When exposed to traffic spray, the lower flanges corrode slightly faster. Top and bottom portions of the web for almost all environments corrode at approximately equal rates and slightly faster than the middle portion. The differences between the top, bottom, and middle web-corrosion rates vary with environment. Differences between the near and far sides of a beam (with respect to oncoming traffic beneath), were not statistically significant for any exposure environment using our current data sampling.

Traffic Spray and Debris

While traffic spray produced obviously visible differences in appearance on a beam's surface, the differences were not of great enough magnitude from one part of a beam to another to show up readily in single beam comparison measurements. Nor, obviously, could differences between these beams and those not exposed to traffic spray be evaluated. A fairly involved statistical analysis of a large volume of data was necessary to properly evaluate the corrosion losses resulting from traffic spray and debris. (In general when traffic spray is present in any significant quantity, debris accumulation is also present and vice versa so that the effects of either traffic spray or debris are almost impossible to evaluate separately.)

In many instances the wide scatter in the data, resulting from the wide tolerance of initial starting size, is probably sufficient to obscure some relationships which might be present. Still, however, some important things have been uncovered. Most significantly, traffic under a bridge appears to be creating much the same magnitude of damage as leaking expansion joints and may even be slightly worse. Apparently, regardless of source, leakage from above or traffic spray from below, salt is the major contributing factor in accelerating corrosion of weathering steels. The first few (three or four) beams subject to traffic spray, especially the fascia beam, appear to suffer the worst effects on the average. These first few beams appear to be corroding almost twice as fast as those following later in the traffic spray path (Figs. 21 and 22 and Appendix B, Fig. B13 through B24). This applies for both urban and rural bridges as a combined group. In essence then this implies that most of the beams of a two-lane overpass would be subjected to the higher rate while wider structures would have less serious corrosion for at least a portion of the structure.

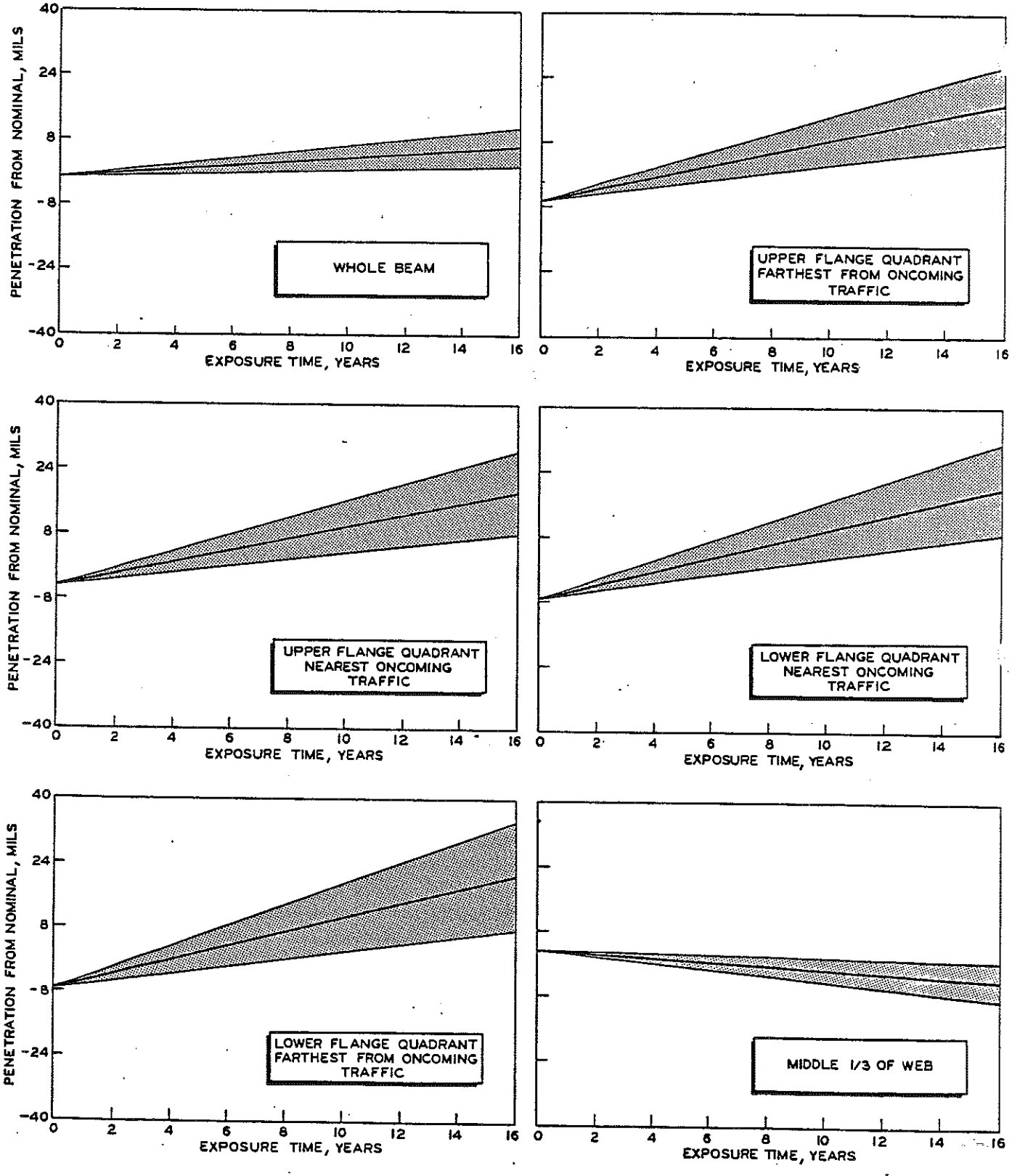


Figure 21. First three beams exposed to traffic spray from below.

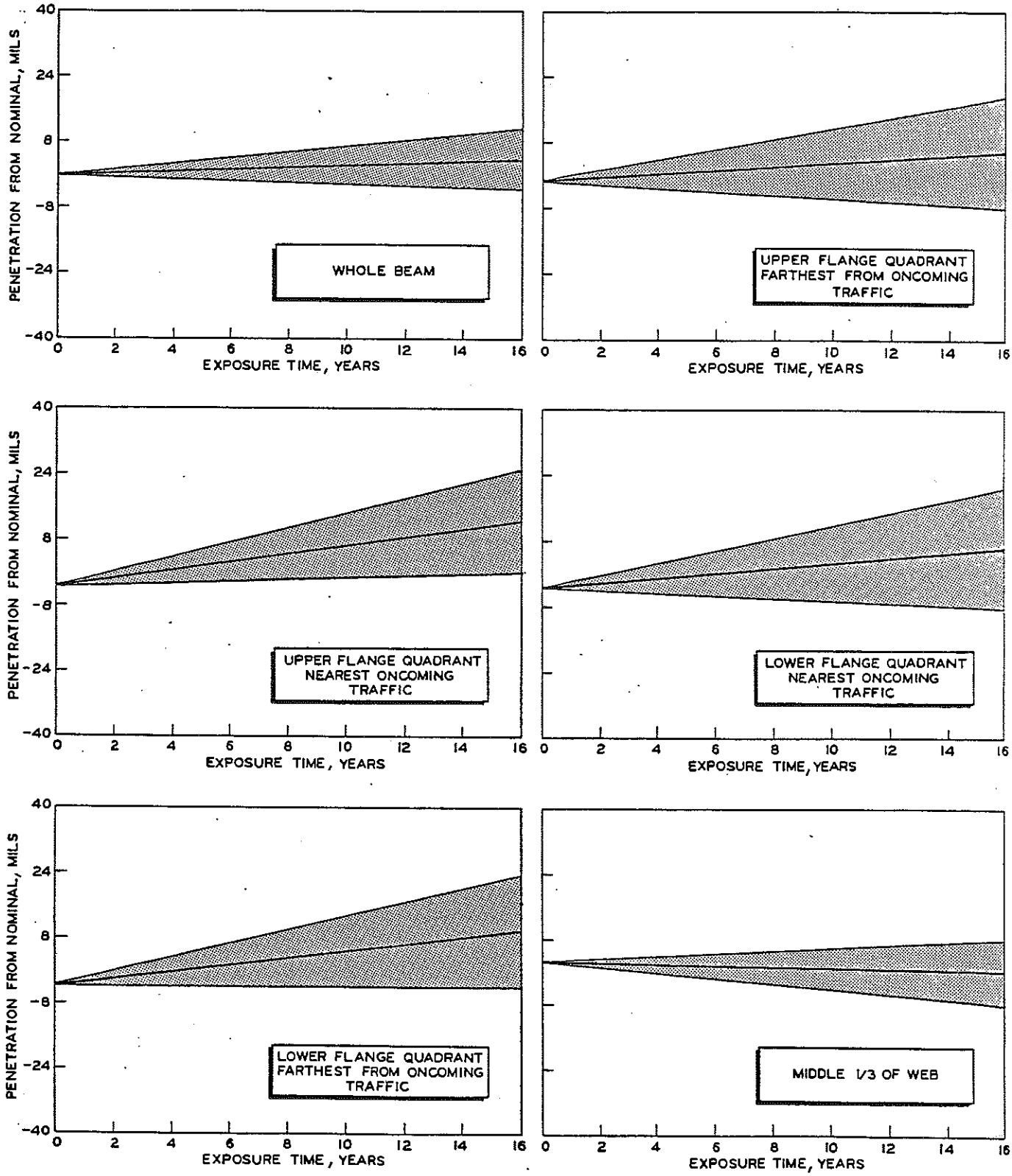


Figure 22. Fifth and later beams exposed to traffic spray from below.

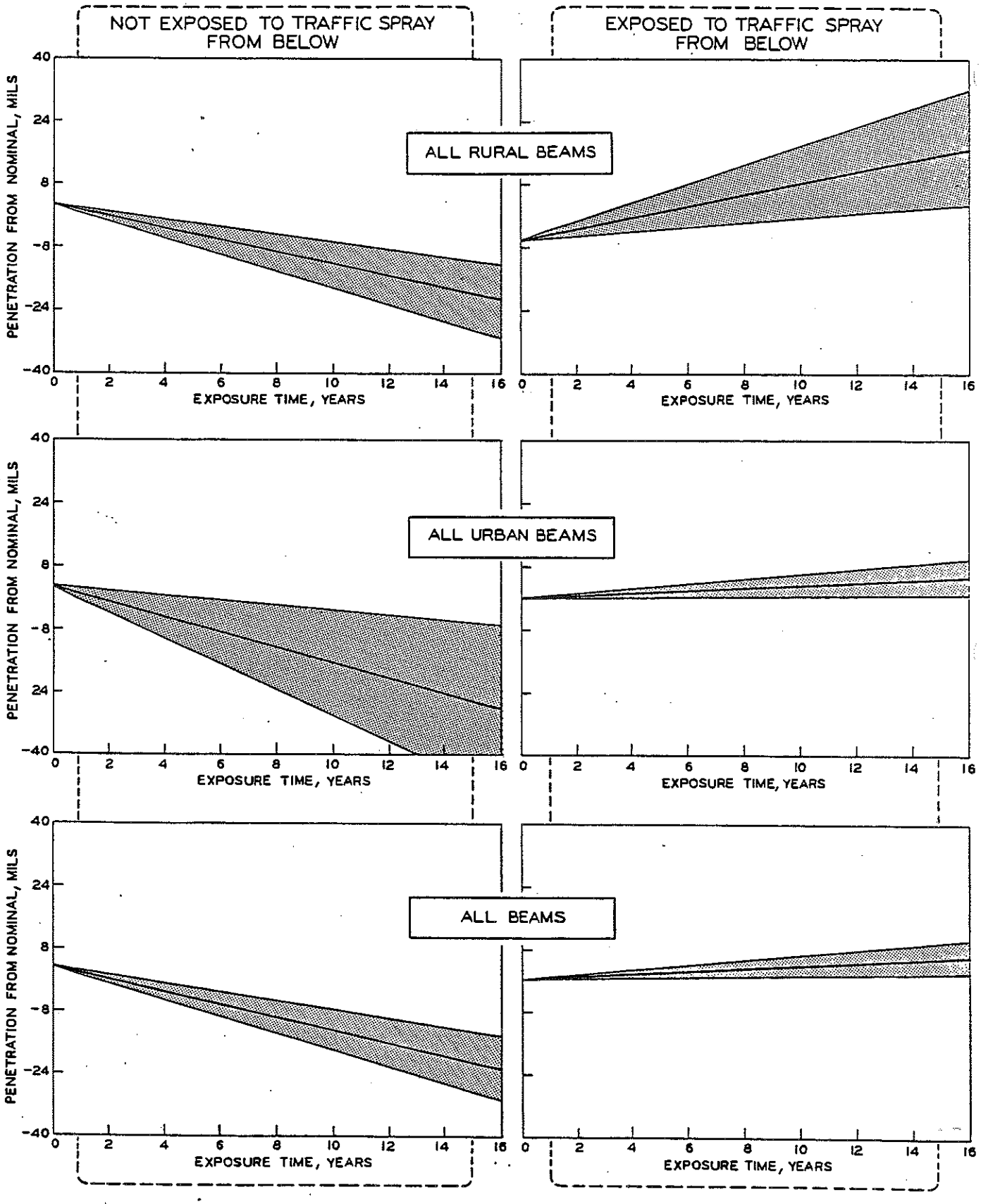


Figure 23. Differences resulting from traffic spray.

Both rural and urban bridges that are not exposed to traffic thrown spray from below appear from our measurements to be increasing (Fig. 23) rather than decreasing in thickness. This appears to be due to an inherent problem with the ultrasonic thickness gage (Fig. 15). The point of back reflection of the ultrasonic signal for the more dense oxides that form in this environment is apparently occurring at or close to the rust-air interface, allowing the back side rust layer to be included (measured) as part of the steel thickness. (While other possible explanations exist that might also explain the apparent growing phenomena, back side reflection appears—based on our current knowledge—to be the most likely.) This growth rate can be converted to an approximate corrosion rate by dividing by the mils of oxide product produced per mil of steel. The exact composition of the oxides being produced is not known, but reasonable estimates can be made. Assuming an alpha, delta, and gamma ferrite mixture with a Piling-Bedworth ratio of 3.75, (in. of corrosion product per in. of metal lost), a corrosion rate of 0.43 mils/year/surface is predicted. Even if the exact ratio of rust produced from the original steel were known, the calculated corrosion rate would still be slightly off since it cannot compensate exactly for the amount of metal lost. Only the dense adherent oxide is measured and the loose oxide on the outer surfaces as well as any oxide that has fallen off is not accounted for. On these structures this error potential is probably minor as the loose oxide and fall-off do not appear to be considerable. Consequently this derived corrosion rate (0.43 mils/year/surface) is used in Tables 1 and 2 to estimate the future beam properties for these exposure environments (urban and rural without traffic spray). These tables, as well as Tables 3 and 4, show extrapolated beam properties for 50 years of exposure in the urban and rural environment subjected to traffic spray from below. The extrapolations are made from the minimum specified original beam size, (nominal 2-1/2 percent), to give a conservative estimate. This is not an unreasonable starting point since some beams have been found to be below the specified minimum size when first installed.

However, for urban structures subject to traffic spray these effects could be vastly more significant. Here the loose oxide can be considerably greater in thickness (up to 1/8-1/4 in. thick after 10 to 15 years) and just the portion of the fall-off that stays on the lower flanges can measure well over 1/2 in. The same sort of phenomenon appears to be responsible for the apparent growth of the web on all bridges over traffic lanes (Fig. 24). Here the indicated growth is insufficient to explain the up to 1/4 in. thickness of the surface rust scale. Apparently the corrosion losses that are occurring are being just slightly more than compensated for by a dense adherent oxide layer. This phenomenon does not appear to be as predominant on the flanges where micrometer thickness checks were used to verify the ultrasonic thickness gage measurements. In laboratory testing on rusted specimens there were never problems with thickness measurements other than probe side surface preparation. However, it turned out that these specimens were substantially salted and this appears to be a factor in whether or not a dense adherent oxide layer will form. For the urban webs exposed to traffic spray a significant difference

TABLE 1
BEAM PROPERTY EXTRAPOLATION FOR A W 36x135 BEAM.*
(USING THE ASSUMED PILING-BEDWORTH RATIO
OF 3.75 TO DERIVE A REASONABLE CORROSION
RATE FROM THE OXIDE INDICATED GROWTH.)

	Year 10 WFB	Year 20 WFB	Year 30 WFB	Year 40 WFB	Year 50 WFB
Nominal Area (Inches **2)	39.7029	39.7029	39.7029	39.7029	39.7029
Actual Area (Inches **2)	38.4705	38.1234	37.7763	37.4530	37.1977
% Reduction From Nominal	3.1042	3.9785	4.8527	5.6668	6.3099
% Reduction From Upper Limit	5.4675	6.3205	7.1734	7.9676	8.5950
% Reduction From Lower Limit	0.6197	1.5164	2.4131	3.2480	3.9075
Penetration (From Nominal)	10.76	13.79	16.83	19.65	21.88
Upper Limit	19.43	22.46	25.49	28.32	30.55
Lower Limit	2.09	5.13	8.16	10.98	13.21
I—XX Nominal	7801.87	7801.87	7801.87	7801.87	7801.87
I—XX Actual	7601.88	7552.62	7503.33	7460.60	7421.12
% Reduction From Nominal	2.56	3.19	3.83	4.37	4.88
I—YY Nominal	226.24	226.24	226.24	226.24	226.24
I—YY Actual	218.81	217.09	215.37	213.94	212.51
% Reduction From Nominal	3.28	4.04	4.80	5.44	6.07

*Urban and rural bridges not exposed to traffic
Spray from below—penetration data (lower 95% confidence limit)
Extrapolated from minimum initial starting size (nominal - 2-1/2%)

TABLE 2
BEAM PROPERTY EXTRAPOLATION FOR A W 36x135 BEAM.*
(USING THE ASSUMED PILING-BEDWORTH RATIO
OF 3.75 TO DERIVE A REASONABLE CORROSION
RATE FROM THE OXIDE INDICATED GROWTH.)

	Year 10 WFB	Year 20 WFB	Year 30 WFB	Year 40 WFB	Year 50 WFB
Nominal Area (Inches **2)	39.7029	39.7029	39.7029	39.7029	39.7029
Actual Area (Inches **2)	38.1234	37.4291	36.7349	36.0885	35.4760
% Reduction From Nominal	3.9785	5.7270	7.4756	9.1038	10.6464
% Reduction From Upper Limit	6.3205	8.0264	9.7323	11.3207	12.8258
% Reduction from Lower limit	1.5164	3.3098	5.1031	6.7731	8.3553
Penetration (From Nominal)	13.79	19.86	25.92	31.57	36.91
Upper Limit	22.45	28.53	34.59	40.23	45.58
Lower Limit	5.13	11.19	17.25	22.90	28.25
I—XX Nominal	7801.87	7801.87	7801.87	7801.87	7801.87
I—XX Actual	7552.62	7454.02	7355.30	7269.67	7185.60
% Reduction From Nominal	3.19	4.46	5.72	6.82	7.90
I—YY Nominal	226.24	226.24	226.24	226.24	226.24
I—YY Actual	217.09	213.66	210.22	207.35	204.49
% Reduction From Nominal	4.04	5.56	7.08	8.35	9.61

*Urban and rural bridges not exposed to traffic
Spray from below-penetration data (upper 95% confidence limit)
Extrapolated from minimum initial starting size (nominal - 2-1/2%)

TABLE 3
BEAM PROPERTY EXTRAPOLATION FOR A W 36x135 BEAM.*

	Year 10 WFB	Year 20 WFB	Year 30 WFB	Year 40 WFB	Year 50 WFB
Nominal Area (Inches **2)	39.7029	39.7029	39.7029	39.7029	39.7029
Actual Area (Inches **2)	37.8203	36.9249	36.0295	35.1340	34.2386
% Reduction From Nominal	4.7418	6.9971	9.2524	11.5077	13.7630
% Reduction From Upper Limit	7.0652	9.2655	11.4658	13.6660	15.8663
% Reduction From Lower Limit	2.2993	4.6124	6.9255	9.2387	11.5518
Penetration (From Nominal)	16.44	24.26	32.08	39.90	47.72
Upper Limit	25.11	32.93	40.75	48.57	56.39
Lower Limit	7.77	15.59	23.41	31.23	39.05
I--XX Nominal	7801.87	7801.87	7801.87	7801.87	7801.87
I--XX Actual	7500.05	7353.63	7206.94	7059.96	6912.70
% Reduction From Nominal	3.87	5.75	7.63	9.51	11.40
I--YY Nominal	226.24	226.24	226.24	226.24	226.24
I--YY Actual	215.09	209.67	204.24	198.82	193.40
% Reduction From Nominal	4.93	7.32	9.72	12.12	14.52

*Urban and rural bridges, 1st 3 beams exposed to traffic
Spray from below-penetration data (lower 95% confidence limit)
Extrapolated from minimum initial starting size (nominal - 2-1/2%)

TABLE 4
BEAM PROPERTY EXTRAPOLATION FOR A W 36x135 BEAM.*

	Year 10 WFB	Year 20 WFB	Year 30 WFB	Year 40 WFB	Year 50 WFB
Nominal Area (Inches **2)	39.7029	39.7029	39.7029	39.7029	39.7029
Actual Area (Inches **2)	36.3602	34.0046	31.6491	29.2936	26.9380
% Reduction From Nominal	8.4194	14.3523	20.2852	26.2181	32.1510
% Reduction From Upper Limit	10.6531	16.4413	22.2295	28.0177	33.8059
% Reduction From Lower Limit	6.0712	12.1562	18.2413	24.3263	30.4113
Penetration (From Nominal)	29.17	49.76	70.33	90.91	111.48
Upper Limit	37.85	58.43	79.00	99.57	120.14
Lower Limit	20.52	41.10	61.67	82.24	102.81
I—XX Nominal	7801.87	7801.87	7801.87	7801.87	7801.87
I—XX Actual	7232.81	6917.79	6551.11	6182.78	5812.78
% Reduction from Nominal	6.65	11.33	16.03	20.75	25.50
I—YY Nominal	226.24	226.24	226.24	226.24	226.24
I—YY Actual	207.37	194.23	181.10	167.98	154.86
% Reduction From Nominal	8.34	14.13	19.95	25.75	31.55

*Urban and rural bridges,1st 3 beams exposed to traffic
Spray from below—penetration data (upper 95 % confidence limit)
Extrapolated from minimum initial starting size (nominal - 2-1/2%)

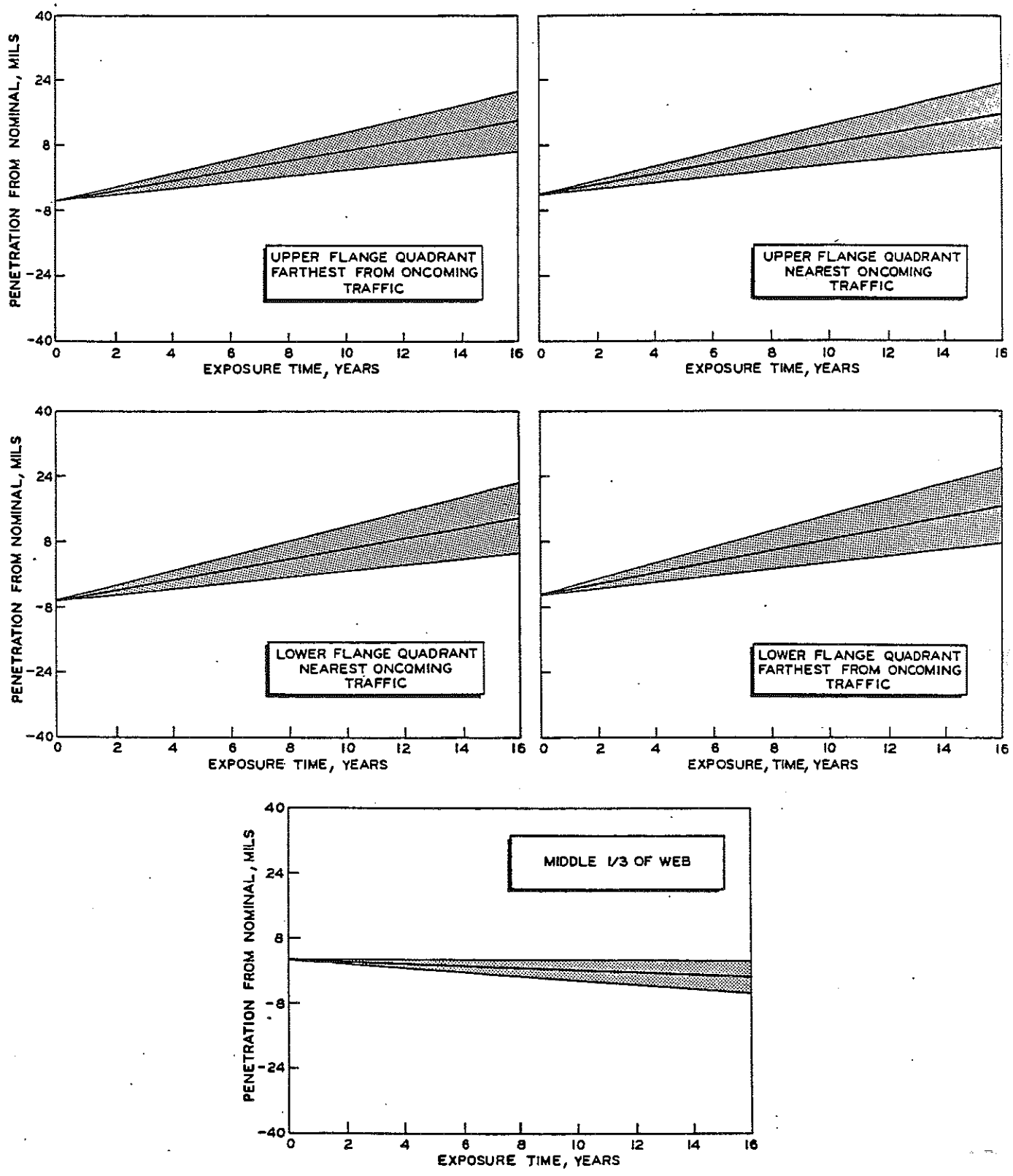


Figure 24. All beams exposed to traffic spray from below.

was noticed in the results of thickness measurements depending on which side of the web (with respect to oncoming traffic) measurements were taken from. Measurements made from the side opposite oncoming traffic were on the average less by 0.4 mils/year/surface. This lends some support for salt effects on ideal oxide formation although slightly deeper pitting on the salted side would produce similar results. In any event it appears that the web surfaces are at least displaying a more 'idealized' oxide and may consequently be slightly better off than the flanges (for the same exposure environment) and may have a decreasing corrosion rate. Even so the amount of surface oxide that is sometimes present would suggest at least a worst case corrosion rate of 1.25 mils/year/surface and it is this number that is used for corrosion of the web in the beam property extrapolations of Tables 3 and 4. Corrosion for the remaining portions of the beam is based on the actual measurements.

Looking at just our younger bridges (Fig. 25) that have been exposed to traffic spray for less than eight years, shows corrosion loss predictions even worse than those for the entire 16-year exposure group. This has been suggested by some as possibly a reflection of the change in chemical content for the weathering steels that has occurred since they were first introduced. Alternately this might imply that a decrease in corrosion rate is occurring with age of exposure or that perhaps our earliest structures contain beams that were initially oversize. Due to the uncertainty of the meaning of this observed trend, it is the full 16-year exposure case that has been used for the representative traffic spray exposure beam property extrapolations of Tables 3 and 4. If it turns out in the long run that the higher indicated rates for younger structures continue then these extrapolations will be non-conservative.

Exposure of Corrosion Specimens

Natural Environment - The first weathering steel bridge constructed in Michigan was used by the steel supplier to test the performance of their weathering steel under actual highway conditions. Several racks of corrosion specimens were installed as illustrated in Figure 26. Small coupons of uniform starting size were oriented to simulate top flange, web, and bottom flange exposures. Sufficient coupons were placed that specimens could be removed at intervals. The weight loss of these coupons after rust removal was used to determine the average corrosion loss. Data were collected over a period of from one to eight years. Plots of these data taken from the steel company reports are reproduced in Figure 27 and in the scatterplots and linear regression analyses that are provided in Appendix B, Figures B31 through B36. More significantly, a linear regression analysis of the natural logarithims of penetration vs. exposure age resulted in an even better fit of the data. This implies that the actual corrosion rates may be more accurately considered as exponential and can be modeled by a relationship of the form Penetration = C x (Age) xx D. These data indicate an exponentially increasing function for both the top and bottom flange orientations and an exponentially decreasing function for the web orientation. Even more significantly all of their

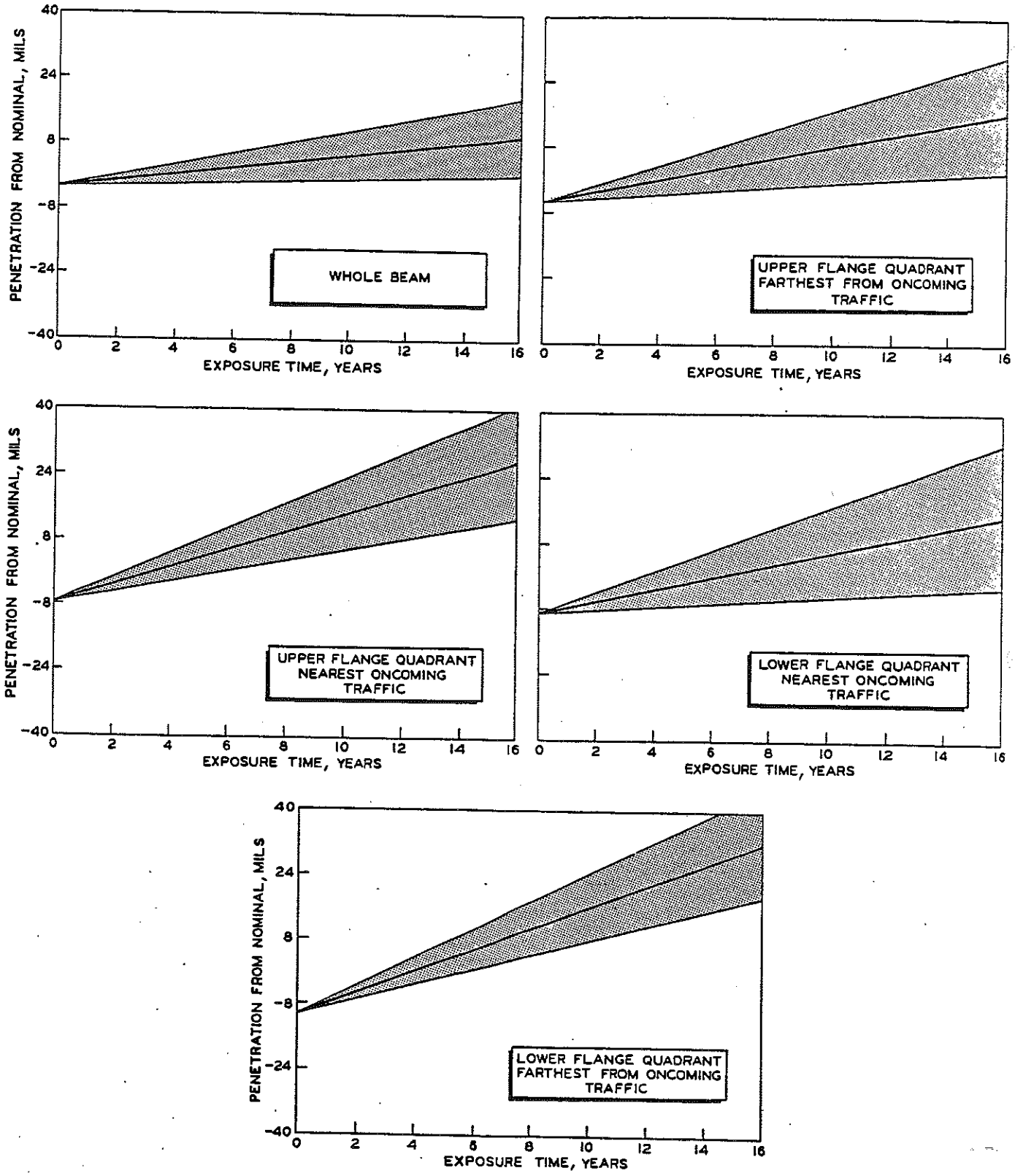


Figure 25. All beams exposed to traffic spray from below for less than eight years.

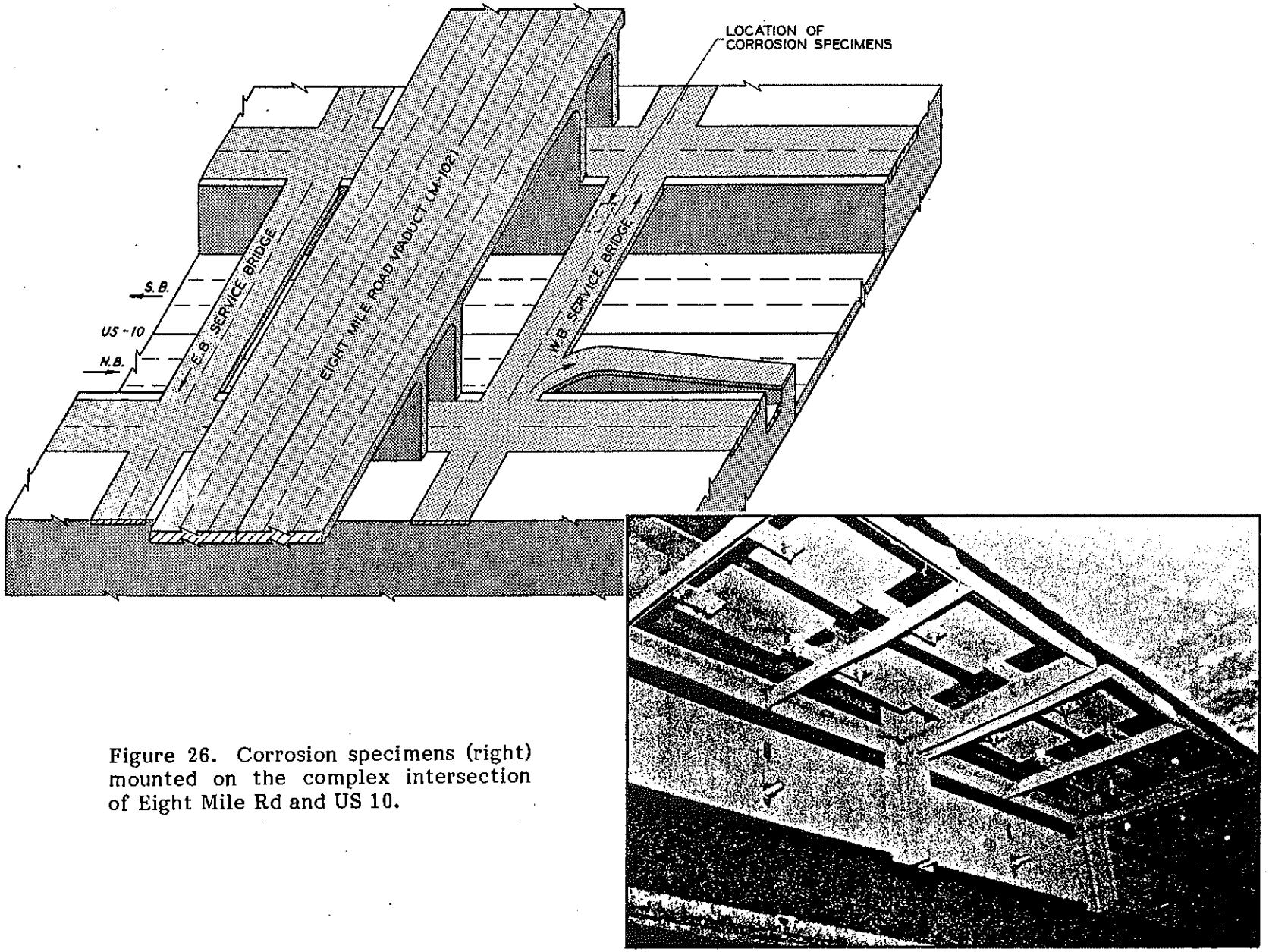
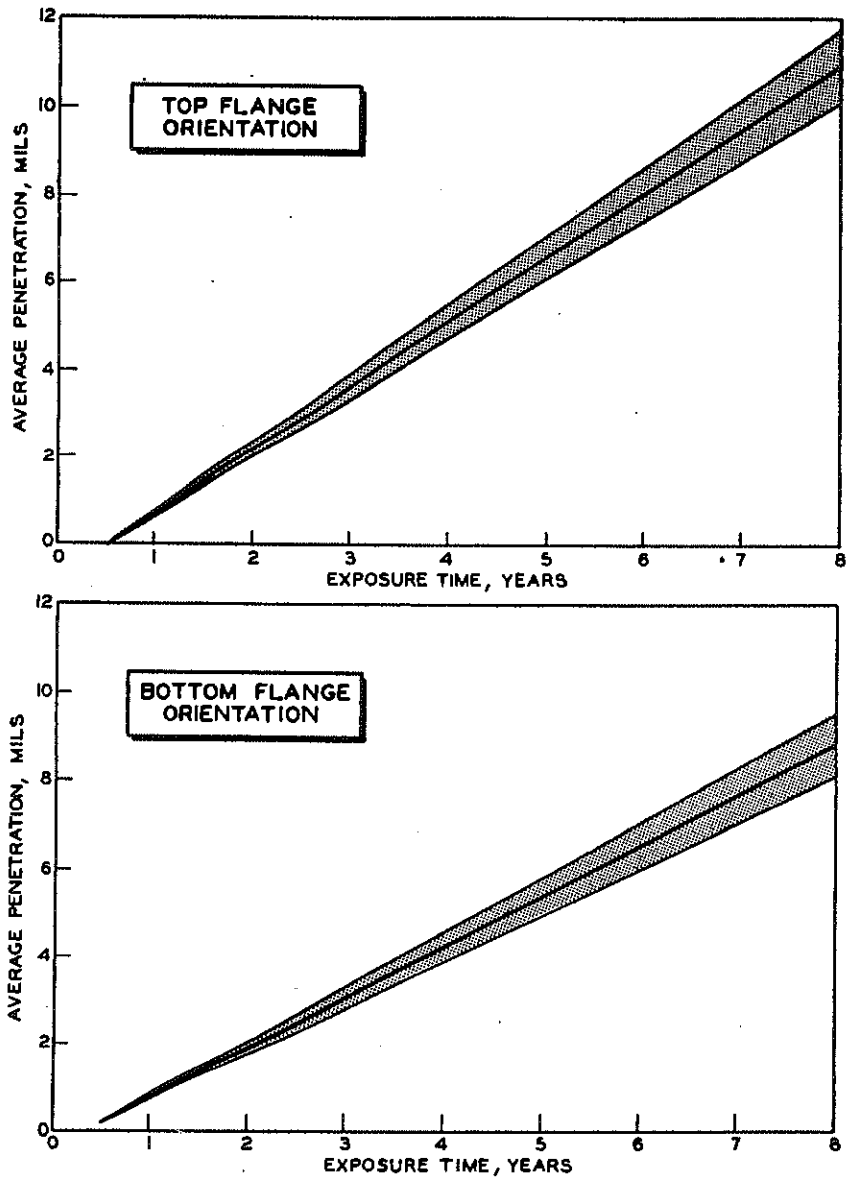


Figure 26. Corrosion specimens (right) mounted on the complex intersection of Eight Mile Rd and US 10.



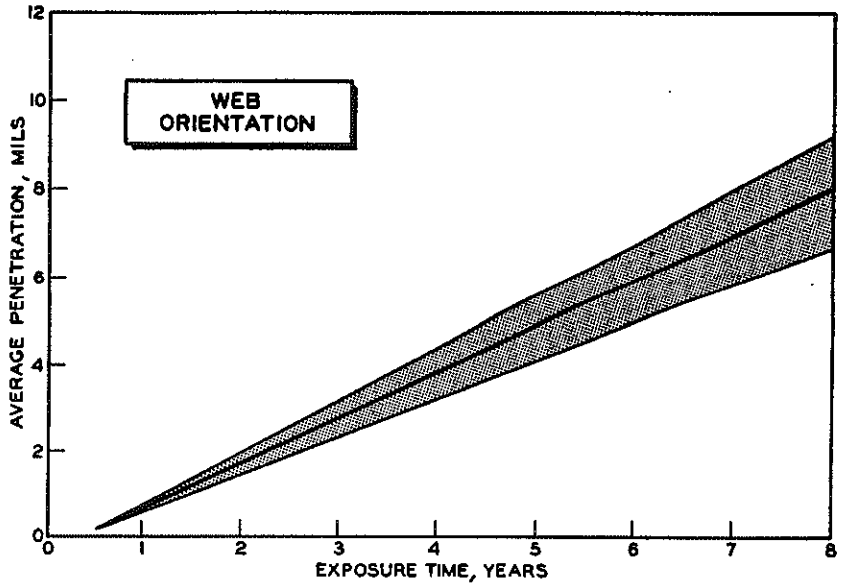


Figure 27. Steel company corrosion data from corrosion specimens placed on one of our first weathering steel bridges. This structure is representative of our worst exposure environment.

data come from the side of the bridge farthest from oncoming traffic (beneath). Our own data indicate that the corrosion rates here may be as little as half that occurring for the first few beams on the side nearest oncoming traffic.

The corrosion rates of our data for overpasses up to eight years old suggest that the 'tunneled freeway environment' in which these exponential corrosion data were taken, is not significantly different from our general category covering all structures exposed to vehicle traffic sprays from below. It would not then be unreasonable to expect that the same type of exponential corrosion rate may be occurring for our general case as well.

Artificial Environment - As part of a separate project, unpainted coupons of several types of bridge steels were exposed to an elevated temperature (110 F) and salty (NaCl) environment with alternating wet and dry cycles (i.e. a marine-beach type of exposure). The weathering steel specimens performed markedly worse than either the A36 or the A572 samples that were tested uncoated in the same environment. Average corrosion was more than twice as great and pitting more severe (more numerous, deeper, and narrower) for the weathering steel specimens. While it does appear to be true that weathering steel performs better than plain carbon steels for some environments (non-salted and alternate wet-dry), we now know that this situation can be reversed for other environments (salted and high humidity). In other words, weathering steel for the very worst environments may perform significantly worse than the bare patches of aging painted structures.

Repeat Corrosion Loss Measurements

Repeat thickness measurements were made on several older urban bridges exposed to traffic spray (greater than seven years old) after approximately two and four-year intervals. Most notable were corrosion losses on sections of the beams directly over traffic lanes approaching 3 and in some cases 6 mils/year/surface on the portions of the lower flange nearest the web and for the lower 1/4 of the web. The obvious visual differences on the lower flange underside (Fig. 28) suggest that such accelerated corrosion may also occur for coverplate fillet welds. Salt-laden vehicle spray does definitely appear to be resulting in the same level of corrosion damage as was earlier known to occur around leaking expansion joints, except that the corrosion damage resulting from spray may affect the majority of the surface area of a structure rather than a limited area near a few joints.

While the results of our repeat measurements are not yet of a sufficient number to be statistically significant, they are at least suggestive of some possible important trends. Using "average" corrosion rates to analyze structures subjected to traffic spray may not be truly representative of what is actually occurring. Some beams on these structures may actually be experiencing a reduction in the corrosion rate with time while others may be getting proportionately worse (1.5 up to 2.5 mils/year/surface - whole beam corrosion) than our average case. Also the area of

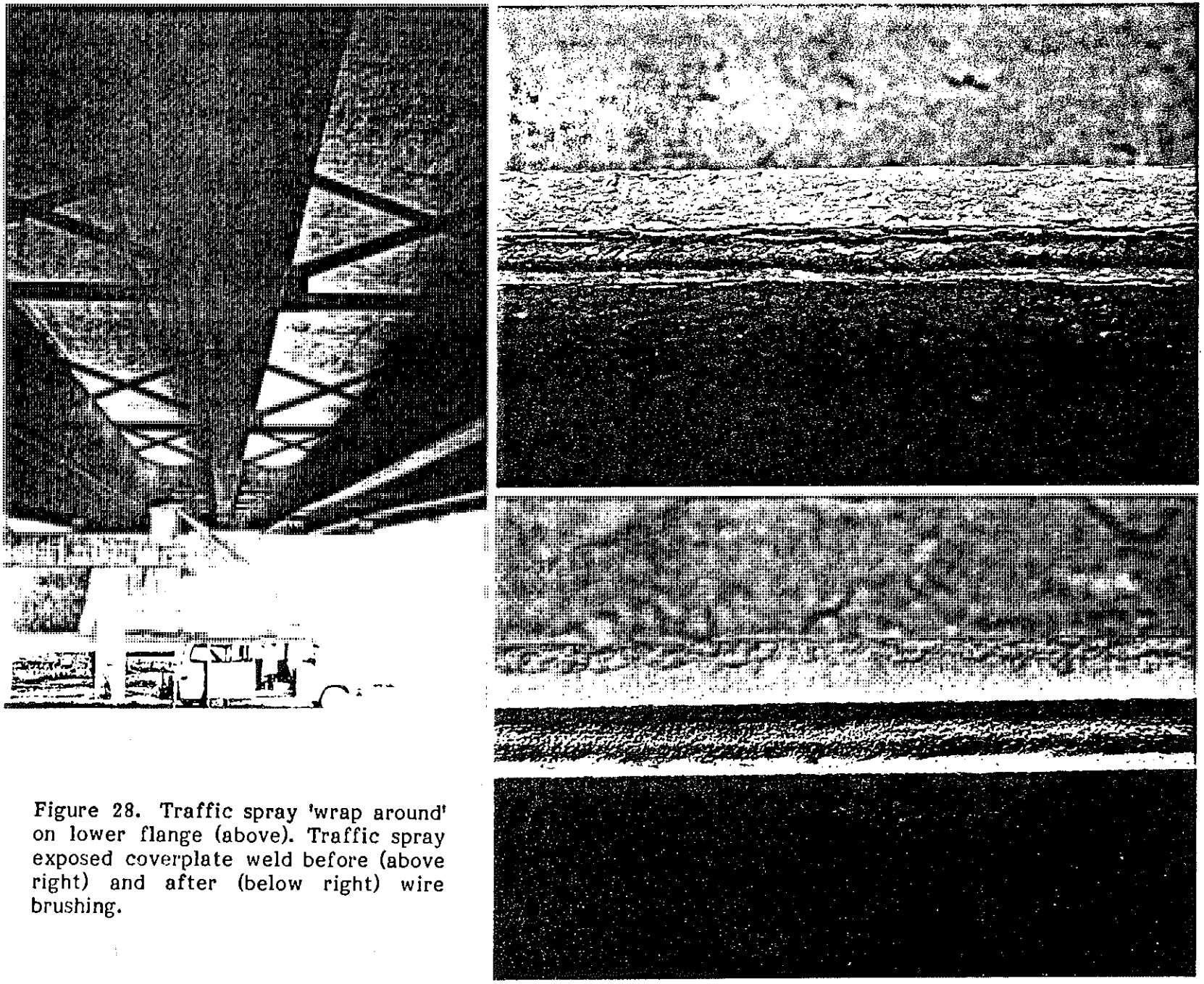


Figure 28. Traffic spray 'wrap around' on lower flange (above). Traffic spray exposed coverplate weld before (above right) and after (below right) wire brushing.

worst corrosion may not necessarily be those first few beams exposed to traffic spray. The four such structures examined to date are equally split between the early or later beams experiencing the worst corrosion with very noticeable differences existing between the early and later beams for all. If such a 'skewed' structure represents a significantly worse case than that which would be created by average corrosion rates, it might be wise to continue our repeat measurements on a few more structures to better define the extent of this problem.

Additional Considerations

Obvious visual differences over a beam surface exist between those areas toward the abutments (away from traffic lanes underneath), and those areas directly over the roadway. Some differences in corrosion rates between these two areas very probably do exist with the areas directly over the roadway receiving, in general, a greater volume of spray and consequently probably experiencing slightly worse corrosion damage. All of our measurements of necessity, however, have been made between the abutment and the road shoulder where corrosion probably is not quite as bad. This factor as well as the possible problem of our ultrasonic thickness gage reading part of the backside rust as part of the steel thickness suggests that our results probably underestimate the worst corrosion taking place.

Implications for Action

The typical average and worst case corrosion rates for Michigan's significantly different highway exposure environments have been determined and are depicted in Figure 19. These rates, combined with the corresponding reductions in section modulus of Figure 20, may be used as a guide to predict the future structural integrity of our bridges. While the corrosion rates that have been observed so far may not forecast immediate structural problems for all bridges, they do predict the gradual erosion of the initial factor of safety of a structure, due to general loss of section. (Effects on fatigue life are yet to be determined.)

This is especially true for bridges exposed to traffic spray from below. Our current estimates of the average corrosion losses occurring suggest that after somewhere between 10 and 20 years of exposure all of the beams of these structures would be below the minimum initial starting size (nominal 2-1/2 percent)—a size reduction of 5 to 8 percent from nominal. During this same time period reductions in section modulus may approach 10 percent from nominal. Our worst case corrosion measurements suggest that for at least some of the beams of a given structure in our worst exposure environments web perforation could occur during a structure's normal life expectancy. For a 3/8-in. web, such perforation may occur in 30 years (6 mils/year/surface) and may at that time extend for the entire portion of the beam over traffic lanes and for some distance beyond. Similar exposure periods may be shown to result (for observed

corrosion rates in some environments) in web thicknesses below the minimums initially required by web buckling criteria and fillet welds (especially lower flange to web and lower flange to coverplate) below minimum initial throat dimensions.

Which aspect of a particular structure will be most susceptible to the levels of corrosion occurring for a given environment will in general be dependent on the design of a given structure. But armed with our current corrosion rate information more intelligent decisions can be made regarding how long structures of a given environment may be allowed to weather before painting becomes structurally imperative.

SUMMARY AND RECOMMENDATIONS

Extensive data have been gathered with the aim of establishing the levels of corrosion and cumulative damage occurring for Michigan's prevalent exposure environments in order to evaluate the necessity and possible time frame for remedial action. The observed corrosion rates are represented in Figure 19 and the corresponding resulting reductions in Section Modulus in Figure 20. Projected section losses can be especially significant in salty environments. Indeed, salt appears to be the major contributing factor in accelerated corrosion of weathering steels. Both leakage from above and traffic spray from below can result in the same levels of corrosion damage.

While the currently available data provide a basis for tentative estimations, there is some evidence which suggests the need for further corrosion loss measurements (specifically repeat measurements on structures which have already been examined). Uncertainty still remains over how some of the observed corrosion rates may be changing with time. While some areas of a given structure may be experiencing decelerating corrosion rates, it appears that other areas may be experiencing exponentially accelerating corrosion rates. Such a turn of events would make statistical averages of entire structures inappropriate as a yardstick of corrosion damage.

The levels of corrosion tentatively occurring for the different environments can be used to place some upper limits on the amount of time that a weathering steel structure can be allowed to weather naturally before further deterioration should be prevented by painting. For the environments with the worst corrosion levels, painting obviously should be done long before extensive web perforation (30 years for 3/8-in. web) or serious structural damage (exact limits dependent on structure design) can occur. For more intermediate environments, painting may never by necessary to preserve structural integrity but would be desirable (at some point in time) to limit the gradual erosion of a structure's original factor of safety and to reduce the probability of fatigue damage being initiated by the corrosion. For the very best environments, painting may very well never be necessary, although some form of periodic inspection might be

necessary to insure that the favorable quality of the environment does not change.

The uncertainties that still remain for such variables as changes in corrosion rate with time, effects of corrosive pitting on fatigue life and strength, as well as possible accelerated galvanic corrosion of welds dictates that caution should be used in establishing the lower limits on when a given structure should require painting. While some further work is planned for all of these uncertain areas, the final answers will not be immediately forthcoming.

Based on the present state of knowledge of all relevant factors, the following recommendations are made:

1) Rates of corrosion have been measured that are sufficient to cause perforation of bridge members during their service lives.

2) Unpainted A588 should not be used in Michigan's highway environments. While A588 has been shown to perform better than uncoated plain carbon steels for some environmental conditions, Michigan's heavily salted highway environment has been found to result in conditions where just the opposite is true. Our own laboratory testing has shown that for heavily salted, high humidity environments A588 can corrode more than twice as fast as uncoated A36 or A572.

3) An effort should be made to paint or otherwise protect those structures exposed to significant amounts of salt (from either leakage or spray) by the time they reach 15 to 20 years of age. Such environments have been found to result in potentially serious average corrosion rates of up to 6 mils/year/surface with pitting approaching up to 16 mils/year/surface. Corresponding reductions in section modulus have been as high as 1/2 percent from nominal/year.

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APPENDIX A

Included in this appendix are copies of the computer program used to initially examine our beam thickness measurements along with the input data and output file. The format of this output was established early on in our investigation to allow easy comparison of the properties of a measured beam with those to be expected of the original nominal beam. A much more comprehensive statistical analysis of the data eventually proved to be necessary to estimate corrosion actually occurring.

```
C-
C-      FILE = 1  DISK DEBUG FILE
C-      FILE = 3  TERMINAL DEBUG FILE
C-      FILE = 5  DATA INPUT FILE
C-      FILE = 6  INDIVIDUAL BRIDGE RESULTS--OUTPUT FILE
C-      FILE = 9  DISK FILE FOR BASIS ANALYSIS
C-
FILE  3=RLM/DEBUG,UNIT=REMOTE
FILE  5=RLM/SRS/RL/A5883,UNIT=DISK,BLOCKING=420,RECORD=14
FILE  6=RLM/Q241,UNIT=PRINTER
FILE  9=RLM/BASIS/DAT/DUMMY,UNIT=DISK,BLOCKING=30,RECORD=14
FILE  1=RLM/PRS/RL/DEBUG,UNIT=DISK,BLOCKING=30,RECORD=14
C-
C-      ID = POINTER TO CURRENT BEAM DATA
C-      NEAR--DESIGNATES SIDE CLOSEST TO ON COMING TRAFFIC (WHEN
C-          APPLICABLE);FAR--OPPOSITE OF NEAR
C-      ARR(ID, 1) = NOMINAL CROSS SECTIONAL SIZE  (INCHES**2)
C-      ARR(ID, 2) = ACTUAL CSA FAR FLANGE--TOP
C-      ARR(ID, 3) =             NEAR FLANGE--TOP
C-      ARR(ID, 4) =             NEAR FLANGE--BOTTOM
C-      ARR(ID, 5) =             FAR FLANGE--BOTTOM
C-      ARR(ID, 6) =             WEB
C-      ARR(ID, 7) = ACTUAL CROSS SECTIONAL SIZE  (INCHES**2)
C-      ARR(ID, 8) = % REDUCTION OF CSA FROM NOMINAL
C-      ARR(ID, 9) =                 FROM UPPER LIMIT
C-      ARR(ID,10) =                 FROM LOWER LIMIT
C-      ARR(ID,11) = PERIMETER  (INCHES)
C-      ARR(ID,12) = PENETRATION (FROM NOMINAL)   (MILS)
C-      ARR(ID,13) =               FROM UPPER LIMIT
C-      ARR(ID,14) =               FROM LOWER LIMIT
C-      ARR(ID,15) = I--XX  NOMINAL
C-      ARR(ID,16) = I--XX  ACTUAL
C-      ARR(ID,17) = % REDUCTION OF I--XX FROM NOMINAL
C-      ARR(ID,18) = I--YY  NOMINAL
C-      ARR(ID,19) = I--YY  ACTUAL
C-      ARR(ID,20) = % REDUCTION OF I--YY FROM NOMINAL
C-      ARR(ID,21) = PENETRATION FAR FLANGE--TOP
C-      ARR(ID,22) =               NEAR FLANGE--TOP
C-      ARR(ID,23) =               NEAR FLANGE--BOTTOM
C-      ARR(ID,24) =               FAR FLANGE--BOTTOM
C-      ARR(ID,25) =               WEB
C-      ARR(ID,26) = I--XX OF FAR FLANGE--TOP     (ACTUAL)
C-      ARR(ID,27) =          NEAR FLANGE--TOP
C-      ARR(ID,28) =          NEAR FLANGE--BOTTOM
C-      ARR(ID,29) =          FAR FLANGE--BOTTOM
C-      ARR(ID,30) =          WEB
C-      ARR(ID,31) = I--XX OF NEAR (OR FAR) FLANGE--TOP   (NOMINAL)
C-      ARR(ID,32) =          NEAR (OR FAR) FLANGE--BOTTOM
C-      ARR(ID,33) =          WEB
C-      ARR(ID,34) = UNDEFINED
C-      ARR(ID,35) = UNDEFINED
C-      ARR(ID,36) = PENETRATION WEB--TOP THIRD
C-      ARR(ID,37) =               WEB--MIDDLE THIRD
C-      ARR(ID,38) =               WEB--BOTTOM THIRD
C-      ARR(ID,39) = UNDEFINED
C-      ARR(ID,40) = PENETRATION FAR FLANGE--TOP (FROM UPPER LIMIT)
C-      ARR(ID,41) =               NEAR FLANGE--TOP
C-      ARR(ID,42) =               NEAR FLANGE--BOTTOM
C-      ARR(ID,43) =               FAR FLANGE--BOTTOM
C-      ARR(ID,44) =               WEB--ALL
C-      ARR(ID,45) =               WEB--UPPER THIRD
C-      ARR(ID,46) =               WEB--MIDDLE THIRD
C-      ARR(ID,47) =               WEB--BOTTOM THIRD
C-      ARR(ID,48) = UNDEFINED
C-
      DIMENSION A(40),B(10,6),ITYP(20),IBSZ(20),IBPS(20),INEG(20)
      DIMENSION IBSD(20),ISDH(20),ARRTEM(40,50),REPDAT(3,3)
      DIMENSION ICLA(20),ISWI(20),WWI(20),IBS(20),BEAM(100),IPT(20)
      DIMENSION ARR(40,50),IG(10),SARR(10,10),SARTEM(10,10),ALPHA(30)
      DIMENSION CIXR(2),CIXT(2),CIYR(2),CIYT(2),IYEAR(13),IBPST(20)
      DIMENSION ROLTOL(9,5),TROLTO(2,4),COR(10),WP(5),CCRW(5)
      INTEGER AGERTO(3),AGERT1(3),AGERT2(3),AGERT3(3),AGERT4(3)
      DOUBLE PRECISIONBCAT(5),BHCAT(4),BCLAS(12),BTYP(4),BCLA(2),BCL(20)
      DOUBLE PRECISION BT(2),BCL2(20)
C-
C-      ROLLING TOLERANCE TABLES FOR FLAT PLATES
C-
      DATA ROLTOL/7.0,8.0,5.0,4.5,4.0,4.0,4.0,3.5,3.5,8.0,7.0,6.0
     -           ,5.0,4.5,4.0,4.0,4.0,3.5,9.0,8.0,7.0,6.0,5.0,4.5
     -           ,4.0,4.0,4.0,4.0,10.,9.0,8.0,7.0,6.0,5.0,4.5,4.0,4.0
     -           ,12.,10.,9.0,8.0,7.0,6.0,5.0,4.5,4.0/
      DATA TROLTO/0.0625000,0.078125,0.09375,0.09375,0.109375
     -           ,0.1093750,0.125000,0.12500/
      DATA IYEAR/0,0,31,59,90,120,151,181,212,243,273,304,334/
C-
C-      I/O  LITERALS INPUT AS DOUBLE PRECISION DATA
C-
      DATA BCAT/"OPEN","          ","TUNNELED","      ",
     -  "INTERMEDIATE","  "/
      DATA BHCAT/"UNDER 15 FEE","T   ","OVER 15 FEET","    "/
      DATA BCLAS/"URBAN LOW TR","AFFIC VOLUME","  ","URBAN HIGH T",
     -"RAFFIC VOLUM","E  ","RURAL LOW TR","AFFIC VOLUME","  ",
     -"RURAL HIGH T","RAFFIC VOLUM","E  "/
      DATA BTYP/"ROLLED WF BE","AM","WELDED PLATE","GIRDER"/
      DATA BCLA/"FACIA","INTERIOR"/
      DATA BT/"WFB","WPG"/
      DATA REPDAT/"   1ST","  COMP","ARISON","   2ND","  COMP","ARISON",
     -           "     ","  DIFF","ERENCE"/
      DO 2500 I=1,30
      ALPHA(I)=" "
 2500 CONTINUE
      DO 3500 I=1,9
      DO 3500 K=1,5
      ROLTOL(I,K)=ROLTOL(I,K)*1.33333333
 3500 CONTINUE
      IBRIDG=0
C-
C-      BRIDGE RELATED VARIABLES INITIALIZED
C-
      1000 I=0;IBH=0;IMAX=0;IMAX1=0;YEAR=1979;ILAST=0
      KTYP=0.0;NTYP=0.0;IBRIDG=IBRIDG+1
      DO 1001 I=1,20
      IBPST(I)=0
      IBPS(I)=0
 1001 CONTINUE
C-
C-      INPUT OF ALPHANUMERIC BRIDGE DESCRIPTION & BRIDGE NUMBER
C-
      READ(5,1)(A(I),I=1,36)
    1 FORMAT(12A6)
C-
C-      ICAT--1=OPEN;2=TUNNELED;3=INTERMEDIATE
C-      IBHC--1=UNDER 15 FEET;2=OVER 15 FEET
C-      ICLS--0=URBAN--LOW TRAFFIC VOLUME;1=URBAN--HIGH TRAFFIC
C-            VOLUME;2=RURAL--LOW TRAFFIC VOLUME;3=RURAL--HIGH
C-            TRAFFIC VOLUME
C-      HEIGHT=ACTAL HEIGHT
```

```
1280    C-      AGE=YEAR BUILT                                                  00001280    082383
1290    C-      AGERT=YEAR READINGS TAKEN                                       00001290    082383
1300    C-      AGERTO=READINGS TAKEN--MONTH/DAY/YEAR                           00001300    082383
1310    C-      AGERT1=STEEL BEAMS SET--MONTH/DAY/YEAR                          00001310    082383
1320    C-      AGERT2=DECK COMPLETED--MONTH/DAY/YEAR                           00001320    082383
1330    C-      AGERT3=HIGHWAY OPENING (OVER)--MONTH/DAY/YEAR                   00001330    082383
1340    C-      AGERT4=HIGHWAY OPENING (UNDER)--MONTH/DAY/YEAR                  00001340    082383
1350    C-      IABUT--QUALITATIVE INDICATOR OF DISTANCE OF MEASUREMENTS        00001350    082383
1360    C-             FROM ROADWAY (UNDER)--0=NOT APPLICABLE OR FAR AWAY;      00001360    082383
1370    C-              --1=NEAR                                                00001370    082383
1380    C-      IREP--0=NORMAL PROCCESSING OF DATA;--1=REPEAT DATA COMPARISON   00001380    082383
1390    C-             1ST SET;--2=REPEAT DATA COMPARISON 2ND SET; FOR PAINTED- 00001390    082383
1400    C-             UNPAINTED COMPARISON PAINTED SHOULD BE 2ND;              00001400    082383
1410    C-              --3=UNDEFINED; --4=TIMEWISE COMPARISONS FROM            00001410    082383
1411    C-             GENERATED DATA.                                          00001411    082383
1412    C-                                                                      00001412    082383
1420    READ(5,2)ICAT,IBHC,ICLS,HEIGHT,AGE,AGERT,AGERTO,AGERT1,AGERT2,          00001420    082383
1430    - AGERT3,AGERT4,IABUT,IREP                                              00001430    082383
1440    2 FORMAT(3I1,2F5.0,F6.0,1X,16I2,1X,I1,1X,I1)                            00001440    082383
1450    IF(AGERT.GT.1000)YEAR=AGERT                                             00001450    082383
1460    IF(IREP.LE.1)JREP=1                                                     00001460    082383
1470    IF(IREP.LE.1)VINTTB=0.0                                                 00001470    082383
1480    IF(IREP.LE.1)VINTTT=0.0                                                 00001480    082383
1490    VINT=YEAR-AGE                                                           00001490    082383
1500    ITAO=AGERTO(1)+1                                                        00001500    082383
1510    ITA1=AGERT1(1)+1                                                        00001510    082383
1520    ITA2=AGERT2(1)+1                                                        00001520    082383
1530    ITA3=AGERT3(1)+1                                                        00001530    082383
1540    ITA4=AGERT4(1)+1                                                        00001540    082383
1550    ATO=(IYEAR(ITAO)+AGERTO(2))/365.+AGERTO(3)                              00001550    082383
1560    AT1=(IYEAR(ITA1)+AGERT1(2))/365.+AGERT1(3)                              00001560    082383
1670    AT2=(IYEAR(ITA2)+AGERT2(2))/365.+AGERT2(3)                              00001570    082383
1580    AT3=(IYEAR(ITA3)+AGERT3(2))/365.+AGERT3(3)                              00001580    082383
1590    AT4=(IYEAR(ITA4)+AGERT4(2))/365.+AGERT4(3)                              00001590    082383
1600    VINT1=ATO-AT1                                                           00001600    082383
1610    VINT2=ATO-AT2                                                           00001610    082383
1620    VINT3=ATO-AT3                                                           00001620    082383
1630    VINT4=ATO-AT4                                                           00001630    082383
1640    AT4=(IYEAR(ITA4)+AGERT4(2))/365.+AGERT4(3)                              00001640    082383
1650    C-                                                                      00001650    082383
1660    C-      USE THIS CODE FOR EXAMINING PENETRATION LOSSES WITH RESPECT     00001660    082383
1670    C-      TO TIME AT BRIDGE SITE                                          00001670    082383
1680    C-                                                                      00001680    082383
1690    VINTBS=ATO-AT1                                                          00001690    082383
1700    IF(AT1.GT.10)GO TO 2221                                                 00001700    082383
1710    VINTBS=ATO-AT2                                                          00001710    082383
1720    IF(AT2.GT.10)GO TO 2221                                                 00001720    082383
1730    VINTBS=YEAR-AGE                                                         00001730    082383
1740    2221VINT=VINTBS                                                         00001740    082383
1750    C-                                                                      00001750    082383
1760    C-      USE THIS CODE FOR EXAMINING PENETRATION LOSSES WITH RESPECT     00001760    082383
1770    C-      TO TIME OF TRAFFIC EXPOSURE                                     00001770    082383
1780    C-                                                                      00001780    082383
1790    VINTTE=ATO-AT4                                                          00001790    082383
1800    IF(AT4.GT.10.AND.ATO.GT.AT4)GO TO 2222                                  00001800    082383
1810    VINTTE=ATO-AT3                                                          00001810    082383
1820    IF(AT3.GT.10.AND.ATO.GT.AT3)GO TO 2222                                  00001820    082383
1830    VINTTE=ATO-AT2                                                          00001830    082383
1840    IF(AT2.GT.10)GO TO 2222                                                 00001840    082383
1850    VINTTE=0.0                                                              00001850    082383
1860    C-2222VINT=VINTTE                                                       00001860    082383
1870    2222 I=0                                                                00001870    082383
1880    10 I=I+1                                                                00001880    082383
1890    C-                                                                      00001890    082383
1900    C-      IT=POINTER TO BEAM SIZE INFO FOR CURRENT BEAM                   00001900    082383
1910    C-      ITYP(IT)--1=ROLLED WF BEAM;2=WELDED PLATE GIRDER                00001910    082383
1920    C-      B(IT,1)=WEB THICKNESS                                           00001920    082383
1930    C-      B(IT,2)=FLANGE THICKNESS AT WEB-FLANGE INTERFACE                00001930    082383
1940    C-      B(IT,3)=FLANGE THICKNESS AT OUTER EDGE                          00001940    082383
1950    C-      B(IT,4)=BEAM HEIGHT                                             00001950    082383
1960    C-      B(IT,5)=BEAM WIDTH                                              00001960    082383
1970    C-      B(IT,6)=LOWER FLANGE THICKNESS IF DIFFERENT FROM UPPER          00001970    082383
1980    C-      IFAB=FABRICATOR--00=NOT KNOWN OR NONE;01=ALLIED STEEL;          00001980    082383
1990    C-           02=AMERICAN BRIDGE;03=APOLLO;04=BAYSTONE;05=BENNETT;       00001990    082383
2000    C-           06=BETHLEHEM;07=DOUGLAS;08=PARAGON;09=TUCKER;              00002000    082383
2010    C-           10=VINCENNES;11=YEAGER;12=ZWEIG                            00002010    082383
2020    C-      ISTEL=STEEL MANUFACTURER--0=NOT KNOWN;1=UNITED STATES STEEL;    00002020    082383
2030    C-           2=BETHLEHEM                                                00002030    082383
2040    C-      IDIRE=DIRECTION OF ONCOMING TRAFFIC--0=NOT AVAILABLE OR DOES    00002040    082383
2050    C-           NOT APPLY;1=1ST BEAM NEAREST ONCOMING TRAFFIC;2=1ST        00002050    082383
2060    C-           BEAM FARTHEST FROM ONCOMING TRAFFIC                        00002060    082383
2070    C-      IBSZ(IT)=BEAM SIZE CODE     (NEGATIVE=LAST SIZE)                00002070    082383
2080    C-                                                                      00002080    082383
2090    READ(5,3)ITYP(I),(B(I,J),J=1,5),IBSZ(I),B(I,8),IFAB,ISTEL,IDIRE         00002090    082383
2100    3 FORMAT(I1,5F10.5,I2,F10.5,I2,2I1)                                     00002100    082383
2110    IF(ITYP(I).GT.1)KTYP=KTYP+1                                             00002110    082383
2120    C-      #########   B(IT,6) IS NEGATIVE FOR LAST BRIDGE IN DATA FILE     00002120    082383
2130    IF(B(I,6).IS.-0.0)ILAST=-1                                              00002130    082383
2140    IF(B(I,6).LT.0.0)ILAST=-1                                               00002140    082383
2150    B(I,6)=ABS(B(I,6))                                                      00002150    082383
2160    NTYP=NTYP+1                                                             00002160    082383
2170    IF(IBSZ(I).GT.0)GOTO10                                                  00002170    082383
2180    I=1                                                                     00002180    082383
2190    C-                                                                      00002190    082383
2200    C-      BEAM RELATED VARIABLES INITIALIZED                              00002200    082383
2210    C-                                                                      00002210    082383
2220    20J=1;IFT=0;IFB=0;INEG(I)=0;JNT=0;JFT=0;JFB=0;JNB=0                     00002220    082383
2230    CRFFT=0.0;CRFFB=0.0;CRNFB=0.0;CRW=0.0;TFAC=0.0;BFAC=0.0                 00002230    082383
2240    CCRW(1)=0.0;CCRW(2)=0.0;CCRW(3)=0.0;CRNFT=0.0;JB=0                      00002240    082383
2250    C-                                                                      00002250    082383
2260    C-      FOR ITH BEAM                                                    00002260    082383
2270    C-      IBPS(I) = POSITION OF BEAM IN BRIDGE                            00002270    082383
2280    C-      ICLA(I)--1=FACIA; 2=INTERIOR                                    00002280    082383
2290    C-      ISWI(I)--0=NO TRAFFIC UNDER BRIDGE; 1=TRAFFIC UNDER BRIDGE      00002290    082383
2300    C-      WMI(I) = WEB MEASUREMENT INTERVAL                               00002300    082383
2310    C-      IBS(I) = IBSZ(IT)--RELATES ITH BEAM TO IT(S) SIZE (NOMINAL)     00002310    082383
2320    C-      IPT(I)--0=UNPAINTED; 1=PAINTED                                  00002320    082383
2330    C-      IBSD(I)--0=NOT APPLICABLE; 1=READINGS TAKEN SIDE FACING         00002330    082383
2340    C-           ON COMING TRAFFIC; 2=READINGS TAKEN SIDE OPPOSITE          00002340    082383
2350    C-           ON COMING TRAFFIC                                          00002350    082383
2360    C-      ISDM(I)--0=NOT APPLICABLE; 1=DIVIDED HIGHWAY UNDER BRIDGE;      00002360    082383
2370    C-           2=UNDIVIDED HIGHWAY UNDER BRIDGE                           00002370    082383
2380    C-                                                                      00002380    082383
2390    READ(5,4)IBPS(I),ICLA(I),ISWI(I),WMI(I),IBS(I),IPT(I),IBSD(I)           00002390    082383
2400    - ,ISDM(I)                                                              00002400    082383
2410    4 FORMAT(I2,2I1,F6.2,I2,2I1,I2)                                         00002410    082383
2420    IZE=7                                                                   00002420    082383
2430    READ(5,5)(BEAM(IN),IN=J,J+10)                                           00002430    082383
2440    5 FORMAT(13F6.3)                                                        00002440    082383
2450    DO 25 IN=J,J+10                                                         00002450    082383
2460    IF(BEAM(IN).LE.0.0)GO TO 24                                             00002460    082383
2470    GO TO 25                                                                00002470    082383
2480    24 INEG(I)=-1                                                           00002480    082383
2490    C-      ##########   SECTIONS OF BEAM WITH MISSING DATA TAGGED           00002490    082383
2500    IF(IN.GE.1.AND.IN.LE.3)JFT=JFT+1                                        00002500    082383
2510    IF(IN.GE.4.AND.IN.LE.6)JNT=JNT+1                                        00002510    082383
2520    IF(IN.GE.7.AND.IN.LE.9)JNB=JNB+1                                        00002520    082383
2530    IF(IN.GE.10.AND.IN.LE.12)JFB=JFB+1                                      00002530    082383
2540    25 CONTINUE                                                             00002540    082383
2550    IFT=JNT+JFT;IFB=JFB+JNB                                                 00002550    082383
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2560    I=I+1                                                                   00002560    082383
2570    30 READ(5,5)(BEAM(IN),IN=J*11+1,J*11+11)                                00002570    082383
2580    IF(BEAM(12).LE.0.0.AND.J.LE.1) IFB=IFB+1                                00002580    082383
2590    IF(BEAM(12).LE.0.0)JFB=JFB+1                                            00002590    082383
2600    DO 40 IN=J*11+1,J*11+11                                                 00002600    082383
2610    IOP=IN                                                                  00002610    082383
2620    C-      ##########   LAST DATA ITEM IN BEAM ARRAY NEGATIVE               00002620    082383
2630    IF(BEAM(IN).LE.0.0.AND.IN.NE.12)GO TO 50                                00002630    082383
2640    40 CONTINUE                                                             00002640    082383
2650    J=J+1                                                                   00002650    082383
2660    GO TO 30                                                                00002660    082383
2670    50 K=0                                                                  00002670    082383
2680    BEAM(IOP)=ABS(BEAM(IOP))                                                00002680    082383
2690    52 K=K+1                                                                00002690    082383
2700    IF(BEAM(K).LT.0)BEAM(K)=0.0                                             00002700    082383
2710    IF(K.GE.12)GOTO 55                                                      00002710    082383
2720    GO TO 52                                                                00002720    082383
2730    55 TEMP=0.0                                                             00002730    082383
2740    TEMP2=0.0                                                               00002740    082383
2750    DO 67 L=1,6                                                             00002750    082383
2760    IF(BEAM(L).GT.0.0)TEMP=TEMP+BEAM(L)                                     00002760    082383
2770    IF(BEAM(L).GT.0.0.AND.L.GE.1.AND.L.LE.3)CRFFT=CRFFT+BEAM(L)             00002770    082383
2780    IF(BEAM(L).GT.0.0.AND.L.GE.4.AND.L.LE.6)CRNFT=CRNFT+BEAM(L)             00002780    082383
2790    IF(BEAM(L+6).GT.0.0)TEMP2=TEMP2+BEAM(L+6)                               00002790    082383
2800    IF(BEAM(L+6).GT.0.0.AND.L.GE.1.AND.L.LE.3)CRNFB=CRNFB+BEAM(L+6)         00002800    082383
2810    IF(BEAM(L+6).GT.0.0.AND.L.GE.4.AND.L.LE.6)CRFFB=CRFFB+BEAM(L+6)         00002810    082383
2820    67 CONTINUE                                                             00002820    082383
2830    IT=ABS(IBS(IZE))                                                        00002830    082383
2840    BIT6=B(IT,2)                                                            00002840    082383
2850    IF(B(IT,6).GT.0.0)BIT6=B(IT,6)                                          00002850    082383
2860    C-                                                                      00002860    082383
2870    C-      NOMINAL & ACTUAL CROSS SECTIONAL AREA CALCULATIONS              00002870    082383
2880    C-                                                                      00002880    082383
2890    C-      ##########   NOMINAL SIZES USED FOR TAGGED BEAM SECTIONS (CSA    00002890    082383
2900    C-      ##########   ONLY)                                              00002900    082383
2910    TEMPFA=B(IT,2);TEMPFB=BIT6                                              00002910    082383
2920    IF(IFT.LT.6.0)TEMPFA=TEMP/(6.0-IFT)                                     00002920    082383
2930    IF(IFB.LT.6.0)TEMPFB=TEMP2/(6.0-IFB)                                    00002930    082383
2940    TEMPF=(TEMPFA+TEMPFB)*B(IT,5)                                           00002940    082383
2950    C- WRITE(1,/)TEMP,TEMP2,TEMPF,IFT,IFB                                   00002950    082383
2960    TEMP1=0.0                                                               00002960    082383
2970    DO 68 J=13,IOP                                                          00002970    082383
2980    TEMP1=TEMP1+BEAM(J)                                                     00002980    082383
2990    68 CONTINUE                                                             00002990    082383
3000    TEMP1=TEMP1/(IOP-12)                                                    00003000    082383
3010    TEMP12=TEMP1*(B(IT,4)-B(IT,2)-BIT6)                                     00003010    082383
3020    ID=IZE                                                                  00003020    082383
3023    BIT4M=0.0                                                               00003023    082383
3024    IF(ITYP(IT).GT.1)GO TO 69                                               00003024    082383
3025    IF(B(IT,4).GT.28.60.AND.B(IT,4).LT.30.36)BIT4M=0.320                    00003025    082383
3026    IF(B(IT,4).GT.32.80.AND.B(IT,4).LT.33.50)BIT4M=0.373                    00003026    082383
3027    IF(B(IT,4).GT.35.50.AND.B(IT,4).LT.36.50)BIT4M=0.425                    00003027    082383
3030    69 ARR(ID,7)=TEMPF+TEMP12+BIT4M                                         00003030    082383
3040    C-WRITE(1,/)IT,ID,IZE,TEMP,TEMP1,TEMP12,I,IOP                           00003040    082383
3050    ARR(ID,1)=B(IT,1)+(B(IT,4)-B(IT,2)-BIT6)                                00003050    082383
3060    ARRID1=(B(IT,2)+BIT6)*B(IT,5)                                           00003060    082383
3070    ARR(ID,1)=ARR(ID,1)+ARRID1+BIT4M                                        00003070    082383
3080    HALFW=(B(IT,6)-B(IT,1))/2.0                                             00003080    082383
3090    IF(JFT.LE.1)ARR(ID,2)=CRFFT+HALFW                                       00003090    082383
3100    IF(JNT.LE.1)ARR(ID,3)=CRNFT+HALFW                                       00003100    082383
3110    IF(JNB.LE.1)ARR(ID,4)=CRNFB+HALFW                                       00003110    082383
3120    IF(JFB.LE.1)ARR(ID,5)=CRFFB+HALFW                                       00003120    082383
3130    ARR(ID,6)=CRW=B(IT,4)                                                   00003130    082383
3140    C-                                                                      00003140    082383
3150    C-      WEB DIVISION INTO UPPER, MIDDLE, AND LOWER THIRDS               00003150    082383
3160    C-                                                                      00003160    082383
3170    R=(IOP-13)/3                                                            00003170    082383
3180    IR=R                                                                    00003180    082383
3190    REM=R-IR                                                                00003190    082383
3200    WP(1)=IR;WP(2)=IR;WP(3)=IR                                              00003200    082383
3210    IF(REM.LT.0.250)GOTO4030                                                00003210    082383
3220    IF(REM.GT.0.250.AND.REM.LT.0.500)GOTO4020                               00003220    082383
3230    WP(2)=IR+1                                                              00003230    082383
3240    4020 WP(3)=IR+1                                                         00003240    082383
3250    4030 IMIT1=13+WP(3)                                                     00003250    082383
3260    IMIT2=IMIT1+WP(2)                                                       00003260    082383
3270    IMIT3=IMIT2+WP(1)                                                       00003270    082383
3280    DO 4050 IK=13,IMIT1                                                     00003280    082383
3290    4050 CCRW(1)=CCRW(1)+BEAM(IK)                                           00003290    082383
3300    CCRW(1)=CCRW(1)/(IMIT1-12.0)                                            00003300    082383
3310    DO 4060 IK=IMIT1+1,IMIT2                                                00003310    082383
3320    4060 CCRW(2)=CCRW(2)+BEAM(IK)                                           00003320    082383
3330    CCRW(2)=CCRW(2)/(IMIT2-IMIT1)                                           00003330    082383
3340    DO 4070 IK=IMIT2+1,IMIT3                                                00003340    082383
3350    4070 CCRW(3)=CCRW(3)+BEAM(IK)                                           00003350    082383
3360    CCRW(3)=CCRW(3)/(IMIT3-IMIT2)                                           00003360    082383
3370    C-                                                                      00003370    082383
3380    C-      PENETRATION OF FLANGE QUADRANTS AND WEB  (FROM NOMINAL)         00003380    082383
3390    C-                                                                      00003390    082383
3400    IF(JNB.LT.2.0)CRNFB=CRNFB/(3.0-JNB)                                     00003400    082383
3410    IF(JFB.LT.2.0)CRFFB=CRFFB/(3.0-JFB)                                     00003410    082383
3420    IF(JFT.LT.2.0)CRFFT=CRFFT/(3.0-JFT)                                     00003420    082383
3430    IF(JNT.LT.2.0)CRNFT=CRNFT/(3.0-JNT)                                     00003430    082383
3440    CRW=TEMP1                                                               00003440    082383
3450    IF(JFT.LE.1)ARR(ID,21)=-((CRFFT-B(IT,2))/2.0)*1000.0                    00003450    082383
3460    IF(JNT.LE.1)ARR(ID,22)=-((CRNFT-B(IT,2))/2.0)*1000.0                    00003460    082383
3470    IF(JNB.LE.1)ARR(ID,23)=-((CRNFB-BIT6)/2.0)*1000.0                       00003470    082383
3480    IF(JFB.LE.1)ARR(ID,24)=-((CRFFB-BIT6)/2.0)*1000.0                       00003480    082383
3490    ARR(ID,25)=-((CRW-B(IT,1))/2.0)*1000.0                                  00003490    082383
3500    ARR(ID,36)=-((CCRW(1)-B(IT,1))/2.0)*1000.0                              00003500    082383
3510    ARR(ID,37)=-((CCRW(2)-B(IT,1))/2.0)*1000.0                              00003510    082383
3520    ARR(ID,38)=-((CCRW(3)-B(IT,1))/2.0)*1000.0                              00003520    082383
3530    IF(JFT.GE.2)ARR(ID,21)=-99.0                                            00003530    082383
3540    IF(JNT.GE.2)ARR(ID,22)=-99.0                                            00003540    082383
3550    IF(JNB.GE.2)ARR(ID,23)=-99.0                                            00003550    082383
3560    IF(JFB.GE.2)ARR(ID,24)=-99.0                                            00003560    082383
3570    C-                                                                      00003570    082383
3580    C-      % REDUCTION IN CROSS SECTIONAL AREA                             00003580    082383
3590    C-                                                                      00003590    082383
3600    ARR(ID,8)=((ARR(ID,1)-ARR(ID,7))/ARR(ID,1))*100.0                       00003600    082383
3610    IF(ITYP(IT).GT.1)GOTO81                                                 00003610    082383
3620    ARR(ID,9)=((ARR(ID,1)*1.025-ARR(ID,7))/ARR(ID,1)/1.025)*100.0           00003620    082383
3630    ARR(ID,10)=((ARR(ID,1)*0.975-ARR(ID,7))/ARR(ID,1)/.975)*100.0           00003630    082383
3640    GO TO 70                                                                00003640    082383
3650    81 ARR(ID,9)=0.0                                                        00003650    082383
3660    ARR(ID,10)=(B(IT,1)-.01)*(B(IT,4)-B(IT,2)-BIT6+.02)                     00003660    082383
3670    ARR(ID,10)=ARR(ID,10)+(B(IT,2)-.01)*B(IT,5)+(BIT6-.01)*B(IT,5)          00003670    082383
3680    ARR(ID,10)=((ARR(ID,10)-ARR(ID,7))/ARR(ID,10))*100.0                    00003680    082383
3690    C-                                                                      00003690    082383
3700    C-      PENETRATION--AVERAGE PENETRATION                                00003700    082383
3710    C-                                                                      00003710    082383
3720    70 ARR(ID,11)=4*B(IT,5)-2*B(IT,1)+2*B(IT,4)-4*B(IT,3)                   00003720    082383
3730    ARR(ID,12)=(ARR(ID,1)-ARR(ID,7))/ARR(ID,11)*1000.0                      00003730    082383
3740    IF(ITYP(IT).GT.1)GOTO3555                                               00003740    082383
3750    ARR(ID,13)=(ARR(ID,1)*1.025-ARR(ID,7))/(ARR(ID,11)                      00003750    082383
3760    C-      ##########   UPPER LIMIT NEGLECTS UPPER SURFACE OF TOP FLANGE    00003760    082383
3770    C-- -B(IT,5))*1000.0                                                    00003770    082383
3780    C-      ##########   PENETRATION OF TOP FLANGE IMPLIES TWO SURFACE       00003780    082383
3790    C-      ##########   CORROSION MUST BE TAKING PLACE                     00003790    082383
3800    -    )*1000.0                                                           00003800    082383
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3810    ARR(ID,14)=(ARR(ID,1)*.975-ARR(ID,7))/ARR(ID,11)*1000.0                  00003810  082383
3820    C-      ##########   PENETRATION OF FLANGE QUADRANTS AND WEB            00003820  082383
3830    C-      ##########   SECTIONS FROM UPPER LIMIT   (FOR WFB ONLY)         00003830  082383
3840    IF(JFT.LE.1)ARR(ID,40)=-((CRFFT-B(IT,2)*1.025)/2.0)*1000.0               00003840  082383
3850    IF(JNT.LE.1)ARR(ID,41)=-((CRNFT-B(IT,2)*1.025)/2.0)*1000.0               00003850  082383
3860    IF(JNB.LE.1)ARR(ID,42)=-((CRNFB-BIT6*1.025)/2.0)*1000.0                  00003860  082383
3870    IF(JFB.LE.1)ARR(ID,43)=-((CRFFB-BIT6*1.025)/2.0)*1000.0                  00003870  082383
3880    ARR(ID,44)=-((CRW-B(IT,1)*1.025)/2.0)*1000.0                             00003880  082383
3890    ARR(ID,45)=-((CCRW(1)-B(IT,1)*1.025)/2.0)*1000.0                         00003890  082383
3900    ARR(ID,46)=-((CCRW(2)-B(IT,1)*1.025)/2.0)*1000.0                         00003900  082383
3910    ARR(ID,47)=-((CCRW(3)-B(IT,1)*1.025)/2.0)*1000.0                         00003910  082383
3920    IF(JFT.GE.2)ARR(ID,40)=-99.0                                             00003920  082383
3930    IF(JNT.GE.2)ARR(ID,41)=-99.0                                             00003930  082383
3940    IF(JNB.GE.2)ARR(ID,42)=-99.0                                             00003940  082383
3950    IF(JFB.GE.2)ARR(ID,43)=-99.0                                             00003950  082383
3960    GO TO 202                                                                00003960  082383
3970    C-      ##########   PENETRATION FROM LOWER AND                         00003970  082383
3980    C-      ##########   UPPER LIMIT CALCULATED FOR WELDED PLATE            00003980  082383
3990    C-      ##########   GIRDERS                                           00003990  082383
4000    3555 JWIT=1                                                              00004000  082383
4010    3556 IWIT=1;KWIT=1                                                       00004010  082383
4020    IF(JWIT.GT.3)GOTO201                                                     00004020  082383
4030    IF(JWIT.EQ.1)WIT=1                                                       00004030  082383
4040    IF(JWIT.EQ.2)WIT=2                                                       00004040  082383
4050    IF( JWIT.EQ.3.AND.B(IT,6).GT.0.0)WIT=6                                   00004050  082383
4060    IF(JWIT.EQ.3.AND.WIT.EQ.2)GOTO200                                        00004060  082383
4070    JWIT=JWIT+1                                                              00004070  082383
4080    IF(B(IT,WIT).GT.2.00)GOTO4000                                            00004080  082383
4090    IF(B(IT,WIT).GT.0.0.AND.B(IT,WIT).LT.0.250)GOTO3560                      00004090  082383
4100    IWIT=IWIT+1                                                              00004100  082383
4110    IF(B(IT,WIT).GE.0.250.AND.B(IT,WIT).LT.0.3125)GOTO3560                   00004110  082383
4120    IWIT=IWIT+1                                                              00004120  082383
4130    IF(B(IT,WIT).GE.0.3125.AND.B(IT,WIT).LT.0.3750)GOTO3560                  00004130  082383
4140    IWIT=IWIT+1                                                              00004140  082383
4150    IF(B(IT,WIT).GE.0.3750.AND.B(IT,WIT).LT.0.4375)GOTO3560                  00004150  082383
4160    IWIT=IWIT+1                                                              00004160  082383
4170    IF(B(IT,WIT).GE.0.4375.AND.B(IT,WIT).LT.0.5000)GOTO3560                  00004170  082383
4180    IWIT=IWIT+1                                                              00004180  082383
4190    IF(B(IT,WIT).GE.0.5000.AND.B(IT,WIT).LT.0.6250)GOTO3560                  00004190  082383
4200    IWIT=IWIT+1                                                              00004200  082383
4210    IF(B(IT,WIT).GE.0.6250.AND.B(IT,WIT).LT.0.7500)GOTO3560                  00004210  082383
4220    IWIT=IWIT+1                                                              00004220  082383
4230    IF(B(IT,WIT).GE.0.7500.AND.B(IT,WIT).LT.1.0000)GOTO3560                  00004230  082383
4240    IWIT=IWIT+1                                                              00004240  082383
4250    IF(B(IT,WIT).GE.1.0000.AND.B(IT,WIT).LE.2.0000)GOTO3560                  00004250  082383
4260    GO TO 800                                                                00004260  082383
4270    3560 IF(WIT.EQ.2.OR.WIT.EQ.6)BTEMP=B(IT,5)                               00004270  082383
4280    IF(WIT.EQ.1)BTEMP=B(IT,4)-B(IT,2)-BIT6                                   00004280  082383
4290    IF(BTEMP.LE.48.0)GOTO3570                                                00004290  082383
4300    KWIT=KWIT+1                                                              00004300  082383
4310    IF(BTEMP.GT.48.0.AND.BTEMP.LE.60.0)GOTO 3570                             00004310  082383
4320    KWIT=KWIT+1                                                              00004320  082383
4330    IF(BTEMP.GT.60.0.AND.BTEMP.LE.72.0)GOTO3570                              00004330  082383
4340    KWIT=KWIT+1                                                              00004340  082383
4350    IF(BTEMP.GT.72.0.AND.BTEMP.LE.84.0)GOTO3570                              00004350  082383
4360    KWIT=KWIT+1                                                              00004360  082383
4370    IF(BTEMP.GT.84.0.AND.BTEMP.LE.96.0)GOTO3570                              00004370  082383
4380    GOTO800                                                                  00004380  082383
4390    3570 COR(WIT)=ROLTOL(IWIT,KWIT)                                          00004390  082383
4400    WTEMP=B(IT,WIT)                                                          00004400  082383
4410    IF(WIT.EQ.6)WTEMP=BIT6                                                   00004410  082383
4420    COR(WIT)=WTEMP*(COR(WIT)/100.00+1)                                       00004420  082383
4430    GO TO 3556                                                               00004430  082383
4440    4000 IF(B(IT,WIT).GT.2.000.AND.B(IT,WIT).LT.3.00)GOTO3600                00004440  082383
4450    IWIT=IWIT+1                                                              00004450  082383
4460    IF(B(IT,WIT).GE.3.00.AND.B(IT,WIT).LT.4.00)GOTO3600                      00004460  082383
4470    GO TO 800                                                                00004470  082383
4480    3600 BTEMP=B(IT,5)                                                       00004480  082383
4490    IF(WIT.EQ.1)BTEMP=B(IT,4)-B(IT,2)-BIT6                                   00004490  082383
4500    IF(BTEMP.LT.36.0)GOTO3610                                                00004500  082383
4510    KWIT=KWIT+1                                                              00004510  082383
4520    IF(BTEMP.GE.36.0.AND.BTEMP.LT.60.0)GO TO 3610                            00004520  082383
4530    KWIT=KWIT+1                                                              00004530  082383
4540    IF(BTEMP.GE.60.0.AND.BTEMP.LT.84.0)GO TO 3610                            00004540  082383
4550    KWIT=KWIT+1                                                              00004550  082383
4560    IF(BTEMP.GE.84.0.AND.BTEMP.LT.120.0)GO TO 3610                           00004560  082383
4570    GO TO 800                                                                00004570  082383
4580    3610 COR(WIT)=TROLTO(IWIT,KWIT)+B(IT,WIT)                                00004580  082383
4590    GO TO 3556                                                               00004590  082383
4600    200 COR(6)=COR(2)                                                        00004600  082383
4610    201 ARR(ID,13)=((COR(2)+COR(6))*B(IT,5)+COR(1)*(B(IT,4)-B(IT,2)          00004610  082383
4620    -               -BIT6)-ARR(ID,7))/(ARR(ID,11))*1000.0                    00004620  082383
4630    ARR(ID,14)=(B(IT,2)-.010)*B(IT,5)+(BIT6                                  00004630  082383
4640    - -.010)*B(IT,5)+(B(IT,1)-.010)*(B(IT,4)-B(IT,2)-BIT6+.020)              00004640  082383
4650    ARR(ID,14)=(ARR(ID,14)-ARR(ID,7))/ARR(ID,11)*1000.0                      00004650  082383
4660    C-      ##########   PENETRATION OF FLANGE QUADRANTS AND WEB            00004660  082383
4670    C-      ##########   SECTIONS FROM UPPER LIMIT   (FOR WPQ ONLY)         00004670  082383
4680    IF(JFT.LE.1)ARR(ID,40)=((COR(2)-CRFFT)/2.0)*1000.0                       00004680  082383
4690    IF(JNT.LE.1)ARR(ID,41)=((COR(2)-CRNFT)/2.0)*1000.0                       00004690  082383
4700    IF(JNB.LE.1)ARR(ID,42)=((COR(6)-CRNFB)/2.0)*1000.0                       00004700  082383
4710    IF(JFB.LE.1)ARR(ID,43)=((COR(6)-CRFFB)/2.0)*1000.0                       00004710  082383
4720    ARR(ID,44)=((COR(1)-CRW)/2.0)*1000.0                                     00004720  082383
4730    ARR(ID,45)=((COR(1)-CCRW(1))/2.0)*1000.0                                 00004730  082383
4740    ARR(ID,46)=((COR(1)-CCRW(2))/2.0)*1000.0                                 00004740  082383
4750    ARR(ID,47)=((COR(1)-CCRW(3))/2.0)*1000.0                                 00004750  082383
4760    IF(JFT.GE.2)ARR(ID,40)=-99.0                                             00004760  082383
4770    IF(JNT.GE.2)ARR(ID,41)=-99.0                                             00004770  082383
4780    IF(JNB.GE.2)ARR(ID,42)=-99.0                                             00004780  082383
4790    IF(JFB.GE.2)ARR(ID,43)=-99.0                                             00004790  082383
4800    ARR(ID,9)=((COR(2)+COR(6))*B(IT,5)+COR(1)*(B(IT,4)-B(IT,2)               00004800  082383
4810    -                -BIT6))                                                 00004810  082383
4820    ARR(ID,9)=(ARR(ID,9)-ARR(IO,7))/ARR(ID,8)*100.0                          00004820  082383
4830    C-                                                                       00004830  082383
4840    C-      I-XX & I-YY NOMINAL CALCULATIONS                                 00004840  082383
4850    C-                                                                       00004850  082383
4860    202 WTEMP=(B(IT,5)-B(IT,1))/2.0                                          00004860  082383
4870    WTEMPY=(WTEMP+B(IT,1))/2.0                                               00004870  082383
4880    HWEB=(B(IT,4)-B(IT,2)-BIT6)/2.0                                          00004880  082383
4890    C-      ##########   MOMENTS TAKEN WITH RESPECT TO CENTER OF GRAVITY    00004890  082383
4900    C-      ##########   FCORDH ADJUSTS MOMENT ARM WHEN BIT6 > OR <         00004900  082383
4910    C-      ##########   B(IT,2)                                           00004910  082383
4920    FCORDH=((B(IT,2)-BIT6)*B(IT,5)*HWEB+.5*(B(IT,2)**2.0-BIT6                00004920  082383
4930    - **2.0)*B(IT,5))/((B(IT,2)+BIT6)*B(IT,5)+2.0*B(IT,1)=HWEB)              00004930  082383
4940    HTEMP1=HWEB+B(IT,2)/2.0-FCORDH                                           00004940  082383
4950    HTEMP2=HWEB+BIT6/2.0+FCORDH                                              00004950  082383
4960    C-      ##########   TAGGED SECTIONS OF BEAM EXCLUDED FROM              00004960  082383
4970    C-      ##########   CALCULATIONS                                       00004970  082383
4980    IF(JNT.GE.1)TFAC=TFAC+1                                                  00004980  082383
4990    IF(JFT.GE.1)TFAC=TFAC+1                                                  00004990  082383
5000    IF(JFB.GE.1)BFAC=BFAC+1                                                  00005000  082383
5010    IF(JNB.GE.1)BFAC=BFAC+1                                                  00005010  082383
5020    TEMPFX=(WTEMP*B(IT,2)**3.0/12.0+WTEMP*B(IT,2)=HTEMP1**                   00005020  082383
5030    - 2.0)*(2.0-TFAC)                                                        00005030  082383
5040    ARR(ID,31)=0.0                                                           00005040  082383
5050    IF(TFAC.LT.2.0)ARR(ID,31)=TEMPFX/(2.0-TFAC)                              00005050  082383
5060    TEMPFX=TEMPFX+(WTEMP*BIT6**3.0/12.0+WTEMP*BIT6                           00005060  082383
5070    - *HTEMP2**2.0)*(2.0-BFAC)                                               00005070  082383
5080    ARR(ID,32)=0.0                                                           00005080  082383
5090    IF(BFAC.LT.2.0)ARR(ID,32)=(WTEMP*BIT6**3.0/12.0 +                        00005090  082383
5100    - WTEMP*BIT6*HTEMP2**2.0)                                                00005100  082383
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5103    HI4H=(BIT4H/2.0)**0.5                                                   00005103  082383
5104    XI4H=HI4H**4.0/9.0+2.0*HI4H**2.0*(HWEB-HI4H/3.0)**2.0                   00005104  082383
5105    YI4H=HI4H**4.0/9.0+2.0*HI4H**2.0*(B(IT,1)/2.0+HI4H/3.0)**2.0            00005105  082383
5110    ARR(ID,15)=TEMPFX+B(IT,1)*B(IT,4)**3.0/12.0                             00005110  082383
5120    - +B(IT,4)*B(IT,1)*(FCORDH-(B(IT,2)-BIT6)/2.0)**2.0+XI4H                00005120  082383
5130    ARR(ID,33)=ARR(ID,15)-TEMPFX                                            00005130  082383
5140    TEMPFY+(B(IT,2)*WTEMP**3.0/12.0+B(IT,2)*WTEMP*WTEMPY                    00005140  082383
5150    - **2.0)*(2.0-TFAC)                                                     00005150  082383
5160    TEMPFY=TEMPFY+(BIT6*WTEMP**3.0/12.0+BIT6*                               00005160  082383
5170    - WTEMP*WTEMPY**2.0)*(2.0-BFAC)                                         00005170  082383
5180    ARR(ID,18)=TEMPFY+B(IT,4)*B(IT,1)**3.0/12.0+YI4H                        00005180  082383
5190    C-WRITE(1,/)ARR(ID,31),ARR(ID,32),ARR(ID,33)                            00005190  082383
5200    C-                                                                      00005200  082383
5210    C-      I-XX & I-YY  ACTUAL CALCULATIONS                                00005210  082383
5220    C-                                                                      00005220  082383
5230    C-        FLANGE MOMENT CALCULATIONS                                    00005230  082383
5240    C-                                                                      00005240  082383
5250    QUARTW=(B(IT,5)-B(IT,1))/4.0                                            00005250  082383
5260    HALFD=B(IT,4)/2.0                                                       00005260  082383
5270    HALFD2=HALFD                                                            00005270  082383
5280    HALFD=HALFD-FCORDH+(B(IT,2)-BIT6)/2.0                                   00005280  082383
5290    IA=0;JA=0;JB=0;ARR(ID,16)=0.0;ARR(ID,19)=0.0                            00005290  082383
5300    300 IA=IA+1;JA=JA+1                                                     00005300  082383
5310    IF(IA.GE.12)GOTO315                                                     00005310  082383
5320    C-      ##########    TAGGED SECTIONS OF BEAM EXCLUDED FROM             00005320  082383
5330    C-      ##########    CALCULATIONS                                      00005330  082383
5340    IF(IA.GE.1.AND.IA.LE.2.AND.JFT.GE.1)GOTO313                             00005340  082383
5350    IF(IA.GE.4.AND.IA.LE.5.AND.JNT.GE.1)GOTO313                             00005350  082383
5360    IF(IA.GE.7.AND.B(IT,6).GT.0.0)HALFD=HALFD2+1                            00005360  082383
5370    - *(FCORDH-(B(IT,2)-BIT6)/2.0)                                          00005370  082383
5380    IF(IA.GE.7.AND.IA.LE.8.AND.JN8.GE.1)GOTO313                             00005380  082383
5390    IF(IA.GE.10.AND.IA.LE.11.AND.JF8.GE.1)GOTO313                           00005390  082383
5400    IF(BEAM(IA).GT.BEAM(IA+1))GOTO305                                       00005400  082383
5410    FRH=BEAM(IA)                                                            00005410  082383
5420    FTH=BEAM(IA+1)-BEAM(IA)                                                 00005420  082383
5430    GO TO 310                                                               00005420  082383
5440    305 FRH=BEAM(IA+1)                                                      00005440  082383
5450    FTH=BEAM(IA)-BEAM(IA+1)                                                 00005450  082383
5460    310 CIXR(JA)=QUARTW*FRH**3.0/12.0+QUARTW*FRH*(FRH/2.0-HALFD)**2.0       00005460  082383
5470    C- WRITE(1,/)FRH,FTH,IA,BEAM(IA),BEAM(IA+1)                             00005470  082383
5480    CIXT(JA)=QUARTW*FTH**3.0/36.+QUARTW*FTH*(HALFD-FRH-FTH/3.)**2./2.       00005480  082383
5490    ARR(ID,16)=ARR(ID,16)+CIXR(JA)+CIXT(JA)                                 00005490  082383
5500    DYR=B(IT,1)/2.0+ QUARTW/2.0                                             00005500  082383
5510    IF(IA.EQ.1.OR.IA.EQ.5.OR.IA.EQ.7.OR.IA.EQ.11)DYR=DYR+QUARTW             00005510  082383
5520    CIYR(JA)=FRH*QUARTW**3.0/12.0+QUARTW*FRH*DYR**2.0                       00005520  082383
5530    DYT=(B(IT,1))/2.0+QUARTW/3.0                                            00005530  082383
5540    IF(IA.EQ.1.OR.IA.EQ.5.OR.IA.EQ.7.OR.IA.EQ.11)DYT=DYT+QUARTW             00005540  082383
5550    CIYT(JA)=FTH*QUARTW**3.0/36.0+QUARTW*FTH*DYT**2.0/2.0                   00005550  082383
5560    ARR(ID,19)=ARR(ID,19)+CIYR(JA)+CIYT(JA)                                 00005560  082383
5570    IF(JA.LT.2)GOTO300                                                      00005570  082383
5580    JB=JB+1                                                                 00005580  082383
5590    ARR(ID,25+JB)=CIXR(JA)+CIXT(JA)+CIXR(JA-1)+CIXT(JA-1)                   00005590  082383
5600    C-WRITE(1,/)JA,CIXR(JA),CIXT(JA),CIXR(JA-1),CIXT(JA-1)                  00005600  082383
5610    C-WRITE(1,/)JB,ARR(ID,25+JB),ARR(ID,32)                                 00005610  082383
5620    C- WRITE(1,/)CIYR(JA),CIYT(JA),CIYR(JA-1),CIYT(JA-1)                    00005620  082383
5630    IF(IA.GE.11)GOTO315                                                     00005630  082383
5640    312 JA=0;IA=IA+1                                                        00005540  082383
5650    GO TO 300                                                               00005650  082383
5660    313 IA=IA+1;JB=JB+1;ARR(ID,25+JB)=0.0;GO TO 312                         00005660  082383
5670    C-                                                                      00005670  082383
5680    C-      START OF WEB MOMENT CALCULATIONS                                00005680  082383
5690    C-                                                                      00005690  082383
5700    C-    "WEB" EMBEDED IN FLANGES--UPPER & LOWER                           00005700  082383
5710    C-                                                                      00005710  082383
5720    315 IF(IA.LE.13)IA=11                                                   00005720  082383
5730    WTEMP1=ARR(ID,16)                                                       00005730  082383
5740    SIXR=0.0;SIYR=0.0;IA=IA+2                                               00005740  082383
5750    WDIFF=(B(IT,4)-2.0*B(IT,2)-WWI(IZE)=(IOP-13.0))/2.0                     00005750  082383
5760    WHR=WDIFF                                                               00005760  082383
5770    HWEB=HWEB-FCORDH                                                        00005770  082383
5780    C- WRITE(1,/) WDIFF,ID,WWI(IZE),B(IT,4),B(IT,2),FCORDH                  00005780  082383
5790    IF(WDIFF.LT.0.0)GO TO 399                                               00005790  082383
5800    SIXR=B(IT,1)*B(IT,2)**3.0/12.0+B(IT,1)*B(IT,2)*(HWEB+B(IT,2)            00005800  082383
5810    - /2.0)**2.0                                                            00005810  082383
5820    SIYR=B(IT,2)*B(IT,1)**3.0/12.0                                          00005820  082383
5830    IF(B(IT,6).GT.0.0)GO TO 340                                             00005830  082383
5840    ARR(ID,16)=ARR(ID,16)+SIXR*2.0                                          00005840  082383
5850    ARR(ID,19)=ARR(ID,19)+SIYR*2.0                                          00005850  082383
5860    GO TO 345                                                               00005860  082383
5870    340 SIXR=SIXR+B(IT,1)*B(IT,6)**3.0/12.0+B(IT,6)*B(IT,1)*                00005870  082383
5880    - (HWEB+2.0*FCORDH+B(IT,6)/2.0)**2.0                                    00005880  082383
5890    SIYR=SIYR+B(IT,6)*B(IT,1)**3.0/12.0                                     00005890  082383
5900    ARR(ID,16)=ARR(ID,16)+SIXR                                              00005900  082383
5910    ARR(ID,19)=ARR(ID,19)+SIYR                                              00005910  082383
5920    C- WRITE(1,/)SIXR,SIXT,SIYR,SIYT                                        00005920  082383
5930    345 BTEMP=BEAM(IA)-B(IT,1)                                              00005930  082383
5940    BNTEMP=B(IT,1)-BEAM(IA)                                                 00005940  082383
5950    C-                                                                      00005950  082383
5960    C-      WEB BETWEEN FLANGE AND FIRST DATA POINT                         00005960  082383
5970    C-                                                                      00005970  082383
5980    HWEB=(B(IT,4)-B(IT,2)-BIT6)/2.0                                         00005980  082383
5990    HWEB=HWEB-FCORDH                                                        00005990  082383
6000    IF(BTEMP.LT.0.0)GOTO350                                                 00006000  082383
6010    355 SIXR=B(IT,1)*WHR**3.0/12.0+B(IT,1)*WHR*(HWEB-WDIFF/2.0)**2.0        00006010  082383
6020    SIYR=WHR*B(IT,1)**3.0/12.0                                              00006020  082383
6030    SIXT=(BTEMP/2.0*WDIFF**3.0/36.0+BTEMP*WDIFF/2.0*(HWEB-WDIFF*            00006030  082383
6040    - 2.0/3.0)**2.0)*2.0                                                    00006040  082383
6050    SIYT=WDIFF*(BTEMP/2.0)**3.0/36.0+.5*WDIFF*(BTEMP)*(BTEMP/               00006050  082383
6060    - 6.0 + B(IT,1)/2.0)**2.0                                               00006060  082383
6070    GO TO 370                                                               00006070  082383
6080    350 SIXR=BEAM(IA)*WHR**3.0/12.0+BEAM(IA)*WHR*(HWEB-WDIFF/2.0)           00006080  082383
6090    - **2.0                                                                 00006090  082383
6100    SIYR=WHR*BEAM(IA)**3.0/12.0                                             00006100  082383
6110    SIXT=((BNTEMP/2.0)**3.0*WDIFF/36.0+.5*BNTEMP*WDIFF*                     00006110  082383
6120    - (HWEB-WDIFF/3.0)**2.0)*2.0                                            00006120  082383
6130    SIYT=(WDIFF*(BNTEMP/2.0)**3.0/36.0+.5*WDIFF*BNTEMP*(BNTEMP/6.0          00006130  082383
6140    - +BEAM(IA)/2.0)**2.0)*2.0                                              00006140  082383
6150    370 ARR(ID,16)=ARR(ID,16)+SIXR+SIXT+XI4H                                00006150  082383
6160    ARR(ID,19)=ARR(ID,19)+SIYR+SIYT+YI4H                                    00006160  082383
6170    AABB=(HWEB-WDIFF)/2.0                                                   00006170  082383
6180    IF(WHR.LT.0.0.OR.AABB.LT.0.0)WRITE(1,351)A(1),A(2),IBPS(I),ID           00006180  082383
6190    351 FORMAT(" BRIDGE  ",2A6,"  BEAM  ",I2,"   CHECK WEB DATA POINTS      00006190  082383
6200    - ",I2,"TH  BEAM IN DATA")                                              00006200  082383
6210    C- WRITE(1,/)A(1),A(2),ARR(ID,16),ARR(ID,19),SIYR,SIYT,SIXR,SIXT        00006210  082383
6220    WHR=WWI(IZE)                                                            00006220  082383
6230    HWEB=HWEB-WDIFF-WHR                                                     00006230  082383
6240    GO TO 401                                                               00006240  082383
6250    C-                                                                      00006250  082383
6260    C-      REMAINDER OF WEB                                                00006260  082383
6270    C-                                                                      00006270  082383
6280    389 WHR=WWI(IZE)+WDIFF                                                  00006280  082383
6290    HWEB=HWEB-WHR                                                           00006290  082383
6300    GO TO 401                                                               00006300  082383
6310    400 HWEB=HWEB-WHR;WHR=WWI(IZE)                                          00006310  082383
6320    401 BTEMP=BEAM(IA+1)-BEAM(IA)                                           00006320  082383
6330    BNTEMP=-BTEMP                                                           00006330  082383
6340    IF(BTEMP.LT.0.0)GOTO450                                                 00006340  082383
6350    SIXR=BEAM(IA)*WHR**3.0/12.0+BEAM(IA)*WHR*(HWEB+WHR/2.0)**2.0            00006350  082383
6360    SIYR=WHR*BEAM(IA)**3.0/12.0                                             00006360  082383
6370    SIXT=(BTEMP/2.0*WHR**3.0/36.0+BTEMP*WHR/2.0*(HWEB+WHR*2.0/              00006370  082383
6380    - 3.0)**2.0)*2.0                                                        00006380  082383
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6390    SIYT=WHR*(BTEMP/2.0)**3.0/36.0+.5*WHR*(BTEMP)*(BTEMP/                    00006390  082383
6400    - 6.0+BEAM(IA)/2.0)**2.0                                                 00006400  082383
6410    GO TO 470                                                                00006410  082383
6420    450 SIXR=BEAM(IA+1)*WHR**3.0/12.0+BEAM(IA+1)*WHR*(HWEB+WHR/2.0           00006420  082383
6430    - )**2.0                                                                 00006430  082383
6440    SIYR=WHR*BEAM(IA+1)**3.0/12.0                                            00006440  082383
6450    SIXT=(BNTEMP/2.0*WHR**3.0/36.0+BNTEMP*WHR/2.0*(HWEB                      00006450  082383
6460    - +WHR/2.0)**2.0)*2.0                                                    00006460  082383
6470    SIYT=(WHR*(BNTEMP/2.0)**3.0/36.0+.5*WHR*BNTEMP*(BNTEMP/                  00006470  082383
6480    - 6.0+BEAM(IA+1))**2.0)*2.0                                              00006480  082383
6490     470 ARR(ID,16)=ARR(ID,16)+SIXR+SIXT                                     00006490  082383
6500     ARR(ID,19)=ARR(ID,19)+SIYR+SIYT                                         00006500  082383
6510    C- WRITE(1,/)ID,ARR(ID,16),ARR(ID,19),SIXR,SIXT,SIYR,SIYT                00006510  082383
6520    C- WRITE(1,/)IA,IA+1,BEAM(IA),BEAM(IA+1)                                 00006520  082383
6530    IA=IA+1                                                                  00006530  082383
6540    IF((IOP-IA).GT.1)GOTO400                                                 00006540  082383
6550    IF((IOP-IA).EQ.1.AND.WDIFF.LT.0.0)GOTO488                                00006550  082383
6560    IF((IOP-IA).EQ.1)GOTO400                                                 00006560  082383
6570    IF((IA-IOP).GE.0.AND.WDIFF.LT.0.0)GOTO490                                00006570  082383
6580    GO TO 489                                                                00006580  082383
6590    488 WHR=WMI(IZE)+WDIFF                                                   00006590  082383
6600    HWEB=HWEB+WHR                                                            00006600  082383
6610    GO TO 401                                                                00006610  082383
6620    489 IF((IA-IOP).GE.1)GOTO490                                             00006620  082383
6630    BEAM(IA+1)=B(IT,1);WHR=WDIFF                                             00006630  082383
6640    HWEB=HWEB-WHR                                                            00006640  082383
6650    GO TO 401                                                                00006650  082383
6660    C-                                                                       00006660  082383
6670    C-      I-XX  &  I-YY  % REDUCTION FROM NOMINAL                          00006670  082383
6680    C-                                                                       00006680  082383
6690    490 ARR(ID,17)=(ARR(ID,15)-ARR(ID,16))/ARR(ID,15)*100.0                  00006690  082383
6700    ARR(ID,20)=(ARR(ID,18)-ARR(ID,19))/ARR(ID,18)*100.0                      00006700  082383
6710    TESTY=B(IT,4)-B(IT,2)-BITS-(IOP-13)*WMI(IZE)                             00006710  082383
6720    C- WRITE(1,/)IBS(I-1),I                                                  00006720  082383
6730    ARR(ID,30)=ARR(ID,16)-WTEMP1                                             00006730  082383
6740    IF(TESTT.LE.0.0)WRITE(1,351)A(1),A(2),IBPS(I-1),ID                       00006740  082383
6750    85 IF(IBS(I-1).GT.0)GOTO20                                               00006750  082383
6760    C-                                                                       00006760  082383
6770    C-      SUMMARY ARRAY CALCULATIONS                                       00006770  082383
6780    C-                                                                       00006780  082383
6790    DO 595 J=1,3                                                             00006790  082383
6800    DO 595 I=1,10                                                            00006800  082383
6810    SARR(J,I)=0.0                                                            00006810  082383
6820    595 CONTINUE                                                             00006820  082383
6830    IFAC=0;INT=0                                                             00006830  082383
6840    DO 610 I=1,IZE                                                           00006840  082383
6850    IF(ICLA(I).GT.1)GOTO601                                                  00006850  082383
6860    IFAC=IFAC+1                                                              00006860  082383
6870    SARR(1,1)=SARR(1,1)+ARR(I,8)                                             00006870  082383
6880    SARR(1,2)=SARR(1,2)+ARR(I,12)                                            00006880  082383
6890    SARR(1,3)=SARR(1,3)+ARR(I,17)                                            00006890  082383
6900    SARR(1,4)=SARR(1,4)+ARR(I,20)                                            00006900  082383
6910    GO TO 610                                                                00006910  082383
6920    601 SARR(2,1)=SARR(2,1)+ARR(I,8)                                         00006920  082383
6930    SARR(2,2)=SARR(2,2)+ARR(I,12)                                            00006930  082383
6940    SARR(2,3)=SARR(2,3)+ARR(I,17)                                            00006940  082383
6950    SARR(2,4)=SARR(2,4)+ARR(I,20)                                            00006950  082383
6960    INT=INT+1                                                                00006960  082383
6970    610 CONTINUE                                                             00006970  082383
6980    DO 630 I=1,4                                                             00006980  082383
6990    SARR(3,I)=(SARR(2,I)+SARR(1,I))/(INT+IFAC)                               00006990  082383
7000    IF(INT.EQ.0)GOTO611                                                      00007000  082383
7010    SARR(2,I)=SARR(2,I)/INT                                                  00007010  082383
7020    611 IF(IFAC.EQ.0)GOTO630                                                 00007020  082383
7030    SARR(1,I)=SARR(1,I)/IFAC                                                 00007030  082383
7040    630 CONTINUE                                                             00007040  082383
7050    C-                                                                       00007050  082383
7060    C-      IBPST(I)--POSITION OF BEAM WITH RESPECT TO ONCOMING TRAFFIC      00007060  082383
7070    C-                                                                       00007070  082383
7080    IF(ISWI(1).LT.1.OR.IDIRE.EQ.0)GOTO640                                    00007080  082383
7090    IF(IDIRE.EQ.2)GOTO635                                                    00007090  082383
7100    DO 633 I=1,IZE                                                           00007100  082383
7110    IBPST(I)=IBPS(I)                                                         00007110  082383
7120    633 CONTINUE                                                             00007120  082383
7130    GO TO 640                                                                00007130  082383
7140    635DO 637 I=1,IZE                                                        00007140  082383
7150    IBPST(I)=(IBPS(IZE)+1)-IBPS(I)                                           00007150  082383
7160    637 CONTINUE                                                             00007160  082383
7170    C-                                                                       00007170  082383
7180    C-      GENERATION OF BASIS DATA FILE                                    00007180  082383
7190    C-                                                                       00007190  082383
7200    640 IF(IREP.GT.0.AND.JREP.LE.2)GOTO 650                                  00007200  082383
7210    DO 650 I=1,IZE                                                           00007210  082383
7220    IDB=I                                                                    00007220  082383
7230    ITB=ABS(IBS(I))                                                          00007230  082383
7240    X1=100.0                                                                 00007240  082383
7250    IF(ARR(IDB,15).GT.0.0)X1=(ARR(IDB,15)-ARR(IDB,16))/ARR(IDB,15)*100       00007250  082383
7260    X2=100.0                                                                 00007260  082383
7270    IF(ARR(I,31).GT.0.0)X2=(ARR(I,31)-ARR(I,26))/ARR(I,31)*100               00007270  082383
7280    X3=100.0                                                                 00007280  082383
7290    IF(ARR(I,31).GT.0.0)X3=(ARR(I,31)-ARR(I,27))/ARR(I,31)*100               00007290  082383
7300    X4=100.0                                                                 00007300  082383
7310    IF(ARR(I,32).GT.0.0)X4=(ARR(I,32)-ARR(I,26))/ARR(I,32)*100               00007310  082383
7320    X5=100.0                                                                 00007320  082383
7330    IF(ARR(I,32).GT.0.0)X5=(ARR(I,32)-ARR(I,28))/ARR(I,32)*100               00007330  082383
7340    X6=100.0                                                                 00007340  082383
7350    IF(ARR(I,33).GT.0.0)X6=(ARR(I,33)-ARR(I,30))/ARR(I,33)*100               00007350  082383
7360    WRITE(9,655)VINTBS,VINTTE,ARR(IDB,12),ARR(IDB,21),ARR(IDB,22),           00007360  082383
7370    - ARR(IDB,23),                                                           00007370  082383
7380    - ARR(IDB,24),ARR(IDB,25),ARR(IDB,36),ARR(IDB,37),ARR(IDB,38)            00007380  082383
7390    WRITE(9,656)ICLA(I),IBPST(I),ITYP(ITB),ICLS,ISWI(1),ICAT,IBHC,           00007390  082383
7400    - IPT(I),HEIGHT,IFAB,ISTEL,ARR(IDB,13),ARR(IDB,40),ARR(IDB,41)           00007400  082383
7410    - ,ARR(IDB,42),ARR(IDB,43),ARR(IDB,44)                                   00007410  082383
7420    WRITE(9,657)ARR(IDB,45),ARR(IDB,46),ARR(IDB,47),X1,X2,X3,X4,X5,X6       00007420  082383
7430    - ,IBSD(I),ISDH(I),IBPS(I),IABUT                                         00007430  082383
7432    SITRX1=ARR(IDB,15)/B(ITB,4)*2.0                                          00007432  082383
7433    SITRY1=ARR(IDB,18)/B(ITB,5)*2.0                                          00007433  082383
7435    SITRX=ARR(IDB,16)/B(ITB,4)*2.0                                           00007435  082383
7436    SITRY=ARR(IDB,19)/B(ITB,5)*2.0                                           00007436  082383
7437    SIXM=0.0;SIYM=0.0                                                        00007437  082383
7438    IF(SITRX1.GT..0000001)SIXM=(SITRX1-SITRX)/SITRX1*100.0                   00007438  082383
7439    IF(SITRY1.GT..0000001)SIYM=(SITRY1-SITRY)/SITRY1*100.0                   00007439  082383
7440    WRITE(9,658)VINT1,VINT2,VINT3,VINT4,VINTD,VINTTB,VINTTT                  00007440  082383
7441    -,SIXM,SIYM                                                              00007441  082383
7450    650 CONTINUE                                                             00007450  082383
7460    655FORMAT(" ",2(F6.3,","),7(F8.2,","),2(F7.2,","))                       00007460  082383
7470    656FORMAT(" ",8(I2,",",F6.2,",",2(I2,","),6(F6.2,","))                  00007470  082383
7480    657FORMAT(" ",9(F6.3,","),I1,",",I2,",",I2,",",I1,",")                  00007480  082383
7490    658FORMAT(" ",9(F6.3,","))                                               00007490  082383
7500    C-                                                                       00007500  082383
7510    C-   · WRITEOUT OF INDIVIDUAL BRIDGE DATA                                00007510  082383
7520    C-                                                                       00007520  082383
7521    IF(IREP.NE.4)GOTO 98                                                     00007521  082383
7522    WRITE(6,101)(A(I),I=1,36)                                                00007522  082383
7523    97 FORMAT("1"//////1X,12A6,/(18X,12A6))                                  00007523  082383
7524    GO TO 99                                                                 00007524  082383
7530    98WRITE(6,101)(A(I),I=1,36)                                              00007530  082383
7540    101 FORMAT("1"/1X,12A6,/(18X,12A6))                                      00007540  082383
7550    99 WRITE(6,102)BCAT(ICAT*2-1),AGE,AGERT1                                 00007550  082383
7560    102 FORMAT(" "./14X,"BRIDGE ENVIRONMENT ",A12,10X,                       00007560  082383
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     -"BRIDGE STARTED ",F5.0,15X,"STEEL IN PLACE ",I2,"/",I2,"/",I2)
     WRITE(6,103)BHCAT(IBHC*2-1),BHCAT(IBHC*2),AGERTO,AGERT2
     103 FORMAT(" ",13X,2A12,17X,"READINGS TAKEN ",I2,"/",I2,"/",I2,
     - 12X,"DECK COMPLETED ",I2,"/",I2,"/",I2)
     IF(ISWI(IZE).LT.1)GO TO 150
     WRITE(6,104)BCLAS((ICLS+1)*3-2),BCLAS((ICLS+1)*3-1)
     -,BCLAS((ICLS+1)*3) ,AGERT3,AGERT4
     104 FORMAT("       ",8X,3A12,5X,"OPEN TO TRAFFIC (OVER) ",I2,"/",I2,
     -"/",I2,4X,"OPEN TO TRAFFIC (UNDER) ",I2,"/",I2,"/",I2)
     GO TO 151
     150 WRITE(6,152)BCLAS((ICLS+1)*3-2),BCLAS((ICLS+1)*3-1)
     -,BCLAS((ICLS+1)*3) ,AGERT3
     152 FORMAT("       ",8X,3A12,5X,"OPEN TO TRAFFIC (OVER) ",I2,"/",I2,
     -"/",I2)
     151 DO 89 J=1,IZE
     BCL(J)=BCLA(ICLA(J))
     JT=ABS(IBS(J))
     BCL2(J)=BT(ITYP(JT))
     89 CONTINUE
     IF(IZE.GT 7)GOTO90
     ISTART=1
     91 IF(IREP.NE.4) GO TO 92
     WRITE(6,95)(ALPHA(I),IBPS(I),I=ISTART,IZE)
     95 FORMAT("O ",/15X,A1,"YEAR ",I2,A1,7X,"YEAR ",I2,A1,7X,"YEAR "
     -  ,I2,A1,7X,"YEAR ",I2,A1,7X,"YEAR ",I2,A1,7X,"YEAR ",I2,A1,7X,
     - "YEAR ",I2)
     GO TO 93
     92 WRITE(6,105)(ALPHA(I),IBPS(I),I=ISTART,IZE)
     105 FORMAT("O ",13X,A1,"BEAM ",I2,A1,7X,"BEAM ",I2,A1,7X,"BEAM "
     -  ,I2,A1,7X,"BEAM ",I2,A1,7X,"BEAM ",I2,A1,7X,"BEAM ",I2,A1,7X,
     - "BEAM ",I2)
     WRITE(6,106) (BCL(J),J=ISTART,IZE)
     106 FORMAT(" ",15X,A9,6X,A9,6X,A9,6X,A9,6X,A9,6X,A9,6X,A9)
     93 WRITE(6,145) (BCL2(J),J=ISTART,IZE)
     145 FORMAT(" ",15X,A9,6X,A9,6X,A9,6X,A9,6X,A9,6X,A9,6X,A9)
     C-
     C-      CROSS SECTIONAL AREAS
     C-
     WRITE(6,107)(ARR(I,1),I=ISTART,IZE)
     107 FORMAT("ONONIMAL AREA",F10.4,5X,F10.4,5X,F10.4,5X,F10.4,5X,
     - F10.4,5X,F10.4,5X,F10.4)
     WRITE(6,108)
     108 FORMAT(" ","(INCHES**2)")
     WRITE(6,109) (ARR(I,7),I=ISTART,IZE)
     109 FORMAT("OACTUAL AREA",1X,F10.4,5X,F10.4,5X,F10.4,5X,F10.4,5X,
     - F10.4,5X,F10.4,5X,F10.4)
     WRITE(6,110)
     110 FORMAT(" ","(INCHES**2)")
     WRITE(6,111)(ARR(I,8),I=ISTART,IZE)
     111 FORMAT("O% REDUCTION",1X,F10.4,5X,F10.4,5X,F10.4,5X,F10.4,5X,
     - F10.4,5X,F10.4,5X,F10.4)
     WRITE(6,112)
     112 FORMAT(" ","FROM NOMINAL")
     C-IF(KTYP.EQ.NTYP)GOTO2000
     WRITE(6,111)(ARR(I,9),I=ISTART,IZE)
     WRITE(6,113)
     113 FORMAT(" ","FROM UPPER LIMIT")
     2000 WRITE(6,111)(ARR(I,10),I=ISTART,IZE)
     WRITE(6,114)
     114 FORMAT(" ","FROM LOWER LIMIT")
     C-
     C-      PENETRATION RESULTS
     C-
     WRITE(6,115)(ARR(I,12),I=ISTART,IZE)
     115 FORMAT("OPENETRATION    ",F7.2,8X,F7.2,8X,F7.2,8X,F7.2
     -,8X,F7.2,8X,F7.2,8X,F7.2)
     WRITE(6,116)
     116 FORMAT(" (FROM NOMINAL) ")
     C-      ##########   UPPER LIMIT PRINTED FOR WELDED PLATE
     C-      ##########   GIRDERS
     C-IF(KTYP.EQ.NTYP)GOTO2010
     WRITE(6,117)(ARR(I,13),I=ISTART,IZE)
     117 FORMAT("OUPPER LIMIT   ",F7.2,8X,F7.2,8X,F7.2,8X,F7.2,
     - 8X,F7.2,8X,F7.2,8X,F7.2)
     2010 WRITE(6,118)(ARR(I,14),I=ISTART,IZE)
     118 FORMAT("OLOWER LIMIT   ",F7.2,8X,F7.2,8X,F7.2,8X,F7.2,
     - 8X,F7.2,8X,F7.2,8X,F7.2)
     WRITE(6,119)(ARR(I,15),I=ISTART,IZE)
     119 FORMAT("OI--XX NOMINAL",2X,F8.2,7X,F8.2,7X,F8.2,7X,F8.2,7X,F8.2,7X,
     -F8.2,7X,F8.2,7X,F8.2)
     C-
     C-      I-XX  RESULTS
     C-
     WRITE(6,121) (ARR(I,16),I=ISTART,IZE)
     121 FORMAT("OI--XX ACTUAL",3X,F8.2,7X,F8.2,7X,F8.2,7X,F8.2,7X,F8.2,7X,
     -F8.2,7X,F8.2,7X,F8.2)
     WRITE(6,123)(ARR(I,17),I=ISTART,IZE)
     123 FORMAT("O% REDUCTION ",3X,F6.2,9X,F6.2,9X,F6.2,9X,F6.2,9X,F6.2,9X,
     -F6.2,9X,F6.2,9X,F6.2)
     WRITE(6,124)
     124 FORMAT(" FROM NOMINAL")
     C-
     C-      I-YY  RESULTS
     C-
     WRITE(6,125)(ARR(I,18),I=ISTART,IZE)
     125 FORMAT("OI--YY NOMINAL",2X,F7.2,8X,F7.2,8X,F7.2,8X,F7.2,8X,F7.2,8X,
     -F7.2,8X,F7.2,8X,F7.2)
     WRITE(6,127)(ARR(I,19),I=ISTART,IZE)
     127 FORMAT("OI--YY ACTUAL",3X,F7.2,8X,F7.2,8X,F7.2,8X,F7.2,8X,F7.2,8X,
     -F7.2,8X,F7.2,8X,F7.2)
     WRITE(6,129)(ARR(I,20),I=ISTART,IZE)
     129 FORMAT("O% REDUCTION ",4X,F6.2,9X,F6.2,9X,F6.2,9X,F6.2,9X,F6.2,9X,
     -F6.2,9X,F6.2,9X,F6.2)
     WRITE(6,130)
     C-
     C-      IF MORE THAN 7 BEAMS REPEAT BEAM PRINT SECTION
     C-
     130 FORMAT(" FROM NOMINAL")
     IF(IMAX1.LT.1.AND.IBM.GT.0)GOTO90
     GO TO 600
     90 CONTINUE
     IF(IMAX.LE.0)IMAX=IZE
     IBM=IBM+1
     IBM1=IMAX-IBM+7
     IZE=IBM+7
     IF(IBM1.LE.0.AND.IBM.GT.1)IZE=IMAX
     ISTART=(IBM-1)+7+1
     IF(IZE.EQ.IMAX)IMAX1=1
     GO TO 91
     C-
     C-      INDIVIDUAL BRIDGE DATA SUMMARY
     C-
     600 IF(IREP.EQ.4)GO TO 660
     WRITE(6,131)A(1),A(2)
     131 FORMAT("O","      DATA SUMMARY FOR BRIDGE  ",2A8)
     WRITE(6,132)
     132FORMAT("O",25X,"% REDUCTION (AREA)  ","PENETRATION (FROM NOMIN",
     -"AL   % REDUCTION I--XX   ","% REDUCTION I--YY   "/" ",25X,"FROM
     -NOMINAL",5X,"--MILS) ",21X,"FROM NOMINAL",8X,
     -"FROM NOMINAL")
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8800    WRITE(6,133)(SARR(1,I),I=1,4)                                          00008800    082383
8810    133 FORMAT("0",5X,"FACIA BEAM",8X,F6.2,14X,F7.2,21X,F6.2,14X,F6.2)     00008810    082383
8820    WRITE(6,134)                                                           00008820    082383
8830    134 FORMAT(" ",5X,"AVERAGES")                                          00008830    082383
8840    WRITE(6,135) (SARR(2,I),I=1,4)                                         00008840    082383
8850    135 FORMAT("0",5X,"INTERIOR BEAM",8X,F6.2,14X,F7.2,21X,F6.2,14X,F6.2)  00008850    082383
8860    WRITE(6,134)                                                           00008860    082383
8870    WRITE(6,136)(SARR(3,I),I=1,4)                                          00008870    082383
8880    136 FORMAT("0",5X,"BRIDGE AVERAGES",4X,F6.2,14X,F7.2,21X,F6.2,14X,     00008880    082383
8890    -F6.2)                                                                 00008890    082383
8900    IF(IREP.EQ.0)GO TO 705                                                 00008900    082383
8910    WRITE(6,137)(REPDAT(I,JREP),I=1,3)                                     00008910    082383
8920    137FORMAT("+",110X,3A6)                                                00008920    082383
8930    IF(JREP.EQ.3)WRITE(6,138)VINDIF                                        00008930    082383
8940    138 FORMAT(" ",112X,"AFTER ",F5.2," YEARS")                            00008940    082383
8950    660JREP=JREP+1                                                         00008950    082383
8960    IF(JREP.GE.4)GO TO 705                                                 00008960    082383
8970    IF(IREP.EQ.2)GO TO 703                                                 00008970    082383
8980    IF(IREP.NE.1)GO TO 705                                                 00008980    082383
8990    DO 701 I=1,IZE                                                         00008990    082383
9000    DO 701 J=1,50                                                          00009000    082383
9010    ARRTEM(I,J)=ARR(I,J)                                                   00009010    082383
9020    701 CONTINUE                                                           00009020    082383
9030    DO 702 I=1,3                                                           00009030    082383
9040    DO 702 J=1,4                                                           00009040    082383
9050    SARTEM(I,J)=SARR(I,J)                                                  00009050    082383
9060    702 CONTINUE                                                           00009060    082383
9070    VINTTB=VINTBS                                                          00009070    082383
9080    VINTTT=VINTTE                                                          00009080    082383
9090    GO TO 705                                                              00009090    082383
9100    703 DO 704 I=1,IZE                                                     00009100    082383
9110    DO 704 J=1,50                                                          00009110    082383
9120    ARR(I,J)=ARRTEM(I,J)-ARR(I,J)                                          00009120    082383
9130    704 CONTINUE                                                           00009130    082383
9140    DO 706 I=1,3                                                           00009140    082383
9150    DO 706 J=1,4                                                           00009150    082383
9160    SARR(I,J)=SARTEM(I,J)-SARR(I,J)                                        00009160    082383
9170    706 CONTINUE                                                           00009170    082383
9180    VINDIF=VINTTB-VINTBS                                                   00009180    082383
9190    GO TO 640                                                              00009190    082383
9200    705IF(ILAST.LT.0)GOTO800                                               00009200    082383
9210    700 GO TO 1000                                                         00009210    082383
9220    800 CONTINUE                                                           00009220    082383
9230    LOCK 1                                                                 00009230    082383
9240    LOCK 9                                                                 00009240    082383
9250    STOP                                                                   00009250    082383
9260    END                                                                    00009260    082383
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   100    S07 OF 03035     WB I196 UNDER 146TH AVENUE
   200  READINGS TAKEN 20 FEET SOUTH OF WB SHOULDER
   300  SANDED INSTEAD OF GRINDING
   400  12216.58 1972   1979 10317908117309227311037312117 4 1 0
   500  2   0.500      0.875      0.875     49.625     16.00    -1  0.750    0511
   600  0111 6.0    1 1 1
   700   -.999 -.999 -.999 0.885 0.885 0.890 0.740 0.740 0.735 -.999 -.999
   800   -.999 0.550 0.500 0.510 0.500 0.500 0.500 0.500-0.500
   900  0221 6.0    1 1 1
  1000   -.999 -.999 -.999 0.880 0.880 0.875 0.735 0.735 0.740 -.999 -.999
  1100   -.999 0.500 0.500 0.500 0.500 0.505 0.500 0.500-0.500
  1200  0321 6.0    1 1 1
  1300   -.999 -.999 -.999 0.870 0.870 0.890 0.745 0.745 0.745 -.999 -.999
  1400   -.999 0.505 0.505 0.510 0.510 0.610 0.510 0.505-0.505
  1500  0521 6.0    1 1 1
  1600   -.999 -.999 -.999 0.875 0.875 0.875 0.740 0.740 0.745 -.999 -.999
  1700   -.999 0.505 0.510 0.510 0.510 0.510 0.510 0.510-0.510
  1800  0611 6.0   -1 2 1
  1900   -.999 -.999 -.999 0.875 0.870 0.885 0.735 0.740 0.745 -.999 -.999
  2000   -.999 0.500 0.500 0.500 0.500 0.500 0.500 0.500-0.500
  2100  B03 OF 13061     WB I94 BL OVER BATTLE CREEK RIVER
  2200  READINGS TAKEN 5 FEET SOUTH OF NORTH ABUTMENT
  2300  GOOD FISHING IF YOU LIKE CARP
  2400  11000.00 1975   1980 09238007247608217610127600000000 0 0
  2500  1   0.5220      0.6700     0.6700    29.640     10.458   -1  0.00     0510
  2600  0110 3.0   1
  2700   0.665 0.670 0.680 0.650 0.650 0.655 0.670 0.670 0.680 0.665 0.675
  2800   0.675 0.585 0.550 0.525 0.520 0.520 0.520 0.515 0.515 0.520-0.565
  2900  0220 3.0   1
  3000   0.675 0.685 0.695 0.665 0.660 0.685 0.665 0.675 0.690 0.660 0.660
  3100   0.660 0.600 0.560 0.530 0.530 0.525 0.525 0.520 0.520 0.520-0.565
  3200  0320 3.0   1
  3300   0.660 0.665 0.660 0.690 0.680 0.665 0.650 0.650 0.650 0.695 0.680
  3400   0.670 0.570 0.530 0.515 0.520 0.525 0.530 0.625 0.530 0.535-0.590
  3500  0420 3.0   1
  3600   0.680 0.685 0.695 0.675 0.675 0.670 0.670 0.685 0.695 0.670 0.665
  3700   0.665 0.565 0.535 0.620 0.520 0.525 0.525 0.525 0.525 0.530-0.580
  3800  0520 3.0   1
  3900   0.700 0.695 0.705 0.675 0.670 0.660 0.690 0.695 0.705 0.670 0.660
  4000   0.665 0.570 0.540 0.520 0.520 0.525 0.520 0.530 0.560 0.545-0.595
  4100  0620 3.0   1
  4200   0.675 0.685 0.700 0.660 0.665 0.665 0.700 0.700 0.715 0.680 0.680
  4300   0.680 0.590 0.556 0.530 0.530 0.530 0.525 0.525 0.520 0.525-0.565
  4400  0720 3.0   1
  4500   0.670 0.685 0.700 0.670 0.680 0.675 0.665 0.670 0.680 0.645 0.635
  4600   0.640 0.560 0.625 0.515 0.515 0.520 0.520 0.510 0.515 0.530-0.575
  4700  0810 3.0  -1
  4800   0.675 0.675 0.690 0.665 0.660 0.665 0.675 0.685 0.700 -.999 -.999
  4900   -.999 0.560 0.530 0.525 0.520 0.525 0.530 0.530 0.535 0.530-0.565
  5000  B02 OF 23092     SB M99 OVER GRAND RIVER
  5100  READINGS TAKEN 6 FEET NORTH OF SOUTH ABUTMENT
  5200
  5300  11200.00 1978   1980 09258009177910097911112800000000 0 0
  5400  1   0.5640     0.850      0.850     30.00      10.50    -1  0.00     0000
  5500  0110 3.0   1
  5600   0.850 0.855 0.865 0.820 0.815 0.815 0.855 0.850 0.855 0.825 0.815
  5700   0.805 0.585 0.560 0.555 0.550 0.550 0.555 0.560 0.560 0.580-0.605
  5800  0320 3.0   1
  5900   0.835 0.835 0.840 0.820 0.815 0.795 0.860 0.860 0.860 0.835 0.825
  6000   0.820 0.595 0.565 0.560 0.555 0.550 0.550 0.555 0.555 0.565-0.595
  6100  0410 3.0  -1
  6200   0.855 0.855 0.855 0.830 0.820 0.815 0.830 0.835 0.840 0.815 0.805
  6300   0.805 0.610 0.585 0.575 0.570 0.565 0.565 0.565 0.570 0.575-0.595
  6400  B03 OF 23092     NB M99 OVER THE GRAND RIVER
  6500  READINGS TAKEN 6 FEET SOUTH OF NORTH ABUTMENT
  6600  50 TO 70 PERCENT OF MILL SCALE STILL INTACT
  6700  11200.00 1978   1980 09258008187810037810037806127B 0 0
  6800  1   0.5640     0.8500     0.8500    30.000     10.500   -1  0.00     0000
  6900  0110 3.0   1
  7000   0.800 0.810 0.805 0.835 0.835 0.830 0.800 0.805 0.810 0.845 0.835
  7100   0.830 0.590 0.575 0.555 0.560 0.555 0.555 0.560 0.560 0.565-0.595
  7200  0220 3.0   1
  7300   0.850 0.850 0.850 0.835 0.830 0.815 0.830 0.840 0.850 0.825 0.815
  7400   0.815 0.620 0.595 0.680 0.575 0.570 0.566 0.570 0.570 0.580-0.605
  7500  0320 3.0   1
  7800   0.845 0.840 0.845 0.820 0.810 0.805 0.830 0.840 0.845 0.805 0.800
  7700   0.800 0.600 0.575 0.685 0.560 0.560 0.560 0.565 0.565 0.575-0.610
  7800  0420 3.0   1
  7900   0.855 0.860 0.855 0.815 0.820 0.830 0.825 0.835 0.840 0.810 0.800
  8000   0.805 0.620 0.590 0.575 0.575 0.570 0.570 0.565 0.570 0.575-0.600
  8100  0520 3.0   1
  8200   0.820 0.830 0.840 0.865 0.860 0.860 0.820 0.825 0.830 0.865 0.855
  8300   0.850 0.620 0.590 0.580 0.580 0.570 0.570 0.565 0.570 0.575-0.600
  8400  0610 3.0  -1
  8500   0.840 0.830 0.825 0.865 0.865 0.860 0.815 0.820 0.825 0.855 0.850
  8600   0.845 0.610 0.585 0.580 0.575 0.570 0.570 0.570 0.570 0.580-0.595
  8700  P01 OF 25132     PEDESTRIAN BRIDGE OVER I475
  8800  READINGS TAKEN 20 FEET WEST OF 1ST PIER EAST OF WEST ABUTMENT
  8900  NOT OPEN TO TRAFFIC AT TIME OF READINGS
  9000  32115.5  1976   1980 09268007307707297808267809078I 1 0
  9100  1   0.538      0.794      0.794     35.550     11.345   -1  0.00     0501
  9200  0110 3.0   1
  9300   0.810 0.805 0.820 0.795 0.785 0.795 0.788 0.790 0.795 0.780 0.785
  9400   0.790 0.640 0.616 0.600 0.595 0.595 0.585 0.590 0.590 0.585 0.595
  9500   0.600-0.630
  9600  0210 3.0   -1
  9700   0.795 0.795 0.800 0.775 0.770 0.765 0.810 0.815 0.825 0.775 0.780
  9800   0.780 0.630 0.605 0.595 0.590 0.590 0.590 0.585 0.600 0.600 0.600
  9900   0.615-0.640
 10000  P02 OF 25132     PEDESTRIAN BRIDGE OVER SB I475
 10100  READINGS TAKEN 10 FEET EAST OF WEST PIER
 10200  ROAD NOT YET OPEN TO TRAFFIC
 10300  12015.50 1977   1980 092680100778000000110478090781 1 0
 10400  1   0.554      0.738      0.738     32.860     11.484   -1  0.00     0012
 10500  0110 3.0   1
 10600   0.755 0.785 0.775 0.715 0.750 0.710 0.700 0.725 0.700 0.745 0.750
 10700   0.725 0.535 0.640 0.550 0.550 0.565 0.655 0.560 0.565 0.565 0.565
 10800  -0.560
 10900  0210 3.0  -1
 11000   0.775 0.800 0.800 0.755 0.775 0.740 0.730 0.755 0.735 0.775 0.775
 11100   0.755 0.560 0.555 0.565 0.665 0.665 0.670 0.670 0.575 0.575 0.580
 11200  -0.580
 11300  P02 OF 25132     PEDESTRAIN BRIDGE OVER NB I475
 11400  READINGS TAKEN 10 FEET WEST OF EAST PIER
 11500  NOT OPEN TO TRAFFIC AT TIME OF READINGS
 11600  12015.50 1977   1980 092680100778000000110478090781 1 0
 11700  1   0.554      0.738      0.738     32.860     11.484   -1  0.00     0011
 11800  0110 3.0   1
 11900   0.705 0.740 0.715 0.770 0.770 0.755 0.725 0.745 0.745 0.715 0.746
 12000   0.715 0.535 0.645 0.550 0.560 0.850 0.560 0.660 0.660 0.565-0.560
 12100  0210 3.0  -1
 12200   0.715 0.750 0.720 0.775 0.780 0.755 0.738 0.750 0.755 0.715 0.735
 12300   0.710 0.545 0.550 0.555 0.555 0.550 0.650 0.550 0.555 0.570 0.568
 12400  -0.570
 12500  S21 OF 25132     WB LONGWAY OVER NB I475
 12600  READINGS TAKEN 10-15 FEET EAST OF CENTER PIER
 12700
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31014.60 1975   1980 0925801007781007780600790907B1 1 0
1    0.6250     0.9400     0.9400     35.840     11.972   -1  0.00
0110 3.0   1
 0.935 0.930 0.930 0.825 0.885 0.890 0.930 0.925 0.955 0.915 0.920
 0.915 0.665 0.645 0.625 0.620 0.615 0.620 0.625 0.625 0.630 0.630
 0.625-0.665
0220 3.0   1
 0.875 0.880 0.890 0.900 0.905 0.915 0.930 0.930 0.925 0.960 0.950
 0.950 0.665 0.635 0.625 0.625 0.625 0.625 0.625 0.625 0.630 0.630
-0.640
0320 3.0   1
 0.885 0.885 0.890 0.925 0.905 0.925 0.935 0.935 0.930 0.940 0.945
 0.945 0.675 0.650 0.635 0.635 0.630 0.630 0.635 0.635 0.640 0.640
 0.655-0.680
0420 3.0   1
 0.810 0.895 0.900 0.935 0.930 0.930 0.940 0.940 0.935 0.950 0.930
 0.940 0.665 0.645 0.630 0.630 0.625 0.625 0.630 0.630 0.635 0.630
 0.650-0.670
0520 3.0   1
 0.935 0.940 0.945 0.920 0.910 0.920 0.925 0.920 0.935 0.910 0.915
 0.915 0.660 0.635 0.625 0.630 0.620 0.620 0.620 0.625 0.630 0.630
 0.635-0.665
0610 3.0  -1
 0.815 0.815 0.925 0.980 0.975 0.975 0.895 0.900 0.900 0.965 0.955
 0.945 0.685 0.640 0.630 0.625 0.625 0.620 0.625 0.625 0.630 0.630
 0.645-0.675
S26 OF 25132      NB M54 UNDER I475
READINGS TAKEN 15 FEET NORTH OF SOUTH PIER
NOT OPEN TO TRAFFIC AT TIME OF READINGS--UNPAINTED
21014.60 1978   1980 1008800826781118780907810907B1 1 0
2    0.4375     1.000      1.000      44.000     16.00     1  0.00     0002
2    0.5000     0.750      0.750      43.750     14.00     2  1.000    0002
2    0.5000     0.625      0.625      43.625     12.00    -3  1.000    0002
0110 3.0   1
 1.015 1.015 1.015 1.015 1.015 1.010 1.010 1.005 1.010 1.005 1.010
 1.010 0.435 0.435 0.435 0.440 0.440 0.435 0.440 0.435 0.440 0.440
 0.435 0.440 0.435-0.435
0220 3.0   2
 0.755 0.760 0.755 0.755 0.755 0.755 1.015 1.015 1.015 1.015 1.015
 1.015 0.495 0.500 0.500 0.500 0.500 0.505 0.500 0.505 0.500 0.500
 0.500 0.500-0.495
0320 3.0   2
 0.765 0.765 0.760 0.755 0.760 0.760 1.015 1.020 1.020 1.020 1.015
 1.020 0.505 0.505 0.505 0.505 0.500 0.505 0.505 0.505 0.505 0.510
 0.510 0.505-0.505
0420 3.0  -3
 0.635 0.635 0.635 0.630 0.635 0.635 1.005 1.005 1.005 1.005 1.010
 1.005 0.505 0.505 0.500 0.505 0.500 0.505 0.505 0.500 0.505 0.505
 0.505 0.505 0.505-0.505
S26 OF 25132      NB M54 UNDER I475
READINGS TAKEN 15 FEET NORTH OF SOUTH PIER
NOT OPEN TO TRAFFIC AT TIME OF READINGS--PAINTED
21014.60 1978   1980 1008800826781118780907810907B1 1 0
2    0.4375     1.000      1.000      44.000     16.00     1  0.000    0020
2    0.5000     0.750      0.750      43.750     14.00     2  1.000    0020
2    0.5000     0.625      0.625      43.625     12.00    -3  1.000    0020
0110 3.0  11
 1.020 1.020 1.020 -.999 -.999 -.999 -.999 -.999 -.999 1.015 1.010
 1.015 0.440 0.440 0.440 0.440 0.440 0.435 0.440 0.445 0.440 0.445
 0.445 0.445 0.440-0.440
0220 3.0  21
 -.999 -.999 -.999 0.765 0.760 0.760 1.020 1.015 1.015 -.999 -.999
 -.999 0.500 0.505 0.505 0.505 0.510 0.510 0.505 0.505 0.510 0.505
 0.510 0.510 0.505-0.505
0320 3.0  21
 -.999 -.999 -.999 0.760 0.760 0.760 1.015 1.015 1.015 -.999 -.999
 -.999 0.505 0.505 0.500 0.505 0.510 0.505 0.510 0.505 0.505 0.505
 0.505 0.505 0.505-0.500
0420 3.0  -31
 0.630 0.640 0.645 -.999 -.999 -.999 -.999 -.999 -.999 1.005 1.010
 1.010 0.500 0.505 0.500 0.500 0.500 0.505 0.500 0.505 0.500 0.500
-0.500
S31 OF 25132      SB I475 UNDER COLDWATER ROAD
READINGS TAKEN 12 FEET EAST OF WEST ABUTMENT
NOT OPEN TO TRAFFIC AT TIME OF READING
31014.6  1977   1980 0926800910771008770617780907B1 1 0
1    0.5545     0.738      0.738      32.860     11.484   -1  0.00     1211
0420 3.0   1
 0.740 0.755 0.740 0.760 0.745 0.765 0.730 0.745 0.750 0.745 0.735
 0.725 0.545 0.545 0.550 0.550 0.545 0.550 0.550 0.560 0.565 0.565
-0.560
0520 3.0   1
 0.745 0.760 0.770 0.755 0.745 0.720 0.745 0.760 0.775 0.765 0.755
 0.725 0.560 0.555 0.550 0.555 0.555 0.560 0.560 0.585 0.570 0.580
-0.585
0720 3.0   1
 0.715 0.745 0.755 0.755 0.765 0.745 0.695 0.725 0.720 0.775 0.770
 0.755 0.555 0.550 0.645 0.545 0.550 0.550 0.545 0.545 0.550 0.550
-0.550
0810 3.0  -1
 0.765 0.775 0.770 0.780 0.775 0.765 0.755 0.770 0.770 0.775 0.775
 0.770 0.555 0.555 0.550 0.555 0.555 0.555 0.560 0.570 0.570
-0.565
S47 OF 25132      SB I475 EXIT RAMP OVER SB I475 ENTRANCE RAMP
READINGS TAKEN 8 FEET SOUTH OF NORTH ABUTMENT
NOT OPEN TO TRAFFIC AT TIME OF READINGS
32014.50 1977   1980 0925800715780729780907810907B1 0 0
2    0.625      0.625      0.625      55.500     15.00     1  0.875    0010
2    0.625      1.125      1.125      56.375     15.00    -2  1.250    0010
0110 3.0   1
 0.615 0.620 0.620 0.825 0.625 0.620 0.870 0.875 0.875 0.875 0.880
 0.875 0.600 0.605 0.605 0.605 0.605 0.605 0.605 0.605 0.605 0.610
 0.610 0.610 0.610 0.610 0.610 0.610 0.610 0.610-0.610
0220 3.0   2
 1.115 1.125 1.120 1.115 1.115 1.115 1.235 1.240 1.240 1.240 1.245
 1.240 0.610 0.610 0.615 0.610 0.610 0.610 0.615 0.610 0.610 0.615
 0.610 0.610 0.615 0.620 0.615 0.620 0.615-0.615
0310 3.0  -1
 0.615 0.615 0.615 -.999 -.999 -.999 0.865 0.870 0.870 0.870 0.875
 0.865 0.615 0.620 0.615 0.620 0.615 0.620 0.620 0.620 0.620 0.620
 0.625 0.620 0.620 0.620 0.620 0.620 0.620 0.620-0.615
R01 OF 38101      EB I94 OVER GTW & NYC RAILROADS
READINGS TAKEN 8 FEET EAST OF 5TH PIER WEST OF EAST ABUTMENT
UNPAINTED WITH PAINTED COMPARISON
12322.08 1975   1979 1115790714770714770727770000000 0 0
2    0.375      1.375      1.375      46.750     10.0     -1  0.00     0300
0110 3.0  -1
 1.375 1.370 1.365 -.998 -.999 -.999 -.999 -.999 -.999 1.370 1.375
 1.380 0.380 0.380 0.380 0.380 0.380 0.380 0.380 0.380 0.380 0.380
 0.380 0.385 0.380 0.380-0.380
R01 OF 38101      EB I94 OVER PC RAILROAD & GRAND RIVER
READINGS TAKEN 8 FEET EAST OF 5TH PIER WEST OF EAST ABUTMENT
PAINTED WITH UNPAINTED COMPARISON
12322.08 1975   1979 1115790714770714770727770000000 0 0
2    0.375      1.375      1.375      46.750     10.0     -1  0.00     0300
0110 3.0  -11
 1.380 1.370 1.360 -.998 -.999 -.999 -.998 -.998 -.998 1.380 1.375
 1.380 0.380 0.380 0.385 0.385 0.380 0.380 0.380 0.385 0.385 0.385
 0.385 0.385 0.385 0.385-0.385
R01 OF 38101      I94 OVER GTW & NYC RAILROADS
READINGS TAKEN 5-8 FEET EAST OF 1ST PIER WEST OF EAST ABUTMENT
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25900    PAINTED WITH UNPAINTED COMPARISON
26000    12300.00 1975   1980 09248007147707147707277700000000 0 0
26100    2   0.375       1.375       1.375      46.750    10.00     1  0.00     0300
26200    2   0.4375      1.375       1.375      52.750    10.00     2  0.00     0300
26300    2   0.4375      1.625       1.625      53.250    10.00    -3  0.00     0300
26400    0110 3.0    21
26500     1.380 1.375 1.375 1.410 1.405 1.415 1.380 1.375 1.405 1.370 1.375
26600     1.375 0.435 0.430 0.435 0.440 0.440 0.435 0.440 0.435 0.435 0.440
26700     0.440 0.440 0.440 0.435 0.440-0.435
26800    0220 3.0    31
26900     1.635 1.630 1.625 1.635 1.635 1.635 1.630 1.625 1.620 1.620 1.620
27000     1.625 0.425 0.425 0.430 0.430 0.435 0.430 0.435 0.430 0.435 0.430
27100     0.435 0.435 0.435 0.430 0.430 0.430-0.435
27200    0320 3.0    31
27300     1.635 1.630 1.630 1.630 1.630 1.635 1.625 1.615 1.620 1.615 1.620
27400     1.625 0.435 0.435 0.435 0.435 0.435 0.435 0.440 0.435 0.435 0.435
27500     0.440 0.435 0.430 0.435 0.435 0.435-0.435
27600    0410 3.0   -11
27700     1.380 1.375 1.375 1.365 1.370 1.375 1.380 1.380 1.375 1.370 1.375
27800     1.380 0.380 0.380 0.375 0.380 0.380 0.380 0.375 0.380 0.380 0.385
27900     0.380 0.385 0.385 0.380-0.375
28000    R01 OF 38101      I94 OVER NYC & GTW RAILROADS
28100    READINGS TAKEN 5-8 FEET EAST OF 1ST PIER WEST OF EAST ABUTMENT
28200    UNPAINTED WITH PAINTED COMPARISION
28300    12300.00 1975   1980 09248007147707147707277700000000 0 0
28400    2   0.375       1.375       1.375      46.750    10.00     1  0.00     0300
28500    2   0.4375      1.375       1.375      52.750    10.00     2  0.00     0300
28600    2   0.4375      1.625       1.625      53.250    10.00    -3  0.00     0300
28700    0110 3.0    2
28800     1.380 1.375 1.380 1.405 1.405 1.405 1.375 1.365 1.370 1.365 1.365
28900     1.375 0.430 0.430 0.435 0.435 0.430 0.435 0.430 0.435 0.435 0.440
29000     0.435 0.440 0.435 0.440 0.435-0.430
29100    0220 3.0    3
29200     1.630 1.630 1.625 1.625 1.630 1.635 1.630 1.630 1.625 1.615 1.625
29300     1.625 0.430 0.430 0.425 0.430 0.430 0.430 0.436 0.436 0.430 0.435
29400     0.430 0.435 0.430 0.430 0.430 0.430-0.435
29500    0320 3.0    3
29600     1.640 1.630 1.625 1.625 1.625 1.635 1.610 1.615 1.620 1.610 1.615
29700     1.625 0.425 0.430 0.430 0.435 0.430 0.430 0.435 0.430 0.435 0.435
29800     0.430 0.435 0.430 0.435 0.430-0.435
29900    0410 3.0   -1
30000     1.376 1.370 1.370 1.380 1.375 1.375 1.380 1.370 1.375 1.370 1.370
30100     1.375 0.375 0.380 0.380 0.380 0.380 0.376 0.380 0.375 0.376 0.375
30200     0.380 0.375 0.375 0.380-0.375
30300    S01 OF 41051      NB M37 OVER CALVIN COLLEGE ENTRANCE WAY
30400    READINGS TAKEN 6 FEET NORTH OF SOUTH ABUTMENT
30500
30600    31012.00 1978   1980 09238006197907147907008007008O 1 0
30700    1   0.522       0.6700      0.6700     29.640    10.458   -1  0.00     0021
30800    0111 3.0    1 1 2
30900     0.650 0.650 0.655 0.690 0.685 0.690 0.660 0.650 0.665 0.710 0.695
31000     0.685 0.530 0.505 0.495 0.495 0.505 0.500 0.500 0.500 0.500-0.535
31100    0221 3.0    1 1 2
31200     0.660 0.635 0.650 0.695 0.690 0.680 0.685 0.660 0.665 0.710 0.695
31300     0.695 0.540 0.515 0.505 0.505 0.510 0.515 0.510 0.505 0.510-0.550
31400    0321 3.0    1 2 2
31500     0.665 0.660 0.665 0.695 0.690 0.695 0.665 0.660 0.670 0.705 0.695
31600     0.685 0.555 0.530 0.510 0.515 0.515 0.620 0.515 0.515 0.515-0.545
31700    0711 3.0   -1 2 2
31800     0.665 0.660 0.665 0.710 0.685 0.680 0.660 0.655 0.665 0.695 0.685
31900     0.675 0.545 0.515 0.510 0.510 0.510 0.515 0.510 0.515 0.505-0.545
32000    S03 OF 41051 SB M37 OVER CALVIN COLLEGE ENTRANCE WAY
32100    READINGS TAKEN 7 FEET SOUTH OF NORTH ABUTMENT
32200    MILL SCALE AND ROLLING DEFECTS PROMINANT
32300    31012.00 1978   1980 09238006287907147907008007008O 1 0
32400    1   0.522       0.6700      0.6700     29.640    10.458   -1  0.00     0021
32500    0221 3.0    1 1 2
32600     0.685 0.690 0.695 0.660 0.650 0.650 0.685 0.695 0.705 0.655 0.660
32700     0.665 0.515 0.505 0.505 0.510 0.510 0.510 0.510 0.505-0.540
32800    0321 3.0    1 1 2
32900     0.695 0.695 0.700 0.655 0.650 0.650 0.695 0.705 0.720 0.665 0.665
33000     0.675 0.585 0.525 0.510 0.515 0.515 0.515 0.515 0.515 0.510-0.550
33100    0421 3.0    1 1 2
33200     0.670 0.680 0.695 0.665 0.660 0.660 0.685 0.685 0.700 0.670 0.665
33300     0.665 0.545 0.540 0.510 0.505 0.510 0.510 0.505 0.505 0.500-0.535
33400    0621 3.0    1 2 2
33500     0.680 0.690 0.700 0.695 0.655 0.650 0.685 0.690 0.720 0.665 0.665
33600     0.675 0.550 0.530 0.515 0.515 0.515 0.520 0.525 0.520 0.525-0.555
33700    0710 3.0   -1 2 2
33800     0.680 0.685 0.700 0.665 0.660 0.670 0.680 0.690 0.710 0.670 0.670
33900     0.670 0.550 0.520 0.505 0.510 0.515 0.515 0.515 0.515 0.520-0.550
34000    S15 OF 44044      EB M21 UNDER M53
34100    READINGS TAKEN 20 FEET NORTH OF SOUTH ABUTMENT
34200    DIRECTLY OVER EB OUTSIDE SHOULDER
34300    31200.00 1979   1980 10248004168008O68O102580000000 0 0
34400    2   0.5625      0.625       0.625      55.875    15.00    -1  1.250    0302
34500    0110 3.0    1
34600     -.999 -.999 -.999 0.620 0.615 0.810 1.240 1.230 1.230 1.230 1.230
34700     1.240 0.550 0.555 0.555 0.555 0.555 0.560 0.560 0.560 0.560 0.560
34800     0.555 0.550 0.555 0.555 0.555 0.555 0.555-0.555
34900    0220 3.0    1
35000     0.620 0.615 0.615 0.615 0.620 0.620 1.240 1.235 1.230 1.235 1.235
35100     1.245 0.550 0.555 0.550 0.555 0.555 0.550 0.555 0.555 0.555 0.560
35200     0.555 0.560 0.555 0.565 0.555 0.555 0.550-0.555
35300    0320 3.0    1
35400     0.620 0.620 0.620 0.620 0.625 0.630 1.235 1.230 1.230 1.235 1.235
35500     1.240 0.550 0.555 0.555 0.555 0.550 0.550 0.555 0.550 0.555 0.555
35600     0.550 0.555 0.565 0.650 0.555 0.550 0.555-0.550
35700    0420 3.0    1
35800     0.625 0.620 0.625 0.635 0.635 0.625 1.230 1.230 1.235 1.235 1.240
35900     1.245 0.555 0.550 0.550 0.555 0.560 0.555 0.555 0.556 0.555 0.560
36000     0.555 0.555 0.555 0.560 0.555 0.550 0.555-0.555
36100    0520 3.0    1
36200     0.625 0.625 0.630 0.630 0.630 0.635 1.230 1.225 1.230 1.225 1.230
36300     1.235 0.555 0.555 0.555 0.560 0.555 0.555 0.560 0.555 0.560 0.555
36400     0.555 0.555 0.560 0.555 0.560 0.555-0.560
36500    0620 3.0    1
36600     0.625 0.625 0.630 0.630 0.630 0.635 1.230 1.225 1.230 1.225 1.230
36700     1.235 0.555 0.555 0.555 0.560 0.555 0.555 0.555 0.560 0.555 0.555
36800     0.555 0.560 0.555 0.560 0.565 0.560-0.560
36900    0720 3.0    1
37000     0.640 0.640 0.645 0.640 0.635 0.640 1.235 1.230 1.230 1.235 1.240
37100     1.245 0.555 0.565 0.560 0.560 0.560 0.550 0.565 0.560 0.560 0.565
37200     0.560 0.565 0.565 0.560 0.565 0.560-0.560
37300    0820 3.0    1
37400     0.630 0.625 0.630 0.630 0.635 0.630 1.240 1.235 1.235 1.235 1.240
37500     1.235 0.565 0.560 0.565 0.560 0.560 0.560 0.560 0.565 0.560 0.565
37600     0.560 0.565 0.560 0.565 0.565 0.560 0.560-0.560
37700    0910 3.0   -1
37800     0.625 0.620 0.620 0.625 0.630 0.630 1.235 1.240 1.235 1.235 1.240
37900     1.245 0.560 0.560 0.555 0.560 0.555 0.560 0.556 0.560 0.560 0.560
38000     0.560 0.560 0.560 0.555 0.560 0.560 0.555-0.560
38100    S05 OF 50061      NB I698 UNDER EB 11 MILE ROAD
38200    READINGS TAKEN 10 FEET SOUTH OF NORTH ABUTMENT
38300
38400    32118.10 1872   1980 11078007007200000000000000120078 1 0
38500    2   0.750       1.250       1.260      68.500    24.00    -1  0.00     0002
38600    0111 3.0    1 2 1
38700     1.295 1.300 1.305 1.315 1.305 1.300 1.280 1.280 1.285 1.275 1.280
38800     1.280 0.765 0.765 0.765 0.770 0.700 0.765 0.765 0.760 0.765 0.760
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-0.755
0221 3.0    1 2 1
 1.305 1.305 1.310 1.310 1.305 1.305 1.280 1.285 1.280 1.295 1.290
 1.290 0.755 0.760 0.760 0.755 0.760 0.760 0.760 0.765 0.760 0.760-0.760
0321 3.0    1 1 1
 1.310 1.315 1.315 1.320 1.310 1.310 1.280 1.280 1.285 1.275 1.275
 1.270 0.750 0.755 0.755 0.760 0.760 0.755 0.755 0.760 0.760 0.755
 0.755-0.750
0411 3.0   -1 1 1
 1.280 1.280 1.280 1.280 1.280 1.280 1.275 1.280 1.285 1.290 1.285
 1.280 0.755 0.760 0.760 0.760 0.765 0.760 0.760 0.760 0.765 0.760
 0.760-0.755
S25 OF 50081      EB I696 UNDER SCHOENHERN ROAD
READINGS TAKEN 12 FEET NORTH OF SOUTH ABUTMENT

32116.3   1973   1980 102180070073000000000000120075 1 0
2   0.500      0.750      0.750      43.50      16.00    -1  0.00      1101
0111 3.0    1 1 1
 0.760 0.765 0.765 0.770 0.765 0.770 0.770 0.730 0.740 0.745 0.735 0.730
 0.735 0.470 0.470 0.475 0.475 0.480 0.475 0.480 0.480 0.480 0.475
 0.480 0.480 0.480-0.475
0221 3.0    1 1 1
 0.770 0.775 0.775 0.775 0.770 0.765 0.735 0.735 0.740 0.745 0.745
 0.745 0.485 0.490 0.490 0.495 0.495 0.495 0.495 0.500 0.500 0.495
 0.500 0.495 0.495-0.495
0321 3.0    1 1 1
 0.770 0.770 0.770 0.780 0.775 0.770 0.745 0.750 0.745 0.740 0.725
 0.725 0.475 0.475 0.480 0.475 0.480 0.480 0.475 0.480 0.480 0.480
 0.480 0.475-0.475
0721 3.0    1 2 1
 0.760 0.775 0.770 0.775 0.775 0.775 0.740 0.750 0.755 0.755 0.755
 0.745 0.495 0.500 0.495 0.495 0.500 0.500 0.505 0.495 0.495 0.500
 0.495 0.495 0.495-0.495
0821 3.0    1 2 1
 0.775 0.775 0.780 0.770 0.770 0.770 0.740 0.750 0.775 0.755 0.755
 0.755 0.510 0.505 0.510 0.505 0.510 0.510 0.510 0.515 0.510 0.510
 0.510 0.515-0.510
0911 3.0   -1 2 1
 0.765 0.770 0.775 0.775 0.775 0.770 0.745 0.740 0.745 0.740 0.745
 0.745 0.500 0.500 0.505 0.505 0.505 0.510 0.510 0.505 0.510 0.510
 0.510 0.505-0.505
S18 OF 63103      EB I696 TO NORTH BOUND I75
READINGS TAKEN 10 FEET WEST OF EAST ABUTMENT
UNPAINTED WITH PAINTED COMPARISON
12116.25 1971   1979 08247908127110217111007212007I 0 0
2   0.500      0.7500     0.7500     53.500     16.00    -1  0.00      0212
0111 4.0    1 1 1
 -.999 -.999 -.999 0.750 0.745 0.750 0.750 0.750 0.750 -.999 -.999
 -.999 0.475 0.485 0.490 0.490 0.490 0.490 0.490 0.490 0.490 0.495
 0.495-0.495
0221 4.0    1 1 1
 -.999 -.999 -.999 0.745 0.740 0.745 0.745 0.740 0.740 -.999 -.999
 -.999 0.500 0.495 0.485 0.490 0.495 0.495 0.495 0.495 0.495 0.495
 0.490 0.490-0.485
0321 4.0    1 1 1
 -.999 -.999 -.999 0.735 0.730 0.730 0.730 0.735 0.740 -.999 -.999
 -.999 0.485 0.485 0.485 0.485 0.485 0.485 0.490 0.490 0.485 0.490
 0.490 0.485-0.480
0411 4.0   -1 2 1
 0.740 0.750 0.750 -.999 -.999 -.999 -.999 -.999 -.999 0.755 0.745
 0.745 0.475 0.475 0.480 0.480 0.480 0.485 0.485 0.485 0.485 0.480
 0.480 0.480-0.475
S18 OF 63103      EB I696 TO NORTH BOUND I75
READINGS TAKEN DIRECTLY OVER EAST PIER
PAINTED WITH UNPAINTED COMPARISON
12116.25 1971   1979 08247908127110217111007212007I 1 0
2   0.500      0.7500     0.7500     53.500     16.00    -1  0.00      0212
0221 4.0    112 1
 0.770 0.765 0.770 -.999 -.999 -.999 -.999 -.999 -.999 0.765 0.760
 0.765 0.510 0.510 0.520 0.510 0.510 0.510 0.510 0.510 0.515 0.510
 0.510 0.505-0.500
0321 4.0    112 1
 0.750 0.750 0.760 0.760 0.750 0.750 -.999 -.999 -.999 0.745 0.745
 0.740 0.510 0.505 0.505 0.510 0.510 0.510 0.510 0.505 0.510 0.510
 0.505 0.505-0.500
0411 4.0   -112 1
 0.760 0.760 0.765 -.999 -.999 -.999 -.999 -.999 -.999 0.760 0.755
 0.745 0.490 0.485 0.485 0.490 0.485 0.490 0.485 0.495 0.490 0.485
 0.485 0.485-0.490
S18 OF 63103      EB I696 TO NORTH BOUND I75
READINGS TAKEN 10 FEET WEST OF EAST ABUTMENT
PAINTED JOINT--NO UNPAINTED COMPARISON
12116.25 1971   1979 08247908127110217111007212007I 1 0
2   0.5625     0.8750     0.8750     54.375     16.00    -1  1.500     0212
0221 4.0    111 1
 -.999 -.999 -.999 0.880 0.875 0.880 1.530 1.540 1.545 -.999 -.999
 -.999 0.560 0.560 0.560 0.555 0.555 0.560 0.560 0.565 0.560 0.565
 0.570 0.560-0.565
0321 4.0   -111 1
 -.999 -.999 -.999 0.875 0.875 0.880 1.535 1.535 1.545 -.999 -.999
 -.999 0.550 0.550 0.555 0.550 0.550 0.555 0.555 0.550 0.550 0.550
 0.550 0.545-0.545
S19 OF 63103      WB I696 TO SOUTH BOUND I75
READINGS TAKEN OVER WEST PIER--WEST TAILSPAN
PAINTED JOINT--NO UNPAINTED COMPARISON
11114.92 1971   1979 08227908127110217111003712007I 1 0
2   0.5000     0.7500     0.7500     53.500     16.00     1  0.000     0211
2   0.5625     0.8750     0.8750     54.375     16.00    -2  1.500     0211
0221 4.0    112 1
 0.765 0.765 0.760 -.999 -.999 -.999 -.999 -.999 -.999 0.775 0.750
 0.770 0.505 0.510 0.515 0.520 0.510 0.515 0.510 0.510 0.515 0.510
 0.510 0.505-0.510
0321 4.0   -211 1
 -.999 -.999 -.999 0.895 0.885 0.870 1.495 1.500 1.505 -.999 -.999
 -.999 0.565 0.570 0.565 0.570 0.570 0.570 0.570 0.570 0.570 0.570
 0.565 0.565-0.565
X02 OF 64014      NB M31 OVER C&O RAILROAD
READINGS TAKEN 8 FEET SOUTH OF NORTH ABUTMENT

122 0.00 1974   1980 0520800921741005740600760000000 0 0
1   0.6150     1.000      1.000      30.300     10.551  -1  0.00      0720
0110 3.0    1
 1.010 0.970 0.975 1.020 1.000 0.990 0.945 0.960 0.955 1.000 0.980
 0.975 0.620 0.620 0.620 0.625 0.620 0.620 0.620 0.620-0.620
0220 3.0    1
 0.960 0.960 0.955 1.025 0.995 0.990 0.970 0.970 0.975 1.010 0.985
 0.965 0.620 0.620 0.620 0.620 0.625 0.620 0.625 0.625-0.625
0320 3.0    1
 1.025 1.025 1.025 1.005 0.995 0.990 0.995 1.000 1.005 0.985 0.890
 0.995 0.645 0.650 0.655 0.660 0.655 0.655 0.660 0.665-0.670
0420 3.0    1
 0.975 0.970 -.999 0.990 0.970 0.955 0.980 0.980 0.995 1.025 1.000
 0.990 0.620 0.620 0.620 0.625 0.620 0.620 0.620 0.620-0.620
0510 3.0   -1
 0.995 0.995 1.005 1.000 1.000 1.005 1.020 1.020 1.020 1.005 1.005
 1.005 0.660 0.650 0.650 0.650 0.645 0.645 0.645 0.645-0.640
S07 OF 64015      NB M31 OVER BUCHANAN ROAD
READINGS TAKEN 10 FEET NORTH OF SOUTH PIER
DIRECTLY OVER EB SHOULDER
122 0.00 1975   1980 0520801227750724761100761227751 0
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51900     1   0.522      0.6700     0.6700    29.640    10.458  -1  0.00     0500
52000     0111 3.0    1 1 2
52100      0.670 0.670 0.675 0.635 0.635 0.630 0.645 0.650 0.665 0.630 0.635
52200      0.645 0.525 0.510 0.505 0.505 0.505 0.505 0.505-0.515
52300     0221 3.0    1 1 2
52400      0.680 0.680 0.690 0.640 0.635 0.635 0.655 0.660 0.675 0.640 0.640
52500      0.650 0.535 0.520 0.515 0.515 0.515 0.510 0.515-0.520
52600     0321 3.0    1 1 2
52700      0.670 0.665 0.675 0.635 0.635 0.635 0.645 0.655 0.670 0.635 0.630
52800      0.645 0.535 0.520 0.515 0.515 0.515 0.510 0.515-0.620
52900     0421 3.0    1 2 2
53000      0.665 0.665 0.670 0.630 0.630 0.630 0.630 0.645 0.655 0.640 0.640
53100      0.655 0.540 0.520 0.515 0.515 0.515 0.510 0.515-0.525
53200     0611 3.0   -1 2 2
53300      0.645 0.645 0.645 0.680 0.670 0.670 0.655 0.645 0.635 0.660 0.655
53400      0.640 0.535 0.520 0.515 0.510 0.510 0.510 0.515-0.520
53500     XO1 OF 64015     SB WJ1 OVER BASELINE ROAD & C&O RAILROAD
53600     READINGS TAKEN 6-8 FEET NORTH OF SOUTH ABUTMENT
53700
53800     122 0.00 1975   1980 052180051676070076121176000000 0 0
53900     1   0.5980     0.7940     0.7940    35.550    11.945  -1  0.00     0010
54000     0220 3.0    1
54100      0.750 0.785 0.775 0.860 0.850 0.805 0.785 0.805 0.815 0.805 0.805
54200      0.765 0.620 0.620 0.615 0.615 0.620 0.615 0.620 0.620 0.625-0.625
54300     0420 3.0    1
54400      0.785 0.805 0.815 0.780 0.775 0.755 0.735 0.760 0.765 0.830 0.820
54500      0.785 0.645 0.650 0.650 0.645 0.640 0.640 0.640 0.645 0.645-0.645
54600     0510 3.0   -1
54700      0.800 0.840 0.845 0.780 0.725 0.755 0.770 0.800 0.800 0.825 0.810
54800      0.795 0.620 0.620 0.615 0.615 0.615 0.615 0.620 0.620 0.620-0.620
54900     SO2 OF 70024     WB I196 UNDER 96TH AVENUE
55000     READINGS TAKEN 15 FEET EAST OF WEST ABUTMENT
55100
55200     11214.75 1972   1979 101878071572072872082672121174 1 0
55300     2   0.500      1.000      1.000     49.875    18.00    1  0.875    0401
55400     2   0.500      1.000      1.000     50.750    18.00   -2  1.750    0401
55500     0321 4.0    1 1 2
55600      1.000 1.000 1.005 -.999 -.999 -.999 -.999 -.999 -.999 0.915 0.920
55700      0.920 0.500 0.495 0.495 0.500 0.500 0.500 0.500 0.500 0.600 0.495
55800      0.495-0.500
55900     0421 4.0    1 1 2
56000      1.010 1.010 1.015 -.999 -.999 -.999 -.999 -.999 -.999 0.895 0.900
56100      0.895 0.510 0.515 0.515 0.515 0.515 0.515 0.515 0.515 0.610 0.515
56200      0.515-0.515
56300     0521 4.0   -2 1 2
56400      1.005 1.005 1.000 -.999 -.999 -.999 -.999 -.999 -.999 1.765 1.760
56500      1.765 0.495 0.495 0.495 0.490 0.490 0.495 0.495 0.495 0.500 0.495
56600      0.490-0.495
56700     BO3 OF 70024     EB I196 OVER BLACK RIVER
56800     READINGS TAKEN 1ST PIER WEST OF EAST ABUTMENT
56900
57000     112 0.00 1972   1979 103179042074051874121174000000 0 0
57100     1   0.5640     0.850      0.850     30.00     10.50   -1  0.00     0400
57200     0110 3.0    1
57300      0.865 0.870 0.885 0.850 0.845 0.830 0.825 0.835 0.840 0.870 0.865
57400      0.865 0.575 0.560 0.560 0.555 0.560 0.560 0.565 0.565 0.580-0.600
57500     0610 3.0   -1
57600      0.845 0.860 0.870 0.840 0.850 0.850 0.845 0.855 0.865 0.885 0.875
57700      0.895 0.600 0.585 0.580 0.580 0.570 0.565 0.565 0.565 0.570-0.570
57800     BO3 OF 70024     EB I196 OVER BLACK RIVER
57900     READINGS TAKEN 3 FEET WEST OF EAST ABUTMENT
58000     GRINDING WHEEL USED INSTEAD OF SANDING DISK
58100     112 0.00 1972   1979 103179042074051874121174000000 0 0
58200     1   0.5640     0.850      0.850     30.00     10.50   -1  0.00     0400
58300     0110 3.0    1
58400      0.885 0.885 0.905 0.870 0.860 0.850 0.835 0.840 0.845 0.875 0.865
58500      0.855 0.570 0.570 0.570 0.565 0.570 0.565 0.565 0.570 0.585-0.600
58600     0420 3.0    1
58700      0.865 0.875 0.875 0.885 0.885 0.865 0.855 0.865 0.880 0.925 0.915
58800      0.910 0.595 0.590 0.580 0.570 0.565 0.565 0.565 0.570 0.575-0.580
58900     0610 3.0   -1
59000      0.860 0.865 0.875 0.845 0.845 0.840 0.845 0.850 0.860 0.890 0.875
59100      0.865 0.695 0.585 0.575 0.570 0.565 0.560 0.565 0.565 0.670-0.675
59200     B04 OF 73031     M52 OVER BEAVER CREEK
59300     READINGS TAKEN 5 FEET SOUTH OF NORTH ABUTMENT
59400
59500     11200.00 1977   1980 100860091377092377102877000000 0 0
59600     1   0.6800     1.100      1.100     36.160    12.027  -1  0.00     0020
59700     0110 3.0    1
59800      1.090 1.085 1.090 1.115 1.105 1.105 1.100 1.105 1.125 1.075 1.070
59900      1.065 0.695 0.680 0.675 0.680 0.680 0.685 0.680 0.685 0.680 0.685
60000      0.690-0.710
60100     0220 3.0    1
60200      1.085 1.090 1.105 1.135 1.130 1.135 1.095 1.100 1.115 1.065 1.055
60300      1.055 0.705 0.695 0.685 0.695 0.695 0.685 0.690 0.695 0.695 0.700
60400      0.705-0.730
60500     0320 3.0    1
60600      1.065 1.060 1.075 1.120 1.110 1.110 1.110 1.115 1.125 1.075 1.070
60700      1.065 0.705 0.685 0.685 0.690 0.690 0.685 0.685 0.685 0.690 0.690
60800      0.705-0.720
60900     0420 3.0    1
61000      1.105 1.110 1.110 1.120 1.110 1.000 1.100 1.105 1.115 1.095 1.090
61100      1.085 0.705 0.685 0.680 0.680 0.685 0.680 0.680 0.685 0.685 0.685
61200      0.690-0.715
61300     0510 3.0   -1
61400      1.075 1.070 1.085 1.115 1.110 1.105 1.090 1.095 1.110 1.075 1.075
61500      1.075 0.695 0.685 0.680 0.680 0.685 0.680 0.685 0.680 0.685 0.680
61600      0.695-0.710
61700     SO3 OF 81041     EB I94 UNDER RAWSONVILLE ROAD
61800     READINGS TAKEN DIRECTLY OVER EB OUTSIDE SHOULDER
61900     25 FEET NORTH OF SOUTH ABUTMENT--BEAM HEIGHT & WIDTH ESTIMATED
62000     12316.8   1973   1980 102480051775071076082176051775 1 0
62100     2   0.5625     0.750      0.750     49.500    18.000  -1  1.125    1121
62200     0111 3.0    1 1 1
62300      0.745 0.750 0.745 0.750 0.745 0.755 1.115 1.115 1.110 1.110 1.110
62400      1.115 1.110 0.550 0.550 0.550 0.545 0.545 0.545 0.550 0.645 0.550
62500      0.545 0.545 0.545-0.550
62600     0221 3.0    1 1 1
62700      0.750 0.745 0.745 0.740 0.745 0.745 1.110 1.105 1.105 1.105 1.105
62800      1.110 0.550 0.555 0.555 0.555 0.555 0.555 0.555 0.555 0.555 0.550
62900      0.555 0.550 0.555 0.555-0.550
63000     0321 3.0    1 1 1
63100      0.745 0.740 0.740 0.740 0.745 0.725 1.110 1.105 1.115 1.105 1.110
63200      1.115 0.550 0.550 0.555 0.555 0.550 0.550 0.550 0.545 0.550 0.566
63300      0.550 0.550 0.550 0.555 0.555-0.560
63400     0421 3.0   -1 2 1
63500      0.745 0.740 0.740 0.745 0.745 0.740 1.085 1.090 1.095 1.100 1.100
63600      1.105 0.545 0.545 0.550 0.545 0.545 0.545 0.550 0.545 0.540 0.545
63700      0.545 0.540-0.540
63800     SO3 OF 81041     EB I94 UNDER RAWSONVILLE ROAD
63900     READINGS TAKEN DIRECTLY OVER EB OUTSIDE SHOULDER
64000     25 FEET NORTH OF SOUTH ABUTMENT--BEAM HEIGHT & WIDTH ESTIMATED
64100     12316.8   1973   1980 102480102073060174122874102073 1 0
64200     2   0.5625     0.750      0.750     49.500    18.000  -1  1.125    1121
64300     0521 3.0    1 2 1
64400      0.750 0.745 0.745 0.745 0.745 0.745 1.110 1.110 1.105 1.100 1.100
64500      1.105 0.546 0.550 0.545 0.550 0.545 0.850 0.850 0.850 0.850 0.550
64600      0.550 0.550 0.550 0.550-0.550
64700     0621 3.0    1 2 1
64800      0.750 0.750 0.750 0.750 0.725 0.745 1.115 1.110 1.106 1.105 1.110
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 1.110 0.545 0.545 0.550 0.545 0.550 0.545 0.545 0.550 0.545 0.545
 0.545 0.545 0.545 0.550 0.545-0.545
0721 3.0   1 2 1
 0.740 0.745 0.745 0.740 0.745 0.740 1.100 1.105 1.100 1.095 1.095
 1.100 0.550 0.550 0.555 0.550 0.555 0.555 0.550 0.555 0.550 0.555
 0.555 0.555 0.560-0.555
0811 3.0  -1 2 1
 0.740 0.745 0.745 0.750 0.725 0.725 1.110 1.105 1.105 1.105 1.110
 1.115 0.550 0.550 0.585 0.550 0.555 0.655 0.550 0.650 0.555 0.550
 0.550 0.545 0.550 0.555-0.555
S12 OF 81103     WB M14 RAMP OVER EAST BOUND M14 & M153
READINGS TAKEN 4 FEET NORTH OF SOUTH ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979
12216.33 1975  1979 0531790412760514761003791003790 0
2   0.500     0.500     0.500    55.000     9.00    -1  0.00    0002
0110 4.0   1
 0.500 0.500 0.500 0.500 0.495 0.495 0.500 0.500 0.500 0.495 0.495
 0.495 0.490 0.490 0.490 0.490 0.490 0.490 0.490 0.490 0.490 0.490
 0.490 0.490-0.490
0220 4.0   -1
 0.500 0.500 0.500 0.500 0.500 0.500 0.505 0.505 0.505 0.505 0.505
 0.505 0.495 0.490 0.495 0.495 0.495 0.495 0.495 0.495 0.495-0.495
S12 OF 81103     EB M14 RAMP OVER EAST BOUND M14 & M153
READINGS TAKEN 2 FEET NORTH OF SOUTH ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979
12216.33 1975  1979 0531790412760514761003791003790 0 0
2   0.500     0.500     0.500    55.000     9.00    -1  0.00    0002
0110 4.0   1
 -.999 -.999 -.999 0.500 0.500 0.500 0.495 0.495 0.495 0.495 0.495
 0.495 0.505 0.505 0.505 0.505 0.505 0.505 0.505 0.505 0.505 0.505
 0.505 0.505-0.505
0220 4.0   -1
 0.500 0.500 0.500 0.500 0.500 0.500 0.500 0.500 0.500 0.500 0.500
 0.500 0.510 0.510 0.510 0.510 0.510 0.510 0.515 0.510 0.510 0.510
 0.510 0.510 0.510-0.510
S13 OF 81103     EB M14 UNDER CURTIS ROAD
READINGS TAKEN 4 FEET NORTH OF SOUTH ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979
12216.17 1975  1979 0531790513760708760616771003790 0 0
2   0.500     0.500     0.500    55.125    10.00    -1  0.625    1001
0110 4.0   1
 0.515 0.515 0.515 0.515 0.515 0.515 0.635 0.630 0.630 0.630 0.630
 0.630 0.500 0.500 0.500 0.505 0.505 0.505 0.505 0.505 0.505 0.505
 0.505-0.505
0220 4.0   -1
 0.510 0.510 0.510 0.510 0.510 0.510 0.625 0.625 0.625 0.630 0.630
 0.630 0.510 0.510 0.515 0.515 0.515 0.515 0.510 0.510 0.510 0.510
 0.510-0.510
S14 OF 81103     EB M14 UNDER JOY ROAD
READINGS TAKEN 3 FEET NORTH OF SOUTH ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979
12216.50 1975  1979 0531790604760709760616771003790 0 0
2   0.500     0.500     0.500    55.125    11.00    -1  0.625    1002
0120 4.0   1
 0.520 0.515 0.515 0.515 0.515 0.515 0.635 0.635 0.640 0.645 0.640
 0.640 0.475 0.480 0.480 0.480 0.480 0.480 0.480 0.480 0.475 0.480
 0.480 0.480-0.480
0410 4.0   -1
 0.525 0.525 0.525 0.525 0.525 0.525 0.645 0.645 0.645 0.650 0.650
 0.650 0.500 0.500 0.500 0.505 0.505 0.505 0.505 0.505 0.505 0.505
 0.505 0.505-0.505
S15 OF 81103     EB M14 UNDER GOTFREDSON ROAD
READINGS TAKEN 3 FEET FROM SOUTH ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979
12216.42 1975  1979 0524790401760414760616771003790 0 0
2   0.4375    0.500     0.500    49.125    12.00    -1  0.625    0001
0110 4.0   1
 0.495 0.495 0.495 0.495 0.495 0.495 0.625 0.625 0.625 0.625 0.625
 0.625 0.440 0.440 0.445 0.445 0.445 0.450 0.445 0.445 0.445 0.445
-0.445
0220 4.0   1
 0.495 0.495 0.495 0.495 0.495 0.495 0.625 0.625 0.625 0.620 0.620
 0.620 0.430 0.430 0.430 0.430 0.430 0.430 0.430 0.430 0.430 0.430
-0.430
0320 4.0  -1
 0.520 0.520 0.520 0.515 0.515 0.515 0.815 0.615 0.615 0.610 0.610
 0.610 0.425 0.425 0.430 0.430 0.430 0.430 0.430 0.430 0.430 0.430
-0.430
S15 OF 81103     EB M14 UNDER GOTFREDSON ROAD
READINGS TAKEN 1ST TRANSITION WELD SOUTH HANGER
ROADWAY OPEN TO TRAFFIC FALL 1979
12216.42 1975  1979 0524790401760414760616771003791 0
2   0.5625    1.000     1.000    50.125    14.00    -1  1.125    0001
0110 2.0   1
 1.000 1.000 1.000 1.005 1.000 1.005 1.130 1.125 1.130 1.135 1.135
 1.140 0.585 0.580 0.580 0.580 0.580 0.580 0.580 0.580 0.580 0.580
 0.580 0.580 0.580 0.580 0.580 0.580 0.580 0.580 0.580 0.580 0.580
 0.580-0.580
0220 6.0   1
 1.000 1.000 1.000 1.005 1.000 1.000 1.150 1.145 1.155 1.155 1.160
 1.155 0.575 0.575 0.575 0.575 0.575 0.575-0.575
0320 6.0   1
 0.995 0.995 0.990 0.990 0.990 0.990 1.135 1.135 1.135 1.135 1.130
 1.130 0.570 0.570 0.565 0.570 0.570 0.565-0.570
0420 6.0   1
 1.005 1.005 1.000 1.005 1.000 1.005 1.125 1.130 1.130 1.130 1.125
 1.125 0.570 0.565 0.570 0.570 0.570 0.570-0.570
0510 6.0  -1
 1.015 1.010 1.010 1.010 1.010 1.010 1.145 1.145 1.150 1.145 1.145
 1.135 0.575 0.575 0.575 0.575 0.575 0.575-0.575
S02 OF 82102     EB M14 UNDER NAPIER ROAD
READINGS TAKEN 4 FEET NORTH OF SOUTH ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979
12216.67 1975  1979 0531790722760806760900761003790 0 0
2   0.500     0.625     0.625    49.25     13.00    -1  0.00    0001
0110 4.0   1
 0.640 0.635 0.635 0.635 0.630 0.630 0.635 0.635 0.640 0.640 0.640
 0.640 0.500 0.500 0.500 0.505 0.505 0.505 0.505 0.505 0.505 0.505
-0.505
0510 4.0  -1
 0.650 0.650 0.645 0.645 0.645 0.650 0.650 0.650 0.645 0.645 0.650
 0.650 0.500 0.500 0.500 0.500 0.500 0.500 0.500 0.505 0.500 0.505
-0.505
S03 OF 82102     NORTH TERRITORIAL ROAD OVER EB M14
READINGS TAKEN 3 FEET NORTH OF SOUTH ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979
12216.25 1976  1979 0531790123770616771022771003790 0 0
2   0.500     0.625     0.625    56.250    13.00    -1  0.00    0301
0110 4.0   1
 0.630 0.630 0.630 0.630 0.630 0.630 0.645 0.640 0.640 0.635 0.635
 0.640 0.505 0.505 0.505 0.505 0.510 0.510 0.510 0.510 0.505 0.510
 0.505 0.510-0.505
0320 4.0  -1
 0.630 0.630 0.630 0.825 0.625 0.625 0.630 0.625 0.625 0.625 0.625
 0.625 0.505 0.505 0.505 0.605 0.505 0.505 0.505 0.605 0.505 0.505
 0.505 0.505-0.505
S04 OF 82102     EB M14 UNDER RIDGE ROAD
READINGS TAKEN 3 FEET NORTH OF SOUTH ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979
12216.83 1976  1979 0531790115770827771022771003790 0 0
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77900    2   0.5625     0.625      0.625     55.120      8.00    -1  0.00     0301
78000    0110 4.0   1
78100     0.625 0.625 0.625 0.630 0.625 0.625 0.635 0.630 0.630 0.630 0.630
78200     0.630 0.565 0.565 0.565 0.565 0.565 0.565 0.565 0.565 0.565 0.565
78300     0.565-0.565
78400    0410 4.0  -1
78500     0.625 0.625 0.625 0.625 0.625 0.625 0.635 0.636 0.635 0.630 0.630
78600     0.635 0.570 0.570 0.570 0.570 0.670 0.570 0.570 0.670 0.670 0.670
78700     0.570 0.570 0.570-0.570
78800    S05 OF 82102      WB M14 UNDER BECK ROAD
78900    READINGS TAKEN 3 FEET FROM NORTH ABUTMENT
79000    ROADWAY OPEN TO TRAFFIC FALL 1979
79100    12216.25 1976  1979 05317907307709247712037710037B 0 0
79200    2   0.625      0.875      0.875     62.250     16.00    -1  1.375    0300
79300    0110 4.0  -1
79400     0.875 0.870 0.870 -.999 -.999 -.999 1.386 1.385 1.385 1.380 1.380
79500     1.380 0.615 0.615 0.615 0.615 0.615 0.820 0.620 0.620 0.620 0.615
79600     0.620 0.620 0.620 0.620-0.620
79700    S05 OF 82102      EB M14 UNDER BECK ROAD
79800    READINGS TAKEN 3 FEET FROM SOUTH ABUTMENT
79900    ROAD WAY OPEN TO TRAFFIC FALL 1979
80000    12216.25 1976  1979 05317907307709247712037710037B 0 0
80100    2   0.625      1.125      1.125     62.126     21.00    -1  1.000    0300
80200    0110 4.0  -1
80300     -.999 -.999 -.999 1.130 1.130 1.130 1.010 1.010 1.010 -.999 -.999
80400     -.999 0.625 0.625 0.625 0.625 0.625 0.630 0.625 0.625 0.625 0.625
80500     0.625 0.625 0.625 0.625-0.630
80600    S06 OF 82102      EB M14 OVER SHELDON ROAD
80700    READINGS TAKEN 3 FEET EAST OF WEST ABUTMENT
80800    ROADWAY OPEN TO TRAFFIC FALL 1979
80900    11214.50 1976  1979 05317912137705177810317912027T 0 0
81000    2   0.562      0.625      0.625     49.250      8.00    -1  0.00     0301
81100    0111 4.0   1 1 2
81200     0.630 0.635 0.635 0.635 0.635 0.640 0.630 0.630 0.630 0.630 0.630
81300     0.630 0.560 0.560 0.560 0.560 0.560 0.560 0.565 0.565 0.565 0.565
81400     0.560-0.660
81500    0321 4.0  -1 1 2
81600     0.630 0.630 0.635 0.635 0.635 0.635 0.630 0.630 0.630 0.630 0.630
81700     0.630 0.560 0.560 0.560 0.560 0.560 0.560 0.565 0.565 0.560 0.560
81800     0.560-0.560
81900    S06 OF 82102      WB M14 OVER SHELDON ROAD
82000    READINGS TAKEN 3 FEET EAST OF WEST ABUTMENT
82100    ROADWAY OPEN TO TRAFFIC FALL 1979
82200    11214.50 1976  1979 05317912137705177810317912027T 0 0
82300    2   0.500      0.625      0.625     49.250     11.00    -1  0.00     0302
82400    0111 4.0   1 1 2
82500     0.625 0.625 0.625 0.620 0.620 0.620 0.625 0.620 0.620 0.635 0.635
82600     0.635 0.505 0.505 0.505 0.505 0.505 0.505 0.505 0.505 0.505 0.505
82700     0.505-0.505
82800    0321 4.0  -1 1 2
82900     0.620 0.620 0.620 0.620 0.630 0.620 0.615 0.615 0.630 0.615 0.615
83000     0.615 0.505 0.505 0.505 0.505 0.505 0.505 0.505 0.505 0.505 0.505
83100     0.505-0.505
83200    S08 OF 82102      M14 OVER HINES ROAD
83300    READINGS TAKEN 20 FEET WEST OF EAST ABUTMENT
83400
83500    32215.20 1976  1980 10218012047706077710037907017T 1 0
83600    2   0.5625     1.625      1.625     52.625     17.00    -1  3.000    0301
83700    0111 3.0   1 1 2
83800     1.655 1.660 1.660 1.660 1.660 1.655 3.050 3.055 3.050 3.050 3.050
83900     3.040 0.560 0.560 0.560 0.565 0.560 0.565 0.565 0.565 0.565 0.570
84000     0.565 0.565 0.570 0.565 0.570-0.565
84100    0321 3.0   1 1 2
84200     1.650 1.650 1.650 1.655 1.655 1.655 3.070 3.075 3.080 3.075 3.075
84300     3.070 0.565 0.565 0.565 0.565 0.565 0.570 0.565 0.565 0.565 0.565
84400     0.570 0.565 0.565 0.560 0.565-0.565
84500    0421 3.0   1 1 2
84600     1.645 1.640 1.645 1.640 1.645 1.645 3.050 3.045 3.050 3.045 3.050
84700     3.045 0.555 0.555 0.550 0.560 0.565 0.560 0.565 0.560 0.560 0.560
84800     0.560 0.560 0.560 0.565 0.560-0.555
84900    1121 3.0   1 2 2
85000     1.640 1.655 1.635 1.635 1.635 1.640 3.050 3.055 3.050 3.045 3.045
85100     3.045 0.560 0.560 0.565 0.560 0.565 0.565 0.565 0.565 0.560 0.565
85200     0.565 0.560 0.565 0.560 0.560-0.575
85300    1221 3.0   1 2 2
85400     1.645 1.645 1.640 1.645 1.650 1.645 3.025 3.020 3.025 3.020 3.015
85500     3.015 0.535 0.575 0.570 0.575 0.575 0.575 0.580 0.575 0.575 0.575
85600     0.575 0.570 0.575 0.570 0.575-0.570
85700    1321 3.0   1 2 2
85800     1.655 1.635 1.655 1.655 1.675 1.660 3.080 3.075 3.075 3.075 3.070
85900     3.080 0.565 0.565 0.565 0.565 0.565 0.570 0.570 0.565 0.570 0.565
86000     0.565 0.570 0.565 0.570 0.565-0.565
86100    1411 3.0  -1 2 2
86200     1.655 1.650 1.650 1.650 1.650 1.625 3.010 3.005 3.005 3.005 3.010
86300     3.010 0.560 0.560 0.560 0.560 0.560 0.560 0.560 0.565 0.560 0.565
86400     0.560 0.560 0.560 0.560 0.560-0.560
86500    S10 OF 82102      ROBINWOOD DRIVE OVER EB M14
86600    READINGS TAKEN 10 FEET NORTH OF SOUTH ABUTMENT
86700
86800    32316.30 1976  1980 10218011177705267806307810217T 1 0
86900    2   0.5625     0.875      0.875     45.625     12.00    -1  2.750    0311
87000    0111 3.0   1 2 1
87100     0.875 0.875 0.870 0.870 0.875 0.875 2.795 2.800 2.800 2.800 2.805
87200     2.805 0.555 0.560 0.560 0.560 0.560 0.560 0.555 0.555 0.560 0.560
87300     0.560 0.560 0.560-0.565
87400    0221 3.0   1 2 1
87500     0.875 0.870 0.870 0.865 0.870 0.870 2.800 2.800 2.795 2.795 2.805
87600     2.805 0.550 0.550 0.550 0.550 0.550 0.555 0.550 0.555 0.555 0.555
87700     0.555 0.555 0.550-0.550
87800    0321 3.0   1 1 1
87900     0.880 0.880 0.880 0.875 0.880 0.875 2.810 2.810 2.815 2.810 2.815
88000     2.820 0.540 0.540 0.545 0.540 0.545 0.545 0.540 0.545 0.540 0.545
88100     0.540 0.545-0.545
88200    0411 3.0  -1 1 1
88300     0.875 0.870 0.865 0.865 0.870 0.865 2.795 2.800 2.795 2.795 2.805
88400     2.805 0.550 0.550 0.550 0.555 0.550 0.555 0.555 0.556 0.555 0.550
88500     0.555 0.550-0.550
88600    S34 OF 82112      WB 8 MILE SERVICE ROAD OVER SB US10
88700    READINGS TAKEN 15 FEET EAST OF WEST ABUTMENT
88800    READINGS ON SPAN 1
88900    22115.00 1965  1979 05167904066404256405156407006S 1 0
89000    1   0.5980     0.7940     0.7940    35.550     11.945   -1  0.00     0601
89100    0111 2.0   1 1 1
89200     0.685 0.760 0.835 0.840 0.770 0.710 0.650 0.750 0.840 0.810 0.725
89300     0.665 0.575 0.580 0.585 0.585 0.585 0.590 0.590 0.585 0.590 0.590
89400     0.590 0.585 0.585 0.585 0.570-0.560
89500    0221 2.0   1 1 1
89600     0.675 0.765 0.875 0.845 0.795 0.720 0.685 0.755 0.825 0.840 0.755
89700     0.690 0.590 0.585 0.590 0.590 0.590 0.600 0.595 0.595 0.595 0.600
89800     0.595 0.595 0.590 0.585 0.575-0.565
89900    0321 2.0   1 1 1
90000     0.665 0.765 0.835 0.835 0.775 0.705 0.655 0.770 0.860 0.825 0.750
90100     0.695 0.575 0.580 0.585 0.580 0.580 0.590 0.690 0.585 0.590 0.590
90200     0.595 0.585 0.585 0.580 0.575-0.565
90300    0421 2.0   1 1 1
90400     0.685 0.690 0.830 0.830 0.780 0.715 0.705 0.800 0.855 0.830 0.760
90500     0.680 0.565 0.575 0.570 0.575 0.570 0.585 0.580 0.588 0.585 0.680
90600     0.580 0.580 0.570 0.576 0.570-0.866
90700    0521 2.0   1 1 1
90800     0.685 0.760 0.850 0.835 0.770 0.690 0.710 0.750 0.838 0.820 0.760
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 0.690 0.590 0.595 0.600 0.605 0.585 0.590 0.585 0.585 0.590 0.585
 0.590 0.570 0.570 0.570 0.580-0.575
0621 2.0  -1 1 1
 0.695 0.775 0.870 0.820 0.755 0.685 0.870 0.755 0.845 0.810 0.765
 0.895 0.580 0.595 0.605 0.590 0.600 0.600 0.600 0.590 0.590 0.590
 0.585 0.580 0.605 0.585 0.570-0.585
S34 OF 82112      EB 8 MILE OVER NB US10
READINGS TAKEN ON SPAN 2 OVER OUTSIDE LANE

22115.58 1965  1979 05167901246402126402216407006S 1 0
1   0.5980     0.7940     0.7940    35.550     11.945  -1  0.00     0602
0421 2.0  -1 2 1
 0.685 0.755 0.820 0.850 0.785 0.675 0.695 0.765 0.825 0.865 0.800
 0.720 0.590 0.600 0.610 0.610 0.610 0.610 0.615 0.615 0.610 0.615
 0.615 0.610 0.610 0.615 0.615-0.615
S34 OF 82112      EB 8 MILE OVER SB US10
READINGS TAKEN ON SPAN 2 OVER OUTSIDE LANE

22115.58 1965  1979 05167901246402126402216407006S 1 0
1   0.5980     0.7940     0.7940    35.550     11.945  -1  0.00     0601
0111 2.0   1 1 1
 0.720 0.780 0.860 0.835 0.765 0.890 0.890 0.760 0.845 0.810 0.750
 0.675 0.600 0.595 0.610 0.605 0.605-0.605
0221 2.0   1 1 1
 0.660 0.755 0.855 0.810 0.745 0.695 0.700 0.770 0.840 0.855 0.760
 0.695 0.600 0.600 0.600 0.600 0.695-0.605
0721 2.0   1 1 1
 0.680 0.790 0.860 0.835 0.755 0.685 0.715 0.795 0.855 0.840 0.770
 0.700 0.605 0.605 0.615 0.625 0.625 0.615 0.615 0.615 0.615 0.615
 0.620 0.615 0.610 0.610 0.615-0.615
0911 2.0  -1 2 1
 0.705 0.795 0.840 0.895 0.775 0.695 0.680 0.765 0.835 0.825 0.750
 0.765 0.620 0.625 0.620 0.615 0.620 0.620 0.620 0.615 0.610 0.610
 0.605 0.605 0.600 0.595 0.585-0.580
S06 OF 82122      EB I696 UNDER FARMINGTON ROAD
READINGS TAKEN 12 FEET NORTH OF SOUTH ABUTMENT

31114.3  1974  1980 110580070075000000000000112177 1 0
1   0.625      0.9400     0.9400    35.840     11.972  -1  0.00     0701
0111 3.0   1 1 1
 0.895 0.925 0.945 0.915 0.895 0.885 0.930 0.935 0.955 0.945 0.935
 0.940 0.605 0.615 0.625 0.625 0.630 0.630 0.635 0.635 0.640 0.630
 0.625-0.615
0221 3.0   1 1 1
 0.920 0.935 0.955 0.960 0.945 0.930 0.920 0.935 0.945 0.935 0.905
 0.895 0.620 0.625 0.630 0.635 0.635 0.635 0.630 0.625 0.625 0.620
 0.625-0.610
0321 3.0   1 1 1
 0.940 0.935 0.950 0.935 0.825 0.810 0.920 0.920 0.935 0.915 0.925
 0.920 0.625 0.625 0.620 0.625 0.625 0.610 0.615 0.615 0.610 0.620
 0.610-0.615
0421 3.0   1 1 1
 0.905 0.920 0.945 0.925 0.910 0.900 0.920 0.920 0.935 0.825 0.920
 0.930 0.600 0.600 0.615 0.605 0.610 0.615 0.605 0.615 0.620 0.615
 0.620-0.610
0521 3.0   1 1 1
 0.815 0.920 0.940 0.935 0.925 0.940 0.925 0.835 0.955 0.940 0.925
 0.925 0.625 0.630 0.620 0.625 0.630 0.615 0.620 0.815 0.610 0.620
 0.605-0.600
0621 3.0   1 1 1
 0.905 0.915 0.940 0.935 0.925 0.915 0.890 0.890 0.900 0.905 0.900
 0.915 0.585 0.595 0.605 0.600 0.600 0.605 0.600 0.605 0.610 0.605
 0.616-0.605
0721 3.0   1 2 1
 0.935 0.915 0.935 0.915 0.900 0.895 0.915 0.920 0.945 0.930 0.910
 0.895 0.610 0.615 0.605 0.610 0.610 0.600 0.600 0.595 0.595 0.600
 0.595-0.585
0821 3.0   1 2 1
 0.930 0.915 0.930 0.915 0.900 0.895 0.910 0.920 0.935 0.935 0.910
 0.895 0.615 0.620 0.610 0.615 0.620 0.605 0.610 0.605 0.600 0.600
 0.595-0.595
0921 3.0   1 2 1
 0.895 0.905 0.910 0.965 0.945 0.935 0.925 0.935 0.950 0.975 0.945
 0.915 0.625 0.630 0.630 0.635 0.630 0.625 0.625 0.620 0.615 0.615
 0.590-0.575
1021 3.0   1 2 1
 0.895 0.900 0.910 0.925 0.915 0.925 0.905 0.910 0.935 0.935 0.910
 0.915 0.610 0.620 0.615 0.615 0.610 0.605 0.610 0.605 0.600 0.605
 0.595-0.590
1121 3.0   1 2 1
 0.910 0.930 0.945 0.985 0.960 0.950 0.945 0.950 0.975 0.980 0.965
 0.925 0.655 0.650 0.650 0.650 0.650 0.650 0.645 0.645 0.640 0.640
 0.620-0.610
1211 3.0  -1 2 1
 0.890 0.900 0.910 0.935 0.925 0.910 0.940 0.935 0.950 0.975 0.940
 0.940 0.825 0.625 0.630 0.630 0.630 0.625 0.620 0.620 0.615 0.610
 0.590-0.575
S18 OF 82122      EB I96 UNDER FENTON
READINGS TAKEN 6 FEET NORTH OF SOUTH ABUTMENT

31114.50 1974  1980 10318002077605157610007610007 7 1 0
2   0.500      1.125      1.125     42.500     12.00   -1  1.375    0302
0111 3.0   1 2 1
 1.130 1.125 1.130 1.125 1.130 1.130 1.360 1.370 1.365 1.375 1.375
 1.375 0.505 0.510 0.505 0.510 0.510 0.510 0.510 0.505 0.510 0.505
 0.510 0.505 0.505-0.505
0221 3.0   1 2 1
 1.090 1.090 1.085 1.085 1.090 1.090 1.365 1.365 1.365 1.370 1.365
 1.365 0.500 0.500 0.500 0.500 0.500 0.500 0.495 0.500 0.500 0.495
 0.500 0.495 0.495-0.495
0321 3.0   1 2 1
 1.130 1.125 1.125 1.125 1.130 1.135 1.370 1.370 1.375 1.375 1.370
 1.375 0.500 0.505 0.500 0.505 0.500 0.500 0.505 0.500 0.500 0.505
 0.500 0.500 0.495-0.495
0421 3.0   1 1 1
 1.135 1.130 1.125 1.130 1.130 1.135 1.370 1.370 1.375 1.380 1.375
 1.375 0.500 0.495 0.500 0.495 0.495 0.495 0.495 0.495 0.490 0.495
 0.495 0.490 0.495-0.490
0521 3.0   1 1 1
 1.135 1.130 1.130 1.130 1.135 1.140 1.365 1.370 1.365 1.370 1.365
 1.365 0.495 0.500 0.495 0.500 0.500 0.495 0.495 0.495 0.500 0.495
 0.495 0.495 0.500-0.495
0611 3.0  -1 1 1
 1.140 1.135 1.135 1.130 1.130 1.135 1.365 1.370 1.365 1.365 1.365
 1.365 0.495 0.500 0.495 0.500 0.500 0.500 0.495 0.500 0.495 0.500
 0.495 0.495 0.500-0.495
S23 OF 82122      NB I96 UNDER SCHOOLCRAFT AVENUE
READING  TAKEN 5 FEET SOUTH OF NORTH ABUTMENT

31114.K  1870  1980 10318007007108007112007120075 1 0
2   0.500      0.750      0.750     49.500     16.00   -1  0.00     1102
0111 3.0   1 2 1
 0.755 0.755 0.760 0.755 0.750 0.750 0.750 0.750 0.755 0.755 0.750
 0.755 0.480 0.480 0.480 0.480 0.480 0.485 0.480 0.485 0.485 0.480 0.480
 0.485 0.480 0.485 0.480 0.470-0.475
0211 3.0   1 2 1
 0.765 0.770 0.775 0.770 0.770 0.765 0.755 0.760 0.755 0.740 0.745
 0.745 0.490 0.490 0.485 0.490 0.485 0.490 0.485 0.490 0.490 0.485
 0.490 0.485 0.490 0.490 0.485-0.485
0321 3.0   1 2 1
```

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  0.745 0.755 0.755 0.755 0.750 0.755 0.735 0.740 0.740 0.745 0.745
  0.745 0.485 0.490 0.490 0.485 0.490 0.490 0.490 0.495 0.495 0.495
  0.500 0.495 0.490 0.495 0.490-0.495
0421 3.0   1 2 1
  0.755 0.755 0.760 0.755 0.750 0.745 0.740 0.745 0.745 0.740 0.735
  0.740 0.475 0.480 0.480 0.480 0.475 0.475 0.480 0.480 0.480 0.485
  0.480 0.485 0.480 0.485 0.480-0.475
0521 3.0   1 2 1
  0.755 0.755 0.755 0.760 0.755 0.750 0.745 0.750 0.755 0.750 0.745
  0.750 0.490 0.490 0.490 0.490 0.490 0.495 0.495 0.490 0.495 0.495
  0.495 0.490 0.485 0.490 0.485-0.490
0621 3.0   1 1 1
  0.755 0.765 0.765 0.775 0.775 0.765 0.745 0.745 0.745 0.740 0.740
  0.735 0.490 0.485 0.490 0.490 0.485 0.485 0.490 0.490 0.445 0.490
  0.485 0.485 0.490 0.485-0.485
0711 3.0  -1 1 1
  0.745 0.745 0.750 0.745 0.745 0.750 0.755 0.755 0.760 0.765 0.760
  0.760 0.475 0.480 0.475 0.475 0.475 0.480 0.480 0.480 0.480 0.480
  0.475 0.475 0.480 0.475 0.475-0.475
S13 OF 82123      WB I96 LOCAL UNDER FULLERTON AVENUE
READINGS TAKEN 5 FEET SOUTH OF NORTH ABUTMENT

32115.7  1970   1980 10318008197102037305247312007J 1 0
1   0.725      1.1800     1.1800    36.320    12.072   1  0.00     1102
1   0.6800     1.100      1.100     36.160    12.027   2  0.00     1102
1   0.6530     1.020      1.020     34.000    12.000  -3  0.00     1102
0111 3.0   1 2 1
  1.140 1.155 1.160 1.140 1.140 1.150 1.135 1.150 1.170 1.155 1.130
  1.135 0.710 0.725 0.730 0.730 0.730 0.730 0.725 0.725 0.730 0.725
  0.730-0.740
0221 3.0   1 2 1
  1.160 1.165 1.180 1.155 1.120 1.145 1.130 1.145 1.155 1.175 1.140
  1.140 0.740 0.740 0.735 0.735 0.740 0.730 0.730 0.735 0.735 0.735
  0.730-0.715
0321 3.0   1 2 1
  1.215 1.220 1.235 1.195 1.160 1.170 1.135 1.160 1.180 1.140 1.130
  1.125 0.725 0.720 0.715 0.740 0.745 0.735 0.740 0.735 0.720 0.715
  0.710-0.705
0421 3.0   2 2 1
  1.125 1.145 1.175 1.115 1.105 1.105 1.140 1.150 1.165 1.135 1.110
  1.125 0.670 0.685 0.695 0.690 0.700 0.710 0.705 0.710 0.700 0.695
  0.690-0.685
0521 3.0   2 1 1
  1.095 1.100 1.110 1.065 1.055 1.070 1.075 1.080 1.095 1.050 1.050
  1.040 0.665 0.675 0.680 0.685 0.685 0.685 0.675 0.680 0.680 0.685
 -0.685
0621 3.0   2 1 1
  1.145 1.150 1.175 1.095 1.085 1.075 1.120 1.130 1.145 1.075 1.070
  1.065 0.660 0.675 0.685 0.685 0.695 0.705 0.700 0.705 0.700 0.695
  0.685-0.685
0721 3.0   3 1 1
  0.985 1.000 1.015 1.025 1.025 1.035 0.950 0.960 0.975 0.980 0.970
  0.965 0.645 0.655 0.660 0.655 0.660 0.660 0.650 0.660 0.660 0.665
  0.660-0.665
0811 3.0  -3 1 1
  0.980 0.990 1.005 0.990 0.990 1.000 0.970 0.980 0.985 0.975 0.970
  0.970 0.640 0.650 0.655 0.650 0.650 0.650 0.645 0.650 0.650 0.650
 -0.655
S24 OF 82123      FULLERTON OVER WB I96
READING TAKEN DIRECTLY OVER  MEDIAN STRIP SEPERATING 186B EXIT
FROM WB I96
31114.10 1971   1980 11058007007207007J000000120073 1 0
2   0.500      1.125      1.125     51.250    16.00   -1  2.125    0212
0111 3.0   1 2 1
  1.105 1.105 1.100 1.095 1.105 1.105 2.145 2.140 2.140 2.145 2.150
  2.155 0.485 0.485 0.490 0.485 0.485 0.485 0.485 0.485 0.485 0.485
  0.485 0.485 0.485 0.480 0.485-0.480
0221 3.0   1 2 1
  1.110 1.115 1.110 1.115 1.115 1.120 2.170 2.165 2.165 2.145 2.155
  2.160 0.480 0.480 0.485 0.480 0.485 0.480 0.480 0.485 0.480 0.480
  0.485 0.480 0.485 0.480 0.480-0.480
0421 3.0   1 2 1
  1.110 1.110 1.105 1.105 1.110 1.105 2.140 2.130 2.135 2.120 2.130
  2.140 0.485 0.480 0.480 0.485 0.480 0.485 0.485 0.485 0.485 0.480
  0.480 0.485 0.480 0.480 0.480-0.475
0521 3.0   1 1 1
  1.125 1.125 1.120 1.120 1.125 1.120 2.140 2.135 2.130 2.140 2.140
  2.145 0.485 0.485 0.490 0.480 0.490 0.485 0.485 0.485 0.490 0.485
  0.485 0.480 0.485 0.485 0.480-0.480
0611 3.0  -1 1 1
  1.110 1.110 1.110 1.105 1.105 1.110 2.155 2.135 2.135 2.130 2.135
  2.145 0.480 0.485 0.480 0.485 0.480 0.485 0.485 0.485 0.490 0.490
  0.485 0.490 0.490 0.485 0.485-0.485
S30 OF 82123      WB I96 UNDER LIVERMOIS AVENUE
READINGS TAKEN OVER OUTSIDE SHOULDER

32115.00 1972   1979 05227905057106027108077112007Z 1 0
1   0.653      1.020      1.020     36.000    12.00   -1  0.00
0111 2.0   1 1 1
  1.005 1.020 1.035 0.980 0.970 0.960 1.040 1.045 1.065 0.985 0.980
  0.985 0.655 0.660 0.660 0.665 0.670 0.660 0.655 0.655 0.655 0.650
  0.650 0.650 0.655 0.655 0.660-0.665
0421 2.0   1 2 1
  0.985 0.995 1.000 1.015 1.000 0.980 1.020 1.030 1.045 1.045 1.030
  1.015 0.675 0.680 0.680 0.680 0.680 0.670 0.670 0.665 0.665 0.665
  0.660 0.660 0.665 0.665 0.670-0.666
0721 2.0   1 1 1
  0.980 0.985 0.995 1.020 1.005 0.975 0.980 0.995 1.005 1.020 0.990
  0.980 0.645 0.655 0.660 0.660 0.660 0.660 0.660 0.660 0.655 0.665
  0.660 0.650 0.655 0.665 0.660-0.660
1021 2.0   1 1 1
  0.980 1.000 1.015 1.020 1.015 0.995 0.980 0.980 0.990 1.005 0.985
  0.990 0.650 0.655 0.655 0.660 0.660 0.660 0.655 0.655 0.650 0.650
  0.646 0.660 0.665 0.655 0.655-0.665
1121 2.0   1 1 1
  1.015 1.015 1.015 1.040 1.020 1.005 0.980 0.990 1.000 1.000 0.986
  0.975 0.660 0.660 0.655 0.655 0.650 0.650 0.650 0.655 0.655 0.660
  0.665 0.660 0.660 0.665 0.665-0.660
1421 2.0   1 1 1
  1.015 1.020 1.040 1.000 0.995 0.895 1.010 1.040 1.045 0.980 0.980
  1.000 0.675 0.670 0.665 0.665 0.660 0.660 0.665 0.665 0.665 0.670
  0.675 0.675 0.675 0.680 0.680-0.680
1721 2.0   1 1 1
  0.925 0.960 0.975 0.980 0.965 0.955 0.995 1.010 1.015 1.010 0.990
  0.985 0.645 0.650 0.650 0.655 0.655 0.655 0.655 0.650 0.866 0.655
  0.650 0.645 0.650 0.650 0.655-0.660
2011 2.0  -1 2 1
  0.990 0.995 1.015 1.015 1.000 0.985 0.995 0.990 1.010 1.045 1.015
  0.995 0.665 0.665 0.665 0.665 0.665 0.665 0.660 0.660 0.660 0.660
  0.655 0.655 0.660 0.660 0.665-0.665
S36 OF 82123      WB I96 UNDER WEST GRAND BLVD.
READINGS TAKEN OVER OUTSIDE SHOULDER                    (5/21/79)

32115.50 1972   1979 05217907007207007J000000120073 1 0
2   0.375      0.750      0.750     43.500    14.00    1  0.00     1121
1   0.5980     0.7940     0.7940    35.550    11.945  -2  0.00     1121
0111 2.0   1 1 1
 -.999 -.999 -.999 0.715 0.715 -.999 0.730 0.730 0.730 -.999 -.999
 -.999 0.365 0.370 0.365 0.365 0.365 0.365 0.365 0.365 0.365 0.365
 0.365 0.365 0.365 0.365 0.365 0.365 0.365 0.366 0.365-0.365
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0721 2.0   2 1 1
 0.815 0.820 0.820 0.825 0.810 0.810 0.830 0.830 0.830 0.805 0.800
 0.775 0.555 0.565 0.570 0.570 0.565 0.570 0.565 0.570 0.560 0.560
 0.560 0.550 0.560 0.560 0.660-0.560
1111 2.0  -1 2 1
 0.725 0.725 0.730 -.999 -.999 -.999 -.999 -.999 -.999 0.725 0.720
 0.720 0.390 0.380 0.380 0.375 0.380 0.380 0.380 0.380 0.380 0.380
 0.375 0.375 0.380 0.380 0.375 0.380 0.380 0.380 0.375-0.380
S36 OF 82123     EB I96 UNDER WEST GRAND BLVD
READINGS TAKEN 10 FEET NORTH OF SOUTH ABUTMENT

22115.60 1972  1980 10178007007207007300000012007 3 1 0
2   0.375      0.875      0.875     44.500     16.00     1  1.625    1122
2   0.375      0.875      0.875     46.750     16.00     2  0.875    1122
1   0.5980     0.7940     0.7940    35.550     11.945    3  0.000    1122
1   0.7700     1.2600     1.2600    36.480     12.117    4  0.000    1122
2   0.375      1.5000     1.5000    46.125     16.000    5  2.625    1122
2   0.375      0.7500     0.7500    43.500     14.000   -6  0.000    1122
0111 3.0   1 2 1
 0.860 0.860 0.860 0.865 0.865 0.870 1.620 1.615 1.610 1.610 1.615
 1.610 0.375 0.375 0.380 0.380 0.380 0.375 0.380 0.375 0.375 0.380
 0.375 0.365-0.370
0221 3.0   2 2 1
 0.865 0.865 0.860 0.850 0.855 0.865 0.825 0.830 0.830 0.835 0.840
 0.835 0.370 0.375 0.370 0.375 0.380 0.375 0.375 0.375 0.370 0.380
 0.375 0.370 0.365-0.365
0321 3.0   2 2 1
 0.870 0.875 0.875 0.870 0.865 0.865 0.820 0.820 0.825 0.835 0.830
 0.835 0.375 0.370 0.370 0.375 0.370 0.375 0.370 0.375 0.375 0.380
 0.375 0.370 0.365-0.365
0421 3.0   2 2 1
 0.860 0.860 0.860 0.855 0.860 0.855 0.845 0.840 0.845 0.850 0.845
 0.845 0.375 0.370 0.375 0.380 0.375 0.375 0.375 0.375 0.375 0.370
 0.370 0.370 0.370-0.365
0621 3.0   3 2 1
 0.790 0.805 0.815 0.815 0.820 0.830 0.855 0.845 0.840 0.820 0.815
 0.810 0.605 0.610 0.610 0.615 0.615 0.615 0.620 0.620 0.615 0.620
-0.610
0921 3.0   4 2 1
 1.215 1.205 1.195 1.180 1.190 1.175 1.230 1.225 1.265 1.265 1.250
 1.240 0.775 0.775 0.780 0.770 0.780 0.785 0.790 0.785 0.780 0.785
-0.770
0721 3.0   3 2 1
 0.805 0.810 0.815 0.790 0.790 0.780 0.800 0.805 0.800 0.770 0.765
 0.750 0.555 0.550 0.555 0.555 0.555 0.560 0.550 0.555 0.545 0.545
 0.550-0.555
0821 3.0   3 2 1
 0.810 0.810 0.815 0.800 0.790 0.790 0.810 0.810 0.810 0.780 0.770
 0.765 0.545 0.555 0.550 0.555 0.560 0.556 0.550 0.545 0.550 0.555
-0.555
1021 3.0   4 1 1
 1.205 1.195 1.180 1.195 1.185 1.165 1.235 1.235 1.240 1.265 1.255
 1.255 0.765 0.770 0.775 0.770 0.765 0.770 0.785 0.780 0.785 0.775
-0.765
1121 3.0   3 1 1
 0.835 0.815 0.810 0.805 0.805 0.795 0.805 0.800 0.805 0.830 0.840
 0.850 0.595 0.500 0.600 0.595 0.600 0.605 0.600 0.605 0.605 0.605
-0.605
1321 3.0   3 1 1
 0.820 0.815 0.810 0.805 0.800 0.795 0.830 0.835 0.840 0.865 0.870
 0.880 0.610 0.610 0.615 0.610 0.615 0.818 0.810 0.620 0.615-0.605
1221 3.0   3 1 1
 0.765 0.770 0.775 0.805 0.790 0.795 0.795 0.795 0.790 0.805 0.800
 0.795 0.550 0.555 0.560 0.555 0.560 0.565 0.555 0.550 0.545-0.555
-0.555
1421 3.0   5 1 1
 1.480 1.485 1.480 1.480 1.485 1.480 2.775 2.775 2.770 2.770 2.770
 2.775 0.375 0.370 0.375 0.375 0.375 0.380 0.375 0.375 0.375 0.370
 0.380 0.375 0.370-0.365
1521 3.0   4 1 1
 1.210 1.210 1.200 1.205 1.185 1.175 1.235 1.240 1.255 1.255 1.250
 1.245 0.780 0.790 0.785 0.775 0.785 0.795 0.795 0.785 0.795 0.790
-0.785
1621 3.0   4 1 1
 1.245 1.250 1.265 1.265 1.255 1.245 1.215 1.210 1.195 1.195 1.185
 1.170 0.765 0.785 0.790 0.785 0.750 0.780 0.775 0.775 0.770 0.780
-0.775
1721 3.0   4 1 1
 1.240 1.240 1.240 1.255 1.245 1.250 1.205 1.205 1.200 1.190 1.190
 1.160 0.770 0.785 0.785 0.780 0.780 0.785 0.780 0.775 0.770 0.780
 0.780-0.770
1821 3.0  -6 1 1
 0.720 0.725 0.720 0.725 0.720 0.725 0.720 0.725 0.725 0.715 0.715
 0.710 0.375 0.375 0.375 0.375 0.375 0.380 0.380 0.375 0.370 0.370
 0.370 0.370-0.370
S03 OF 82124     MYRTYLE STREET OVER EB I96
READINGS TAKEN 10 FEET NORTH OF SOUTH ABUTMENT

31114.9   1971   1980 10288004096905216908276902117O 1 0
1   0.6800     1.100      1.100     36.160     12.027   -1  0.00     0501
0111 3.0   1 1 1
 1.080 1.080 1.100 1.095 1.070 1.075 1.075 1.085 1.115 1.110 1.105
 1.100 0.680 0.685 0.690 0.695 0.700 0.695 0.695 0.690 0.690 0.695
-0.695
0221 3.0   1 1 1
 1.075 1.080 1.095 1.080 1.070 1.055 1.055 1.080 1.100 1.110 1.075
 1.070 0.675 0.685 0.690 0.685 0.700 0.695 0.685 0.590 0.690 0.695
-0.690
0321 3.0   1 1 1
 1.085 1.075 1.095 1.095 1.080 1.070 1.070 1.085 1.120 1.110 1.105
 1.105 0.695 0.685 0.690 0.695 0.700 0.685 0.700 0.695 0.695 0.695
 0.695-0.695
0521 3.0   1 2 1
 -.999 -.999 -.999 1.125 1.110 1.125 1.085 1.085 1.105 1.095 1.085
 1.080 0.675 0.665 0.670 0.670 0.665 0.666 0.665 0.655 0.655 0.660
 0.655-0.645
0621 3.0   1 2 1
 1.095 1.110 1.140 -.999 -.999 -.999 1.080 1.085 1.105 1.100 1.080
 1.070 0.700 0.705 0.705 0.700 0.695 0.700 0.695 0.695 0.695 0.660
-0.680
0721 3.0   1 2 1
 1.100 1.105 1.110 1.105 1.100 1.105 1.095 1.095 1.095 1.095 1.085
 1.080 0.665 0.660 0.670 0.670 0.665 0.660 0.660 0.655 0.650 0.650
 0.645-0.650
0811 3.0  -1 2 1
 1.065 1.060 1.085 1.065 1.045 1.050 1.040 1.050 1.080 1.095 1.080
 1.080 0.665 0.670 0.670 0.675 0.676 0.676 0.676 0.670 0.670 0.670
 0.670-0.665
S06 OF 82194     SB I75 OVER WB FORT STREET
READINGS TAKEN OVER SHOULDER LANE
STRUCTURE CLOSE TO FACTORIES--HIGH ACID CONTENT IN AIR
11114.50 1967  1979 05237903156706216707126712196 7 1 0
2   0.375      0.7500     0.7500    60.250     16.00     1  1.500    0501
2   0.375      1.0000     1.0000    50.500     16.00     2  1.500    0501
2   0.375      0.7500     0.7500    51.875     16.00    -3  1.125    0501
0421 2.0   1 1 2
 -.999 -.999 -.999 0.740 0.740 0.745 1.500 1.500 1.500 1.500 1.600
 1.600 0.355 0.360 0.360 0.360 0.360 0.365 0.360 0.360 0.360 0.365 0.365
 0.370 0.370 0.375 0.370 0.360 0.365 0.365 0.365 0.365 0.375 0.366
-0.370
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0721 2.0   2 1 2
 -.999 -.999 -.999 1.000 1.000 0.985 1.500 1.500 1.510 1.515 1.500
 1.505 0.365 0.370 0.370 0.370 0.365 0.365 0.365 0.370 0.360 0.370
 0.370 0.370 0.370 0.370 0.370 0.370 0.370 0.370 0.370 0.375 0.370
 0.360 0.370-0.375
1021 2.0   2 1 2
 -.999 -.999 -.999 1.005 1.000 0.995 1.500 1.510 1.505 1.510 1.510
 1.510 0.370 0.365 0.370 0.375 0.370 0.370 0.370 0.370 0.375 0.370
 0.370 0.370 0.370 0.370 0.375 0.375 0.370 0.370 0.370 0.370 0.370
 0.370-0.385
1121 2.0   2 1 2
 0.985 1.010 0.995 -.999 -.999 -.999 1.505 1.500 1.500 1.500 1.495
 1.495 0.370 0.370 0.370 0.370 0.370 0.370 0.370 0.375 0.380 0.375
 0.375 0.375 0.375 0.375 0.375 0.375 0.375 0.375 0.375 0.385 0.375
 0.380-0.380
1421 2.0   2 1 2
 0.995 1.000 0.990 0.990 0.990 0.995 1.500 1.500 1.505 1.500 1.500
 1.500 0.375 0.375 0.375 0.375 0.375 0.385 0.375 0.380 0.380 0.380
 0.380 0.380 0.375 0.380 0.375 0.375 0.380 0.380 0.380 0.380 0.380
 0.385-0.385
1721 2.0   2 1 2
 0.985 0.985 0.985 1.005 1.015 1.010 1.490 1.500 1.495 1.495 1.495
 1.495 0.365 0.365 0.365 0.370 0.365 0.380 0.370 0.380 0.365 0.365
 0.365 0.375 0.365 0.365 0.375 0.365 0.360 0.365 0.365 0.365 0.365
 0.370-0.375
2011 2.0  -3 1 2
 0.735 0.735 0.740 0.760 0.755 0.745 1.125 1.115 1.120 1.120 1.125
 1.125 0.360 0.365 0.360 0.365 0.370 0.365 0.370 0.365 0.365 0.365
 0.365 0.370 0.365 0.365 0.365 0.370 0.365 0.365 0.365 0.370 0.375
 0.370 0.365-0.370
S27 OF 82194      WB I96 UNDER US12 CONNECTION
READINGS TAKEN 4 FEET SOUTH OF NORTH ABUTMENT

31114.80 1971  1980 10148001296905216909156902007O 0 0
1   0.5980     0.7940     0.7940    35.550     11.945  -1  0.00     0502
0111 3.0   1 2 1
 0.760 0.765 0.780 0.815 0.800 0.795 0.775 0.780 0.805 0.840 0.815
 0.805 0.580 0.575 0.585 0.585 0.585 0.585 0.586 0.585 0.580 0.580
 0.585-0.580
0221 3.0   1 2 1
 0.800 0.805 0.820 0.855 0.845 0.835 0.780 0.785 0.805 0.845 0.820
 0.815 0.605 0.610 0.610 0.605 0.605 0.605 0.610 0.605 0.610 0.605
 0.600-0.600
0321 3.0   1 1 1
 0.790 0.790 0.790 0.800 0.775 0.770 0.800 0.805 0.825 0.820 0.810
 0.805 0.595 0.605 0.600 0.600 0.605 0.605 0.610 0.610 0.610 0.610
-0.605
0411 3.0  -1 1 1
 0.790 0.785 0.805 0.790 0.770 0.760 0.795 0.795 0.805 0.790 0.785
 0.780 0.600 0.605 0.600 0.605 0.605 0.605 0.610 0.610 0.610 0.615
 0.610-0.595
S27 OF  82194      WB I96 UNDER US12  CONNECTION
READINGS TAKEN 5 FEET SOUTH OF NORTH PIER
DIRECTLY OVER WB SHOULDER
31114.80 1971  1980 10148001296905216909156902007O 1 0
1   0.625      0.9400     0.9400    35.840     11.972  -1  0.00     0501
0111 3.0   1 1 1
 0.925 0.930 0.935 0.920 0.900 0.890 0.920 0.925 0.940 0.930 0.925
 0.920 0.625 0.625 0.630 0.630 0.630 0.625 0.630 0.635 0.635 0.635
 0.640-0.635
0221 3.0   1 1 1
 0.895 0.910 0.900 0.925 0.915 0.910 0.905 0.910 0.915 0.905 0.895
 0.895 0.615 0.620 0.620 0.620 0.625 0.625 0.620 0.620 0.625 0.630
-0.630
0321 3.0   1 1 1
 0.895 0.900 0.905 0.900 0.885 0.875 0.895 0.895 0.915 0.900 0.895
 0.890 0.620 0.630 0.635 0.625 0.620 0.625 0.630 0.630 0.630 0.635
 0.635-0.635
0421 3.0  -1 2 1
 0.885 0.895 0.895 0.900 0.880 0.860 0.900 0.900 0.905 0.885 0.875
 0.875 0.615 0.620 0.615 0.615 0.520 0.620 0.625 0.625 0.630 0.625
-0.625
0521 3.0   1 1 1
 0.935 0.935 0.955 0.920 0.910 0.905 0.950 0.975 0.975 0.925 0.945
 0.905 0.635 0.645 0.640 0.640 0.645 0.640 0.646 0.650 0.650 0.650
-0.635
0611 3.0  -1 1 1
 0.955 0.950 0.965 0.940 0.930 0.910 0.975 0.990 0.985 0.965 0.945
 0.940 0.620 0.630 0.630 0.630 0.635 0.635 0.640 0.640 0.645 0.645
 0.640-0.660
S10 OF 82252      WB 8 MILE OVER I75  (UPPER STRUCTURE)
READINGS TAKEN 4 FEET WEST OF 7TH PIER & 4 FEET EAST OF 2ND DIAPHRAGM
WEST OF 7TH PIER--MEASUREMENTS TAKEN NORTH SIDE ON WEB
12115.17 1969  1979 05187910076606176612216600000O 0 0
2   0.375      1.250      1.250     57.000     16.00   -1  1.750     1010
0420 2.0   1
 -.999 -.999 -.999 -.999 -.999 -.999 1.755 1.755 1.755 1.755 1.750
 1.750 0.360 0.355 0.355 0.360 0.355 0.360 0.360 0.355 0.355 0.355
 0.355 0.355 0.355 0.360 0.355 0.355 0.365 0.360-0.370
0520 2.0  -1
 -.999 -.999 -.999 -.999 -.999 -.999 1.760 1.775 1.765 1.765 1.770
 1.775 0.365 0.360 0.360 0.360 0.360 0.365 0.360 0.365 0.360 0.360
 0.360 0.360 0.360 0.360 0.360 0.360 0.360 0.355 0.355-0.360
S10 OF 82252      WB 8 MILE OVER I-75  (UPPER STRUCTURE)
READINGS TAKEN 4 FEET WEST OF 7TH PIER & 4 FEET EAST OF 2ND DIAPHRAGM
WEST OF 7TH PIER--MEASUREMENTS TAKEN NORTH SIDE ON WEB
12115.17 1969  1979 05187910076606176612216600000O 0 0
2   0.375      2.0000     2.0000    58.750     16.00   -1  2.750
0420 2.0   1
 -.999 -.999 -.999 -.999 -.999 -.999 2.815 2.815 2.815 -.999 -.999
 -.999 0.360 0.360 0.360 0.360 0.360 0.360 0.365 0.365 0.360 0.360
 0.365 0.365 0.360 0.365 0.360-0.365
0520 2.0  -1
 -.999 -.999 -.999 -.999 -.999 -.999 2.790 2.795 2.800 -.999 -.999
 -.999 0.355 0.360 0.360 0.360 0.360 0.360 0.356 0.355 0.350 0.355
 0.355 0.355 0.355 0.355-0.360
S16 OF 82291      SB I275 RAMP TO EB I94 UNDER WB I94
READINGS TAKEN 20 FEET EAST OF WEST ABUTMENT
DIRECTLY OVER OUTSIDE SOULDER
J2116.00 1972  1980 10248006237308167307007409157S 1 0
2   0.5625     1.000      1.000     69.000     16.00    1  2.00     0301
2   0.5625     0.750      0.750     68.750     16.00   -2  2.00     0301
0111 3.0   1 1 1
 1.005 1.000 1.000 -.999 -.999 -.999 2.005 2.016 2.015 2.005 2.005
 2.000 0.550 0.555 0.555 0.550 0.560 0.560 0.555 0.555 0.555 0.655
 0.555-0.555
0221 3.0   2 1 1
 0.760 0.760 0.765 0.760 0.755 0.755 2.020 2.020 2.025 2.025 2.025
 2.025 0.550 0.545 0.535 0.545 0.545 0.550 0.550 0.550 0.550 0.550
 0.550-0.550
0321 3.0   2 2 1
 0.750 0.755 0.755 0.756 0.755 0.760 2.015 2.015 2.015 2.010 2.005
 2.010 0.540 0.540 0.535 0.535 0.540 0.540 0.545 0.540 0.540 0.549
 0.540-0.540
0411 3.0  -2 2 1
 0.750 0.745 0.750 0.760 0.755 0.750 2.015 2.020 2.020 2.010 2.015
 2.010 0.540 0.540 0.540 0.545 0.540 0.545 0.545 0.545 0.550 0.545
 0.540-0.545
802 OF 23092      SB M99 OVER GRAND RIVER
READINGS TAKEN 8 FEET NORTH OF SOUTH ABUTMENT
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142900     TOO FAR BELOW LOWER SIZE TOLERANCE LIMIT
143000     11200.00 1978   1980 092580081878100378100378061279 0 0
143100     1   0.5640      0.850      0.850     30.00      10.50   -1  0.00     0000
143200     0220 3.0   -1
143300      0.780 0.785 0.780 0.805 0.800 0.795 0.815 0.805 0.800 0.810 0.800
143400      0.790 0.585 0.565 0.565 0.555 0.555 0.560 0.555 0.560 0.560-0.585
143500     S17 OF 25132      THIRD STREET OVER NB I475
143600     READINGS TAKEN 5 FEET EAST OF MIDDLE PIER
143700     INDIVIDUAL FLANGE QUADRANTS HAVE EXCESSIVE VARIATION FROM NOMINAL
143800     31014.60 1976   1980 093080073077081377102877090781 1 0
143900     1   0.625       0.9400     0.9400     35.840     11.972  -1  0.00     0012
144000     0110 3.0   1
144100      0.915 0.920 0.930 0.955 0.945 0.935 0.910 0.925 0.940 0.965 0.970
144200      0.980 0.665 0.645 0.635 0.635 0.630 0.630 0.630 0.630 0.635 0.635
144300      0.640-0.660
144400     0220 3.0   1
144500      0.930 0.945 0.950 0.985 0.970 0.970 0.935 0.940 0.965 0.985 0.980
144600      0.980 0.680 0.660 0.655 0.655 0.655 0.650 0.650 0.650 0.655 0.650
144700      0.655-0.675
144800     0320 3.0   1
144900      0.935 0.945 0.960 0.980 0.985 0.990 0.920 0.930 0.940 0.975 0.955
145000      0.950 0.665 0.655 0.645 0.645 0.640 0.640 0.645 0.645 0.645 0.650
145100      0.650 -.675
145200     0420 3.0   1
145300      0.925 0.945 0.950 0.985 0.960 0.960 0.935 0.950 0.970 0.985 0.990
145400      0.995 0.685 0.655 0.655 0.650 0.650 0.645 0.645 0.650 0.655 0.655
145500      0.665-0.675
145600     0520 3.0   1
145700      0.925 0.935 0.950 0.990 0.895 0.895 0.820 0.830 0.935 0.985 0.965
145800      0.960 0.670 0.660 0.650 0.650 0.650 0.645 0.645 0.650 0.655 0.655
145900      0.660-0.685
146000     0610 3.0   -1
146100      0.925 0.935 0.940 1.010 0.995 0.990 0.900 0.915 0.930 0.990 0.990
146200      0.990 0.680 0.665 0.655 0.655 0.650 0.645 0.645 0.650 0.650 0.650
146300      0.655-0.675
146400     S31 OF 25132      S8 I475 UNDER COLDWATER ROAD
146500     READINGS TAKEN 12 FEET EAST OF WEST ABUTMENT
146600     NOT OPEN TO TRAFFIC AT TIME OF READING
146700     31014.6   1977   1980 092680091077100877061778090781 1 0
146800     1   0.5540      0.738      0.738     32.860     11.484  -1  0.00     1211
146900     0110 3.0   1
147000      0.805 0.810 0.805 0.765 0.770 0.760 0.735 0.755 0.735 0.795 0.805
147100      0.795 0.565 0.570 0.570 0.565 0.570 0.565 0.565 0.570 0.570 0.575
147200     -0.570
147300     0220 3.0   1
147400      0.800 0.800 0.795 0.755 0.750 0.725 0.765 0.780 0.770 0.795 0.805
147500      0.805 0.555 0.560 0.565 0.560 0.560 0.565 0.560 0.660 0.565 0.570
147600     -0.575
147700     0320 3.0   1
147800      0.790 0.800 0.795 0.835 0.850 0.855 0.850 0.850 0.845 0.790 0.815
147900      0.785 0.590 0.590 0.585 0.585 0.585 0.685 0.590 0.590 0.585-0.590
148000     0620 3.0   -1
148100      0.805 0.805 0.795 0.765 0.785 0.750 0.740 0.765 0.735 0.795 0.795
148200      0.795 0.570 0.570 0.565 0.565 0.565 0.560 0.565 0.565 0.565 0.570
148300     -0.565
148400     S03 OF 41051      S8 M37 OVER CALVIN COLLEGE ENTRANCE WAY
148500     READINGS TAKEN 7 FEET SOUTH OF NORTH ABUTMENT
148600     TOO FAR ABOVE UPPER SIZE TOLERANCE LIMIT
148700     31012.00 1978   1980 092380062879070079070980070980 1 0
148800     1   0.522       0.6700     0.6700     29.625     10.50   -1  0.00     0021
148900     0111 3.0   -1 1 2
149000      0.685 0.690 0.720 0.670 0.670 -.999 0.720 0.720 0.720 0.695 0.690
149100      0.690 0.560 0.565 0.525 0.525 0.530 0.535 0.530 0.530 0.545-0.575
149200     X01 OF 64015      S8 M31 OVER BASELINE ROAD & C&O RAILROAD
149300     READINGS TAKEN 6-8 FEET NORTH OF SOUTH ABUTMENT
149400
149500     122 0.00 1975   1980 052180051676070076121176000000 0 0
149600     1   0.5980      0.7940     0.7940     35.550     11.945  -1  0.00     0010
149700     0110 3.0   1
149800      0.800 0.855 0.860 0.790 0.795 0.775 0.755 0.795 0.790 -.999 -.999
149900      -.999 0.650 0.650 0.645 0.645 0.645 0.645 0.650 0.650 0.650 0.655-0.655
150000     0320 3.0   -1
150100      0.805 0.795 0.795 0.855 0.840 0.805 0.795 0.810 0.825 0.800 0.800
150200      0.765 0.655 0.655 0.650 0.645 0.650 0.650 0.650 0.655 0.655-0.655
150300     S03 OF 64015      S8 M31 OVER EB GRANT ROAD
160400     READINGS TAKEN 8 FEET NORTH OF SOUTH ABUTMENT
150500     TOO FAR ABOVE UPPER SIZE TOLERANCE LIMIT
150600     122 0.00 1975   1980 052180051576061276110076051576 0 0
150700     1   0.522       0.6700     0.6700     29.640     10.458  -1  0.00
150800     0111 3.0   1 1 2
150900      0.695 0.715 0.720 0.710 0.705 0.695 0.685 0.695 0.705 0.700 0.685
151000      0.675 0.550 0.550 0.540 0.540 0.535 0.540 0.540 0.540-0.535
151100     0221 3.0   1 1 2
151200      0.680 0.695 0.715 0.705 0.700 0.700 0.705 0.715 0.730 0.705 0.695
151300      0.685 0.560 0.555 0.545 0.545 0.545 0.545 0.550 0.550-0.540
151400     0321 3.0   1 2 2
151500      0.710 0.725 0.740 0.715 0.700 0.685 0.690 0.710 0.725 0.695 0.690
151600      0.675 0.545 0.545 0.550 0.545 0.540 0.540 0.550 0.555-0.555
151700     0421 3.0   1 2 2
151800      0.690 0.695 0.705 0.715 0.700 0.680 0.665 0.680 0.690 0.710 0.690
151900      0.675 0.545 0.550 0.540 0.535 0.535 0.540 0.540 0.540-0.530
152000     0521 3.0   -1 2 2
152100      0.675 0.685 0.700 0.695 0.670 0.670 0.680 0.695 0.705 0.695 0.685
152200      0.675 0.535 0.540 0.530 0.530 0.530 0.535 0.535 0.535-0.535
152300     S01 OF 65041      GLENWOOD ROAD OVER NB I75
152400     READINGS TAKEN 5 FEET WEST OF EAST ABUTMENT
152500     PAINTED--A242? --!ROLLING DEFECTS VERY PROMINANT!!--WRONG NOMINAL??
152600     12216.40 1970   1980 100680041770072470080770080071 0 0
152700     1   0.600       0.7900     0.7900     35.550     11.950  -1  0.00
152800     0111 3.0   111 1
152900      0.765 0.780 0.810 0.810 0.790 0.775 0.805 0.805 0.810 0.815 0.790
153000      0.780 0.550 0.560 0.570 0.575 0.575 0.575 0.575 0.570 0.575 0.570
153100      0.565-0.570
153200     0221 3.0   112 1
153300      0.795 0.815 0.825 0.845 0.835 0.835 0.825 0.820 0.830 0.810 0.810
153400      0.825 0.595 0.595 0.585 0.595 0.600 0.600 0.600 0.600 0.600
153500      0.600-0.595
153600     0321 3.0   111 1
153700      0.775 0.780 0.795 0.810 0.790 0.780 0.810 0.805 0.825 0.810 0.790
153800      0.775 0.545 0.560 0.665 0.570 0.575 0.575 0.575 0.570 0.570 0.565
153900     -0.595
154000     0421 3.0   111 1
154100      0.760 0.785 0.790 0.825 0.800 0.785 0.790 0.790 0.800 0.815 0.785
154200      0.780 0.560 0.565 0.570 0.575 0.580 0.580 0.575 0.570 0.570 0.565
154300      0.565-0.565
154400     0511 3.0   -112 1
154500      0.775 0.790 0.810 0.795 0.780 0.765 0.780 0.790 0.810 0.795 0.790
164600      0.795 0.550 0.560 0.570 0.575 0.575 0.575 0.570 0.570 0.570 0.570
164700      0.565-0.565
154800     802 OF 70024      W8 I196 OVER BLACK RIVER
164900     READINGS TAKEN 5 FEET EAST OF WEST ABUTMENT
155000     TOO FAR ABOVE UPPER SIZE TOLERANCE LIMIT
156100     122 0.00 1972   1979 101879100673072872121174000000 0 0
155200     1   0.598       0.7940     0.7940     35.550     11.945  -1  0.00
165300     0110 3.0   1
165400      0.805 0.820 0.825 0.830 0.825 0.825 0.820 0.840 0.845 0.835 0.835
155500      0.825 0.625 0.825 0.625 0.825 0.625 0.625 0.630 0.630 0.635 0.635
155600      0.635-0.665
155700     0220 3.0   1
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155800     0.775 0.785 0.800 0.810 0.820 0.820 0.800 0.815 0.840 0.830 0.825
155900     0.815 0.640 0.635 0.635 0.630 0.630 0.630 0.835 0.640 0.640 0.645
156000     0.645-0.650
156100    0320 3.0   1
156200     0.790 0.810 0.820 0.805 0.805 0.815 0.820 0.830 0.850 0.830 0.830
156300     0.815 0.650 0.635 0.635 0.630 0.630 0.630 0.630 0.635 0.640 0.640
156400     0.640-0.640
156500    0520 3.0   1
156600     0.830 0.845 0.850 0.860 0.855 0.845 0.820 0.830 0.835 0.820 0.830
156700     0.825 0.665 0.860 0.655 0.655 0.650 0.650 0.645 0.645 0.650 0.655
156800     0.650-0.655
156900    0610 3.0  -1
157000     0.860 0.870 0.880 0.835 0.845 0.830 0.845 0.855 0.865 0.890 0.880
157100     0.875 0.595 0.585 0.580 0.570 0.565 0.565 0.565 0.570 0.575-0.575
157200    B03 OF 70024      EB I196 OVER BLACK RIVER
157300    READINGS TAKEN 2 FEET EAST OF EAST PIER
157400    TOO FAR ABOVE UPPER SIZE TOLERANCE LIMIT
157500    112 0.00 1972   1979 10317904207405187412117400000000 0 0
157600    1    0.5640      0.850       0.850      30.00       10.50    -1  0.00
157700    0110 3.0   1
157800     0.865 0.870 0.885 0.850 0.845 0.830 0.825 0.835 0.840 0.870 0.865
157900     0.865 0.575 0.560 0.560 0.555 0.560 0.560 0.565 0.565 0.580-0.600
158000    0220 3.0   1
158100     0.915 0.915 0.925 0.905 0.880 0.870 0.890 0.895 0.905 0.900 0.885
158200     0.880 0.595 0.590 0.585 0.580 0.580 0.580 0.580 0.590 0.600-0.610
158300    0320 3.0   1
158400     0.905 0.905 0.910 0.915 0.900 0.885 0.880 0.895 0.910 0.935 0.920
158500     0.915 0.610 0.605 0.595 0.590 0.585 0.585 0.585 0.590 0.590-0.595
158600    0420 3.0   1
158700     0.870 0.875 0.880 0.880 0.880 0.865 0.845 0.860 0.875 0.925 0.920
158800     0.915 0.605 0.595 0.585 0.575 0.570 0.570 0.570 0.570 0.575-0.580
158900    0520 3.0   1
159000     0.865 0.880 0.885 0.890 0.885 0.875 0.915 0.915 0.930 0.900 0.880
159100     0.860 0.600 0.595 0.580 0.575 0.575 0.670 0.575 0.575 0.580-0.595
159200    0610 3.0  -1
159300     0.880 0.870 0.880 0.835 0.845 0.830 0.845 0.855 0.865 0.890 0.880
159400     0.875 0.595 0.585 0.580 0.570 0.565 0.565 0.565 0.570 0.575-0.575
159500    B03 OF 70024      EB I196 OVER BLACK RIVER
159600    READINGS TAKEN 1ST PIER WEST OF EAST ABUTMENT
159700
159800    112 0.00 1972   1979 10317904207405187412117400000000 0 0
159900    1    0.5640      0.850       0.850      30.00       10.50    -1  0.00     0400
160000    0310 3.0   1
160100     0.900 0.905 0.910 0.900 0.895 0.875 0.865 0.880 0.900 0.930 0.920
160200     0.920 0.615 0.605 0.595 0.590 0.580 0.580 0.580 0.580 0.590-0.600
160300    0520 3.0  -1
160400     0.870 0.885 0.875 0.900 0.890 0.885 0.925 0.925 0.935 0.880 0.870
160500     0.855 0.600 0.600 0.585 0.575 0.575 0.570 0.570 0.575 0.580-0.575
160600    B03 OF 70024      EB I196 OVER BLACK RIVER
160700    READINGS TAKEN 3 FEET WEST OF EAST ABUTMENT
160800    TOO FAR ABOVE UPPER SIZE TOLERANCE BAND
160900    110 0.00 1972   1979 10317904207405187412117400000000 0 0
161000    1    0.5640      0.850       0.850      30.00       10.50    -1  0.00
161100    0220 3.0   1
161200     0.915 0.910 0.920 0.890 0.880 0.865 0.886 0.900 0.915 0.895 0.885
161300     0.880 0.595 0.590 0.585 0.580 0.580 0.580 0.580 0.590 0.605-0.610
161400    0320 3.0   1
161500     0.900 0.905 0.910 0.900 0.890 0.875 0.875 0.890 0.895 0.925 0.915
161600     0.910 0.615 0.605 0.595 0.590 0.580 0.580 0.580 0.585 0.690-0.590
161700    0520 3.0  -1
161800     0.870 0.875 0.895 0.895 0.880 0.870 0.905 0.910 0.925 0.900 0.870
161900     0.855 0.605 0.600 0.585 0.575 0.570 0.570 0.575 0.570 0.580-0.580
162000    S24 OF 82123      FULLERTON OVER WB I96
162100    READING TAKEN DIRECTLY OVER  MEDIAN STRIP SEPERATING 186B EXIT
162200    FROM WB I96
162300    31114.10 1971   1980 11058007007207007300000012007 3 1 0
162400    2    0.500       1.125       2.125      48.00       16.00    -1  0.00
162500    0321 3.0  -1
162600     1.365 1.360 1.355 1.365 1.370 1.375 2.400 2.395 2.390 2.405 2.410
162700     2.415 0.480 0.480 0.485 0.480 0.480 0.485 0.480 0.485 0.480 0.480
162800     0.480 0.485 0.480 0.475-0.480
162900    S34 OF 82112      EB 8 MILE OVER NB US10
163000    READINGS TAKEN ON SPAN 2 OVER OUTSIDE LANE
163100    TOO FAR ABOVE UPPER TOLERANCE LIMIT (AFTER 15 YEARS!!)
163200    22115.58 1965   1979 05167901246402126402216407006S 1 0
163300    1    0.5980      0.7940      0.7940     35.550      11.945   -1  0.00     0602
163400    0721 2.0  -1 1 1
163500     0.725 0.785 0.865 0.920 0.840 0.766 0.725 0.780 0.875 0.915 0.820
163600     0.730 0.625 0.630 0.635 0.640 0.645 0.645 0.645 0.645 0.645 0.645
163700     0.645 0.650 0.640 0.650 0.655-0.655
163800    X02 OF 80031      NORTH BOUND US131 OVER PENN CENTRAL RAILROAD
163900    READINGS TAKEN 8 FEET NORTH OF SOUTH ABUTMENT
164000    ?HAVING PROBLEMS WITH THICKNESS GUAGE?????????
164100    12223.00 1975   1980 05218011247506167611157700000O 0 0
164200    1    0.5480      0.760       0.760      29.820      10.484   -1 -0.00
164300    0110 3.0   1
164400     0.835 0.855 0.865 0.830 0.825 0.825 0.820 0.835 0.850 0.805 0.810
164500     0.810 0.560 0.560 0.555 0.555 0.560 0.560 0.560 0.565-0.565
164600    0220 3.0   1
164700     0.850 0.860 0.880 0.835 0.830 0.835 0.835 0.845 0.865 0.830 0.835
164800     0.835 0.570 0.570 0.570 0.565 0.570 0.575 0.570 0.580-0.575
164900    0320 3.0   1
165000     0.810 0.830 0.850 0.805 0.805 0.805 0.825 0.840 0.850 0.810 0.800
165100     0.805 0.560 0.555 0.560 0.555 0.550 0.550 0.555 0.550-0.555
165200    0420 3.0   1
165300     0.785 0.805 0.805 0.780 0.775 0.775 0.790 0.800 0.820 0.785 0.760
165400     0.790 0.520 0.520 0.520 0.520 0.520 0.520 0.520 0.525-0.520
165500    0510 3.0  -1
165600     0.790 0.790 0.805 0.785 0.775 0.775 0.800 0.805 0.820 0.785 0.780
165700     0.790 0.515 0.520 0.515 0.515 0.515 0.520 0.520 0.520-0.520
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S07 OF 03035 WB I196 UNDER 146TH AVENUE
READINGS TAKEN 20 FEET SOUTH OF WB SHOULDER
SANDED INSTEAD OF GRINDING

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1972.
READINGS TAKEN 10/31/72
OPEN TO TRAFFIC (OVER) 11/ 3/73

STEEL IN PLACE 8/11/73
DECK COMPLETED 9/22/73
OPEN TO TRAFFIC (UNDER) 12/11/74

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG	BEAM 5 INTERIOR WPG	BEAM 6 FACIA WPG
NOMINAL AREA (INCHES**2)	50.0000	50.0000	50.0000	50.0000	50.0000
ACTUAL AREA (INCHES**2)	50.3600	49.8700	50.3067	50.3167	49.8667
% REDUCTION FROM NOMINAL	-0.7200	0.2600	-0.6133	-0.6333	0.2667
% REDUCTION FROM UPPER LIMIT	4.0640	4.9975	4.1656	4.1466	5.0038
% REDUCTION FROM LOWER LIMIT	-2.3373	-1.3415	-2.2290	-2.2493	-1.3348
PENETRATION (FROM NOMINAL)	-2.27	0.82	-1.93	-1.89	0.84
UPPER LIMIT	13.44	16.52	13.77	13.71	16.55
LOWER LIMIT	-7.25	-4.16	-6.91	-6.97	-4.14
I--XX NOMINAL	12582.03	12582.03	12582.03	12582.03	12582.03
I--XX ACTUAL	12698.06	12493.47	12576.53	12586.51	12494.75
% REDUCTION FROM NOMINAL	-0.92	0.70	0.04	-0.04	0.69
I--YY NOMINAL	277.84	277.84	277.84	277.84	277.84
I--YY ACTUAL	278.15	275.73	277.33	276.20	275.78
% REDUCTION FROM NOMINAL	-0.11	0.76	0.18	0.59	0.74

DATA SUMMARY FOR BRIDGE S07 OF 0303

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.23	-0.71	-0.11	0.32
INTERIOR BEAM AVERAGES	-0.33	-1.04	0.24	0.51
BRIDGE AVERAGES	-0.29	-0.91	0.10	0.43

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803 OF 13061 WB I94 BL OVER BATTLE CREEK RIVER
READINGS TAKEN 5 FEET SOUTH OF NORTH ABUTMENT
GOOD FISHING IF YOU LIKE CARP

BRIDGE ENVIRONMENT OPEN
UNDER 15 FEET
URBAN LOW TRAFFIC VOLUME

BRIDGE STARTED 1975.
READINGS TAKEN 9/23/80
OPEN TO TRAFFIC (OVER) 10/12/76

STEEL IN PLACE 7/24/76
DECK COMPLETED 8/21/76

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 4 INTERIOR WFB	BEAM 5 INTERIOR WFB	BEAM 6 INTERIOR WFB	BEAM 7 INTERIOR WFB
NOMINAL AREA (INCHES**2)	29.1063	29.1063	29.1063	29.1063	29.1063	29.1063	29.1063
ACTUAL AREA (INCHES**2)	29.3708	29.6277	29.4872	29.6311	29.9479	29.8892	29.2467
% REDUCTION FROM NOMINAL	-0.9085	-1.7913	-1.3087	-1.8029	-2.8915	-2.6896	-0.4823
% REDUCTION FROM UPPER LIMIT	1.5526	0.6914	1.1622	0.6801	-0.3819	-0.1850	1.9685
% REDUCTION FROM LOWER LIMIT	-3.4959	-4.4014	-3.9064	-4.4133	-5.5297	-5.3227	-3.0588
PENETRATION (FROM NOMINAL)	-2.72	-5.35	-3.91	-5.39	-8.64	-8.04	-1.44
UPPER LIMIT	4.76	2.12	3.56	2.08	-1.17	-0.57	6.03
LOWER LIMIT	-10.19	-12.83	-11.38	-12.86	-16.11	-15.51	-8.91
I--XX NOMINAL	3989.62	3989.62	3989.62	3989.62	3989.62	3989.62	3989.62
I--XX ACTUAL	4040.16	4068.79	4050.73	4079.19	4119.71	4113.50	4030.40
% REDUCTION FROM NOMINAL	-1.27	-1.98	-1.53	-2.24	-3.26	-3.11	-1.02
I--YY NOMINAL	128.11	128.11	128.11	128.11	128.11	128.11	128.11
I--YY ACTUAL	127.42	127.86	127.24	129.04	129.98	130.37	127.18
% REDUCTION FROM NOMINAL	0.54	0.20	0.68	-0.72	-1.46	-1.76	0.73

	BEAM 8 FACIA WFB
NOMINAL AREA (INCHES**2)	29.1063
ACTUAL AREA (INCHES**2)	29.6660
% REDUCTION FROM NOMINAL	-1.9227
% REDUCTION FROM UPPER LIMIT	0.6832

% REDUCTION FROM LOWER LIMIT	-4.5361
PENETRATION (FROM NOMINAL)	-5.75
UPPER LIMIT	1.73
LOWER LIMIT	-13.22
I--XX NOMINAL	3291.12
I--XX ACTUAL	3359.50
% REDUCTION FROM NOMINAL	-2.08
I--YY NOMINAL	96.18
I--YY ACTUAL	96.62
% REDUCTION FROM NOMINAL	-0.46

DATA SUMMARY FOR BRIDGE 803 OF 13061

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-1.42	-4.23	-1.67	0.04
INTERIOR BEAM AVERAGES	-1.83	-5.46	-2.19	-0.39
BRIDGE AVERAGES	-1.72	-5.15	-2.06	-0.28

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802 OF 23092 SB M99 OVER GRAND RIVER
READINGS TAKEN 6 FEET NORTH OF SOUTH ABUTMENT

BRIDGE ENVIRONMENT OPEN
UNDER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1978.
READINGS TAKEN 9/25/80
OPEN TO TRAFFIC (OVER) 11/12/80

STEEL IN PLACE 9/17/79
DECK COMPLETED 10/ 9/79

	BEAM 1 FACIA WFB	BEAM 3 INTERIOR WFB	BEAM 4 FACIA WFB
NOMINAL AREA (INCHES**2)	34.1312	34.1312	34.1312
ACTUAL AREA (INCHES**2)	33.8816	33.7954	34.0933
% REDUCTION FROM NOMINAL	0.7314	0.9840	0.1112
% REDUCTION FROM UPPER LIMIT	3.1528	3.3990	2.5475
% REDUCTION FROM LOWER LIMIT	-1.8139	-1.5549	-2.4501
PENETRATION (FROM NOMINAL)	2.56	3.45	0.39
UPPER LIMIT	11.32	13.20	9.14
LOWER LIMIT	-6.19	-5.31	-8.36
I--XX NOMINAL	4921.10	4921.10	4321.10
I--XX ACTUAL	4895.21	4886.60	4881.88
% REDUCTION FROM NOMINAL	0.53	0.70	0.59
I--YY NOMINAL	164.48	164.48	164.48
I--YY ACTUAL	161.15	160.80	160.25
% REDUCTION FROM NOMINAL	2.02	2.23	2.57

DATA SUMMARY FOR BRIDGE 802 OF 23092

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.42	1.48	0.56	2.30
INTERIOR BEAM AVERAGES	0.98	3.45	0.70	2.23
BRIDGE AVERAGES	0.81	2.13	0.81	2.28

B03 OF 23092 NB M99 OVER THE GRAND RIVER
READINGS TAKEN 6 FEET SOUTH OF NORTH ABUTMENT
50 TO 70 PERCENT OF MILL SCALE STILL INTACT

BRIDGE ENVIRONMENT OPEN
UNDER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1978.
READINGS TAKEN 9/25/80
OPEN TO TRAFFIC (OVER) 10/ 3/78

STEEL IN PLACE 8/18/78
DECK COMPLETED 10/ 3/78

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 4 INTERIOR WFB	BEAM 5 INTERIOR WFB	BEAM 6 FACIA WFB
NOMINAL AREA (INCHES**2)	34.1312	34.1312	34.1312	34.1312	34.1312	34.1312
ACTUAL AREA (INCHES**2)	33.5861	34.3277	33.8468	34.1748	34.5006	34.4144
% REDUCTION FROM NOMINAL	1.5971	-0.5756	0.8274	-0.1277	-1.0823	-0.8297
% REDUCTION FROM UPPER LIMIT	3.9971	1.8775	3.2462	2.3144	1.3831	1.6295
% REDUCTION FROM LOWER LIMIT	-0.9251	-3.1544	-1.7155	-2.6961	-3.5741	-3.4151
PENETRATION (FROM NOMINAL)	5.59	-2.02	2.90	-0.45	-3.79	-2.91
UPPER LIMIT	14.35	5.74	11.65	8.31	4.96	5.85
LOWER LIMIT	-3.16	-10.77	-5.86	-9.20	-12.54	-11.66
I--XX NOMINAL	4921.10	4921.10	4921.10	4921.10	4921.10	4921.10
I--XX ACTUAL	4834.99	4923.52	4864.69	4899.05	4955.85	4940.22
% REDUCTION FROM NOMINAL	1.75	-0.05	1.15	0.45	-0.71	-0.39
I--YY NOMINAL	164.48	164.48	164.48	164.48	164.48	164.48
I--YY ACTUAL	158.36	160.87	158.98	160.32	162.69	162.65
% REDUCTION FROM NOMINAL	3.72	2.19	3.34	2.53	1.09	1.11

DATA SUMMARY FOR BRIDGE B03 OF 23092

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.38	1.34	0.68	2.41
INTERIOR BEAM AVERAGES	-0.24	-0.84	0.21	2.29
BRIDGE AVERAGES	-0.03	-0.11	0.37	2.33

P01 OF 25132 PEDESTRIAN BRIDGE OVER I475
READINGS TAKEN 20 FEET WEST OF 1ST PIER EAST OF WEST ABUTMENT
NOT OPEN TO TRAFFIC AT TIME OF READINGS

BRIDGE ENVIRONMENT INTERMEDIATE
OVER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1976.
READINGS TAKEN 9/26/80
OPEN TO TRAFFIC (OVER) 8/26/78

STEEL IN PLACE 7/30/77
DECK COMPLETED 7/29/78

	BEAM 1 FACIA WFB	BEAM 2 FACIA WFB
NOMINAL AREA (INCHES**2)	39.7029	39.7029
ACTUAL AREA (INCHES**2)	39.8980	39.8268
% REDUCTION FROM NOMINAL	-0.4913	-0.3119
% REDUCTION FROM UPPER LIMIT	1.9597	2.1347
% REDUCTION FROM LOWER LIMIT	-3.0680	-2.8840
PENETRATION (FROM NOMINAL)	-1.70	-1.08
UPPER LIMIT	6.95	7.59
LOWER LIMIT	-10.37	-9.75
I--XX NOMINAL	7801.87	7801.87
I--XX ACTUAL	7865.52	7845.19
% REDUCTION FROM NOMINAL	-0.82	-0.56
I--YY NOMINAL	226.24	226.24
I--YY ACTUAL	225.87	224.82
% REDUCTION FROM NOMINAL	0.16	0.63

DATA SUMMARY FOR BRIDGE P01 OF 25132

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.40	-1.39	-0.69	0.40
INTERIOR BEAM AVERAGES	0.00	0.00	0.00	0.00
BRIDGE AVERAGES	-0.40	-1.39	-0.69	0.40

P02 OF 25132 PEDESTRIAN BRIDGE OVER SB I475
READINGS TAKEN 10 FEET EAST OF WEST PIER
ROAD NOT YET OPEN TO TRAFFIC

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
URBAN LOW TRAFFIC VOLUME

BRIDGE STARTED 1977.
READINGS TAKEN 9/26/80
OPEN TO TRAFFIC (OVER) 11/ 4/78

STEEL IN PLACE 10/ 7/78
DECK COMPLETED 0/ 0/ 0

	BEAM 1 FACIA WFB	BEAM 2 FACIA WFB
NOMINAL AREA (INCHES**2)	34.7101	34.7101
ACTUAL AREA (INCHES**2)	34.6870	35.7847
% REDUCTION FROM NOMINAL	0.0665	-3.0960
% REDUCTION FROM UPPER LIMIT	2.5039	-0.5814
% REDUCTION FROM LOWER LIMIT	-2.4959	-5.7394
PENETRATION (FROM NOMINAL)	0.21	-9.99
UPPER LIMIT	8.28	-1.92
LOWER LIMIT	-7.85	-18.05
I--XX NOMINAL	5890.49	5890.49
I--XX ACTUAL	5906.92	6090.13
% REDUCTION FROM NOMINAL	-0.28	-3.39
I--YY NOMINAL	186.80	186.80
I--YY ACTUAL	186.08	192.83
% REDUCTION FROM NOMINAL	0.39	-3.23

DATA SUMMARY FOR BRIDGE P02 OF 25132

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-1.51	-4.89	-1.83	-1.42
INTERIOR BEAM AVERAGES	0.00	0.00	0.00	0.00
BRIDGE AVERAGES	-1.51	-4.89	-1.83	-1.42

P02 OF 25132 PEDESTRAIN BRIDGE OVER NB I475
READINGS TAKEN 10 FEET WEST OF EAST PIER
NOT OPEN TO TRAFFIC AT TIME OF READINGS

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
URBAN LOW TRAFFIC VOLUME

BRIDGE STARTED 1977.
READINGS TAKEN 9/26/80
OPEN TO TRAFFIC (OVER) 11/ 4/78

STEEL IN PLACE 10/ 7/78
DECK COMPLETED 0/ 0/ 0

	BEAM 1 FACIA WFB	BEAM 2 FACIA WFB
NOMINAL AREA (INCHES**2)	34.7101	34.7101
ACTUAL AREA (INCHES**2)	34.6734	34.8447
% REDUCTION FROM NOMINAL	0.1059	-0.3877
% REDUCTION FROM UPPER LIMIT	2.5423	2.0608
% REDUCTION FROM LOWER LIMIT	-2.4555	-2.9617
PENETRATION (FROM NOMINAL)	0.34	-1.25
UPPER LIMIT	8.41	8.81
LOWER LIMIT	-7.72	-9.32
I--XX NOMINAL	5890.49	5890.49
I--XX ACTUAL	5909.27	5942.21
% REDUCTION FROM NOMINAL	-0.32	-0.88
I--YY NOMINAL	186.80	186.80
I--YY ACTUAL	186.23	187.20
% REDUCTION FROM NOMINAL	0.31	-0.21

DATA SUMMARY FOR BRIDGE P02 OF 25132

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.14	-0.45	-0.60	0.05
INTERIOR BEAM AVERAGES	0.00	0.00	0.00	0.00
BRIDGE AVERAGES	-0.14	-0.45	-0.60	0.05

S21 OF 25132 WB LONGWAY OVER NB I475
READINGS TAKEN 10-15 FEET EAST OF CENTER PIER

BRIDGE ENVIRONMENT INTERMEDIATE
UNDER 15 FEET
URBAN LOW TRAFFIC VOLUME

BRIDGE STARTED 1976.
READINGS TAKEN 9/25/80
OPEN TO TRAFFIC (OVER) 6/ 0/79

STEEL IN PLACE 10/ 7/78
DECK COMPLETED 10/ 7/78

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 4 INTERIOR WFB	BEAM 5 INTERIOR WFB	BEAM 6 FACIA WFB
NOMINAL AREA (INCHES**2)	44.1574	44.1574	44.1574	44.1574	44.1574	44.1574
ACTUAL AREA (INCHES**2)	43.7636	43.8502	44.3677	44.3350	44.0471	44.5262
% REDUCTION FROM NOMINAL	0.8918	0.6957	-0.4762	-0.4023	0.2497	-0.8352
% REDUCTION FROM UPPER LIMIT	3.3090	3.1177	1.9744	2.0466	2.6826	1.6242
% REDUCTION FROM LOWER LIMIT	-1.6495	-1.8506	-3.0525	-2.9767	-2.3080	-3.4207
PENETRATION (FROM NOMINAL)	3.44	2.68	-1.84	-1.55	0.96	-3.22
UPPER LIMIT	13.07	12.32	7.80	8.09	10.60	6.42
LOWER LIMIT	-6.20	-6.95	-11.47	-11.19	-8.67	-12.86
I--XX NOMINAL	9015.40	9015.40	9015.40	9015.40	9015.40	9015.40
I--XX ACTUAL	8915.90	8928.15	8998.69	8921.62	8978.17	9099.89
% REDUCTION FROM NOMINAL	1.10	0.97	0.19	-0.07	0.41	-0.94
I--YY NOMINAL	269.62	269.62	269.62	269.62	269.62	269.62
I--YY ACTUAL	262.33	262.94	263.79	265.73	264.56	268.18
% REDUCTION FROM NOMINAL	2.70	2.48	2.16	1.44	1.88	0.53

DATA SUMMARY FOR BRIDGE S21 OF 25132

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.03	0.11	0.08	1.62
INTERIOR BEAM AVERAGES	0.02	0.06	0.37	1.99
BRIDGE AVERAGES	0.02	0.08	0.28	1.87

S26 OF 25132 NB HS4 UNDER I475
READINGS TAKEN 15 FEET NORTH OF SOUTH PIER
NOT OPEN TO TRAFFIC AT TIME OF READINGS--UNPAINTED

BRIDGE ENVIRONMENT TUNNELED
UNDER 15 FEET
URBAN LOW TRAFFIC VOLUME

BRIDGE STARTED 1976.
READINGS TAKEN 10/ 8/80
OPEN TO TRAFFIC (OVER) 9/ 7/81

STEEL IN PLACE 8/26/78
DECK COMPLETED 11/16/78

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG	BEAM 4 INTERIOR WPG
NOMINAL AREA (INCHES**2)	50.3750	45.5000	45.5000	40.5000
ACTUAL AREA (INCHES**2)	50.7200	45.7917	46.1345	40.8450
% REDUCTION FROM NOMINAL	-0.6849	-0.6410	-1.3945	-0.8519
% REDUCTION FROM UPPER LIMIT	4.0272	4.1280	3.4102	4.0747
% REDUCTION FROM LOWER LIMIT	-2.1684	-2.1912	-2.9562	-2.4974
PENETRATION (FROM NOMINAL)	-2.24	-2.09	-4.55	-2.62
UPPER LIMIT	14.47	14.13	11.66	13.17
LOWER LIMIT	-7.32	-7.04	-9.50	-7.55
I--XX NOMINAL	17495.79	14228.68	14228.68	11804.02
I--XX ACTUAL	17649.30	14396.07	14480.71	11986.91
% REDUCTION FROM NOMINAL	-0.88	-1.18	-1.77	-1.55
I--YY NOMINAL	682.96	400.60	400.60	234.44
I--YY ACTUAL	690.44	405.41	407.29	236.72
% REDUCTION FROM NOMINAL	-1.10	-1.20	-1.67	-0.97

DATA SUMMARY FOR BRIDGE S26 OF 25132

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.68	-2.34	-0.88	-1.10
INTERIOR BEAM AVERAGES	-0.96	-3.09	-1.50	-1.28
BRIDGE AVERAGES	-0.89	-2.90	-1.34	-1.23

S26 OF 25132 NB N54 UNDER I475
READINGS TAKEN 15 FEET NORTH OF SOUTH PIER
NOT OPEN TO TRAFFIC AT TIME OF READINGS--PAINTED

BRIDGE ENVIRONMENT TUNNELED
UNDER 15 FEET
URBAN LOW TRAFFIC VOLUME

BRIDGE STARTED 1978.
READINGS TAKEN 10/ 8/80
OPEN TO TRAFFIC (OVER) 9/ 7/81

STEEL IN PLACE 6/26/78
DECK COMPLETED 11/18/78

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG	BEAM 4 INTERIOR WPG
NOMINAL AREA (INCHES**2)	50.3750	45.5000	45.5000	40.5000
ACTUAL AREA (INCHES**2)	51.0583	46.1667	46.0600	40.8173
% REDUCTION FROM NOMINAL	-1.3565	-1.4652	-1.2308	-0.7834
% REDUCTION FROM UPPER LIMIT	3.3871	3.3429	3.5662	4.1398
% REDUCTION FROM LOWER LIMIT	-2.8499	-3.0261	-2.7900	-2.4278
PENETRATION (FROM NOMINAL)	-4.64	-4.78	-4.01	-2.41
UPPER LIMIT	12.17	11.45	12.21	13.38
LOWER LIMIT	-9.62	-9.73	-8.96	-7.34
I--XX NOMINAL	10300.73	8885.47	8885.47	7686.22
I--XX ACTUAL	10434.97	9049.43	9037.48	7820.09
% REDUCTION FROM NOMINAL	-1.30	-1.85	-1.71	-1.74
I--YY NOMINAL	341.63	200.53	200.53	117.45
I--YY ACTUAL	347.09	203.64	203.42	118.87
% REDUCTION FROM NOMINAL	-1.60	-1.55	-1.44	-1.21

DATA SUMMARY FOR BRIDGE S26 OF 25132

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-1.36	-4.64	-1.30	-1.60
INTERIOR BEAM AVERAGES	-1.16	-3.73	-1.77	-1.40
BRIDGE AVERAGES	-1.21	-3.86	-1.65	-1.45

S31 OF 25132 SB I475 UNDER COLDWATER ROAD
READINGS TAKEN 12 FEET EAST OF WEST ABUTMENT
NOT OPEN TO TRAFFIC AT TIME OF READING

BRIDGE ENVIRONMENT INTERMEDIATE
UNDER 15 FEET
URBAN LOW TRAFFIC VOLUME

BRIDGE STARTED 1977.
READINGS TAKEN 9/26/80
OPEN TO TRAFFIC (OVER) 6/17/78

STEEL IN PLACE 9/10/77
DECK COMPLETED 10/ 8/77

	BEAM 4 INTERIOR WF8	BEAM 5 INTERIOR WF8	BEAM 7 INTERIOR WF8	BEAM 8 FACIA WF8
NOMINAL AREA (INCHES**2)	34.7258	34.7258	34.7258	34.7258
ACTUAL AREA (INCHES**2)	34.8356	35.3122	34.6643	35.6002
% REDUCTION FROM NOMINAL	-0.3163	-1.6886	0.1772	-2.5179
% REDUCTION FROM UPPER LIMIT	2.1304	0.7916	2.6119	-0.0175
% REDUCTION FROM LOWER LIMIT	-2.8865	-4.2960	-2.3824	-5.1466
PENETRATION (FROM NOMINAL)	-1.02	-5.45	0.57	-8.13
UPPER LIMIT	7.05	2.62	8.64	-0.06
LOWER LIMIT	-9.09	-13.52	-7.50	-16.20
I--XX NOMINAL	5891.78	5891.78	5891.78	5891.78
I--XX ACTUAL	5932.10	6006.90	5922.41	6089.13
% REDUCTION FROM NOMINAL	-0.68	-1.95	-0.52	-3.35
I--YY NOMINAL	186.80	186.80	186.80	186.80
I--YY ACTUAL	187.69	188.48	187.00	194.53
% REDUCTION FROM NOMINAL	-0.47	-0.90	-0.11	-4.14

DATA SUMMARY FOR BRIDGE S31 OF 25132

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-2.52	-8.13	-3.35	-4.14
INTERIOR BEAM AVERAGES	-0.61	-1.97	-1.05	-0.49
BRIDGE AVERAGES	-1.09	-3.81	-1.83	-1.40

S47 OF 25132 SB I475 EXIT RAMP OVER SB I475 ENTRANCE RAMP
READINGS TAKEN 8 FEET SOUTH OF NORTH ABUTMENT
NOT OPEN TO TRAFFIC AT TIME OF READINGS

BRIDGE ENVIRONMENT INTERMEDIATE
OVER 15 FEET
URBAN LOW TRAFFIC VOLUME

BRIDGE STARTED 1977.
READINGS TAKEN 9/25/80
OPEN TO TRAFFIC (OVER) 9/ 7/81

STEEL IN PLACE 7/15/78
DECK COMPLETED 7/29/78

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 FACIA WPG
NOMINAL AREA (INCHES**2)	56.2500	69.3750	56.2500
ACTUAL AREA (INCHES**2)	55.2275	68.4825	55.6975
% REDUCTION FROM NOMINAL	1.8178	1.2865	0.9822
% REDUCTION FROM UPPER LIMIT	6.6512	5.9791	5.8568
% REDUCTION FROM LOWER LIMIT	0.3515	0.0945	-0.4966
PENETRATION (FROM NOMINAL)	6.11	5.34	3.30
UPPER LIMIT	23.53	26.08	20.72
LOWER LIMIT	1.16	0.39	-1.65
I--XX NOMINAL	24884.09	35293.69	21063.56
I--XX ACTUAL	24743.73	35070.65	21003.19
% REDUCTION FROM NOMINAL	0.56	0.63	0.29
I--YY NOMINAL	422.97	669.07	336.09
I--YY ACTUAL	421.37	663.93	331.81
% REDUCTION FROM NOMINAL	0.38	0.77	0.98

DATA SUMMARY FOR BRIDGE S47 OF 25132

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	1.40	4.71	0.43	0.68
INTERIOR BEAM AVERAGES	1.29	5.34	0.63	0.77
BRIDGE AVERAGES	1.36	4.82	0.49	0.71

RO1 OF 38101 EB I94 OVER GTW & NYC RAILROADS
READINGS TAKEN 8 FEET EAST OF 5TH PIER WEST OF EAST ABUTMENT
UNPAINTED WITH PAINTED COMPARISON

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL HIGH TRAFFIC VOLUME

BRIDGE STARTED 1975.
READINGS TAKEN 11/15/79
OPEN TO TRAFFIC (OVER) 7/27/77

STEEL IN PLACE 7/14/77
DECK COMPLETED 7/14/77

	BEAM 1 FACIA WPG
NOMINAL AREA (INCHES**2)	44.0000
ACTUAL AREA (INCHES**2)	44.1847
% REDUCTION FROM NOMINAL	-0.4197
% REDUCTION FROM UPPER LIMIT	4.5138
% REDUCTION FROM LOWER LIMIT	-1.8848
PENETRATION (FROM NOMINAL)	-1.45
UPPER LIMIT	16.41
LOWER LIMIT	-6.42
I--XX NOMINAL	10007.09
I--XX ACTUAL	10035.14
% REDUCTION FROM NOMINAL	-0.28
I--YY NOMINAL	114.78
I--YY ACTUAL	114.69
% REDUCTION FROM NOMINAL	0.08

DATA SUMMARY FOR BRIDGE RO1 OF 38101

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.42	-1.45	-0.28	0.08
INTERIOR BEAM AVERAGES	0.00	0.00	0.00	0.00
BRIDGE AVERAGES	-0.42	-1.45	-0.28	0.08

RO1 OF 38101 EB I94 OVER PC RAILROAD & GRAND RIVER
READINGS TAKEN 8 FEET EAST OF 5TH PIER WEST OF EAST ABUTMENT
PAINTED WITH UNPAINTED COMPARISON

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL HIGH TRAFFIC VOLUME

BRIDGE STARTED 1975.
READINGS TAKEN 11/19/79
OPEN TO TRAFFIC (OVER) 7/27/77

STEEL IN PLACE 7/14/77
DECK COMPLETED 7/14/77

	BEAM 1 FACIA WPG
NOMINAL AREA (INCHES**2)	44.0000
ACTUAL AREA (INCHES**2)	44.4313
% REDUCTION FROM NOMINAL	-0.9803
% REDUCTION FROM UPPER LIMIT	3.9807
% REDUCTION FROM LOWER LIMIT	-2.4535
PENETRATION (FROM NOMINAL)	-3.39
UPPER LIMIT	14.46
LOWER LIMIT	-8.36
I--XX NOMINAL	10007.09
I--XX ACTUAL	10080.68
% REDUCTION FROM NOMINAL	-0.74
I--YY NOMINAL	114.78
I--YY ACTUAL	114.83
% REDUCTION FROM NOMINAL	-0.04

DATA SUMMARY FOR BRIDGE RO1 OF 38101

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.98	-3.39	-0.74	-0.04
INTERIOR BEAM AVERAGES	0.00	0.00	0.00	0.00
BRIDGE AVERAGES	-0.98	-3.39	-0.74	-0.04

RD1 OF 38101 I94 OVER GTW & NYC RAILROADS
READINGS TAKEN 5-8 FEET EAST OF 1ST PIER WEST OF EAST ABUTMENT
PAINTED WITH UNPAINTED COMPARISON

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL HIGH TRAFFIC VOLUME

BRIDGE STARTED 1975:
READINGS TAKEN 9/24/80
OPEN TO TRAFFIC (OVER) 7/27/77

STEEL IN PLACE 7/14/77
DECK COMPLETED 7/14/77

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG	BEAM 4 FACIA WPG
NOMINAL AREA (INCHES**2)	49.3750	54.3750	54.3750	44.0000
ACTUAL AREA (INCHES**2)	49.5927	54.1319	54.2814	44.2200
% REDUCTION FROM NOMINAL	-0.4409	0.4471	0.1722	-0.5000
% REDUCTION FROM UPPER LIMIT	4.5759	5.3708	5.1094	4.4374
% REDUCTION FROM LOWER LIMIT	-1.8675	-0.8351	-1.1136	-1.9662
PENETRATION (FROM NOMINAL)	-1.56	1.75	0.67	-1.73
UPPER LIMIT	17.09	22.08	21.01	16.14
LOWER LIMIT	-8.53	-3.22	-4.30	-8.70
I--XX NOMINAL	22707.43	25218.71	25218.71	16821.21
I--XX ACTUAL	22841.97	26194.89	25201.84	16863.97
% REDUCTION FROM NOMINAL	-0.59	0.09	0.07	-0.25
I--YY NOMINAL	229.52	271.18	271.18	229.36
I--YY ACTUAL	231.10	271.77	271.32	229.53
% REDUCTION FROM NOMINAL	-0.69	-0.22	-0.05	-0.07

DATA SUMMARY FOR BRIDGE RD1 OF 38101

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.47	-1.65	-0.42	-0.38
INTERIOR BEAM AVERAGES	0.31	1.21	0.08	-0.13
BRIDGE AVERAGES	-0.08	-0.22	-0.17	-0.26

RO1 OF 38101 I94 OVER NYC & GTW RAILROADS
READINGS TAKEN 5-8 FEET EAST OF 1ST PIER WEST OF EAST ABUTMENT
UNPAINTED WITH PAINTED COMPARISION

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL HIGH TRAFFIC VOLUME

BRIDGE STARTED 1975.
READINGS TAKEN 8/24/80
OPEN TO TRAFFIC (OVER) 7/27/77

STEEL IN PLACE 7/14/77
DECK COMPLETED 7/14/77

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG	BEAM 4 FACIA WPG
NOMINAL AREA (INCHES**2)	49.3750	54.3750	54.3750	44.0000
ACTUAL AREA (INCHES**2)	49.3271	54.1005	54.0521	44.0777
% REDUCTION FROM NOMINAL	0.0970	0.5048	0.5939	-0.1765
% REDUCTION FROM UPPER LIMIT	5.0870	5.4256	5.5102	4.7450
% REDUCTION FROM LOWER LIMIT	-1.3219	-0.7767	-0.6665	-1.6380
PENETRATION (FROM NOMINAL)	0.34	1.97	2.32	-0.61
UPPER LIMIT	19.00	22.31	22.66	17.25
LOWER LIMIT	-4.63	-3.00	-2.65	-5.58
I--XX NOMINAL	22707.43	26218.71	26218.71	16821.21
I--XX ACTUAL	22750.05	26191.04	26157.46	16831.45
% REDUCTION FROM NOMINAL	-0.19	0.11	0.23	-0.06
I--YY NOMINAL	229.52	271.18	271.18	229.36
I--YY ACTUAL	230.31	271.77	270.84	229.05
% REDUCTION FROM NOMINAL	-0.35	-0.22	0.13	0.14

DATA SUMMARY FOR BRIDGE RO1 OF 38101

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.04	-0.13	-0.12	-0.11
INTERIOR BEAM AVERAGES	0.56	2.16	0.17	-0.04
BRIDGE AVERAGES	0.25	1.01	0.02	-0.08

S03 OF 41051 M6 M37 OVER CALVIN COLLEGE ENTRANCE WAY
READINGS TAKEN 6 FEET NORTH OF SOUTH ABUTMENT

BRIDGE ENVIRONMENT INTERMEDIATE
UNDER 15 FEET
URBAN LOW TRAFFIC VOLUME

BRIDGE STARTED 1978.
READINGS TAKEN 9/23/80
OPEN TO TRAFFIC (OVER) 7/ 0/80

STEEL IN PLACE 6/19/79
DECK COMPLETED 7/14/79
OPEN TO TRAFFIC (UNDER) 7/ 0/80

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 7 FACIA WFB
NOMINAL AREA (INCHES**2)	29.1063	29.1063	29.1063	29.1063
ACTUAL AREA (INCHES**2)	28.7635	29.0901	29.3405	29.0977
% REDUCTION FROM NOMINAL	1.1777	0.0557	-0.8046	0.0296
% REDUCTION FROM UPPER LIMIT	3.5860	2.4934	1.6541	2.4679
% REDUCTION FROM LOWER LIMIT	-1.3562	-2.5070	-3.3893	-2.5337
PENETRATION (FROM NOMINAL)	3.52	0.17	-2.40	0.09
UPPER LIMIT	10.98	7.64	5.07	7.56
LOWER LIMIT	-3.95	-7.31	-9.88	-7.38
I--XX NOMINAL	3989.62	3989.62	3989.62	3989.62
I--XX ACTUAL	3999.99	4024.97	4051.66	4023.63
% REDUCTION FROM NOMINAL	-0.26	-0.89	-1.56	-0.85
I--YY NOMINAL	128.11	128.11	128.11	128.11
I--YY ACTUAL	128.46	128.78	129.40	128.27
% REDUCTION FROM NOMINAL	-0.29	-0.52	-1.00	-0.12

DATA SUMMARY FOR BRIDGE S03 OF 41051

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.60	1.80	-0.56	-0.20
INTERIOR BEAM AVERAGES	-0.37	-1.12	-1.22	-0.76
BRIDGE AVERAGES	0.11	0.34	-0.89	-0.48

S03 OF 41051 SB M37 OVER CALVIN COLLEGE ENTRANCE WAY
READINGS TAKEN 7 FEET SOUTH OF NORTH ABUTMENT
MILL SCALE AND ROLLING DEFECTS PROMINANT

BRIDGE ENVIRONMENT INTERMEDIATE
UNDER 15 FEET
URBAN LOW TRAFFIC VOLUME

BRIDGE STARTED 1978.
READINGS TAKEN 9/23/80
OPEN TO TRAFFIC (OVER) 7/ 0/80

STEEL IN PLACE 6/28/79
DECK COMPLETED 7/14/79

	BEAM 2 INTERIOR WF8	BEAM 3 INTERIOR WF8	BEAM 4 INTERIOR WF8	BEAM 6 INTERIOR WF8	BEAM 7 FACIA WF8
NOMINAL AREA (INCHES**2)	29.1063	29.1063	29.1063	29.1063	29.1063
ACTUAL AREA (INCHES**2)	28.9255	29.4320	29.0553	29.4744	29.2839
% REDUCTION FROM NOMINAL	0.6213	-1.1188	0.1755	-1.2646	-0.6101
% REDUCTION FROM UPPER LIMIT	3.0452	1.3475	2.6102	1.2052	1.8438
% REDUCTION FROM LOWER LIMIT	-1.9268	-3.7116	-2.3841	-3.8612	-3.1899
PENETRATION (FROM NOMINAL)	1.86	-3.34	0.52	-3.78	-1.82
UPPER LIMIT	9.33	4.13	8.00	3.69	5.65
LOWER LIMIT	-5.61	-10.82	-6.95	-11.25	-9.30
I--XX NOMINAL	3989.62	3989.62	3989.62	3989.62	3989.62
I--XX ACTUAL	4009.57	4076.73	4022.05	4061.62	4049.67
% REDUCTION FROM NOMINAL	-0.50	-2.18	-0.81	-1.80	-1.50
I--YY NOMINAL	128.11	128.11	128.11	128.11	128.11
I--YY ACTUAL	128.56	129.81	128.44	128.93	129.21
% REDUCTION FROM NOMINAL	-0.35	-1.32	-0.26	-0.64	-0.85

DATA SUMMARY FOR BRIDGE S03 OF 41051

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.61	-1.82	-1.50	-0.85
INTERIOR BEAM AVERAGES	-0.40	-1.19	-1.33	-0.64
BRIDGE AVERAGES	-0.44	-1.31	-1.36	-0.69

S15 OF 44044 EB M21 UNDER M53
READINGS TAKEN 20 FEET NORTH OF SOUTH ABUTMENT
DIRECTLY OVER EB OUTSIDE SHOULDER

BRIDGE ENVIRONMENT INTERMEDIATE
UNDER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1979.
READINGS TAKEN 10/24/80
OPEN TO TRAFFIC (OVER) 10/25/80

STEEL IN PLACE 4/16/80
DECK COMPLETED 8/ 8/80

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG	BEAM 4 INTERIOR WPG	BEAM 5 INTERIOR WPG	BEAM 6 INTERIOR WPG	BEAM 7 INTERIOR WPG
NOMINAL AREA (INCHES**2)	58.5000	58.5000	58.5000	58.5000	58.5000	58.5000	58.5000
ACTUAL AREA (INCHES**2)	57.7400	57.7525	57.6850	57.9200	57.9403	57.9403	58.4251
% REDUCTION FROM NOMINAL	1.2991	1.2778	1.3932	0.9915	0.9568	0.9568	0.1280
% REDUCTION FROM UPPER LIMIT	8.1062	8.0859	8.1956	8.8135	8.7805	8.7805	4.9920
% REDUCTION FROM LOWER LIMIT	-0.1196	-0.1412	-0.0242	-0.4317	-0.4669	-0.4669	-1.3076
PENETRATION (FROM NOMINAL)	4.52	4.45	4.85	3.45	3.33	3.33	0.45
UPPER LIMIT	22.33	22.26	22.66	21.26	21.14	21.14	18.26
LOWER LIMIT	-0.41	-0.48	-0.08	-1.48	-1.60	-1.60	-4.49
I--XX NOMINAL	22954.01	27513.62	27513.62	27513.62	27513.62	27513.62	27513.62
I--XX ACTUAL	22857.97	27400.92	27436.98	27541.07	27547.73	27545.75	27804.02
% REDUCTION FROM NOMINAL	0.42	0.41	0.28	-0.10	-0.12	-0.12	-1.06
I--YY NOMINAL	440.25	528.14	528.14	528.14	528.14	528.14	528.14
I--YY ACTUAL	433.64	522.63	523.18	524.36	523.23	523.23	528.18
% REDUCTION FROM NOMINAL	1.46	1.04	0.94	0.72	0.93	0.93	-0.01

	BEAM 8 INTERIOR WPG	BEAM 9 FACIA WPG
NOMINAL AREA (INCHES**2)	58.5000	58.5000
ACTUAL AREA (INCHES**2)	58.3450	58.1150
% REDUCTION FROM NOMINAL	0.2650	0.6581
% REDUCTION FROM UPPER LIMIT	5.1224	8.4984

% REDUCTION FROM LOWER LIMIT	-1.1686	-0.7698
PENETRATION (FROM NOMINAL)	0.92	2.29
UPPER LIMIT	18.74	20.10
LOWER LIMIT	-4.01	-2.64
I--XX NOMINAL	27513.62	27513.62
I--XX ACTUAL	27684.37	27584.90
% REDUCTION FROM NOMINAL	-0.62	-0.26
I--YY NOMINAL	528.14	528.14
I--YY ACTUAL	525.70	525.25
% REDUCTION FROM NOMINAL	0.46	0.55

DATA SUMMARY FOR BRIDGE S15 OF 44044

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.98	3.41	0.08	1.00
INTERIOR BEAM AVERAGES	0.85	2.97	-0.19	0.72
BRIDGE AVERAGES	0.88	3.06	-0.13	0.78

S05 OF 50061 WB I696 UNDER EB 11 MILE ROAD
READINGS TAKEN 10 FEET SOUTH OF NORTH ABUTMENT

BRIDGE ENVIRONMENT INTERMEDIATE
OVER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1972.
READINGS TAKEN 11/ 7/80
OPEN TO TRAFFIC (OVER) 0/ 0/ 0

STEEL IN PLACE 7/ 0/72
DECK COMPLETED 0/ 0/ 0
OPEN TO TRAFFIC (UNDER) 12/ 0/78

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG	BEAM 4 FACIA WPG
NOMINAL AREA (INCHES**2)	109.5000	109.5000	109.5000	109.5000
ACTUAL AREA (INCHES**2)	112.0100	112.3670	112.0650	111.6600
% REDUCTION FROM NOMINAL	-2.2922	-2.6183	-2.3425	-1.9726
% REDUCTION FROM UPPER LIMIT	2.5492	2.2386	2.5013	2.8537
% REDUCTION FROM LOWER LIMIT	-3.3543	-3.6837	-3.4050	-3.0313
PENETRATION (FROM NOMINAL)	-11.08	-12.66	-11.32	-9.64
UPPER LIMIT	12.94	11.36	12.69	14.48
LOWER LIMIT	-16.05	-17.63	-16.29	-14.50
I--XX NOMINAL	85814.75	85814.75	85814.75	85814.75
I--XX ACTUAL	88122.97	88333.87	88124.76	87520.02
% REDUCTION FROM NOMINAL	-2.69	-2.94	-2.69	-1.99
I--YY NOMINAL	2882.32	2882.32	2882.32	2882.32
I--YY ACTUAL	2974.71	2987.57	2983.37	2951.66
% REDUCTION FROM NOMINAL	-3.21	-3.65	-3.51	-2.41

DATA SUMMARY FOR BRIDGE S05 OF 50061

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-2.13	-10.31	-2.34	-2.81
INTERIOR BEAM AVERAGES	-2.48	-11.99	-2.81	-3.58
BRIDGE AVERAGES	-2.31	-11.15	-2.58	-3.19

S25 OF 50061 EB I696 UNDER SCHOENHERN ROAD
READINGS TAKEN 12 FEET NORTH OF SOUTH ABUTMENT

BRIDGE ENVIRONMENT INTERMEDIATE
OVER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1973.
READINGS TAKEN 10/21/80
OPEN TO TRAFFIC (OVER) 0/ 0/ 0

STEEL IN PLACE 7/ 0/73
DECK COMPLETED 0/ 0/ 0
OPEN TO TRAFFIC (UNDER) 12/ 0/78

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG	BEAM 7 INTERIOR WPG	BEAM 8 INTERIOR WPG	BEAM 9 FACIA WPG
NOMINAL AREA (INCHES**2)	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000
ACTUAL AREA (INCHES**2)	44.0517	44.9750	44.2364	45.2267	45.8733	45.4985
% REDUCTION FROM NOMINAL	2.1074	0.0556	1.6969	-0.5037	-1.9407	-1.1077
% REDUCTION FROM UPPER LIMIT	8.7492	4.7947	8.3581	4.2619	2.8930	3.6866
% REDUCTION FROM LOWER LIMIT	0.4927	-1.5930	0.0754	-2.1614	-3.6222	-2.7754
PENETRATION (FROM NOMINAL)	8.45	0.17	5.19	-1.54	-5.94	-3.39
UPPER LIMIT	21.69	15.41	20.43	13.70	9.30	11.85
LOWER LIMIT	1.48	-4.80	0.23	-8.51	-10.91	-8.36
I--XX NOMINAL	14053.50	14053.50	14053.50	14053.50	14053.50	14053.50
I--XX ACTUAL	13948.02	14110.32	14040.13	14199.12	14309.65	14183.07
% REDUCTION FROM NOMINAL	0.75	-0.40	0.10	-1.04	-1.82	-0.92
I--YY NOMINAL	512.44	512.44	512.44	512.44	512.44	512.44
I--YY ACTUAL	511.74	515.87	514.96	518.67	520.31	516.96
% REDUCTION FROM NOMINAL	0.14	-0.67	-0.49	-1.22	-1.54	-0.86

DATA SUMMARY FOR BRIDGE S25 OF 50061

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.50	1.53	-0.09	-0.37
INTERIOR BEAM AVERAGES	-0.17	-0.53	-0.79	-0.98
BRIDGE AVERAGES	0.05	0.16	-0.56	-0.78

S18 OF 63103 EB I696 TO NORTH BOUND I75
READINGS TAKEN 10 FEET WEST OF EAST ABUTMENT
UNPAINTED WITH PAINTED COMPARISON

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1971.
READINGS TAKEN 8/24/79
OPEN TO TRAFFIC (OVER) 11/ 0/72

STEEL IN PLACE 8/12/71
DECK COMPLETED 10/21/71
OPEN TO TRAFFIC (UNDER) 12/ 0/71

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG	BEAM 4 FACIA WPG
NOMINAL AREA (INCHES**2)	50.0000	50.0000	50.0000	50.0000
ACTUAL AREA (INCHES**2)	49.4317	49.4200	48.7467	48.9000
% REDUCTION FROM NOMINAL	1.1367	1.1600	2.5067	2.2000
% REDUCTION FROM UPPER LIMIT	5.8584	5.8786	7.1610	6.8690
% REDUCTION FROM LOWER LIMIT	-0.5326	-0.5088	0.8606	0.5487
PENETRATION (FROM NOMINAL)	3.40	3.47	7.50	6.59
UPPER LIMIT	18.41	18.48	22.51	21.60
LOWER LIMIT	-1.57	-1.50	2.53	1.62
I--XX NOMINAL	14467.80	14467.80	14467.80	14467.80
I--XX ACTUAL	14395.37	14329.73	14165.60	14251.87
% REDUCTION FROM NOMINAL	0.50	0.95	2.09	1.49
I--YY NOMINAL	256.55	256.55	256.55	256.55
I--YY ACTUAL	255.99	253.75	250.17	254.82
% REDUCTION FROM NOMINAL	0.22	1.09	2.49	0.67

DATA SUMMARY FOR BRIDGE S18 OF 63103

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	1.67	5.00	1.00	0.45
INTERIOR BEAM AVERAGES	1.83	5.48	1.62	1.79
BRIDGE AVERAGES	1.75	5.24	1.28	1.12

S18 OF 63103 EB I696 TO NORTH BOUND I75
READINGS TAKEN DIRECTLY OVER EAST PIER
PAINTED WITH UNPAINTED COMPARISON

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1971.
READINGS TAKEN 8/24/79
OPEN TO TRAFFIC (OVER) 11/ 0/72

STEEL IN PLACE 8/12/71
DECK COMPLETED 10/21/71
OPEN TO TRAFFIC (UNDER) 12/ 0/71

	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG	BEAM 4 FACIA WPG
NOMINAL AREA (INCHES**2)	50.0000	50.0000	50.0000
ACTUAL AREA (INCHES**2)	51.0267	50.3267	49.6000
% REDUCTION FROM NOMINAL	-2.0533	-0.6533	0.8000
% REDUCTION FROM UPPER LIMIT	2.8187	4.1519	5.5358
% REDUCTION FROM LOWER LIMIT	-3.7764	-2.3528	-0.8749
PENETRATION (FROM NOMINAL)	-6.16	-1.96	2.40
UPPER LIMIT	8.86	13.05	17.41
LOWER LIMIT	-11.12	-6.93	-2.58
I--XX NOMINAL	14467.80	18511.48	14467.80
I--XX ACTUAL	14743.86	18586.65	14437.78
% REDUCTION FROM NOMINAL	-1.91	-0.41	0.21
I--YY NOMINAL	256.55	384.55	256.55
I--YY ACTUAL	261.52	383.41	258.27
% REDUCTION FROM NOMINAL	-1.94	0.29	-0.67

DATA SUMMARY FOR BRIDGE S18 OF 63103

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.80	2.40	0.21	-0.67
INTERIOR BEAM AVERAGES	-1.35	-4.05	-1.16	-0.82
BRIDGE AVERAGES	-0.64	-1.90	-0.70	-0.77

S18 OF 63103 EB I696 TO NORTH BOUND I75
READINGS TAKEN 10 FEET WEST OF EAST ABUTMENT
PAINTED JOINT--NO UNPAINTED COMPARISON

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1971.
READINGS TAKEN 8/24/79
OPEN TO TRAFFIC (OVER) 11/ 0/72

STEEL IN PLACE 8/12/71
DECK COMPLETED 10/21/71
OPEN TO TRAFFIC (UNDER) 12/ 0/71

	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG
NOMINAL AREA (INCHES**2)	67.2500	67.2500
ACTUAL AREA (INCHES**2)	67.8467	67.2600
% REDUCTION FROM NOMINAL	-0.8872	-0.0149
% REDUCTION FROM UPPER LIMIT	3.8772	4.7084
% REDUCTION FROM LOWER LIMIT	-2.1463	-1.2631
PENETRATION (FROM NOMINAL)	-3.55	-0.06
UPPER LIMIT	16.28	19.77
LOWER LIMIT	-8.48	-4.99
I--XX NOMINAL	20208.76	20208.76
I--XX ACTUAL	20538.22	20420.09
% REDUCTION FROM NOMINAL	-1.63	-1.05
I--YY NOMINAL	406.12	406.12
I--YY ACTUAL	412.45	412.43
% REDUCTION FROM NOMINAL	-1.56	-1.55

DATA SUMMARY FOR BRIDGE S18 OF 63103

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.00	0.00	0.00	0.00
INTERIOR BEAM AVERAGES	-0.45	-1.80	-1.34	-1.56
BRIDGE AVERAGES	-0.45	-1.80	-1.34	-1.56

S19 OF 63103 WB I696 TO SOUTH BOUND I75
READINGS TAKEN OVER WEST PIER--WEST TAILSPAN
PAINTED JOINT--NO UNPAINTED COMPARISON

BRIDGE ENVIRONMENT OPEN
UNDER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1971.
READINGS TAKEN 8/22/79
OPEN TO TRAFFIC (OVER) 10/ 3/73

STEEL IN PLACE 8/12/71
DECK COMPLETED 10/21/71
OPEN TO TRAFFIC (UNDER) 12/ 0/71

	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG
NOMINAL AREA (INCHES**2)	50.0000	67.2500
ACTUAL AREA (INCHES**2)	51.0333	67.6733
% REDUCTION FROM NOMINAL	-2.0667	-0.6235
% REDUCTION FROM UPPER LIMIT	2.8060	4.1228
% REDUCTION FROM LOWER LIMIT	-3.7900	-1.8854
PENETRATION (FROM NOMINAL)	-6.19	-2.52
UPPER LIMIT	8.82	17.31
LOWER LIMIT	-11.16	-7.45
I--XX NOMINAL	14467.80	20208.76
I--XX ACTUAL	14732.24	20515.84
% REDUCTION FROM NOMINAL	-1.83	-1.52
I--YY NOMINAL	256.55	406.12
I--YY ACTUAL	260.41	406.20
% REDUCTION FROM NOMINAL	-1.51	-0.02

DATA SUMMARY FOR BRIDGE S19 OF 63103

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.00	0.00	0.00	0.00
INTERIOR BEAM AVERAGES	-1.35	-4.35	-1.67	-0.76
BRIDGE AVERAGES	-1.35	-4.35	-1.67	-0.76

X02 OF 64014 NB M31 OVER C&O RAILROAD
READINGS TAKEN 8 FEET SOUTH OF NORTH ABUTMENT

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1974.
READINGS TAKEN 5/20/80
OPEN TO TRAFFIC (OVER) 8/ 0/76

STEEL IN PLACE 9/21/74
DECK COMPLETED 10/ 5/74

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 4 INTERIOR WFB	BEAM 5 FACIA WFB
NOMINAL AREA (INCHES**2)	38.8265	38.8265	38.8265	38.8265	38.8265
ACTUAL AREA (INCHES**2)	38.5969	38.6086	40.0829	38.6355	39.8860
% REDUCTION FROM NOMINAL	0.5915	0.5606	-3.2360	0.4918	-2.7288
% REDUCTION FROM UPPER LIMIT	3.0161	2.9859	-0.7181	2.9189	-0.2232
% REDUCTION FROM LOWER LIMIT	-1.9575	-1.9892	-5.8831	-2.0587	-5.3629
PENETRATION (FROM NOMINAL)	2.35	2.23	-12.88	1.96	-10.86
UPPER LIMIT	12.30	12.18	-2.93	11.91	-0.91
LOWER LIMIT	-7.59	-7.72	-22.82	-7.99	-20.81
I--XX NOMINAL	5755.19	5755.19	5755.19	4688.53	5755.19
I--XX ACTUAL	5687.64	5686.95	5848.78	4657.18	5844.37
% REDUCTION FROM NOMINAL	1.17	1.19	-1.63	0.67	-1.55
I--YY NOMINAL	196.38	196.38	196.38	147.45	196.38
I--YY ACTUAL	191.98	191.47	196.86	144.52	197.58
% REDUCTION FROM NOMINAL	2.24	2.50	-0.25	1.99	-0.61

DATA SUMMARY FOR BRIDGE X02 OF 64014

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-1.07	-4.25	-0.19	0.81
INTERIOR BEAM AVERAGES	-0.73	-2.90	0.08	1.41
BRIDGE AVERAGES	-0.88	-3.44	-0.03	1.17

S07 OF 64015 NB M31 OVER BUCHANAN ROAD
READINGS TAKEN 10 FEET NORTH OF SOUTH PIER
DIRECTLY OVER EB SHOULDER

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1975.
READINGS TAKEN 5/20/80
OPEN TO TRAFFIC (OVER) 11/ 0/76

STEEL IN PLACE 12/27/75
DECK COMPLETED 7/24/76
OPEN TO TRAFFIC (UNDER) 12/27/75

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 4 INTERIOR WFB	BEAM 5 FACIA WFB
NOMINAL AREA (INCHES**2)	29.1063	29.1063	29.1063	29.1063	29.1063
ACTUAL AREA (INCHES**2)	28.2871	28.7178	28.5696	28.5353	28.6214
% REDUCTION FROM NOMINAL	2.8144	1.3349	1.8439	1.9619	1.6660
% REDUCTION FROM UPPER LIMIT	5.1848	3.7414	4.2380	4.3531	4.0644
% REDUCTION FROM LOWER LIMIT	0.3225	-1.1950	-0.6729	-0.6519	-0.8553
PENETRATION (FROM NOMINAL)	8.41	3.99	5.51	5.86	4.98
UPPER LIMIT	15.88	11.46	12.98	13.34	12.45
LOWER LIMIT	0.94	-3.48	-1.96	-1.61	-2.49
I--XX NOMINAL	3989.62	3989.62	3989.62	3989.62	3989.62
I--XX ACTUAL	3894.23	3940.95	3912.31	3907.70	3932.12
% REDUCTION FROM NOMINAL	2.39	1.22	1.94	2.05	1.44
I--YY NOMINAL	128.11	128.11	128.11	128.11	128.11
I--YY ACTUAL	123.49	125.12	123.73	123.27	124.80
% REDUCTION FROM NOMINAL	3.60	2.33	3.42	3.78	2.59

DATA SUMMARY FOR BRIDGE S07 OF 64015

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	2.24	8.70	1.92	3.10
INTERIOR BEAM AVERAGES	1.71	5.12	1.74	3.18
BRIDGE AVERAGES	1.92	5.76	1.81	3.14

X01 OF 64015 SB M31 OVER BASELINE ROAD & C&O RAILROAD
READINGS TAKEN 6-8 FEET NORTH OF SOUTH ABUTMENT

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1975.
READINGS TAKEN 5/21/80
OPEN TO TRAFFIC (OVER) 12/11/76

STEEL IN PLACE 5/16/76
DECK COMPLETED 7/ 0/76

	BEAM 2 INTERIOR WFB	BEAM 4 INTERIOR WFB	BEAM 5 FACIA WFB
NOMINAL AREA (INCHES**2)	39.7029	39.7029	39.7029
ACTUAL AREA (INCHES**2)	40.5864	41.0473	40.4160
% REDUCTION FROM NOMINAL	-2.2252	-3.3859	-1.7960
% REDUCTION FROM UPPER LIMIT	0.2681	-0.8643	0.6868
% REDUCTION FROM LOWER LIMIT	-4.8464	-6.0369	-4.4062
PENETRATION (FROM NOMINAL)	-7.72	-11.74	-6.23
UPPER LIMIT	0.95	-3.07	2.44
LOWER LIMIT	-16.38	-20.41	-14.90
I--XX NOMINAL	7801.87	7801.87	7801.87
I--XX ACTUAL	7938.38	7901.01	7877.60
% REDUCTION FROM NOMINAL	-1.75	-1.27	-0.97
I--YY NOMINAL	226.24	226.24	226.24
I--YY ACTUAL	225.11	221.74	224.09
% REDUCTION FROM NOMINAL	0.06	1.99	0.95

DATA SUMMARY FOR BRIDGE X01 OF 64015

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-1.80	-6.23	-0.97	0.95
INTERIOR BEAM AVERAGES	-2.81	-9.73	-1.51	1.02
BRIDGE AVERAGES	-2.47	-8.58	-1.33	1.00

SO2 OF 70024 WB I136 UNDER 96TH AVENUE
READINGS TAKEN 15 FEET EAST OF WEST ABUTMENT

BRIDGE ENVIRONMENT OPEN
UNDER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1972.
READINGS TAKEN 10/18/78
OPEN TO TRAFFIC (OVER) 8/26/72

STEEL IN PLACE 7/15/72
DECK COMPLETED 7/28/72
OPEN TO TRAFFIC (UNDER) 12/11/74

	BEAM 3 INTERIOR WPG	BEAM 4 INTERIOR WPG	BEAM 5 INTERIOR WPG
NOMINAL AREA (INCHES**2)	57.7500	57.7500	73.5000
ACTUAL AREA (INCHES**2)	58.4800	59.0300	73.5200
% REDUCTION FROM NOMINAL	-1.2641	-2.2165	-0.0272
% REDUCTION FROM UPPER LIMIT	3.5063	2.5988	4.6310
% REDUCTION FROM LOWER LIMIT	-2.7410	-3.7073	-1.1699
PENETRATION (FROM NOMINAL)	-4.38	-7.68	-0.12
UPPER LIMIT	12.74	9.45	21.19
LOWER LIMIT	-9.36	-12.65	-5.05
I--XX NOMINAL	14978.12	14978.12	19614.44
I--XX ACTUAL	15172.79	15247.05	19786.67
% REDUCTION FROM NOMINAL	-1.30	-1.80	-0.88
I--YY NOMINAL	456.13	456.13	868.78
I--YY ACTUAL	466.99	463.98	672.75
% REDUCTION FROM NOMINAL	-2.38	-1.72	-0.60

DATA SUMMARY FOR BRIDGE SO2 OF 70024

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.00	0.00	0.00	0.00
INTERIOR BEAM AVERAGES	-1.17	-4.06	-1.32	-1.57
BRIDGE AVERAGES	-1.17	-4.06	-1.32	-1.57

BO3 OF 70024 EB I196 OVER BLACK RIVER
READINGS TAKEN 1ST PIER WEST OF EAST ABUTMENT

BRIDGE ENVIRONMENT OPEN
UNDER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1972.
READINGS TAKEN 10/31/79
OPEN TO TRAFFIC (OVER) 12/11/74

STEEL IN PLACE 4/20/74
DECK COMPLETED 5/18/74

	BEAM 1 FACIA WFB	BEAM 6 FACIA WFB
NOMINAL AREA (INCHES**2)	34.1312	34.1312
ACTUAL AREA (INCHES**2)	34.3232	34.6788
% REDUCTION FROM NOMINAL	-0.5624	-1.6043
% REDUCTION FROM UPPER LIMIT	1.8904	0.8739
% REDUCTION FROM LOWER LIMIT	-3.1408	-4.2095
PENETRATION (FROM NOMINAL)	-1.97	-5.62
UPPER LIMIT	6.78	3.14
LOWER LIMIT	-10.72	-14.37
I--XX NOMINAL	4921.10	4921.10
I--XX ACTUAL	4963.49	4996.73
% REDUCTION FROM NOMINAL	-0.86	-1.54
I--YY NOMINAL	164.48	164.48
I--YY ACTUAL	164.55	166.18
% REDUCTION FROM NOMINAL	-0.04	-1.04

DATA SUMMARY FOR BRIDGE BO3 OF 70024

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-1.08	-3.79	-1.20	-0.54
INTERIOR BEAM AVERAGES	0.00	0.00	0.00	0.00
BRIDGE AVERAGES	-1.08	-3.79	-1.20	-0.54

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803 OF 70024 EB I196 OVER BLACK RIVER
READINGS TAKEN 3 FEET WEST OF EAST ABUTMENT
GRINDING WHEEL USED INSTEAD OF SANDING DISK

BRIDGE ENVIRONMENT OPEN
UNDER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1972.
READINGS TAKEN 10/31/79
OPEN TO TRAFFIC (OVER) 12/11/74

STEEL IN PLACE 4/20/74
DECK COMPLETED 5/18/74

	BEAM 1 FACIA WFB	BEAM 4 INTERIOR WFB	BEAM 6 FACIA WFB
NOMINAL AREA (INCHES**2)	34.1312	34.1312	34.1312
ACTUAL AREA (INCHES**2)	34.6834	35.1567	34.5730
% REDUCTION FROM NOMINAL	-1.6179	-3.0044	-1.2944
% REDUCTION FROM UPPER LIMIT	0.8606	-0.4921	1.1762
% REDUCTION FROM LOWER LIMIT	-4.2235	-5.6456	-3.8917
PENETRATION (FROM NOMINAL)	-5.67	-10.52	-4.53
UPPER LIMIT	3.09	-1.77	4.22
LOWER LIMIT	-14.42	-19.27	-13.29
I--XX NOMINAL	4921.10	4921.10	4921.10
I--XX ACTUAL	5006.23	5092.38	4989.45
% REDUCTION FROM NOMINAL	-1.73	-3.48	-1.39
I--YY NOMINAL	164.48	164.48	164.48
I--YY ACTUAL	166.39	170.22	165.67
% REDUCTION FROM NOMINAL	-1.16	-3.49	-0.72

DATA SUMMARY FOR BRIDGE 803 OF 70024

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-1.46	-5.10	-1.56	-0.94
INTERIOR BEAM AVERAGES	-3.00	-10.52	-3.48	-3.49
BRIDGE AVERAGES	-1.97	-6.91	-2.20	-1.79

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804 OF 73031 MS2 OVER BEAVER CREEK
READINGS TAKEN 5 FEET SOUTH OF NORTH ABUTMENT

BRIDGE ENVIRONMENT OPEN
UNDER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1977.
READINGS TAKEN 10/ 8/80
OPEN TO TRAFFIC (OVER) 10/28/77

STEEL IN PLACE 9/13/77
DECK COMPLETED 9/23/77

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 4 INTERIOR WFB	BEAM 5 FACIA WFB
NOMINAL AREA (INCHES**2)	49.9772	49.9772	49.9772	49.9772	49.9772
ACTUAL AREA (INCHES**2)	50.0208	50.5638	50.2154	50.1358	49.9631
% REDUCTION FROM NOMINAL	-0.0873	-1.1738	-0.4766	-0.3173	0.0283
% REDUCTION FROM UPPER LIMIT	2.3538	1.2938	1.9740	2.1294	2.4666
% REDUCTION FROM LOWER LIMIT	-2.6537	-3.7680	-3.0529	-2.8896	-2.5351
PENETRATION (FROM NOMINAL)	-0.38	-5.12	-2.08	-1.38	0.12
UPPER LIMIT	10.52	5.78	8.82	9.51	11.02
LOWER LIMIT	-11.28	-16.01	-12.97	-12.28	-10.77
I--XX NOMINAL	10473.37	10473.37	10473.37	10473.37	10473.37
I--XX ACTUAL	10472.09	10542.37	10485.91	10513.31	10450.25
% REDUCTION FROM NOMINAL	0.01	-0.66	-0.12	-0.38	0.22
I--YY NOMINAL	319.94	319.94	319.94	319.94	319.94
I--YY ACTUAL	317.34	318.44	318.64	318.54	318.24
% REDUCTION FROM NOMINAL	0.81	0.47	1.03	1.06	1.16

DATA SUMMARY FOR BRIDGE 804 OF 73031

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.03	-0.13	0.12	0.99
INTERIOR BEAM AVERAGES	-0.66	-2.88	-0.39	0.86
BRIDGE AVERAGES	-0.41	-1.77	-0.19	0.91

SOJ OF 81041 EB I94 UNDER RAWSONVILLE ROAD
READINGS TAKEN DIRECTLY OVER EB OUTSIDE SHOULDER
35 FEET NORTH OF SOUTH ABUTMENT--BEAM HEIGHT & WIDTH ESTIMATED

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL HIGH TRAFFIC VOLUME

BRIDGE STARTED 1973.
READINGS TAKEN 10/24/80
OPEN TO TRAFFIC (OVER) 8/21/76

STEEL IN PLACE 5/17/75
DECK COMPLETED 7/10/76
OPEN TO TRAFFIC (UNDER) 5/17/75

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG	BEAM 4 INTERIOR WPG
NOMINAL AREA (INCHES**2)	56.7891	56.7891	56.7891	56.7891
ACTUAL AREA (INCHES**2)	57.7530	55.9950	55.8697	55.3606
% REDUCTION FROM NOMINAL	-1.6974	1.3982	1.6189	2.5329
% REDUCTION FROM UPPER LIMIT	3.1279	6.0767	6.2869	7.1575
% REDUCTION FROM LOWER LIMIT	-3.1233	0.0158	0.2395	1.1664
PENETRATION (FROM NOMINAL)	-6.07	5.00	5.79	8.05
UPPER LIMIT	11.74	22.80	23.59	26.86
LOWER LIMIT	-11.01	0.06	0.84	4.11
I--XX NOMINAL	22392.54	22392.54	22392.54	22392.54
I--XX ACTUAL	24365.18	22256.96	22206.06	23135.67
% REDUCTION FROM NOMINAL	-8.81	0.61	0.84	1.15
I--YY NOMINAL	640.71	640.71	640.71	640.71
I--YY ACTUAL	636.72	632.86	631.15	627.60
% REDUCTION FROM NOMINAL	0.62	1.21	1.49	2.04

DATA SUMMARY FOR BRIDGE SOJ OF 81041

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-1.70	-6.07	-8.81	0.62
INTERIOR BEAM AVERAGES	1.55	6.81	0.88	1.56
BRIDGE AVERAGES	0.98	3.44	-1.55	1.34

SOJ OF 81041 EB I94 UNDER RAWSONVILLE ROAD
READINGS TAKEN DIRECTLY OVER EB OUTSIDE SHOULDER
25 FEET NORTH OF SOUTH ABUTMENT--BEAM HEIGHT & WIDTH ESTIMATED

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL HIGH TRAFFIC VOLUME

BRIDGE STARTED 1973.
READINGS TAKEN 10/24/80
OPEN TO TRAFFIC (OVER) 12/28/74

STEEL IN PLACE 10/20/73
DECK COMPLETED 6/ 1/74
OPEN TO TRAFFIC (UNDER) 10/20/73

	BEAM 5 INTERIOR WPG	BEAM 6 INTERIOR WPG	BEAM 7 INTERIOR WPG	BEAM 8 FACIA WPG
NOMINAL AREA (INCHES**2)	56.7891	56.7891	56.7891	56.7891
ACTUAL AREA (INCHES**2)	55.7595	55.6818	55.8305	56.8188
% REDUCTION FROM NOMINAL	1.8130	1.9497	1.6879	1.7068
% REDUCTION FROM UPPER LIMIT	6.4718	6.6020	6.3526	6.3706
% REDUCTION FROM LOWER LIMIT	0.4364	0.5750	0.3095	0.3287
PENETRATION (FROM NOMINAL)	6.48	8.97	6.03	8.10
UPPER LIMIT	24.29	24.77	23.84	23.91
LOWER LIMIT	1.54	2.03	1.09	1.15
I--XX NOMINAL	22392.54	22392.54	22392.54	22392.54
I--XX ACTUAL	22223.91	23191.80	23199.02	22178.86
% REDUCTION FROM NOMINAL	0.75	0.90	0.86	0.96
I--YY NOMINAL	640.71	640.71	640.71	640.71
I--YY ACTUAL	632.64	632.73	629.25	629.81
% REDUCTION FROM NOMINAL	1.26	1.24	1.79	1.70

DATA SUMMARY FOR BRIDGE SOJ OF 81041

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	1.71	8.10	0.96	1.70
INTERIOR BEAM AVERAGES	1.82	8.49	0.84	1.43
BRIDGE AVERAGES	1.79	8.40	0.87	1.50

S12 OF 81103 WB M14 RAMP OVER EAST BOUND M14 & M153
READINGS TAKEN 4 FEET NORTH OF SOUTH ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1975.
READINGS TAKEN 5/31/79
OPEN TO TRAFFIC (OVER) 10/ 3/79

STEEL IN PLACE 4/12/76
DECK COMPLETED 5/14/76

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG
NOMINAL AREA (INCHES**2)	36.0000	36.0000
ACTUAL AREA (INCHES**2)	35.4225	35.7480
% REDUCTION FROM NOMINAL	1.6042	0.7000
% REDUCTION FROM UPPER LIMIT	6.5862	5.7278
% REDUCTION FROM LOWER LIMIT	-0.3760	-1.2984
PENETRATION (FROM NOMINAL)	4.04	1.76
UPPER LIMIT	17.47	15.19
LOWER LIMIT	-0.93	-3.20
I--XX NOMINAL	13244.25	13244.25
I--XX ACTUAL	13124.95	13255.78
% REDUCTION FROM NOMINAL	0.90	-0.09
I--YY NOMINAL	61.31	61.31
I--YY ACTUAL	60.98	61.61
% REDUCTION FROM NOMINAL	0.53	-0.48

DATA SUMMARY FOR BRIDGE S12 OF 81102

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	1.60	4.04	0.90	0.53
INTERIOR BEAM AVERAGES	0.70	1.76	-0.09	-0.48
BRIDGE AVERAGES	1.15	2.90	0.41	0.03

S12 OF 81103 EB M14 RAMP OVER EAST BOUND M14 & M153
READINGS TAKEN 2 FEET NORTH OF SOUTH ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1975.
READINGS TAKEN 5/31/79
OPEN TO TRAFFIC (OVER) 10/ 3/79

STEEL IN PLACE 4/12/76
DECK COMPLETED 5/14/76

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG
NOMINAL AREA (INCHES**2)	36.0000	36.0000
ACTUAL AREA (INCHES**2)	36.2250	36.5593
% REDUCTION FROM NOMINAL	-0.6250	-1.5536
% REDUCTION FROM UPPER LIMIT	4.4699	3.5884
% REDUCTION FROM LOWER LIMIT	-2.6501	-3.5973
PENETRATION (FROM NOMINAL)	-1.57	-3.91
UPPER LIMIT	11.85	9.52
LOWER LIMIT	-6.54	-8.86
I--XX NOMINAL	11666.26	13244.25
I--XX ACTUAL	11700.49	13375.83
% REDUCTION FROM NOMINAL	-0.29	-0.99
I--YY NOMINAL	46.13	61.31
I--YY ACTUAL	45.84	61.35
% REDUCTION FROM NOMINAL	0.62	-0.07

DATA SUMMARY FOR BRIDGE S12 OF 81103

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.63	-1.57	-0.29	0.62
INTERIOR BEAM AVERAGES	-1.55	-3.91	-0.99	-0.07
BRIDGE AVERAGES	-1.09	-2.74	-0.64	0.27

S13 OF 81103 EB M14 UNDER CURTIS ROAD
READINGS TAKEN 4 FEET NORTH OF SOUTH ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1975.
READINGS TAKEN 5/31/79
OPEN TO TRAFFIC (OVER) 8/16/77

STEEL IN PLACE 5/13/76
DECK COMPLETED 7/ 8/76

	BEAM 1 FACIA WPG	BEAM 3 INTERIOR WPG
NOMINAL AREA (INCHES**2)	38.2500	38.2500
ACTUAL AREA (INCHES**2)	38.6608	39.0050
% REDUCTION FROM NOMINAL	-1.0741	-1.9739
% REDUCTION FROM UPPER LIMIT	4.0436	3.1894
% REDUCTION FROM LOWER LIMIT	-3.0411	-3.9584
PENETRATION (FROM NOMINAL)	-2.79	-5.13
UPPER LIMIT	11.06	8.73
LOWER LIMIT	-7.75	-10.09
I--XX NOMINAL	14905.42	14905.42
I--XX ACTUAL	15131.26	15180.10
% REDUCTION FROM NOMINAL	-1.52	-1.84
I--YY NOMINAL	94.31	94.31
I--YY ACTUAL	96.07	95.41
% REDUCTION FROM NOMINAL	-1.86	-1.16

DATA SUMMARY FOR BRIDGE S13 OF 81103

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-1.07	-2.79	-1.52	-1.86
INTERIOR BEAM AVERAGES	-1.97	-5.13	-1.84	-1.16
BRIDGE AVERAGES	-1.52	-3.96	-1.68	-1.51

S14 OF 81103 EB M14 UNDER JOY ROAD
READINGS TAKEN 3 FEET NORTH OF SOUTH ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1975.
READINGS TAKEN 5/31/79
OPEN TO TRAFFIC (OVER) 8/16/77

STEEL IN PLACE 6/ 4/76
DECK COMPLETED 7/ 9/76

	BEAM 1 INTERIOR WPG	BEAM 4 FACIA WPG
NOMINAL AREA (INCHES**2)	39.3750	39.3750
ACTUAL AREA (INCHES**2)	38.5835	40.1052
% REDUCTION FROM NOMINAL	2.0103	-1.8545
% REDUCTION FROM UPPER LIMIT	6.9718	3.3027
% REDUCTION FROM LOWER LIMIT	0.1070	-3.8328
PENETRATION (FROM NOMINAL)	5.23	-4.83
UPPER LIMIT	19.12	9.06
LOWER LIMIT	0.27	-9.79
I--XX NOMINAL	15737.52	15737.52
I--XX ACTUAL	15821.83	16183.46
% REDUCTION FROM NOMINAL	-0.54	-2.83
I--YY NOMINAL	125.34	125.34
I--YY ACTUAL	128.45	130.63
% REDUCTION FROM NOMINAL	-2.48	-4.22

DATA SUMMARY FOR BRIDGE S14 OF 81103

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-1.85	-4.83	-2.83	-4.22
INTERIOR BEAM AVERAGES	2.01	5.23	-0.54	-2.48
BRIDGE AVERAGES	0.08	0.20	-1.68	-3.35

S15 OF 81103 EB M14 UNDER GOTFREDSON ROAD
READINGS TAKEN 3 FEET FROM SOUTH ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979

BRIDGE ENVIRONMENT OPEN OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1975.
READINGS TAKEN 5/24/79
OPEN TO TRAFFIC (OVER) 6/16/77

STEEL IN PLACE 4/ 1/76
DECK COMPLETED 4/14/76

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG
NOMINAL AREA (INCHES**2)	34.5000	34.5000	34.5000
ACTUAL AREA (INCHES**2)	34.7782	34.0500	34.1564
% REDUCTION FROM NOMINAL	-0.8063	1.3043	0.9960
% REDUCTION FROM UPPER LIMIT	4.2978	6.3016	6.0089
% REDUCTION FROM LOWER LIMIT	-2.9289	-0.7738	-1.0886
PENETRATION (FROM NOMINAL)	-1.94	3.14	2.40
UPPER LIMIT	10.89	15.97	15.23
LOWER LIMIT	-6.90	-1.82	-2.57
I--XX NOMINAL	11954.63	11954.63	11954.63
I--XX ACTUAL	11999.53	11891.74	11988.05
% REDUCTION FROM NOMINAL	-0.38	0.53	-0.28
I--YY NOMINAL	162.33	162.33	162.33
I--YY ACTUAL	161.64	161.24	163.04
% REDUCTION FROM NOMINAL	0.43	0.67	-0.43

DATA SUMMARY FOR BRIDGE S15 OF 81103

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.81	-1.94	-0.38	0.43
INTERIOR BEAM AVERAGES	1.15	2.77	0.12	0.12
BRIDGE AVERAGES	0.50	1.20	-0.04	0.22

S15 OF 81103 EB M14 UNDER GOTFREDSON ROAD
READINGS TAKEN 1ST TRANSITION WELD SOUTH HANGER
ROADWAY OPEN TO TRAFFIC FALL 1979

BRIDGE ENVIRONMENT OPEN OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1975.
READINGS TAKEN 5/24/79
OPEN TO TRAFFIC (OVER) 8/16/77

STEEL IN PLACE 4/ 1/76
DECK COMPLETED 4/14/76

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG	BEAM 4 INTERIOR WPG	BEAM 5 FACIA WPG
NOMINAL AREA (INCHES**2)	56.7500	56.7500	56.7500	56.7500	56.7500
ACTUAL AREA (INCHES**2)	57.7054	57.7583	57.0414	57.1574	57.7700
% REDUCTION FROM NOMINAL	-1.6836	-1.7768	-0.5135	-0.7179	-1.7974
% REDUCTION FROM UPPER LIMIT	3.1436	3.0548	4.2581	4.0635	3.0352
% REDUCTION FROM LOWER LIMIT	-3.0435	-3.1379	-1.8578	-2.0648	-3.1588
PENETRATION (FROM NOMINAL)	-6.32	-6.67	-1.93	-2.70	-6.75
UPPER LIMIT	12.39	12.04	16.79	16.02	11.97
LOWER LIMIT	-11.28	-11.63	-6.88	-7.65	-11.71
I--XX NOMINAL	23058.66	23058.66	23058.66	23058.66	23058.66
I--XX ACTUAL	23320.59	23418.44	23155.55	23208.89	23437.57
% REDUCTION FROM NOMINAL	-1.14	-1.56	-0.42	-0.65	-1.64
I--YY NOMINAL	486.63	486.63	486.63	486.63	486.63
I--YY ACTUAL	487.99	492.89	486.64	487.70	493.18
% REDUCTION FROM NOMINAL	-0.28	-1.29	-0.00	-0.22	-1.35

DATA SUMMARY FOR BRIDGE S15 OF 81103

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-1.74	-6.54	-1.39	-0.81
INTERIOR BEAM AVERAGES	-1.00	-3.77	-0.88	-0.50
BRIDGE AVERAGES	-1.30	-4.87	-1.08	-0.63

SO2 OF 82102 EB M14 UNDER NAPIER ROAD
READINGS TAKEN 4 FEET NORTH OF SOUTH ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1975.
READINGS TAKEN 5/31/79
OPEN TO TRAFFIC (OVER) 9/ 0/76

STEEL IN PLACE 7/22/76
DECK COMPLETED 8/ 6/76

	BEAM 1 FACIA WPG	BEAM 5 FACIA WPG
NOMINAL AREA (INCHES**2)	40.2500	40.2500
ACTUAL AREA (INCHES**2)	40.7170	40.9113
% REDUCTION FROM NOMINAL	-1.1604	-1.6430
% REDUCTION FROM UPPER LIMIT	3.9617	3.5035
% REDUCTION FROM LOWER LIMIT	-3.0295	-3.5210
PENETRATION (FROM NOMINAL)	-3.18	-4.50
UPPER LIMIT	11.43	10.10
LOWER LIMIT	-8.14	-9.47
I--XX NOMINAL	14213.87	14213.87
I--XX ACTUAL	14397.46	14568.89
% REDUCTION FROM NOMINAL	-1.29	-2.50
I--YY NOMINAL	229.35	229.35
I--YY ACTUAL	233.22	238.08
% REDUCTION FROM NOMINAL	-1.69	-3.80

DATA SUMMARY FOR BRIDGE SO2 OF 82102

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-1.40	-3.84	-1.89	-2.75
INTERIOR BEAM AVERAGES	0.00	0.00	0.00	0.00
BRIDGE AVERAGES	-1.40	-3.84	-1.89	-2.75

SO3 OF 82102 NORTH TERRITORIAL ROAD OVER EB M14
READINGS TAKEN 3 FEET NORTH OF SOUTH ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1976.
READINGS TAKEN 5/31/79
OPEN TO TRAFFIC (OVER) 10/22/77

STEEL IN PLACE 1/29/77
DECK COMPLETED 6/16/77

	BEAM 1 FACIA WPG	BEAM 3 INTERIOR WPG
NOMINAL AREA (INCHES**2)	43.2500	43.2500
ACTUAL AREA (INCHES**2)	43.6938	43.5633
% REDUCTION FROM NOMINAL	-1.4885	-0.7245
% REDUCTION FROM UPPER LIMIT	3.6501	4.3755
% REDUCTION FROM LOWER LIMIT	-3.3773	-2.5990
PENETRATION (FROM NOMINAL)	-4.05	-1.97
UPPER LIMIT	10.46	12.54
LOWER LIMIT	-9.02	-6.94
I--XX NOMINAL	18683.58	18683.58
I--XX ACTUAL	18944.95	18777.27
% REDUCTION FROM NOMINAL	-1.40	-0.50
I--YY NOMINAL	229.42	229.42
I--YY ACTUAL	232.97	230.05
% REDUCTION FROM NOMINAL	-1.55	-0.28

DATA SUMMARY FOR BRIDGE SO3 OF 82102

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-1.49	-4.05	-1.40	-1.55
INTERIOR BEAM AVERAGES	-0.72	-1.97	-0.50	-0.28
BRIDGE AVERAGES	-1.11	-3.01	-0.95	-0.91

S04 OF 82102 EB M14 UNDER RIDGE ROAD
READINGS TAKEN 3 FEET NORTH OF SOUTH ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1978.
READINGS TAKEN 5/31/79
OPEN TO TRAFFIC (OVER) 10/22/77

STEEL IN PLACE 1/15/77
DECK COMPLETED 8/27/77

	BEAM 1 FACIA WPG	BEAM 4 INTERIOR WPG
NOMINAL AREA (INCHES**2)	41.5519	41.5518
ACTUAL AREA (INCHES**2)	41.7466	42.0309
% REDUCTION FROM NOMINAL	-0.4685	-1.1528
% REDUCTION FROM UPPER LIMIT	4.6185	3.9688
% REDUCTION FROM LOWER LIMIT	-2.2092	-2.9054
PENETRATION (FROM NOMINAL)	-1.37	-3.36
UPPER LIMIT	14.17	12.18
LOWER LIMIT	-8.33	-8.32
I--XX NOMINAL	15680.81	15680.61
I--XX ACTUAL	15750.90	15827.97
% REDUCTION FROM NOMINAL	-0.45	-0.94
I--YY NOMINAL	76.74	76.74
I--YY ACTUAL	77.11	77.28
% REDUCTION FROM NOMINAL	-0.49	-0.71

DATA SUMMARY FOR BRIDGE S04 OF 82102

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.47	-1.37	-0.45	-0.49
INTERIOR BEAM AVERAGES	-1.15	-3.36	-0.94	-0.71
BRIDGE AVERAGES	-0.81	-2.36	-0.69	-0.60

S05 OF 82102 WB M14 UNDER BECK ROAD
READINGS TAKEN 3 FEET FROM NORTH ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1976.
READINGS TAKEN 5/31/79
OPEN TO TRAFFIC (OVER) 12/ 3/77

STEEL IN PLACE 7/30/77
DECK COMPLETED 9/24/77

	BEAM 1 FACIA WPG
NOMINAL AREA (INCHES**2)	73.5000
ACTUAL AREA (INCHES**2)	73.1467
% REDUCTION FROM NOMINAL	0.4807
% REDUCTION FROM UPPER LIMIT	5.2259
% REDUCTION FROM LOWER LIMIT	-0.7637
PENETRATION (FROM NOMINAL)	1.92
UPPER LIMIT	21.95
LOWER LIMIT	-3.02
I--XX NOMINAL	36402.28
I--XX ACTUAL	36557.28
% REDUCTION FROM NOMINAL	-0.43
I--YY NOMINAL	619.90
I--YY ACTUAL	621.87
% REDUCTION FROM NOMINAL	-0.32

DATA SUMMARY FOR BRIDGE S05 OF 82102

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.48	1.92	-0.43	-0.32
INTERIOR BEAM AVERAGES	0.00	0.00	0.00	0.00
BRIDGE AVERAGES	0.48	1.92	-0.43	-0.32

S05 OF 82102 EB M14 UNDER BECK ROAD
READINGS TAKEN 3 FEET FROM SOUTH ABUTMENT
ROAD WAY OPEN TO TRAFFIC FALL 1979

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1976.
READINGS TAKEN 5/31/79
OPEN TO TRAFFIC (OVER) 12/ 3/77

STEEL IN PLACE 7/30/77
DECK COMPLETED 9/24/77

	BEAM 1 FACIA WPG
NOMINAL AREA (INCHES**2)	82.1250
ACTUAL AREA (INCHES**2)	82.4600
% REDUCTION FROM NOMINAL	-0.4323
% REDUCTION FROM UPPER LIMIT	4.3239
% REDUCTION FROM LOWER LIMIT	-1.6799
PENETRATION (FROM NOMINAL)	-1.75
UPPER LIMIT	18.41
LOWER LIMIT	-6.73
I--XX NOMINAL	32648.80
I--XX ACTUAL	32739.63
% REDUCTION FROM NOMINAL	-0.28
I--YY NOMINAL	821.23
I--YY ACTUAL	827.03
% REDUCTION FROM NOMINAL	-0.71

DATA SUMMARY FOR BRIDGE S05 OF 82102

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.43	-1.75	-0.28	-0.71
INTERIOR BEAM AVERAGES	0.00	0.00	0.00	0.00
BRIDGE AVERAGES	-0.43	-1.75	-0.28	-0.71

S06 OF 82102 EB M14 OVER SHELDON ROAD
READINGS TAKEN 3 FEET EAST OF WEST ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979

BRIDGE ENVIRONMENT OPEN
UNDER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1976.
READINGS TAKEN 5/31/79
OPEN TO TRAFFIC (OVER) 10/31/79

STEEL IN PLACE 12/13/77
DECK COMPLETED 5/17/78
OPEN TO TRAFFIC (UNDER) 12/ 2/77

	BEAM 1 FACIA WPG	BEAM 3 INTERIOR WPG
NOMINAL AREA (INCHES**2)	36.9760	36.9760
ACTUAL AREA (INCHES**2)	37.0800	37.0267
% REDUCTION FROM NOMINAL	-0.2813	-0.1370
% REDUCTION FROM UPPER LIMIT	4.7963	4.9332
% REDUCTION FROM LOWER LIMIT	-2.0166	-1.8698
PENETRATION (FROM NOMINAL)	-0.82	-0.40
UPPER LIMIT	14.72	15.14
LOWER LIMIT	-5.78	-5.36
I--XX NOMINAL	11090.69	11090.69
I--XX ACTUAL	11150.44	11134.36
% REDUCTION FROM NOMINAL	-0.54	-0.39
I--YY NOMINAL	54.04	54.04
I--YY ACTUAL	54.67	54.58
% REDUCTION FROM NOMINAL	-1.16	-1.00

DATA SUMMARY FOR BRIDGE S06 OF 82102

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.28	-0.82	-0.54	-1.16
INTERIOR BEAM AVERAGES	-0.14	-0.40	-0.39	-1.00
BRIDGE AVERAGES	-0.21	-0.61	-0.47	-1.08

S06 OF 82102 WB M14 OVER SHELDON ROAD
READINGS TAKEN 3 FEET EAST OF WEST ABUTMENT
ROADWAY OPEN TO TRAFFIC FALL 1979

BRIDGE ENVIRONMENT OPEN
UNDER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1976.
READINGS TAKEN 5/31/79
OPEN TO TRAFFIC (OVER) 10/31/79

STEEL IN PLACE 12/13/77
DECK COMPLETED 5/17/78
OPEN TO TRAFFIC (UNDER) 12/ 2/77

	BEAM 1 FACIA WPG	BEAM 3 INTERIOR WPG
NOMINAL AREA (INCHES**2)	37.7500	37.7500
ACTUAL AREA (INCHES**2)	37.9992	37.8342
% REDUCTION FROM NOMINAL	-0.6600	-0.2230
% REDUCTION FROM UPPER LIMIT	4.4367	4.8516
% REDUCTION FROM LOWER LIMIT	-2.5347	-2.0895
PENETRATION (FROM NOMINAL)	-1.79	-0.61
UPPER LIMIT	12.69	13.86
LOWER LIMIT	-6.76	-5.57
I--XX NOMINAL	12736.04	12736.04
I--XX ACTUAL	12785.73	12694.99
% REDUCTION FROM NOMINAL	-0.39	0.32
I--YY NOMINAL	139.15	139.15
I--YY ACTUAL	139.26	137.51
% REDUCTION FROM NOMINAL	-0.08	1.18

DATA SUMMARY FOR BRIDGE S06 OF 82102

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.66	-1.79	-0.39	-0.08
INTERIOR BEAM AVERAGES	-0.22	-0.61	0.32	1.18
BRIDGE AVERAGES	-0.44	-1.20	-0.03	0.55

S08 OF 82102 M14 OVER HINES ROAD
READINGS TAKEN 20 FEET WEST OF EAST ABUTMENT

BRIDGE ENVIRONMENT INTERMEDIATE
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1976.
READINGS TAKEN 10/21/80
OPEN TO TRAFFIC (OVER) 10/ 3/79

STEEL IN PLACE 12/ 4/77
DECK COMPLETED 6/ 7/77
OPEN TO TRAFFIC (UNDER) 7/ 1/77

	BEAM 1 FACIA WPG	BEAM 3 INTERIOR WPG	BEAM 4 INTERIOR WPG	BEAM 11 INTERIOR WPG	BEAM 12 INTERIOR WPG	BEAM 13 INTERIOR WPG	BEAM 14 FACIA WPG
NOMINAL AREA (INCHES**2)	105.6250	105.6250	105.6250	105.6250	105.6250	105.6250	105.6250
ACTUAL AREA (INCHES**2)	107.1325	107.4883	106.5942	106.7467	106.7400	107.6333	106.0308
% REDUCTION FROM NOMINAL	-1.4272	-1.7641	-0.9176	-1.0619	-1.0556	-1.9014	-0.3842
% REDUCTION FROM UPPER LIMIT	2.3247	2.0003	2.8155	2.6765	2.6826	1.8681	3.3291
% REDUCTION FROM LOWER LIMIT	-2.2100	-2.5495	-1.6964	-1.8419	-1.8355	-2.6678	-1.1590
PENETRATION (FROM NOMINAL)	-9.10	-11.25	-5.85	-6.77	-6.73	-12.13	-2.45
UPPER LIMIT	15.39	13.25	18.65	17.72	17.76	12.37	22.05
LOWER LIMIT	-13.99	-16.13	-10.74	-11.66	-11.62	-17.01	-7.33
I--XX NOMINAL	51817.23	51817.23	51817.23	51817.23	51817.23	51817.23	51817.23
I--XX ACTUAL	52870.65	52929.86	52589.66	52620.03	52621.72	52984.98	52441.71
% REDUCTION FROM NOMINAL	-2.03	-2.15	-1.49	-1.55	-1.55	-2.25	-1.21
I--YY NOMINAL	1894.26	1894.26	1894.26	1894.26	1894.26	1894.26	1894.26
I--YY ACTUAL	1927.37	1935.25	1920.94	1920.68	1910.41	1936.91	1905.53
% REDUCTION FROM NOMINAL	-1.75	-2.16	-1.41	-1.39	-0.85	-2.25	-0.59

DATA SUMMARY FOR BRIDGE S08 OF 82102

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.91	-5.78	-1.82	-1.17
INTERIOR BEAM AVERAGES	-1.34	-8.55	-1.80	-1.61
BRIDGE AVERAGES	-1.22	-7.75	-1.75	-1.49

S10 OF 82102 ROBINWOOD DRIVE OVER EB M14
READINGS TAKEN 10 FEET NORTH OF SOUTH ABUTMENT

BRIDGE ENVIRONMENT INTERMEDIATE
OVER 15 FEET
RURAL HIGH TRAFFIC VOLUME

BRIDGE STARTED 1976.
READINGS TAKEN 10/21/80
OPEN TO TRAFFIC (OVER) 6/30/78

STEEL IN PLACE 11/17/77
DECK COMPLETED. 5/26/78
OPEN TO TRAFFIC (UNDER) 10/31/79

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG	BEAM 4 FACIA WPG
NOMINAL AREA (INCHES**2)	67.1250	67.1250	67.1250	67.1250
ACTUAL AREA (INCHES**2)	67.5800	67.2300	67.0931	67.2068
% REDUCTION FROM NOMINAL	-0.6778	-0.1564	0.0476	-0.1220
% REDUCTION FROM UPPER LIMIT	2.9372	3.4399	3.6365	3.4730
% REDUCTION FROM LOWER LIMIT	-1.6607	-1.1342	-0.9282	-1.0995
PENETRATION (FROM NOMINAL)	-3.38	-0.78	0.24	-0.61
UPPER LIMIT	15.19	17.79	18.81	17.96
LOWER LIMIT	-8.20	-5.60	-4.58	-5.43
I--XX NOMINAL	20916.05	20916.05	20916.05	20916.05
I--XX ACTUAL	21210.47	21110.87	21192.82	21118.81
% REDUCTION FROM NOMINAL	-1.41	-0.93	-1.32	-0.97
I--YY NOMINAL	522.62	522.62	522.62	522.62
I--YY ACTUAL	529.91	529.44	532.20	529.04
% REDUCTION FROM NOMINAL	-1.39	-1.30	-1.83	-1.23

DATA SUMMARY FOR BRIDGE S10 OF 82102

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.40	-1.89	-1.19	-1.31
INTERIOR BEAM AVERAGES	-0.05	-0.27	-1.13	-1.57
BRIDGE AVERAGES	-0.23	-1.13	-1.16	-1.44

S34 OF 82112 WB 8 MILE SERVICE ROAD OVER SB US10
READINGS TAKEN 15 FEET EAST OF WEST ABUTMENT
READINGS ON SPAN 1

BRIDGE ENVIRONMENT TUNNELED
OVER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1965.
READINGS TAKEN 5/16/79
OPEN TO TRAFFIC (OVER) 5/15/64

STEEL IN PLACE 4/ 6/64
DECK COMPLETED 4/26/64
OPEN TO TRAFFIC (UNDER) 7/ 0/65

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 4 INTERIOR WFB	BEAM 5 INTERIOR WFB	BEAM 6 INTERIOR WFB
NOMINAL AREA (INCHES**2)	39.7029	39.7029	39.7029	39.7029	39.7029	39.7029
ACTUAL AREA (INCHES**2)	38.2262	38.8174	38.4154	38.2104	38.5295	38.6800
% REDUCTION FROM NOMINAL	3.7194	2.2304	3.2430	3.7592	2.9556	2.5764
% REDUCTION FROM UPPER LIMIT	8.0677	4.6150	5.6030	8.1066	5.3226	4.9526
% REDUCTION FROM LOWER LIMIT	1.2507	-0.2765	0.7621	1.2915	0.4673	0.0784
PENETRATION (FROM NOMINAL)	12.90	7.73	11.24	13.03	10.25	8.93
UPPER LIMIT	21.56	18.40	19.91	21.70	18.92	17.60
LOWER LIMIT	4.23	-0.93	2.58	4.37	1.58	0.26
I--XX NOMINAL	7801.87	7801.87	7801.87	7801.87	7801.87	7801.87
I--XX ACTUAL	7494.72	7810.26	7556.86	7639.30	7570.73	7585.41
% REDUCTION FROM NOMINAL	3.94	2.46	3.14	3.37	2.96	2.77
I--YY NOMINAL	226.24	226.24	226.24	226.24	226.24	226.24
I--YY ACTUAL	206.22	208.67	208.42	207.79	207.76	207.03
% REDUCTION FROM NOMINAL	8.73	7.77	8.78	8.15	8.17	8.48

DATA SUMMARY FOR BRIDGE S34 OF 82112

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	3.72	12.90	3.94	8.73
INTERIOR BEAM AVERAGES	2.96	10.24	2.94	8.27
BRIDGE AVERAGES	3.08	10.68	3.11	8.51

S34 OF 82112 EB 8 MILE OVER NB US10
READINGS TAKEN ON SPAN 2 OVER OUTSIDE LANE

BRIDGE ENVIRONMENT TUNNELED
OVER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1965.
READINGS TAKEN 5/16/79
OPEN TO TRAFFIC (OVER) 2/21/64

STEEL IN PLACE 1/24/64
DECK COMPLETED 2/12/64
OPEN TO TRAFFIC (UNDER) 7/ 0/65

	BEAM 4 INTERIOR WFB
NOMINAL AREA (INCHES**2)	39.7029
ACTUAL AREA (INCHES**2)	39.5477
% REDUCTION FROM NOMINAL	0.3909
% REDUCTION FROM UPPER LIMIT	2.8204
% REDUCTION FROM LOWER LIMIT	-2.1632
PENETRATION (FROM NOMINAL)	1.36
UPPER LIMIT	10.02
LOWER LIMIT	-7.31
I--XX NOMINAL	7801.87
I--XX ACTUAL	7691.37
% REDUCTION FROM NOMINAL	1.42
I--YY NOMINAL	226.24
I--YY ACTUAL	209.94
% REDUCTION FROM NOMINAL	7.21

DATA SUMMARY FOR BRIDGE S34 OF 82112

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.00	0.00	0.00	0.00
INTERIOR BEAM AVERAGES	0.39	1.36	1.42	7.21
BRIDGE AVERAGES	0.39	1.36	1.42	7.21

S34 OF 82112 EB 8 MILE OVER SB US10
READINGS TAKEN ON SPAN 2 OVER OUTSIDE LANE

BRIDGE ENVIRONMENT TUNNELED
OVER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1965.
READINGS TAKEN 5/16/79
OPEN TO TRAFFIC (OVER) 2/21/64

STEEL IN PLACE 1/24/64
DECK COMPLETED 2/12/64
OPEN TO TRAFFIC (UNDER) 7/ 0/65

	BEAM 1 FACIA WFB	BEAM 3 INTERIOR WFB	BEAM 7 INTERIOR WFB	BEAM 8 FACIA WFB
NOMINAL AREA (INCHES**2)	39.7029	39.7029	39.7029	39.7029
ACTUAL AREA (INCHES**2)	39.1913	38.9984	39.7760	39.6745
% REDUCTION FROM NOMINAL	1.2888	1.7745	-0.1839	0.0716
% REDUCTION FROM UPPER LIMIT	3.6964	4.1702	2.2596	2.5089
% REDUCTION FROM LOWER LIMIT	-1.2423	-0.7441	-2.7527	-2.4906
PENETRATION (FROM NOMINAL)	4.47	6.15	-0.64	0.25
UPPER LIMIT	13.14	14.82	8.03	8.92
LOWER LIMIT	-4.20	-2.52	-9.31	-8.42
I--XX NOMINAL	7801.87	7801.87	7801.87	7801.87
I--XX ACTUAL	7621.98	7595.00	7722.54	7715.68
% REDUCTION FROM NOMINAL	2.31	2.65	1.02	1.10
I--YY NOMINAL	226.24	226.24	226.24	226.24
I--YY ACTUAL	208.31	206.63	210.38	211.78
% REDUCTION FROM NOMINAL	7.92	8.67	7.01	6.39

DATA SUMMARY FOR BRIDGE S34 OF 82112

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.68	2.36	1.71	7.18
INTERIOR BEAM AVERAGES	0.80	2.76	1.83	7.84
BRIDGE AVERAGES	0.74	2.56	1.77	7.50

SO6 OF 82122 EB I696 UNDER FARMINGTON ROAD
READINGS TAKEN 12 FEET NORTH OF SOUTH ABUTMENT

BRIDGE ENVIRONMENT INTERMEDIATE
UNDER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1974.
READINGS TAKEN 11/ 5/80
OPEN TO TRAFFIC (OVER) 0/ 0/ 0

STEEL IN PLACE 7/ 0/75
DECK COMPLETED 0/ 0/ 0
OPEN TO TRAFFIC (UNDER) 11/21/77

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 4 INTERIOR WFB	BEAM 5 INTERIOR WFB	BEAM 6 INTERIOR WFB	BEAM 7 INTERIOR WFB
NOMINAL AREA (INCHES**2)	44.1574	44.1574	44.1574	44.1574	44.1574	44.1574	44.1574
ACTUAL AREA (INCHES**2)	43.8265	44.0003	43.6175	43.2273	43.7173	42.7049	42.8262
% REDUCTION FROM NOMINAL	0.7493	0.3557	1.2226	2.1062	0.9966	3.2893	3.0145
% REDUCTION FROM UPPER LIMIT	3.1700	2.7861	3.6318	4.4939	3.4113	5.8481	5.3800
% REDUCTION FROM LOWER LIMIT	-1.7956	-2.1992	-1.3102	-0.4039	-1.5419	0.8096	0.5277
PENETRATION (FROM NOMINAL)	2.89	1.37	4.71	8.12	3.84	12.68	11.62
UPPER LIMIT	12.52	11.01	14.35	17.76	13.48	22.32	21.26
LOWER LIMIT	-6.75	-8.27	-4.92	-1.52	-5.79	3.04	1.98
I--XX NOMINAL	9015.40	9015.40	9015.40	9015.40	9015.40	9015.40	9015.40
I--XX ACTUAL	8915.43	8964.50	8919.44	8853.32	8940.05	8766.73	8799.51
% REDUCTION FROM NOMINAL	1.11	0.56	1.06	1.80	0.84	2.76	2.39
I--YY NOMINAL	268.62	269.62	269.62	269.62	269.62	269.62	269.62
I--YY ACTUAL	263.32	264.99	265.13	262.67	265.72	260.06	261.16
% REDUCTION FROM NOMINAL	2.34	1.71	1.67	2.58	1.44	3.55	3.14

	BEAM 8 INTERIOR WFB	BEAM 9 INTERIOR WFB	BEAM 10 INTERIOR WFB	BEAM 11 INTERIOR WFB	BEAM 12 FACIA WFB
NOMINAL AREA (INCHES**2)	44.1574	44.1574	44.1574	44.1574	44.1574
ACTUAL AREA (INCHES**2)	42.9844	43.7771	42.9561	45.0159	43.6008
% REDUCTION FROM NOMINAL	2.6563	0.8611	2.7204	-1.9464	1.2604
% REDUCTION FROM UPPER LIMIT	5.0305	3.2791	5.0931	0.5401	3.5688
% REDUCTION FROM LOWER LIMIT	0.1603	-1.6810	0.2260	-4.5605	-1.2714
PENETRATION (FROM NOMINAL)	10.24	3.32	10.49	-7.50	4.86
UPPER LIMIT	19.88	12.96	20.12	2.13	14.49
LOWER LIMIT	0.60	-6.32	0.86	-17.14	-4.78
I--XX NOMINAL	9015.40	9015.40	9015.40	9015.40	9015.40
I--XX ACTUAL	8801.15	8952.75	8803.57	9145.24	8908.25
% REDUCTION FROM NOMINAL	2.38	0.59	2.35	-1.44	1.19
I--YY NOMINAL	269.62	269.62	269.62	269.62	269.62
I--YY ACTUAL	260.85	265.54	261.25	270.42	264.76
% REDUCTION FROM NOMINAL	3.35	1.51	3.11	-0.30	1.80

DATA SUMMARY FOR BRIDGE SO6 OF 82122

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	1.00	3.87	1.15	2.07
INTERIOR BEAM AVERAGES	1.53	5.89	1.34	2.17
BRIDGE AVERAGES	1.44.	5.55	1.31	2.16

S18 OF 82122 EB I96 UNDER FENTON
READINGS TAKEN 6 FEET NORTH OF SOUTH ABUTMENT

BRIDGE ENVIRONMENT INTERMEDIATE
UNDER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1974.
READINGS TAKEN 10/31/80
OPEN TO TRAFFIC (OVER) 10/ 0/78

STEEL IN PLACE 2/ 7/76
DECK COMPLETED 5/15/76
OPEN TO TRAFFIC (UNDER) 10/ 0/77

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG	BEAM 4 INTERIOR WPG	BEAM 5 INTERIOR WPG	BEAM 6 FACIA WPG
NOMINAL AREA (INCHES**2)	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
ACTUAL AREA (INCHES**2)	50.2800	49.3786	50.0386	49.8457	49.8714	49.9000
% REDUCTION FROM NOMINAL	-0.5600	1.2429	-0.0771	0.3086	0.2571	0.2000
% REDUCTION FROM UPPER LIMIT	4.1677	5.8858	4.6279	4.9955	4.9465	4.8920
% REDUCTION FROM LOWER LIMIT	-1.8436	-0.0178	-1.3546	-0.9640	-1.0161	-1.0739
PENETRATION (FROM NOMINAL)	-2.20	4.87	-0.30	1.21	1.01	0.78
UPPER LIMIT	17.15	24.22	19.04	20.56	20.35	20.13
LOWER LIMIT	-7.14	-0.07	-5.25	-3.73	-3.93	-4.16
I--XX NOMINAL	15358.98	15358.98	15358.98	15358.98	15358.98	15358.98
I--XX ACTUAL	15447.54	15169.26	15418.39	15414.58	15410.08	15412.01
% REDUCTION FROM NOMINAL	-0.58	1.24	-0.39	-0.36	-0.33	-0.35
I--YY NOMINAL	360.42	360.42	360.42	360.42	360.42	360.42
I--YY ACTUAL	360.14	353.88	360.44	361.02	360.42	360.45
% REDUCTION FROM NOMINAL	0.08	1.81	-0.01	-0.17	-0.00	-0.01

DATA SUMMARY FOR BRIDGE S18 OF 82122

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.18	-0.71	-0.46	0.03
INTERIOR BEAM AVERAGES	0.43	1.70	0.04	0.41
BRIDGE AVERAGES	0.23	0.90	-0.13	0.28

S23 OF 82122 WB I96 UNDER SCHOOLCRAFT AVENUE
READING TAKEN 5 FEET SOUTH OF NORTH ABUTMENT

BRIDGE ENVIRONMENT INTERMEDIATE
UNDER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1970.
READINGS TAKEN 10/31/80
OPEN TO TRAFFIC (OVER) 12/ 0/72

STEEL IN PLACE 7/ 0/71
DECK COMPLETED 8/ 0/71
OPEN TO TRAFFIC (UNDER) 12/ 0/75

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG	BEAM 4 INTERIOR WPG	BEAM 5 INTERIOR WPG	BEAM 6 INTERIOR WPG	BEAM 7 FACIA WPG
NOMINAL AREA (INCHES**2)	48.0000	48.0000	48.0000	48.0000	48.0000	48.0000	48.0000
ACTUAL AREA (INCHES**2)	47.1767	47.7217	47.5167	46.9317	47.6317	47.3973	46.9983
% REDUCTION FROM NOMINAL	1.7153	0.5799	1.0069	2.2257	0.7674	1.2556	2.0868
% REDUCTION FROM UPPER LIMIT	6.3955	5.3142	5.7209	6.8816	5.4927	5.9577	6.7493
% REDUCTION FROM LOWER LIMIT	0.0702	-1.0842	-0.6500	0.5891	-0.8936	-0.3972	0.4479
PENETRATION (FROM NOMINAL)	5.18	1.75	3.04	6.72	2.32	3.79	6.20
UPPER LIMIT	20.27	16.84	18.13	21.81	17.41	18.88	21.39
LOWER LIMIT	0.21	-3.22	-1.93	1.75	-2.65	-1.18	1.33
I--XX NOMINAL	18868.50	18868.50	18868.50	18868.50	18868.50	18868.50	18868.50
I--XX ACTUAL	18771.18	18964.32	18763.25	18671.84	18829.43	18851.07	18743.17
% REDUCTION FROM NOMINAL	0.52	-0.51	0.56	1.04	0.21	-0.07	0.66
I--YY NOMINAL	512.50	512.50	512.50	512.50	512.50	512.50	512.50
I--YY ACTUAL	513.74	518.69	509.78	508.40	512.84	514.54	513.69
% REDUCTION FROM NOMINAL	-0.24	-1.21	0.53	0.81	-0.07	-0.40	-0.23

DATA SUMMARY FOR BRIDGE S23 OF 82122

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	1.90	5.74	0.59	-0.24
INTERIOR BEAM AVERAGES	1.17	3.52	0.25	-0.11
BRIDGE AVERAGES	1.38	4.16	0.34	-0.14

S13 OF 82123 WB I96 LOCAL UNDER FULLERTON AVENUE
READINGS TAKEN 5 FEET SOUTH OF NORTH ABUTMENT

BRIDGE ENVIRONMENT INTERMEDIATE
OVER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1970.
READINGS TAKEN 10/31/80
OPEN TO TRAFFIC (OVER) 5/24/73

STEEL IN PLACE 8/19/71
DECK COMPLETED 2/ 3/73
OPEN TO TRAFFIC (UNDER) 12/ 0/73

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 4 INTERIOR WFB	BEAM 5 INTERIOR WFB	BEAM 6 INTERIOR WFB	BEAM 7 INTERIOR WFB
NOMINAL AREA (INCHES**2)	53.5359	53.5359	53.5359	49.9772	49.9772	49.9772	47.0809
ACTUAL AREA (INCHES**2)	52.8160	53.1147	53.3589	51.2642	49.3458	50.5632	46.5579
% REDUCTION FROM NOMINAL	1.3447	0.7868	0.3308	-2.5752	1.2634	-1.1726	1.1109
% REDUCTION FROM UPPER LIMIT	3.7509	3.2066	2.7618	-0.0734	3.6716	1.2950	3.5228
% REDUCTION FROM LOWER LIMIT	-1.1849	-1.7572	-2.2250	-5.2054	-1.2683	-3.7668	-1.4247
PENETRATION (FROM NOMINAL)	8.27	3.67	1.54	-11.22	5.51	-5.11	4.56
UPPER LIMIT	17.94	15.33	13.21	-0.33	16.40	5.79	14.83
LOWER LIMIT	-5.39	-7.99	-10.12	-22.12	-5.39	-16.01	-5.71
I--XX NOMINAL	11284.86	11284.86	11284.86	10473.37	10473.37	10473.37	9742.14
I--XX ACTUAL	11081.85	11114.71	11215.86	10720.31	10303.26	10562.97	9575.53
% REDUCTION FROM NOMINAL	1.80	1.51	0.81	-2.36	1.62	-0.86	1.71
I--YY NOMINAL	347.19	347.19	347.19	319.94	319.94	319.94	294.65
I--YY ACTUAL	336.00	336.45	342.79	327.52	311.36	321.61	285.32
% REDUCTION FROM NOMINAL	3.22	3.09	1.27	-2.37	2.68	-0.52	3.17

	BEAM 8 FACIA WFB
NOMINAL AREA (INCHES**2)	47.0809
ACTUAL AREA (INCHES**2)	45.9936
% REDUCTION FROM NOMINAL	2.3095
% REDUCTION FROM UPPER LIMIT	4.6922
% REDUCTION FROM LOWER LIMIT	-0.1954
PENETRATION (FROM NOMINAL)	9.49
UPPER LIMIT	19.76
LOWER LIMIT	-0.78
I--XX NOMINAL	9742.14
I--XX ACTUAL	9481.83
% REDUCTION FROM NOMINAL	2.67
I--YY NOMINAL	294.65
I--YY ACTUAL	283.08
% REDUCTION FROM NOMINAL	3.93

DATA SUMMARY FOR BRIDGE S13 OF 82123

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	1.83	7.88	2.24	3.58
INTERIOR BEAM AVERAGES	-0.04	-0.18	0.37	1.22
BRIDGE AVERAGES	0.42	1.84	0.84	1.81

S24 OF 82123 FULLERTON OVER WB I96
READING TAKEN DIRECTLY OVER MEDIAN STRIP SEPERATING 186B EXIT
FROM WB I96

BRIDGE ENVIRONMENT INTERMEDIATE
UNDER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1971.
READINGS TAKEN 11/ 5/80
OPEN TO TRAFFIC (OVER) 0/ 0/ 0

STEEL IN PLACE 7/ 0/72
DECK COMPLETED 7/ 0/73
OPEN TO TRAFFIC (UNDER) 12/ 0/73

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 4 INTERIOR WPG	BEAM 5 INTERIOR WPG	BEAM 8 FACIA WPG
NOMINAL AREA (INCHES**2)	76.0000	76.0000	76.0000	76.0000	76.0000
ACTUAL AREA (INCHES**2)	75.2383	75.5017	74.9433	75.4383	75.2550
% REDUCTION FROM NOMINAL	1.0022	0.6557	1.3904	0.7390	0.9803
% REDUCTION FROM UPPER LIMIT	4.9060	4.8732	5.2789	4.8533	4.8850
% REDUCTION FROM LOWER LIMIT	-0.0379	-0.3881	0.3543	-0.3038	-0.0601
PENETRATION (FROM NOMINAL)	4.73	3.10	8.56	3.48	4.63

UPPER LIMIT	24.11	22.47	25.94	22.87	24.01
LOWER LIMIT	-0.18	-1.81	1.66	-1.42	-0.28
I--XX NOMINAL	34626.93	34626.93	34626.93	34626.93	34626.93
I--XX ACTUAL	34510.74	34706.84	34467.82	34743.02	34527.90
% REDUCTION FROM NOMINAL	0.34	-0.23	0.46	-0.34	0.29
I--YY NOMINAL	1109.83	1109.83	1109.83	1109.83	1109.83
I--YY ACTUAL	1110.05	1118.52	1106.69	1113.97	1109.22
% REDUCTION FROM NOMINAL	-0.02	-0.78	0.28	-0.37	0.06

DATA SUMMARY FOR BRIDGE S24 OF 82123

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.99	4.68	0.31	0.02
INTERIOR BEAM AVERAGES	0.93	4.38	-0.04	-0.29
BRIDGE AVERAGES	0.95	4.50	0.10	-0.17

S30 OF 82123 WB I96 UNDER LIVERNOIS AVENUE
READINGS TAKEN OVER OUTSIDE SHOULDER

BRIDGE ENVIRONMENT INTERMEDIATE
OVER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1972.
READINGS TAKEN 5/22/79
OPEN TO TRAFFIC (OVER) 8/ 7/71

STEEL IN PLACE 5/ 5/71
DECK COMPLETED 6/ 2/71
OPEN TO TRAFFIC (UNDER) 12/ 0/72

	BEAM 1 FACIA WFB	BEAM 4 INTERIOR WFB	BEAM 7 INTERIOR WFB	BEAM 10 INTERIOR WFB	BEAM 11 INTERIOR WFB	BEAM 14 INTERIOR WFB	BEAM 17 INTERIOR WFB
NOMINAL AREA (INCHES**2)	47.0809	47.0809	47.0809	47.0809	47.0809	47.0809	47.0809
ACTUAL AREA (INCHES**2)	46.8937	47.4878	46.6137	46.6106	46.8443	47.4288	46.1245
% REDUCTION FROM NOMINAL	0.3976	-0.8638	0.9923	0.9988	0.5025	-0.7390	2.0313
% REDUCTION FROM UPPER LIMIT	2.8269	1.5962	3.4071	3.4135	2.9292	1.7180	4.4208
% REDUCTION FROM LOWER LIMIT	-2.1563	-3.4501	-1.5464	-1.5397	-2.0487	-3.3221	-0.4807
PENETRATION (FROM NOMINAL)	1.63	-3.55	4.08	4.10	2.06	-3.04	8.34
UPPER LIMIT	11.90	6.72	14.35	14.37	12.33	7.23	18.61
LOWER LIMIT	-8.64	-13.82	-6.19	-6.17	-8.21	-13.31	-1.93
I--XX NOMINAL	9742.14	9742.14	9742.14	9742.14	9742.14	9742.14	9742.14
I--XX ACTUAL	9670.53	9762.26	9591.42	9604.38	9656.29	9746.34	9488.47
% REDUCTION FROM NOMINAL	0.74	-0.21	1.55	1.41	0.88	-0.04	2.60
I--YY NOMINAL	294.65	294.65	294.65	294.65	294.65	294.65	294.65
I--YY ACTUAL	289.17	291.06	285.11	286.28	288.49	290.79	281.28
% REDUCTION FROM NOMINAL	1.86	1.22	3.24	2.84	2.09	1.31	4.54

	BEAM 20 FACIA WFB
NOMINAL AREA (INCHES**2)	47.0809
ACTUAL AREA (INCHES**2)	47.0023
% REDUCTION FROM NOMINAL	0.1670
% REDUCTION FROM UPPER LIMIT	2.6019
% REDUCTION FROM LOWER LIMIT	-2.3929
PENETRATION (FROM NOMINAL)	0.69
UPPER LIMIT	10.96
LOWER LIMIT	-9.58
I--XX NOMINAL	9742.14
I--XX ACTUAL	9667.69
% REDUCTION FROM NOMINAL	0.76
I--YY NOMINAL	294.65
I--YY ACTUAL	287.64
% REDUCTION FROM NOMINAL	2.31

DATA SUMMARY FOR BRIDGE S30 OF 82123

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.28	1.16	0.75	2.09
INTERIOR BEAM AVERAGES	0.49	2.00	1.03	2.54
BRIDGE AVERAGES	0.44	1.79	0.96	2.43

S36 OF 82123 WB I96 UNDER WEST GRAND BLVD.
READINGS TAKEN OVER OUTSIDE SHOULDER (5/21/79)

BRIDGE ENVIRONMENT INTERMEDIATE
OVER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1972.
READINGS TAKEN 5/21/79
OPEN TO TRAFFIC (OVER) 0/.0/ 0

STEEL IN PLACE 7/ 0/72
DECK COMPLETED 7/ 0/73
OPEN TO TRAFFIC (UNDER) 12/ 0/73

	BEAM 1 FACIA WPG	BEAM 7 INTERIOR WFB	BEAM 11 FACIA WPG
NOMINAL AREA (INCHES**2)	36.7500	39.7029	36.7500
ACTUAL AREA (INCHES**2)	35.5705	38.9791	36.2052
% REDUCTION FROM NOMINAL	3.2095	1.8232	1.4825
% REDUCTION FROM UPPER LIMIT	8.0271	4.2178	6.3861
% REDUCTION FROM LOWER LIMIT	1.3501	-0.6941	-0.4101
PENETRATION (FROM NOMINAL)	8.47	6.32	3.91
UPPER LIMIT	22.29	14.99	17.74
LOWER LIMIT	3.50	-2.35	-1.06
I--XX NOMINAL	4906.94	7801.87	7241.61
I--XX ACTUAL	4806.99	7859.03	7128.44
% REDUCTION FROM NOMINAL	2.04	-0.73	1.56
I--YY NOMINAL	85.94	226.24	171.69
I--YY ACTUAL	83.64	231.09	165.46
% REDUCTION FROM NOMINAL	2.67	-2.14	3.63

DATA SUMMARY FOR BRIDGE S36 OF 82123

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	2.35	6.19	1.80	3.15
INTERIOR BEAM AVERAGES	1.82	6.32	-0.73	-2.14
BRIDGE AVERAGES	2.17	6.23	0.96	1.38

S36 OF 82123 EB I96 UNDER WEST GRAND BLVD
READINGS TAKEN 10 FEET NORTH OF SOUTH ABUTMENT

BRIDGE ENVIRONMENT TUNNELED
OVER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1972.
READINGS TAKEN 10/17/80
OPEN TO TRAFFIC (OVER) 0/ 0/ 0

STEEL IN PLACE 7/ 0/72
DECK COMPLETED 7/ 0/73
OPEN TO TRAFFIC (UNDER) 12/ 0/73

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG	BEAM 4 INTERIOR WPG	BEAM 6 INTERIOR WFB	BEAM 9 INTERIOR WFB	BEAM 7 INTERIOR WFB
NOMINAL AREA (INCHES**2)	55.7500	44.8750	44.8750	44.8750	39.7029	57.1090	39.7029
ACTUAL AREA (INCHES**2)	55.4090	43.8586	43.9064	44.0319	40.9104	56.4537	38.0621
% REDUCTION FROM NOMINAL	0.6117	2.2650	2.1584	1.8788	-3.0412	1.1474	4.1328
% REDUCTION FROM UPPER LIMIT	5.3835	7.0678	6.9684	6.7005	-0.5280	3.5585	6.4710
% REDUCTION FROM LOWER LIMIT	-0.7119	0.5752	0.4667	0.1823	-5.6833	-1.3872	1.5746
PENETRATION (FROM NOMINAL)	2.29	6.63	6.32	5.50	-10.54	5.71	14.33
UPPER LIMIT	21.19	21.77	21.45	20.63	-1.88	18.14	23.00
LOWER LIMIT	-2.63	1.66	1.34	0.52	-19.21	-6.73	5.66
I--XX NOMINAL	19847.48	17581.05	17581.05	17581.05	7801.87	12106.71	7801.87
I--XX ACTUAL	19765.66	17120.89	17144.73	17201.31	8030.89	11866.19	7646.13
% REDUCTION FROM NOMINAL	0.41	2.62	2.48	2.18	-2.94	1.99	2.00
I--YY NOMINAL	853.52	587.53	587.53	587.53	226.24	375.02	226.24
I--YY ACTUAL	845.82	578.21	578.70	581.14	233.77	361.97	224.42
% REDUCTION FROM NOMINAL	0.90	3.23	3.15	2.74	-3.33	3.48	0.80

	BEAM 8 INTERIOR WFB	BEAM 10 INTERIOR WFB	BEAM 11 INTERIOR WFB	BEAM 13 INTERIOR WFB	BEAM 12 INTERIOR WFB	BEAM 14 INTERIOR WPG	BEAM 15 INTERIOR WFB
NOMINAL AREA (INCHES**2)	39.7029	57.1090	39.7029	39.7029	39.7029	81.7500	57.1090
ACTUAL AREA (INCHES**2)	38.2137	56.1871	40.3487	41.0654	38.1470	83.7717	56.7969
% REDUCTION FROM NOMINAL	3.7511	1.6143	-1.6266	-3.4318	3.9189	-2.4730	0.5465
% REDUCTION FROM UPPER LIMIT	6.0888	4.0139	0.8521	-0.9089	6.2624	1.2301	2.9722
% REDUCTION FROM LOWER LIMIT	1.2831	-0.9084	-4.2324	-6.0837	1.4553	-3.3997	-2.0036
PENETRATION (FROM NOMINAL)	13.01	8.03	-5.84	-11.90	13.59	-13.82	2.72

UPPER LIMIT	21.67	20.46	3.03	-3.23	22.26	6.98	15.15
LOWER LIMIT	4.34	-4.40	-14.31	-20.57	4.92	-18.42	-9.71
I--XX NOMINAL	7801.87	12106.71	7801.87	7801.87	7801.87	32498.97	12106.71
I--XX ACTUAL	7719.37	11841.58	7959.12	8080.81	7679.15	33007.42	11924.16
% REDUCTION FROM NOMINAL	1.06	2.19	-2.02	-3.58	1.57	-1.56	1.51
I--YY NOMINAL	226.24	375.02	226.24	226.24	226.24	1408.18	375.02
I--YY ACTUAL	226.31	361.95	232.61	236.49	224.45	1452.57	363.31
% REDUCTION FROM NOMINAL	-0.03	3.48	-2.82	-4.53	0.79	-3.15	3.12

	BEAM 16 INTERIOR WFB	BEAM 17 INTERIOR WFB	BEAM 18 INTERIOR WPQ
NOMINAL AREA (INCHES**2)	57.1090	57.1090	36.7500
ACTUAL AREA (INCHES**2)	56.4360	56.3823	35.8732
% REDUCTION FROM NOMINAL	1.1785	1.2726	2.3858
% REDUCTION FROM UPPER LIMIT	3.5888	3.6806	7.2445
% REDUCTION FROM LOWER LIMIT	-1.3553	-1.2589	0.5108
PENETRATION (FROM NOMINAL)	5.86	6.33	6.30
UPPER LIMIT	18.29	18.76	20.12
LOWER LIMIT	-6.57	-6.10	1.32
I--XX NOMINAL	12106.71	12106.71	11910.94
I--XX ACTUAL	11907.53	11872.58	11548.22
% REDUCTION FROM NOMINAL	1.65	1.93	3.05
I--YY NOMINAL	375.02	375.02	343.18
I--YY ACTUAL	363.75	362.24	329.30
% REDUCTION FROM NOMINAL	3.01	3.41	4.04

DATA SUMMARY FOR BRIDGE SJ6 OF 82123

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.61	2.29	0.41	0.90
INTERIOR BEAM AVERAGES	0.98	3.29	0.88	1.09
BRIDGE AVERAGES	0.96	3.24	0.85	1.08

SOJ OF 82124 MYRTYLE STREET OVER EB I96
READINGS TAKEN 10 FEET NORTH OF SOUTH ABUTMENT

BRIDGE ENVIRONMENT INTERMEDIATE
UNDER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1971.
READINGS TAKEN 10/28/80
OPEN TO TRAFFIC (OVER) 8/27/69

STEEL IN PLACE 4/ 9/69
DECK COMPLETED 5/21/69
OPEN TO TRAFFIC (UNDER) 2/11/70

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 5 INTERIOR WFB	BEAM 6 INTERIOR WFB	BEAM 7 INTERIOR WFB	BEAM 8 FACIA WFB
NOMINAL AREA (INCHES**2)	49.9772	49.9772	49.9772	49.9772	49.9772	49.9772	49.9772
ACTUAL AREA (INCHES**2)	50.1681	49.8365	50.2620	49.4790	50.4603	49.1813	48.8541
% REDUCTION FROM NOMINAL	-0.3819	0.2815	-0.5698	0.9969	-0.9667	1.5926	2.2473
% REDUCTION FROM UPPER LIMIT	2.0860	2.7136	1.8831	3.4116	1.4959	3.9928	4.6315
% REDUCTION FROM LOWER LIMIT	-2.9352	-2.2754	-3.1485	-1.5417	-3.5556	-0.9307	-0.2592
PENETRATION (FROM NOMINAL)	-1.58	1.23	-2.48	4.34	-4.21	6.94	9.78
UPPER LIMIT	9.32	12.12	8.41	15.24	6.68	17.84	20.69
LOWER LIMIT	-12.47	-9.67	-13.38	-6.55	-15.11	-3.95	-1.10
I--XX NOMINAL	10473.37	10473.37	10473.37	8554.93	8554.93	10473.37	10473.37
I--XX ACTUAL	10437.79	10361.81	10455.82	8499.10	8575.78	10392.42	10212.17
% REDUCTION FROM NOMINAL	0.34	1.07	0.17	0.65	-0.24	0.77	2.49
I--YY NOMINAL	318.94	319.94	319.94	240.22	240.22	319.94	319.94
I--YY ACTUAL	315.47	311.51	315.59	238.07	237.62	318.62	308.11
% REDUCTION FROM NOMINAL	1.40	2.63	1.36	0.48	1.08	0.41	3.70

DATA SUMMARY FOR BRIDGE SOJ OF 82124

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.94	4.11	1.42	2.55
INTERIOR BEAM AVERAGES	0.27	1.18	0.48	1.19
BRIDGE AVERAGES	0.46	2.00	0.75	1.58

S06 OF 82194 SB I75 OVER WB FORT STREET
READINGS TAKEN OVER SHOULDER LANE
STRUCTURE CLOSE TO FACTORIES--HIGH ACID CONTENT IN AIR

BRIDGE ENVIRONMENT OPEN
UNDER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1967.
READINGS TAKEN 5/23/79
OPEN TO TRAFFIC (OVER) 7/12/67

STEEL IN PLACE 3/15/67
DECK COMPLETED 6/21/67
OPEN TO TRAFFIC (UNDER) 12/19/67

	BEAM 4 INTERIOR WPG	BEAM 7 INTERIOR WPG	BEAM 10 INTERIOR WPG	BEAM 11 INTERIOR WPG	BEAM 14 INTERIOR WPG	BEAM 17 INTERIOR WPG	BEAM 20 FACIA WPG
NOMINAL AREA (INCHES**2)	54.0000	58.0000	58.0000	58.0000	58.0000	58.0000	48.7500
ACTUAL AREA (INCHES**2)	53.3758	57.6900	57.9530	57.9125	58.0841	57.5461	48.1896
% REDUCTION FROM NOMINAL	1.1560	0.5345	0.0810	0.1509	-0.1449	0.7826	1.1496
% REDUCTION FROM UPPER LIMIT	5.9624	5.3435	4.9119	4.9785	4.6969	5.5796	6.2459
% REDUCTION FROM LOWER LIMIT	-0.3166	-0.8438	-1.1036	-1.2326	-1.5326	-0.5922	-0.5263
PENETRATION (FROM NOMINAL)	3.88	1.93	0.29	0.55	-0.52	2.83	3.42
UPPER LIMIT	21.05	20.32	18.68	18.93	17.86	21.22	19.58
LOWER LIMIT	-1.05	-3.01	-4.65	-4.40	-5.47	-2.11	-1.54
I--XX NOMINAL	18349.60	20945.71	20945.71	20945.71	27063.82	27063.82	22900.54
I--XX ACTUAL	18306.60	20983.53	21071.96	21013.93	27113.78	27057.61	22820.75
% REDUCTION FROM NOMINAL	0.24	-0.18	-0.60	-0.33	-0.18	0.02	0.35
I--YY NOMINAL	640.21	682.88	682.88	682.88	853.54	853.54	840.22
I--YY ACTUAL	638.79	681.98	684.90	681.58	851.56	851.10	836.50
% REDUCTION FROM NOMINAL	0.22	0.13	-0.30	0.19	0.23	0.29	0.58

DATA SUMMARY FOR BRIDGE S06 OF 82194

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	1.15	3.42	0.35	0.58
INTERIOR BEAM AVERAGES	0.43	1.49	-0.17	0.13
BRIDGE AVERAGES	0.53	1.77	-0.10	0.19

S27 OF 82194 WB I96 UNDER US12 CONNECTION
READINGS TAKEN 4 FEET SOUTH OF NORTH ABUTMENT

BRIDGE ENVIRONMENT INTERMEDIATE
UNDER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1971.
READINGS TAKEN 10/14/80
OPEN TO TRAFFIC (OVER) 9/15/69

STEEL IN PLACE 1/29/69
DECK COMPLETED 5/21/69
OPEN TO TRAFFIC (UNDER) 2/ 0/70

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 4 FACIA WFB
NOMINAL AREA (INCHES**2)	39.7029	39.7029	39.7029	39.7029
ACTUAL AREA (INCHES**2)	39.1905	40.5304	40.0442	38.8137
% REDUCTION FROM NOMINAL	1.2908	-2.0841	-0.8585	-0.2789
% REDUCTION FROM UPPER LIMIT	3.6983	0.4058	1.6005	2.1669
% REDUCTION FROM LOWER LIMIT	-1.2402	-4.7016	-3.4457	-2.8502
PENETRATION (FROM NOMINAL)	4.48	-7.23	-2.98	-0.97
UPPER LIMIT	13.14	1.44	5.69	7.70
LOWER LIMIT	-4.19	-15.69	-11.65	-9.84
I--XX NOMINAL	7801.87	7801.87	7801.87	7801.87
I--XX ACTUAL	7754.63	7976.73	7849.24	7786.42
% REDUCTION FROM NOMINAL	0.61	-2.24	-0.61	0.21
I--YY NOMINAL	226.24	226.24	226.24	226.24
I--YY ACTUAL	224.38	231.18	228.17	223.11
% REDUCTION FROM NOMINAL	0.82	-2.18	0.03	1.38

DATA SUMMARY FOR BRIDGE S27 OF 82194

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.51	1.75	0.41	1.10
INTERIOR BEAM AVERAGES	-1.47	-5.10	-1.42	-1.08
BRIDGE AVERAGES	-0.48	-1.67	-0.51	0.01

S27 OF 82194 WB I96 UNDER US12 CONNECTION
READINGS TAKEN 5 FEET SOUTH OF NORTH PIER
DIRECTLY OVER WB SHOULDER

BRIDGE ENVIRONMENT INTERMEDIATE
UNDER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1971.
READINGS TAKEN 10/14/80
OPEN TO TRAFFIC (OVER) 9/15/69

STEEL IN PLACE 1/29/69
DECK COMPLETED 5/21/69
OPEN TO TRAFFIC (UNDER) 2/ 0/70

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 4 INTERIOR WFB	BEAM 5 INTERIOR WFB	BEAM 6 FACIA WFB
NOMINAL AREA (INCHES**2)	44.1574	44.1574	44.1574	44.1574	44.1574	44.1574
ACTUAL AREA (INCHES**2)	43.9306	43.2620	43.2413	42.7868	44.6850	44.8211
% REDUCTION FROM NOMINAL	0.5134	1.9823	2.0745	3.1038	-1.1950	-1.7295
% REDUCTION FROM UPPER LIMIT	2.9399	4.3729	4.4629	5.4672	1.2732	0.7517
% REDUCTION FROM LOWER LIMIT	-2.0375	-0.5310	-0.4365	0.6193	-3.7897	-4.3380
PENETRATION (FROM NOMINAL)	1.38	7.64	8.00	11.96	-4.61	-6.67
UPPER LIMIT	11.62	17.28	17.63	21.60	5.03	2.97
LOWER LIMIT	-7.66	-2.00	-1.64	2.33	-14.24	-16.30
I--XX NOMINAL	9015.40	9015.40	9015.40	9015.40	9015.40	9015.40
I--XX ACTUAL	8918.42	8799.76	8748.52	8669.18	9058.83	9159.54
% REDUCTION FROM NOMINAL	1.08	2.39	2.96	3.84	-0.48	-1.60
I--YY NOMINAL	269.62	269.62	269.62	269.62	269.62	269.62
I--YY ACTUAL	263.14	259.41	255.82	253.61	267.44	272.35
% REDUCTION FROM NOMINAL	2.40	3.79	5.12	5.94	0.81	-1.01

DATA SUMMARY FOR BRIDGE S27 OF 82194

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-0.61	-2.34	-0.26	0.69
INTERIOR BEAM AVERAGES	1.49	5.75	2.18	3.91
BRIDGE AVERAGES	0.79	3.05	1.36	2.84

S10 OF 82252 WB 8 MILE OVER I75 (UPPER STRUCTURE)
READINGS TAKEN 4 FEET WEST OF 7TH PIER & 4 FEET EAST OF 2ND DIAPHRAGH
WEST OF 7TH PIER--MEASUREMENTS TAKEN NORTH SIDE ON WEB

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1969.
READINGS TAKEN 5/18/79
OPEN TO TRAFFIC (OVER) 12/21/66

STEEL IN PLACE 10/ 7/68
DECK COMPLETED 8/17/66

	BEAM 4 INTERIOR WPG	BEAM 5 INTERIOR WPG
NOMINAL AREA (INCHES**2)	68.2500	68.2600
ACTUAL AREA (INCHES**2)	67.3796	67.7475
% REDUCTION FROM NOMINAL	1.2752	0.7362
% REDUCTION FROM UPPER LIMIT	6.2087	5.6966
% REDUCTION FROM LOWER LIMIT	0.0262	-0.5197
PENETRATION (FROM NOMINAL)	5.05	2.92
UPPER LIMIT	25.69	23.76
LOWER LIMIT	0.10	-2.03
I--XX NOMINAL	22457.57	22457.57
I--XX ACTUAL	22537.62	22674.97
% REDUCTION FROM NOMINAL	-0.36	-0.97
I--YY NOMINAL	597.58	597.58
I--YY ACTUAL	538.45	603.94
% REDUCTION FROM NOMINAL	-0.15	-1.07

DATA SUMMARY FOR BRIDGE S10 OF 82252

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.00	0.00	0.00	0.00
INTERIOR BEAM AVERAGES	1.01	3.98	-0.68	-0.61
BRIDGE AVERAGES	1.01	3.98	-0.66	-0.61

S10 OF 82252 WB 8 MILE OVER I-75 (UPPER STRUCTURE)
READINGS TAKEN 4 FEET WEST OF 7TH PIER & 4 FEET EAST OF 2ND DIAPHRAGM WEST OF 7TH PIER--MEASUREMENTS TAKEN NORTH SIDE ON WEB

BRIDGE ENVIRONMENT OPEN OVER 15 FEET URBAN HIGH TRAFFIC VOLUME
BRIDGE STARTED 1969. READINGS TAKEN 5/18/79 OPEN TO TRAFFIC (OVER) 12/21/66
STEEL IN PLACE 10/ 7/66 DECK COMPLETED 6/17/68

	BEAM 4 INTERIOR WPG	BEAM 5 INTERIOR WPG
NOMINAL AREA (INCHES**2)	96.2500	96.2500
ACTUAL AREA (INCHES**2)	96.5981	96.0160
% REDUCTION FROM NOMINAL	-0.3617	0.2431
% REDUCTION FROM UPPER LIMIT	3.4919	4.0735
% REDUCTION FROM LOWER LIMIT	-1.2588	-0.6486
PENETRATION (FROM NOMINAL)	-2.02	1.35
UPPER LIMIT	20.23	23.60
LOWER LIMIT	-6.95	-3.58
I--XX NOMINAL	19709.32	19709.32
I--XX ACTUAL	20117.91	20034.74
% REDUCTION FROM NOMINAL	-2.07	-1.65
I--YY NOMINAL	469.59	469.59
I--YY ACTUAL	480.67	476.83
% REDUCTION FROM NOMINAL	-2.36	-1.54

DATA SUMMARY FOR BRIDGE S1D OF 82252

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.00	0.00	0.00	0.00
INTERIOR BEAM AVERAGES	-0.06	-0.33	-1.86	-1.95
BRIDGE AVERAGES	-0.06	-0.33	-1.86	-1.95

S16 OF 82291 SB I275 RAMP TO EB I94 UNDER WB I94
READINGS TAKEN 20 FEET EAST OF WEST ABUTMENT DIRECTLY OVER OUTSIDE SOULDER

BRIDGE ENVIRONMENT INTERMEDIATE OVER 15 FEET URBAN HIGH TRAFFIC VOLUME
BRIDGE STARTED 1972. READINGS TAKEN 10/24/80 OPEN TO TRAFFIC (OVER) 7/ 0/74
STEEL IN PLACE 6/23/73 DECK COMPLETED 8/16/73 OPEN TO TRAFFIC (UNDER) 9/15/75

	BEAM 1 FACIA WPG	BEAM 2 INTERIOR WPG	BEAM 3 INTERIOR WPG	BEAM 4 FACIA WPG
NOMINAL AREA (INCHES**2)	85.1250	81.1250	81.1250	81.1250
ACTUAL AREA (INCHES**2)	84.7767	80.6550	79.9067	80.1367
% REDUCTION FROM NOMINAL	0.4092	0.5794	1.5018	1.2306
% REDUCTION FROM UPPER LIMIT.	5.3753	6.5627	6.4389	6.1813
% REDUCTION FROM LOWER LIMIT	-0.7375	-0.6225	0.3111	0.0367
PENETRATION (FROM NOMINAL)	1.77	2.38	6.17	5.08
UPPER LIMIT	24.46	24.07	27.88	26.75
LOWER LIMIT	-3.15	-2.53	1.26	0.15
I--XX NOMINAL	52515.78	58020.02	58020.02	58020.02
I--XX ACTUAL	53021.92	58850.35	58611.82	58676.90
% REDUCTION FROM NOMINAL	-0.96	-1.43	-1.02	-0.86
I--YY NOMINAL	854.32	939.65	939.65	939.65
I--YY ACTUAL	856.70	949.98	944.90	944.53
% REDUCTION FROM NOMINAL	-0.28	-1.10	-0.55	-0.52

DATA SUMMARY FOR BRIDGE S16 OF 82291

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.82	3.41	-0.96	-0.40
INTERIOR BEAM AVERAGES	1.04	4.28	-1.23	-0.63
BRIDGE AVERAGES	0.93	3.85	-1.08	-0.51

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802 OF 23092 SB H99 OVER GRAND RIVER
READINGS TAKEN 6 FEET NORTH OF SOUTH ABUTMENT
TOO FAR BELOW LOWER SIZE TOLERANCE LIMIT

BRIDGE ENVIRONMENT OPEN
UNDER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1978.
READINGS TAKEN 9/25/80
OPEN TO TRAFFIC (OVER) 10/ 3/78

STEEL IN PLACE 8/18/78
DECK COMPLETED 10/ 3/78

	BEAM 2 INTERIOR WFB
NOMINAL AREA (INCHES**2)	34.1312
ACTUAL AREA (INCHES**2)	33.0341
% REDUCTION FROM NOMINAL	3.2144
% REDUCTION FROM UPPER LIMIT	5.5750
% REDUCTION FROM LOWER LIMIT	0.7327
PENETRATION (FROM NOMINAL)	11.26
UPPER LIMIT	20.01
LOWER LIMIT	2.50
I--XX NOMINAL	4921.10
I--XX ACTUAL	4731.05
% REDUCTION FROM NOMINAL	3.86
I--YY NOMINAL	164.48
I--YY ACTUAL	154.03
% REDUCTION FROM NOMINAL	6.35

DATA SUMMARY FOR BRIDGE 802 OF 23092

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.00	0.00	0.00	0.00
INTERIOR BEAM AVERAGES	3.21	11.26	3.86	6.35
BRIDGE AVERAGES	3.21	11.26	3.86	6.35

S17 OF 25132 THIRD STREET OVER NB I475
READINGS TAKEN 6 FEET EAST OF MIDDLE PIER
INDIVIDUAL FLANGE QUADRANTS HAVE EXCESSIVE VARIATION FROM NOMINAL

BRIDGE ENVIRONMENT INTERMEDIATE
UNDER 15 FEET
URBAN LOW TRAFFIC VOLUME

BRIDGE STARTED 1976.
READINGS TAKEN 9/30/80
OPEN TO TRAFFIC (OVER) 10/28/77

STEEL IN PLACE 7/30/77
DECK COMPLETED 8/13/77

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 4 INTERIOR WFB	BEAM 5 INTERIOR WFB	BEAM 6 FACIA WFB
NOMINAL AREA (INCHES**2)	44.1574	44.1574	44.1574	44.1574	44.1574	44.1574
ACTUAL AREA (INCHES**2)	44.6584	45.7699	45.3755	45.7857	45.6277	45.5775
% REDUCTION FROM NOMINAL	-1.1347	-3.6517	-2.7586	-3.6875	-3.3297	-3.4426
% REDUCTION FROM UPPER LIMIT	1.3320	-1.1236	-0.2523	-1.1585	-0.8094	-0.9196
% REDUCTION FROM LOWER LIMIT	-3.7279	-6.3095	-5.3936	-6.3461	-5.9791	-6.0950
PENETRATION (FROM NOMINAL)	-4.37	-14.08	-10.63	-14.21	-12.83	-13.27
UPPER LIMIT	5.26	-4.44	-1.00	-4.58	-3.20	-3.63
LOWER LIMIT	-14.01	-23.71	-20.27	-23.85	-22.47	-22.91
I--XX NOMINAL	9015.40	9015.40	9015.40	9015.40	9015.40	9015.40
I--XX ACTUAL	9101.63	9265.21	9225.38	9301.11	9250.56	9274.92
% REDUCTION FROM NOMINAL	-0.96	-2.99	-2.33	-3.17	-2.72	-2.88
I--YY NOMINAL	269.62	269.62	269.62	269.62	269.62	269.62
I--YY ACTUAL	268.91	274.54	272.96	274.80	273.57	274.13
% REDUCTION FROM NOMINAL	0.26	-1.83	-1.24	-1.92	-1.46	-1.67

DATA SUMMARY FOR BRIDGE S17 OF 25132

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-2.29	-8.82	-1.92	-0.71
INTERIOR BEAM AVERAGES	-3.36	-12.94	-2.80	-1.61
BRIDGE AVERAGES	-3.00	-11.57	-2.51	-1.31

S31 OF 25132 SB I475 UNDER COLDWATER ROAD
READINGS TAKEN 12 FEET EAST OF WEST ABUTMENT
NOT OPEN TO TRAFFIC AT TIME OF READING

BRIDGE ENVIRONMENT INTERMEDIATE
UNDER 15 FEET
URBAN LOW TRAFFIC VOLUME

BRIDGE STARTED 1977.
READINGS TAKEN 9/26/80
OPEN TO TRAFFIC (OVER) 6/17/78

STEEL IN PLACE 9/10/77
DECK COMPLETED 10/ 8/77

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 6 INTERIOR WFB
NOMINAL AREA (INCHES**2)	34.7101	34.7101	34.7101	34.7101
ACTUAL AREA (INCHES**2)	36.0863	35.9342	37.6831	35.9911
% REDUCTION FROM NOMINAL	-3.9647	-3.5267	-8.5653	-3.6905
% REDUCTION FROM UPPER LIMIT	-1.4290	-1.0016	-5.9173	-1.1615
% REDUCTION FROM LOWER LIMIT	-6.6305	-6.1812	-11.3490	-6.3493
PENETRATION (FROM NOMINAL)	-12.79	-11.38	-27.63	-11.91
UPPER LIMIT	-4.73	-3.31	-19.57	-3.84
LOWER LIMIT	-20.85	-19.44	-35.70	-19.97
I--XX NOMINAL	5890.49	5890.49	5890.49	5890.49
I--XX ACTUAL	6158.81	6147.75	6438.57	6153.53
% REDUCTION FROM NOMINAL	-4.56	-4.37	-9.30	-4.47
I--YY NOMINAL	186.80	186.80	186.80	186.80
I--YY ACTUAL	196.99	196.93	208.30	197.00
% REDUCTION FROM NOMINAL	-5.45	-5.42	-11.51	-5.48

DATA SUMMARY FOR BRIDGE S31 OF 25132

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-3.96	-12.79	-4.56	-5.45
INTERIOR BEAM AVERAGES	-5.26	-16.97	-6.05	-7.46
BRIDGE AVERAGES	-4.94	-15.93	-5.67	-6.96

S03 OF 41051 SB M37 OVER CALVIN COLLEGE ENTRANCE WAY
READINGS TAKEN 7 FEET SOUTH OF NORTH ABUTMENT
TOO FAR ABOVE UPPER SIZE TOLERANCE LIMIT

BRIDGE ENVIRONMENT INTERMEDIATE
UNDER 15 FEET
URBAN LOW TRAFFIC VOLUME

BRIDGE STARTED 1978;
READINGS TAKEN 9/23/80
OPEN TO TRAFFIC (OVER) 7/ 9/80

STEEL IN PLACE 6/28/79
DECK COMPLETED 7/ 0/79
OPEN TO TRAFFIC (UNDER) 7/ 9/80

	BEAM 1 FACIA WFB
NOMINAL AREA (INCHES**2)	29.1548
ACTUAL AREA (INCHES**2)	30.2752
% REDUCTION FROM NOMINAL	-3.8431
% REDUCTION FROM UPPER LIMIT	-1.3104
% REDUCTION FROM LOWER LIMIT	-6.5058
PENETRATION (FROM NOMINAL)	-11.49
UPPER LIMIT	-4.02
LOWER LIMIT	-15.96
I--XX NOMINAL	3298.01
I--XX ACTUAL	3462.49
% REDUCTION FROM NOMINAL	-5.05
I--YY NOMINAL	97.34
I--YY ACTUAL	101.70
% REDUCTION FROM NOMINAL	-4.48

DATA SUMMARY FOR BRIDGE S03 OF 41051

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-3.84	-11.49	-5.05	-4.48
INTERIOR BEAM AVERAGES	0.00	0.00	0.00	0.00
BRIDGE AVERAGES	-3.84	-11.49	-5.05	-4.48

XO1 OF 64015 SB M31 OVER BASELINE ROAD & C&O RAILROAD
READINGS TAKEN 6-8 FEET NORTH OF SOUTH ABUTMENT

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1975.
READINGS TAKEN 5/21/80
OPEN TO TRAFFIC (OVER) 12/11/76

STEEL IN PLACE 5/16/76
DECK COMPLETED 7/ 0/76

	BEAM 1 FACIA WFB	BEAM 3 INTERIOR WFB
NOMINAL AREA (INCHES**2)	39.7029	39.7029
ACTUAL AREA (INCHES**2)	41.4688	41.8594
% REDUCTION FROM NOMINAL	-4.4979	-5.4315
% REDUCTION FROM UPPER LIMIT	-1.9492	-2.8600
% REDUCTION FROM LOWER LIMIT	-7.1774	-8.1349
PENETRATION (FROM NOMINAL)	-15.60	-18.83
UPPER LIMIT	-6.93	-10.16
LOWER LIMIT	-24.26	-27.50
I--XX NOMINAL	6441.22	7801.87
I--XX ACTUAL	6667.82	8077.56
% REDUCTION FROM NOMINAL	-3.52	-3.53
I--YY NOMINAL	169.86	226.24
I--YY ACTUAL	170.30	228.60
% REDUCTION FROM NOMINAL	-0.26	-1.04

DATA SUMMARY FOR BRIDGE XO1 OF 64015

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-4.50	-15.60	-3.52	-0.26
INTERIOR BEAM AVERAGES	-5.43	-18.83	-3.53	-1.04
BRIDGE AVERAGES	-4.96	-17.21	-3.53	-0.65

SO3 OF 64015 SB M31 OVER EB GRANT ROAD
READINGS TAKEN 8 FEET NORTH OF SOUTH ABUTMENT
TOO FAR ABOVE UPPER SIZE TOLERANCE LIMIT

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1975.
READINGS TAKEN 5/21/80
OPEN TO TRAFFIC (OVER) 11/ 0/76

STEEL IN PLACE 5/15/76
DECK COMPLETED 6/12/76
OPEN TO TRAFFIC (UNDER) 6/15/76

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 4 INTERIOR WFB	BEAM 5 INTERIOR WFB
NOMINAL AREA (INCHES**2)	29.1063	29.1063	29.1063	29.1063	29.1063
ACTUAL AREA (INCHES**2)	30.2485	30.5313	30.5522	30.0445	29.7739
% REDUCTION FROM NOMINAL	-3.9242	-4.8959	-4.9675	-3.2232	-2.2937
% REDUCTION FROM UPPER LIMIT	-1.3894	-2.3374	-2.4073	-0.7055	0.2012
% REDUCTION FROM LOWER LIMIT	-6.5889	-7.5855	-7.6589	-5.8689	-4.9167
PENETRATION (FROM NOMINAL)	-11.73	-14.63	-14.85	-9.63	-6.86
UPPER LIMIT	-4.26	-7.16	-7.37	-2.16	0.62
LOWER LIMIT	-19.20	-22.10	-22.32	-17.10	-14.33
I--XX NOMINAL	3969.62	3969.62	3969.62	3969.62	3969.62
I--XX ACTUAL	4145.23	4173.14	4182.66	4110.78	4077.01
% REDUCTION FROM NOMINAL	-3.90	-4.60	-4.84	-3.04	-2.19
I--YY NOMINAL	128.11	128.11	128.11	128.11	128.11
I--YY ACTUAL	132.73	133.38	133.60	130.97	130.02
% REDUCTION FROM NOMINAL	-3.60	-4.12	-4.28	-2.24	-1.49

DATA SUMMARY FOR BRIDGE SO3 OF 64015

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-3.92	-11.73	-3.90	-3.60
INTERIOR BEAM AVERAGES	-3.85	-11.48	-3.67	-3.03
BRIDGE AVERAGES	-3.88	-11.54	-3.71	-3.15

S01 OF 65041 GLENWOOD ROAD OVER NB I75
READINGS TAKEN 5 FEET WEST OF EAST ABUTMENT.
PAINTED--A2427 --!ROLLING DEFECTS VERY PROMINANT!!--WRONG NOMINAL??

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1970.
READINGS TAKEN 10/ 8/80
OPEN TO TRAFFIC (OVER) 8/ 7/70

STEEL IN PLACE 4/17/70
DECK COMPLETED 7/24/70
OPEN TO TRAFFIC (UNDER) 8/ 0/71

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 4 INTERIOR WFB	BEAM 5 FACIA WFB
NOMINAL AREA (INCHES**2)	39.6880	39.6880	39.6880	39.6880	39.6880
ACTUAL AREA (INCHES**2)	38.7501	40.3515	38.7829	38.7187	38.5882
% REDUCTION FROM NOMINAL	2.3631	-1.6718	2.2805	2.4423	2.7712
% REDUCTION FROM UPPER LIMIT	4.7445	0.8080	4.6639	4.8218	5.1426
% REDUCTION FROM LOWER LIMIT	-0.1404	-4.2788	-0.2251	-0.0592	0.2781
PENETRATION (FROM NOMINAL)	8.19	-5.79	7.90	8.46	9.60
UPPER LIMIT	16.85	2.87	16.56	17.12	18.26
LOWER LIMIT	-0.47	-14.46	-0.76	-0.20	0.94
I--XX NOMINAL	7784.67	7784.67	7784.67	7784.67	7784.67
I--XX ACTUAL	7717.01	7985.82	7753.73	7699.44	7681.36
% REDUCTION FROM NOMINAL	0.87	-2.58	0.40	1.09	1.33
I--YY NOMINAL	225.39	225.39	225.39	225.39	225.39
I--YY ACTUAL	224.44	233.77	224.92	223.88	223.43
% REDUCTION FROM NOMINAL	0.42	-3.72	0.21	0.67	0.87

DATA SUMMARY FOR BRIDGE S01 OF 65041

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	2.57	8.90	1.10	0.65
INTERIOR BEAM AVERAGES	1.02	3.52	-0.36	-0.94
BRIDGE AVERAGES	1.64	5.67	0.22	-0.31

B02 OF 70024 WB I196 OVER BLACK RIVER
READINGS TAKEN 6 FEET EAST OF WEST ABUTMENT
TOO FAR ABOVE UPPER SIZE TOLERANCE LIMIT

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1972.
READINGS TAKEN 10/18/79
OPEN TO TRAFFIC (OVER) 12/11/74

STEEL IN PLACE 10/ 8/73
DECK COMPLETED 7/28/72

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 5 INTERIOR WFB	BEAM 6 FACIA WFB
NOMINAL AREA (INCHES**2)	39.7029	39.7029	39.7029	39.7029	39.7029
ACTUAL AREA (INCHES**2)	41.6466	41.4707	41.5833	42.8172	40.5015
% REDUCTION FROM NOMINAL	-4.8956	-4.4524	-4.7361	-7.3401	-2.0113
% REDUCTION FROM UPPER LIMIT	-2.3372	-1.9048	-2.1816	-4.7221	0.4768
% REDUCTION FROM LOWER LIMIT	-7.5852	-7.1307	-7.4216	-10.0924	-4.6270
PENETRATION (FROM NOMINAL)	-16.97	-15.44	-16.42	-25.45	-6.97
UPPER LIMIT	-8.31	-6.77	-7.76	-16.78	1.69
LOWER LIMIT	-25.64	-24.11	-25.09	-34.12	-15.84
I--XX NOMINAL	7801.87	7801.87	7801.87	7801.87	7801.87
I--XX ACTUAL	8161.87	8057.86	8101.52	8286.63	8211.51
% REDUCTION FROM NOMINAL	-4.49	-3.26	-3.84	-6.21	-5.25
I--YY NOMINAL	226.24	226.24	226.24	226.24	226.24
I--YY ACTUAL	234.86	220.06	222.10	228.10	244.21
% REDUCTION FROM NOMINAL	-3.86	-1.69	-2.59	-5.24	-7.94

DATA SUMMARY FOR BRIDGE B02 OF 70024

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-3.45	-11.97	-4.87	-5.90
INTERIOR BEAM AVERAGES	-5.51	-19.10	-4.45	-3.17
BRIDGE AVERAGES	-4.69	-16.25	-4.81	-4.27

B03 OF 70024 EB I196 OVER BLACK RIVER
READINGS TAKEN 2 FEET EAST OF EAST PIER
TOO FAR ABOVE UPPER SIZE TOLERANCE LIMIT

BRIDGE ENVIRONMENT OPEN
UNDER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1972.
READINGS TAKEN 10/31/79
OPEN TO TRAFFIC (OVER) 12/11/74

STEEL IN PLACE 4/20/74
DECK COMPLETED 5/18/74

	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 4 INTERIOR WFB	BEAM 5 INTERIOR WFB	BEAM 6 FACIA WFB
NOMINAL AREA (INCHES**2)	34.1312	34.1312	34.1312	34.1312	34.1312	34.1312
ACTUAL AREA (INCHES**2)	34.3232	35.8275	36.1332	35.2524	35.4806	34.6559
% REDUCTION FROM NOMINAL	-0.5624	-4.9698	-5.8655	-3.2848	-3.9536	-1.5372
% REDUCTION FROM UPPER LIMIT	1.8904	-2.4096	-3.2834	-0.7657	-1.4181	0.9394
% REDUCTION FROM LOWER LIMIT	-3.1409	-7.6613	-8.6800	-5.9332	-6.6190	-4.1407
PENETRATION (FROM NOMINAL)	-1.97	-17.40	-20.64	-11.50	-13.84	-5.38
UPPER LIMIT	6.78	-8.65	-11.78	-2.75	-5.09	3.37
LOWER LIMIT	-10.72	-26.16	-29.29	-20.26	-22.60	-14.14
I--XX NOMINAL	4921.10	4921.10	4921.10	4921.10	4921.10	4921.10
I--XX ACTUAL	4963.49	5167.91	5209.48	5096.37	5131.44	4999.34
% REDUCTION FROM NOMINAL	-0.86	-5.02	-5.86	-3.56	-4.27	-1.59
I--YY NOMINAL	164.48	164.48	164.48	164.48	164.48	164.48
I--YY ACTUAL	164.55	172.62	174.42	170.12	171.24	165.96
% REDUCTION FROM NOMINAL	-0.04	-4.95	-6.04	-3.43	-4.11	-0.90

DATA SUMMARY FOR BRIDGE B03 OF 70024

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-1.05	-3.68	-1.23	-0.47
INTERIOR BEAM AVERAGES	-4.52	-15.82	-4.68	-4.63
BRIDGE AVERAGES	-3.36	-11.77	-3.53	-2.25

B03 OF 70024 EB I196 OVER BLACK RIVER
READINGS TAKEN 1ST PIER WEST OF EAST ABUTMENT

BRIDGE ENVIRONMENT OPEN
UNDER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1972.
READINGS TAKEN 10/31/79
OPEN TO TRAFFIC (OVER) 12/11/74

STEEL IN PLACE 4/20/74
DECK COMPLETED 5/18/74

	BEAM 3 INTERIOR WFB	BEAM 5 INTERIOR WFB
NOMINAL AREA (INCHES**2)	34.1312	34.1312
ACTUAL AREA (INCHES**2)	35.9595	35.4644
% REDUCTION FROM NOMINAL	-5.3565	-3.9061
% REDUCTION FROM UPPER LIMIT	-2.7869	-1.3718
% REDUCTION FROM LOWER LIMIT	-8.0580	-6.5704
PENETRATION (FROM NOMINAL)	-18.76	-13.68
UPPER LIMIT	-10.00	-4.92
LOWER LIMIT	-27.51	-22.43
I--XX NOMINAL	4921.10	4921.10
I--XX ACTUAL	5189.93	5130.71
% REDUCTION FROM NOMINAL	-5.46	-4.26
I--YY NOMINAL	164.48	164.48
I--YY ACTUAL	173.31	171.89
% REDUCTION FROM NOMINAL	-5.37	-4.51

DATA SUMMARY FOR BRIDGE B03 OF 70024

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.00	0.00	0.00	0.00
INTERIOR BEAM AVERAGES	-4.63	-16.22	-4.86	-4.94
BRIDGE AVERAGES	-4.63	-16.22	-4.86	-4.94

B03 OF 70024 EB I196 OVER BLACK RIVER
READINGS TAKEN 3 FEET WEST OF EAST ABUTMENT
TOO FAR ABOVE UPPER SIZE TOLERANCE BAND

BRIDGE ENVIRONMENT OPEN
UNDER 15 FEET
URBAN LOW TRAFFIC VOLUME

BRIDGE STARTED 1972.
READINGS TAKEN 10/31/79
OPEN TO TRAFFIC (OVER) 12/11/74

STEEL IN PLACE 4/20/74
DECK COMPLETED 5/18/74

	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 5 INTERIOR WFB
NOMINAL AREA (INCHES**2)	34.1312	34.1312	34.1312
ACTUAL AREA (INCHES**2)	35.7979	35.9278	35.3998
% REDUCTION FROM NOMINAL	-4.8831	-5.2638	-3.7168
% REDUCTION FROM UPPER LIMIT	-2.3249	-2.6964	-1.1872
% REDUCTION FROM LOWER LIMIT	-7.5724	-7.9629	-6.3762
PENETRATION (FROM NOMINAL)	-17.10	-18.43	-13.02
UPPER LIMIT	-8.34	-9.68	-4.26
LOWER LIMIT	-25.85	-27.19	-21.77
I--XX NOMINAL	4921.10	4921.10	4921.10
I--XX ACTUAL	5163.00	5182.87	5114.42
% REDUCTION FROM NOMINAL	-4.92	-5.32	-3.93
I--YY NOMINAL	164.48	164.48	164.48
I--YY ACTUAL	172.30	173.29	170.26
% REDUCTION FROM NOMINAL	-4.76	-5.36	-3.57

DATA SUMMARY FOR BRIDGE B03 OF 70024

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.00	0.00	0.00	0.00
INTERIOR BEAM AVERAGES	-4.62	-16.18	-4.72	-4.58
BRIDGE AVERAGES	-4.62	-16.18	-4.72	-4.58

S24 OF 82123 FULLERTON OVER WB I96
READING TAKEN DIRECTLY OVER MEDIAN STRIP SEPERATING 166B EXIT
FROM WB I96

BRIDGE ENVIRONMENT INTERMEDIATE
UNDER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1971.
READINGS TAKEN 11/ 5/80
OPEN TO TRAFFIC (OVER) 0/ 0/ 0

STEEL IN PLACE 7/ 0/72
DECK COMPLETED 7/ 0/73
OPEN TO TRAFFIC (UNDER) 12/ 0/73

	BEAM 3 INTERIOR WPG
NOMINAL AREA (INCHES**2)	58.8750
ACTUAL AREA (INCHES**2)	62.2867
% REDUCTION FROM NOMINAL	-39.7635
% REDUCTION FROM UPPER LIMIT	-33.2023
% REDUCTION FROM LOWER LIMIT	-41.6100
PENETRATION (FROM NOMINAL)	-155.55
UPPER LIMIT	-136.28
LOWER LIMIT	-160.65
I--XX NOMINAL	23769.09
I--XX ACTUAL	35377.58
% REDUCTION FROM NOMINAL	-48.84
I--YY NOMINAL	768.48
I--YY ACTUAL	1287.23
% REDUCTION FROM NOMINAL	-67.50

DATA SUMMARY FOR BRIDGE S24 OF 82123

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.00	0.00	0.00	0.00
INTERIOR BEAM AVERAGES	-39.76	-155.55	-48.84	-67.50
BRIDGE AVERAGES	-39.76	-155.55	-48.84	-67.50

S34 OF 82112 EB 8 MILE OVER NB US10
READINGS TAKEN ON SPAN 2 OVER OUTSIDE LANE
TOO FAR ABOVE UPPER TOLERANCE LIMIT (AFTER 15 YEARS!!)

BRIDGE ENVIRONMENT TUNNELED
OVER 15 FEET
URBAN HIGH TRAFFIC VOLUME

BRIDGE STARTED 1965.
READINGS TAKEN 5/16/79
OPEN TO TRAFFIC (OVER) 2/21/64

STEEL IN PLACE 1/24/64
DECK COMPLETED 2/12/64
OPEN TO TRAFFIC (UNDER) 7/ 0/65

	BEAM 7 INTERIOR WFB
NOMINAL AREA (INCHES**2)	39.7029
ACTUAL AREA (INCHES**2)	41.6980
% REDUCTION FROM NOMINAL	-5.0250
% REDUCTION FROM UPPER LIMIT	-2.4634
% REDUCTION FROM LOWER LIMIT	-7.7179
PENETRATION (FROM NOMINAL)	-17.42
UPPER LIMIT	-8.75
LOWER LIMIT	-26.09
I--XX NOMINAL	7801.87
I--XX ACTUAL	8064.58
% REDUCTION FROM NOMINAL	-3.37
I--YY NOMINAL	226.24
I--YY ACTUAL	221.00
% REDUCTION FROM NOMINAL	2.32

DATA SUMMARY FOR BRIDGE S34 OF 82112

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	0.00	0.00	0.00	0.00
INTERIOR BEAM AVERAGES	-5.02	-17.42	-3.37	2.32
BRIDGE AVERAGES	-5.02	-17.42	-3.37	2.32

X02 OF 83031 NORTH BOUND US131 OVER PENN CENTRAL RAILROAD
READINGS TAKEN 8 FEET NORTH OF SOUTH ABUTMENT
?HAVING PROBLEMS WITH THICKNESS GUAGE?????????

BRIDGE ENVIRONMENT OPEN
OVER 15 FEET
RURAL LOW TRAFFIC VOLUME

BRIDGE STARTED 1975.
READINGS TAKEN 5/21/80
OPEN TO TRAFFIC (OVER) 11/15/77

STEEL IN PLACE 11/24/75
DECK COMPLETED 6/16/76

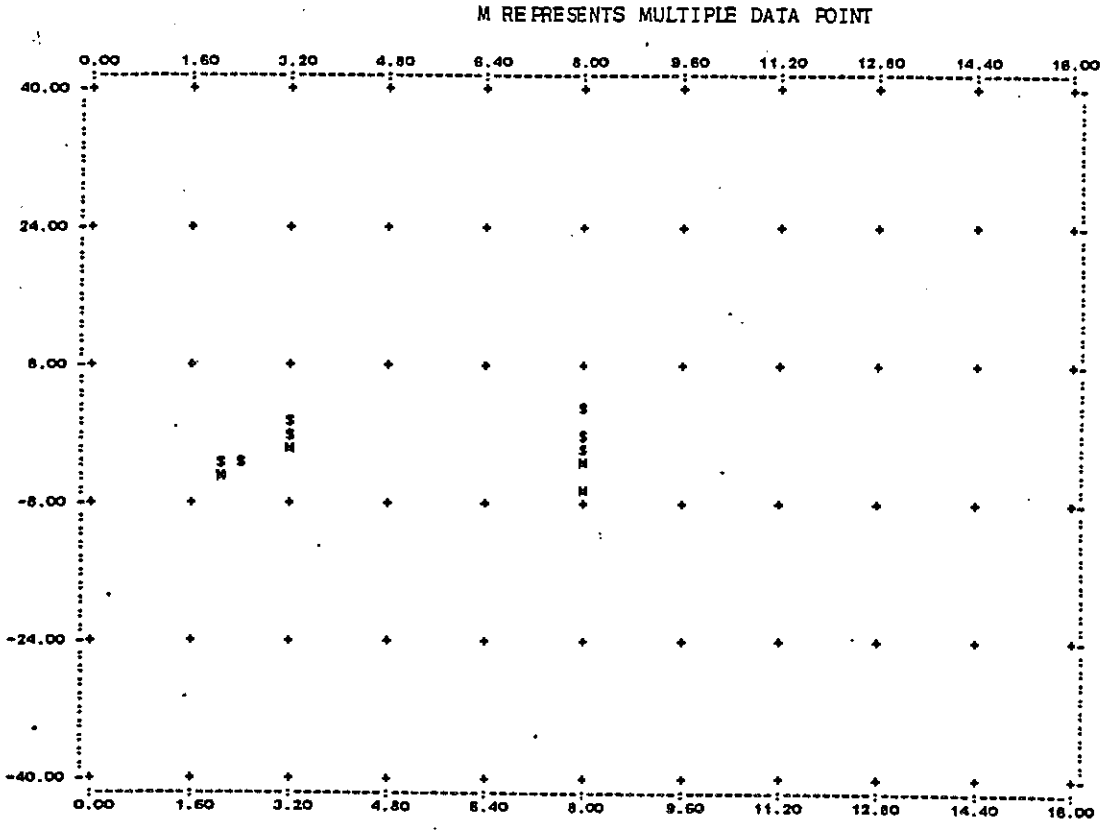
	BEAM 1 FACIA WFB	BEAM 2 INTERIOR WFB	BEAM 3 INTERIOR WFB	BEAM 4 INTERIOR WFB	BEAM 5 FACIA WFB
NOMINAL AREA (INCHES**2)	31.7641	31.7641	31.7641	31.7641	31.7641
ACTUAL AREA (INCHES**2)	33.5802	34.2074	33.1958	31.6339	31.5728
% REDUCTION FROM NOMINAL	-5.7175	-7.6921	-4.5074	0.4098	0.6023
% REDUCTION FROM UPPER LIMIT	-3.1390	-5.0654	-1.9584	2.8388	3.0266
% REDUCTION FROM LOWER LIMIT	-8.4282	-10.4534	-7.1870	-2.1438	-1.9464
PENETRATION (FROM NOMINAL)	-18.64	-25.08	-14.69	1.34	1.96
UPPER LIMIT	-10.49	-16.93	-6.84	9.49	10.11
LOWER LIMIT	-26.79	-33.22	-22.84	-6.81	-6.19
I--XX NOMINAL	4463.04	4463.04	4463.04	4463.04	4463.04
I--XX ACTUAL	4768.83	4843.54	4715.66	4554.70	4552.16
% REDUCTION FROM NOMINAL	-6.85	-8.53	-5.66	-2.05	-2.00
I--YY NOMINAL	146.41	146.41	146.41	146.41	146.41
I--YY ACTUAL	159.30	161.98	157.02	151.61	151.77
% REDUCTION FROM NOMINAL	-8.81	-10.64	-7.25	-3.55	-3.66

DATA SUMMARY FOR BRIDGE X02 OF 83031

	% REDUCTION (AREA) FROM NOMINAL	PENETRATION (FROM NOMINAL --MILS)	% REDUCTION I--XX FROM NOMINAL	% REDUCTION I--YY FROM NOMINAL
FACIA BEAM AVERAGES	-2.56	-8.34	-4.42	-6.23
INTERIOR BEAM AVERAGES	-3.93	-12.81	-5.41	-7.14
BRIDGE AVERAGES	-3.38	-11.02	-5.02	-6.78

APPENDIX B

For those more interested in statistics, this appendix contains more detailed analysis of our major findings. Scatterplots showing penetration losses from nominal vs. exposure age are provided for the more significant relationships along with the results of their linear regression analyses. Drawn on the scatterplots are the lines depiciting the mean regression line (Penetration = A x Age + B). Above and below this mean are regression lines drawn using the upper and lower limits of the 95 percent Confidence Interval for d(Penetration)/dt = A—the corrosion rate. The fan-like area produced demonstrates the approximate range of penetration (from an initial value—B) that may be expected to occur for the exposure conditions represented in the plot. The results of the statistical anlayses (linear regression) for each case are included in Figures B1 through B36 interspersed with their respective scatterplots. Results reported are, with only a few exceptions, significant at the p less than or equal to .05 level (95 percent confidence level).



POINTS PLOTTED = 16 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 0

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 1
SAMPLE SIZE = 16
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = CORATE

VAR	LABEL	MEAN	STD DEVIATION
1	AGE BS	4.98869	2.60025
2	CORATE	-2.38313	2.58875

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-2.43287	
1	AGE BS	0.00597	0.01079

STANDARD ERROR OF ESTIMATE = 2.67945
COEFFICIENT OF DETERMINATION = 0.00012
COEFFICIENT OF DETERMINATION (ADJ) = 0.00000
MULTIPLE CORRELATION COEFFICIENT = 0.01079
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.00000

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE BS	0.24706	0.26725	0.040	3.169

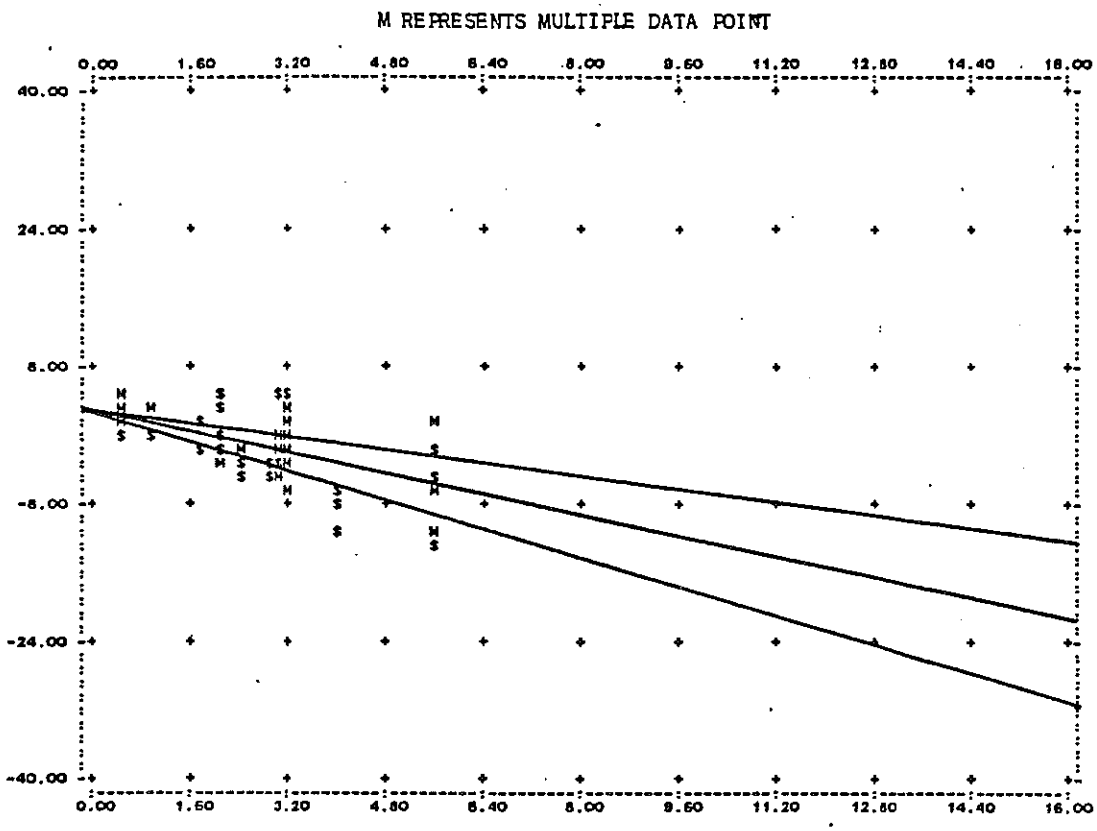
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE BS	0.01079	2.22070E-15

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	0.0117	0.0117	0.0016	3.162
RESIDUAL	14	100.5126	7.1795		
TOTAL	15	100.5243			

Figure B1. Penetration from nominal (mils) vs. age from first exposure to bridge site (years), all painted weathering steel beams.



POINTS PLOTTED = 65 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 0

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 1
SAMPLE SIZE = 65
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = CORATE

VAR	LABEL	MEAN	STD DEVIATION
1	AGE BS	2.86171	1.51397
2	CORATE	-1.39062	4.32000

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	3.10572	
1	AGE BS	-1.65922	-0.54644

STANDARD ERROR OF ESTIMATE = 3.64660
COEFFICIENT OF DETERMINATION = 0.29860
COEFFICIENT OF DETERMINATION (ADJ) = 0.28746
MULTIPLE CORRELATION COEFFICIENT = 0.54644
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.53616

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE BS	0.30106	0.10551	-5.173	100.000

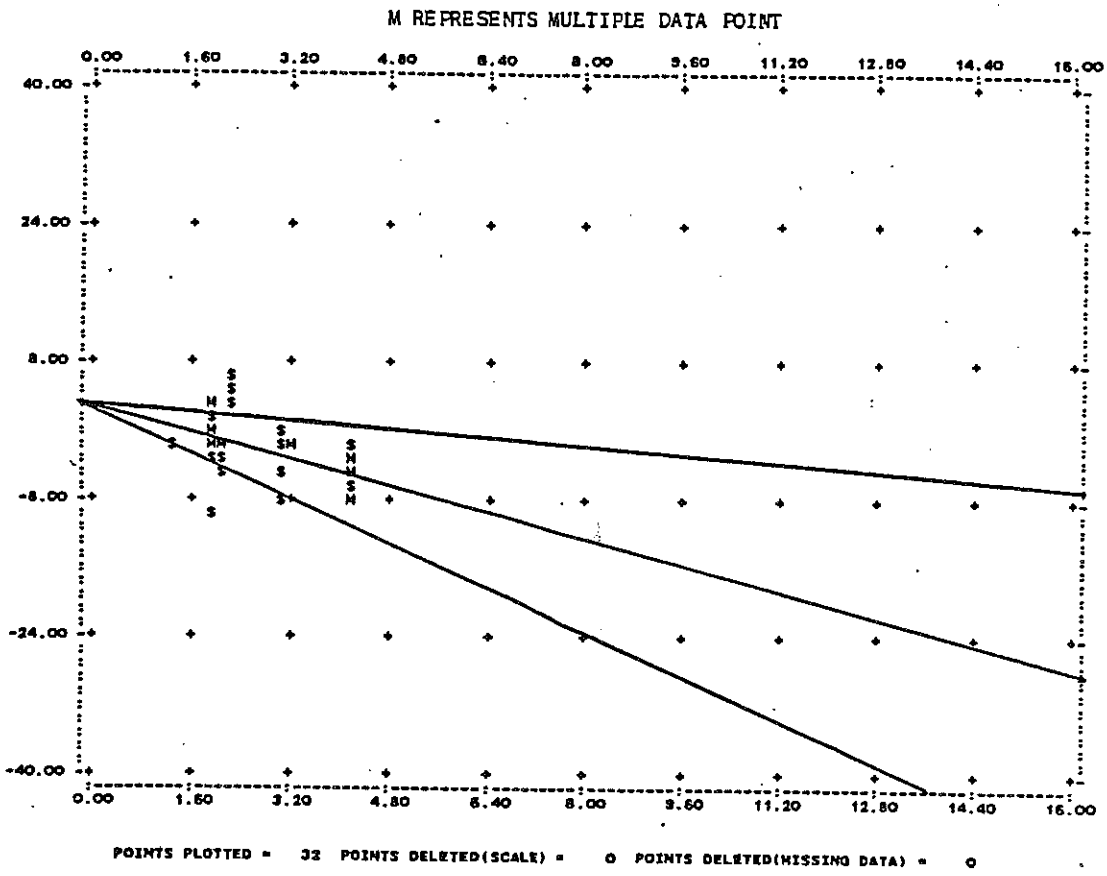
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE BS	-0.54644	1.29668E-11

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	356.6410	356.6410	26.8128	100.000
RESIDUAL	63	837.7523	13.2977		
TOTAL	64	1194.3934			

Figure B2. Penetration from nominal (mils) vs. age from first exposure to bridge site (years), all rural beams not exposed to traffic spray from below.



MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 1
SAMPLE SIZE = 32
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = CORATE

VAR	LABEL	MEAN	STD DEVIATION
1	AGE BS	2.74416	0.84452
2	CORATE	-2.09187	3.89612

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	3.28552	
1	AGE BS	-1.95958	-0.47481

STANDARD ERROR OF ESTIMATE = 3.48740
COEFFICIENT OF DETERMINATION = 0.22544
COEFFICIENT OF DETERMINATION (ADJ) = 0.19963
MULTIPLE CORRELATION COEFFICIENT = 0.47481
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.44679

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE BS	0.66315	0.16068	-2.955	99.417

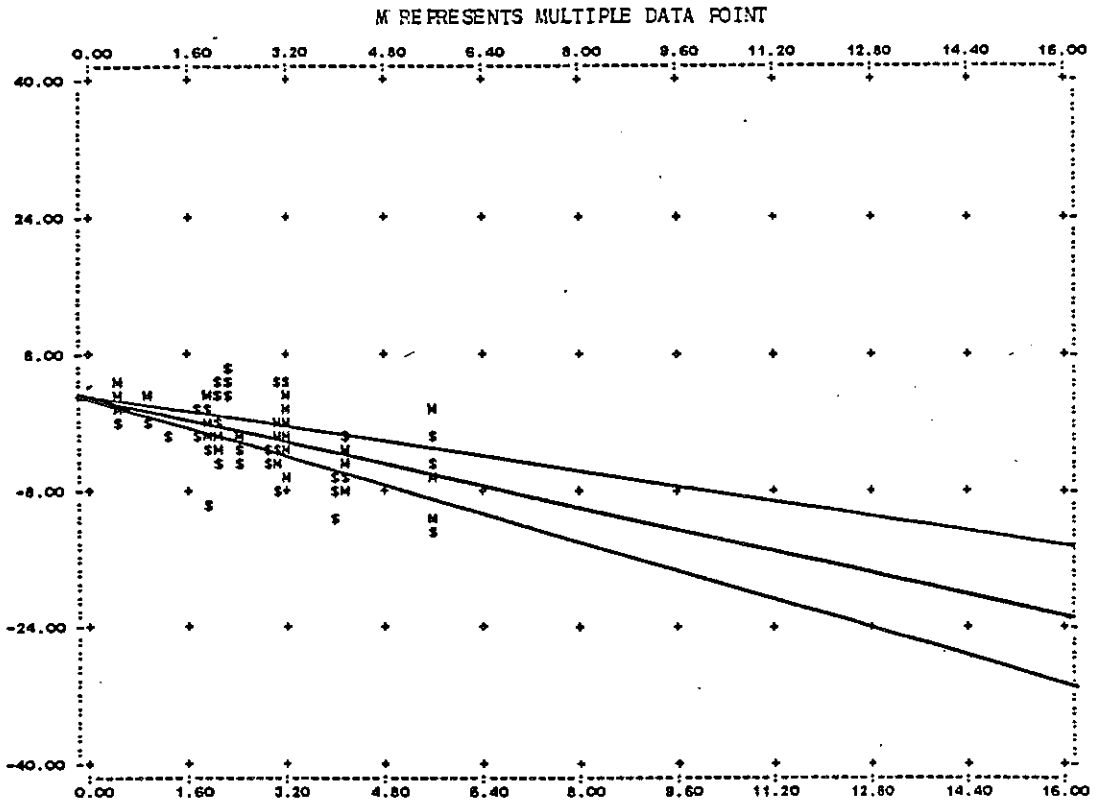
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE BS	-0.47481	0.00000

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	106.1968	106.1968	8.7318	99.397
RESIDUAL	30	364.8597	12.1620		
TOTAL	31	471.0565			

Figure B3. Penetration from nominal (mils) vs. age from first exposure to bridge site (years), all urban beams not exposed to traffic spray from below.



POINTS PLOTTED = 97 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 0

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 1
SAMPLE SIZE = 97
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = CORATE

VAR	LABEL	MEAN	STD DEVIATION
1	AGE BS	2.83767	1.24926
2	CORATE	-1.62196	4.17831

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	2.93773	
1	AGE BS	-1.60684	-0.51888

STANDARD ERROR OF ESTIMATE = 3.59058
COEFFICIENT OF DETERMINATION = 0.26924
COEFFICIENT OF DETERMINATION (ADJ) = 0.26155
MULTIPLE CORRELATION COEFFICIENT = 0.51888
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.51142

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE BS	0.27160	0.08771	-5.916	100.000

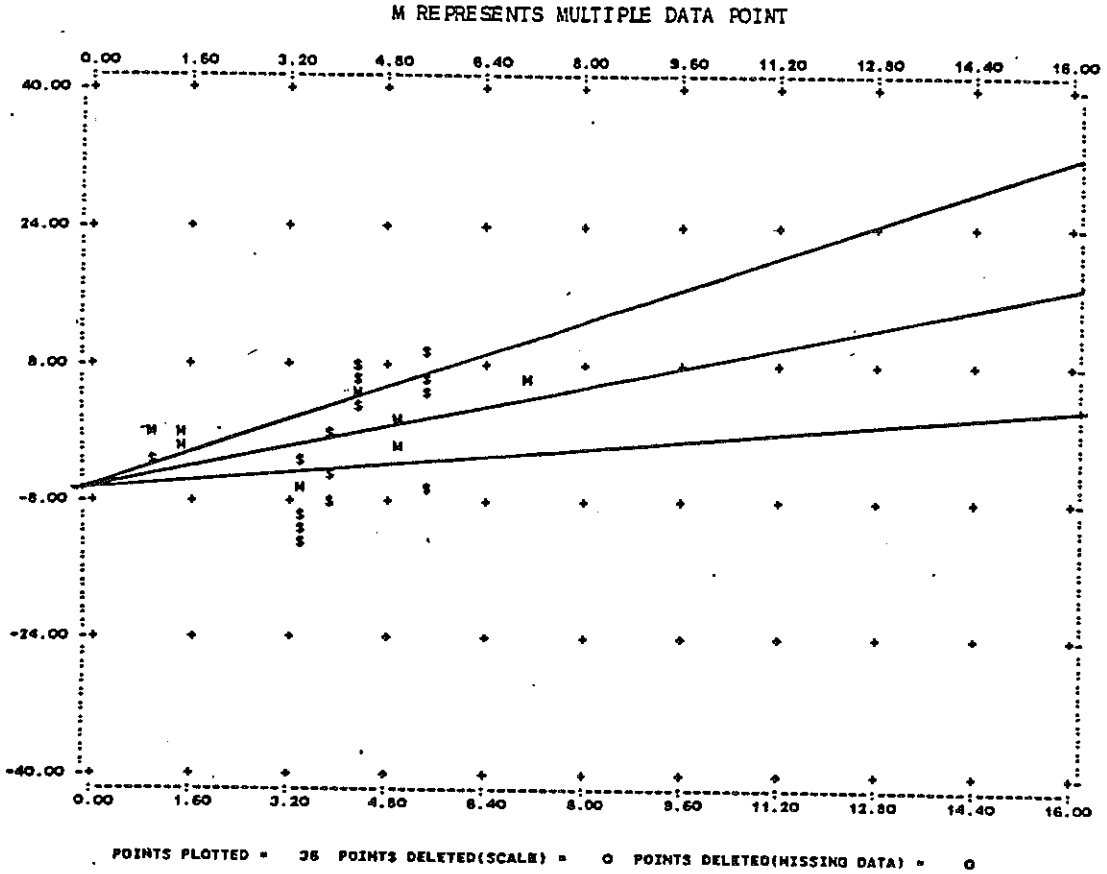
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE BS	-0.51888	-2.48917E-12

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	451.2420	451.2420	35.0013	100.000
RESIDUAL	95	1224.7529	12.8921		
TOTAL	96	1675.9949			

Figure B4. Penetration from nominal (mils) vs. age from first exposure to bridge site (years), all beams not exposed to traffic spray from below.



POINTS PLOTTED = 36 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 0

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 1
SAMPLE SIZE = 36
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = CORATE

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	3.91056	1.80625
2	CORATE	-0.30667	5.63485

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-5.97015	
1	AGE TE	1.44825	0.46424

STANDARD ERROR OF ESTIMATE = 5.06371
COEFFICIENT OF DETERMINATION = 0.21552
COEFFICIENT OF DETERMINATION (ADJ) = 0.19244
MULTIPLE CORRELATION COEFFICIENT = 0.46424
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.43868

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.47387	0.15190	3.056	99.579

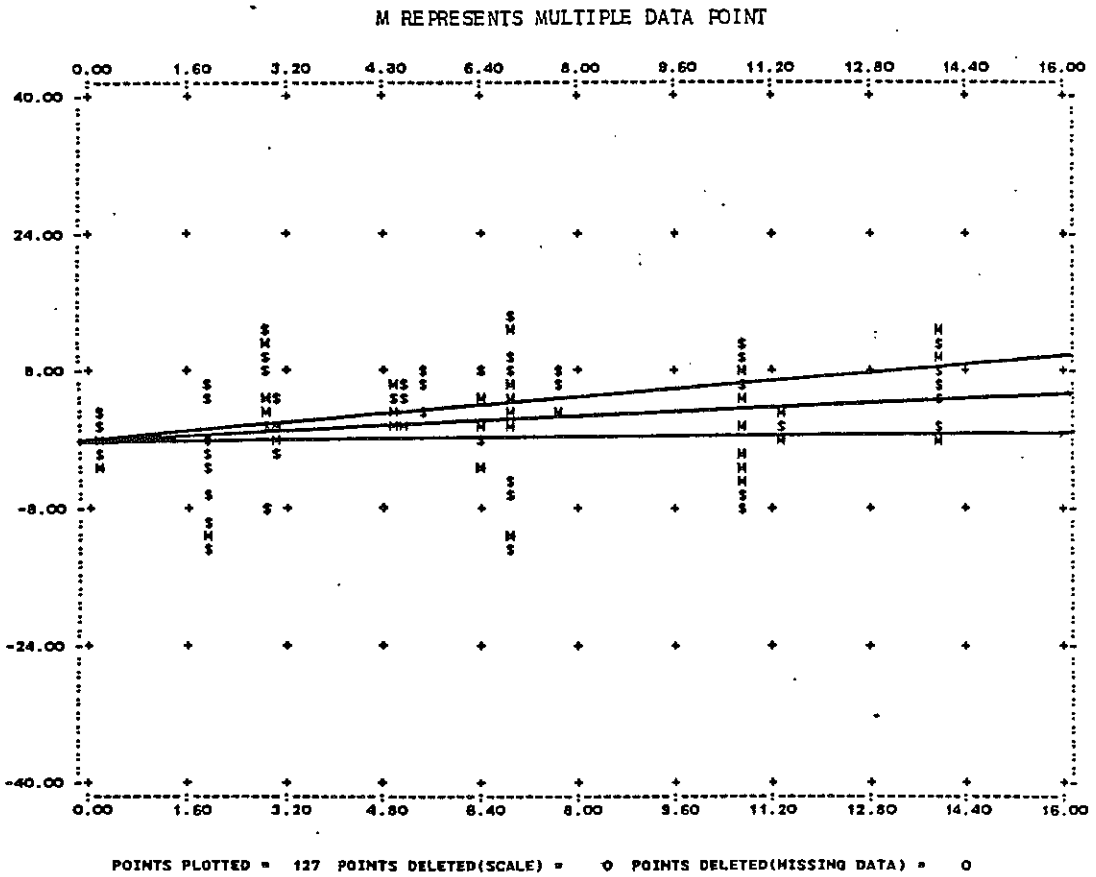
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.46424	2.318716-12

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	239.5053	239.5053	9.3407	99.566
RESIDUAL	34	871.7995	25.6412		
TOTAL	35	1111.3048			

Figure B5. Penetration from nominal (mils) vs. age from first exposure to traffic (years), all rural beams exposed to traffic spray from below.



POINTS PLOTTED = 127 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 0

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 1
SAMPLE SIZE = 127
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = CORATE

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	6.69661	3.83060
2	CORATE	2.59339	5.90542

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	0.40799	
1	AGE TE	0.32634	0.21170

STANDARD ERROR OF ESTIMATE = 5.79462
COEFFICIENT OF DETERMINATION = 0.04482
COEFFICIENT OF DETERMINATION (ADJ) = 0.03717
MULTIPLE CORRELATION COEFFICIENT = 0.21170
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.19281

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.12478	0.06742	2.422	98.314

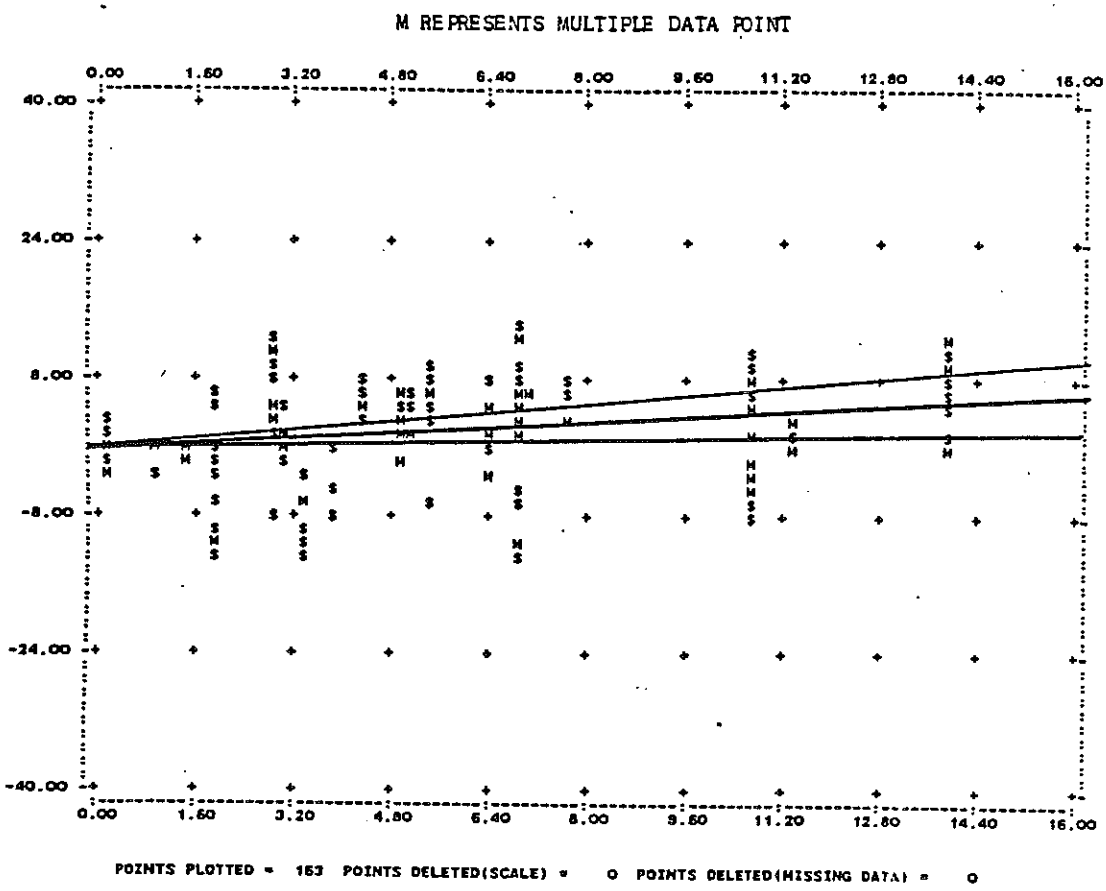
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.21170	3.52166E-13

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	196.9244	196.9244	5.8648	98.312
RESIDUAL	125	4197.1987	33.5776		
TOTAL	126	4394.1230			

Figure B6. Penetration from nominal (mils) vs. age from first exposure to traffic (years), all urban beams exposed to traffic spray from below.



MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 1
SAMPLE SIZE = 163
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = CORATE

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	6.08129	3.66916
2	CORATE	1.95288	5.95318

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-0.82273	
1	AGE TE	0.45642	0.28131

STANDARD ERROR OF ESTIMATE = 5.73049
COEFFICIENT OF DETERMINATION = 0.07913
COEFFICIENT OF DETERMINATION (ADJ) = 0.07341
MULTIPLE CORRELATION COEFFICIENT = 0.28131
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.27095

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.12271	0.07563	3.720	99.973

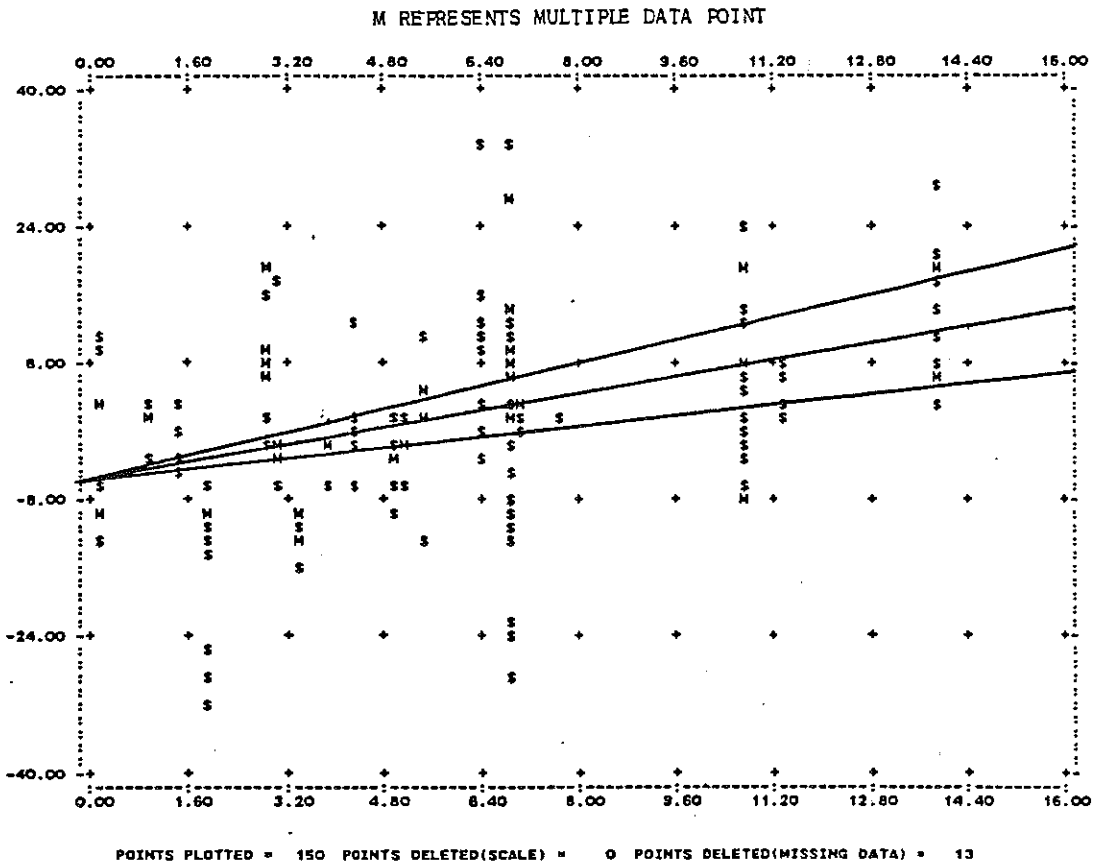
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.28131	0.00000

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	454.3322	454.3322	13.8354	99.972
RESIDUAL	161	5286.9970	32.8385		
TOTAL	162	5741.3291			

Figure B7. Penetration from nominal (mils) vs. age from first exposure to traffic (years), all beams exposed to traffic spray from below.



MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 2
SAMPLE SIZE = 150
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = FFT

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	5.95439	3.71446
2	FFT	2.03353	11.64660

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-5.41045	
1	AGE TE	1.26025	0.40193

STANDARD ERROR OF ESTIMATE = 10.70041
COEFFICIENT OF DETERMINATION = 0.16155
COEFFICIENT OF DETERMINATION (ADJ) = 0.15588
MULTIPLE CORRELATION COEFFICIENT = 0.40193
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.39482

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.23600	0.07527	5.340	100.000

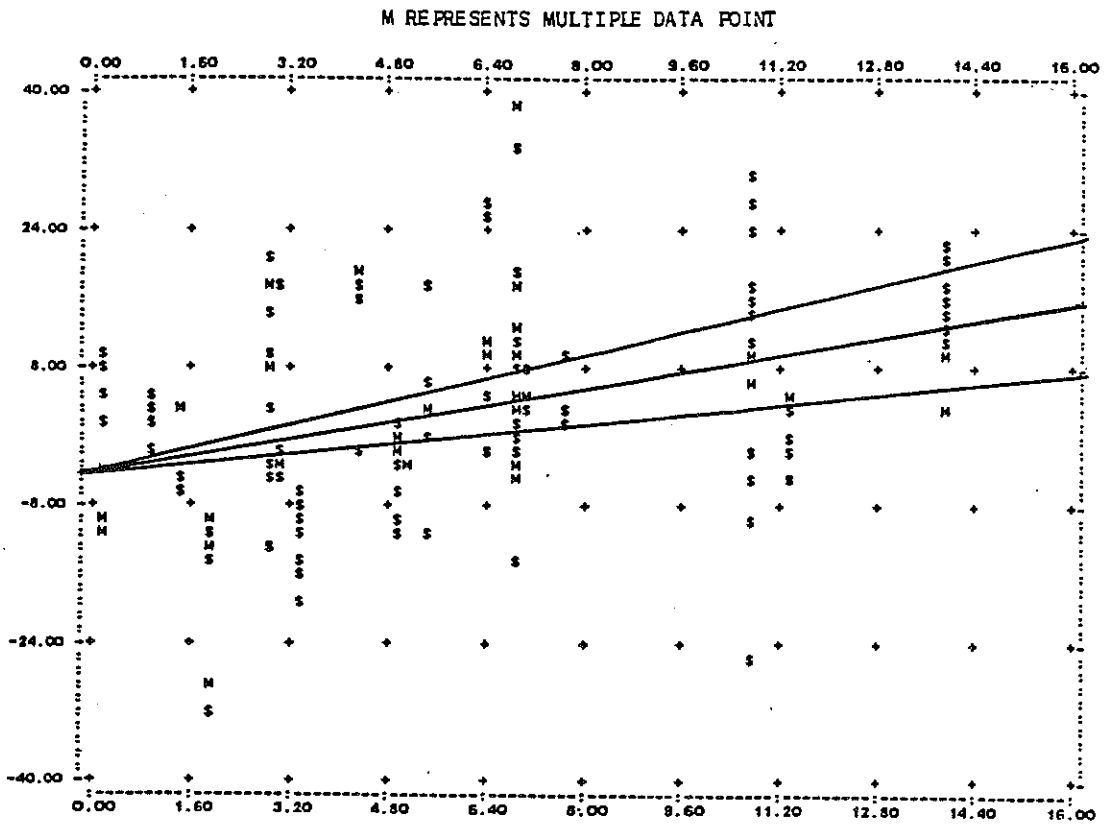
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.40193	0.00000

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	3265.0399	3265.0399	28.5159	100.000
RESIDUAL	148	16945.8267	114.4988		
TOTAL	149	20210.8666			

Figure B8. Penetration from nominal (mils) vs. age from first exposure to traffic (years), all beams exposed to traffic spray from below, upper flange quadrant farthest from oncoming traffic, FFT.



POINTS PLOTTED = 155 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 8

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 3
SAMPLE SIZE = 155
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = NFT

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	6.05967	3.70324
2	NFT	3.53135	12.20268

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-4.26683	
1	AGE TE	1.28690	0.39054

STANDARD ERROR OF ESTIMATE = 11.27025
COEFFICIENT OF DETERMINATION = 0.15253
COEFFICIENT OF DETERMINATION (ADJ) = 0.14699
MULTIPLE CORRELATION COEFFICIENT = 0.39054
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.38339

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.24524	0.07442	5.248	100.000

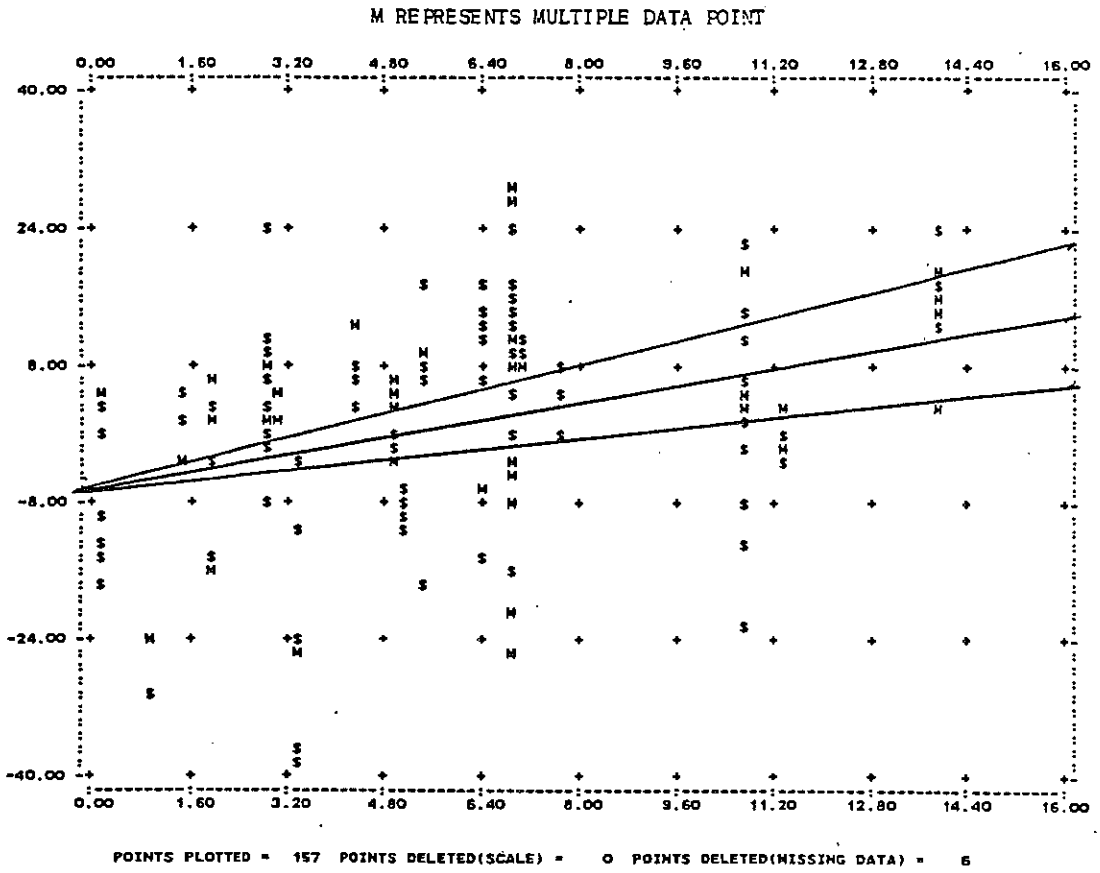
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.39054	2.14636E-12

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	3497.6259	3497.6259	27.5364	100.000
RESIDUAL	153	19433.8230	127.0185		
TOTAL	154	22931.4488			

Figure B9. Penetration from nominal (mils) vs. age from first exposure to traffic (years), all beams exposed to traffic spray from below, upper flange quadrant nearest oncoming traffic, NFT.



POINTS PLOTTED = 157 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 6

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 4
SAMPLE SIZE = 157
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = NFB

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	6.11218	3.72291
2	NFB	1.53885	10.28939

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-6.38008	
1	AGE TE	1.29560	0.36295

STANDARD ERROR OF ESTIMATE = 12.42304
COEFFICIENT OF DETERMINATION = 0.13173
COEFFICIENT OF DETERMINATION (ADJ) = 0.12613
MULTIPLE CORRELATION COEFFICIENT = 0.36295
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.35515

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.26717	0.07464	4.849	100.000

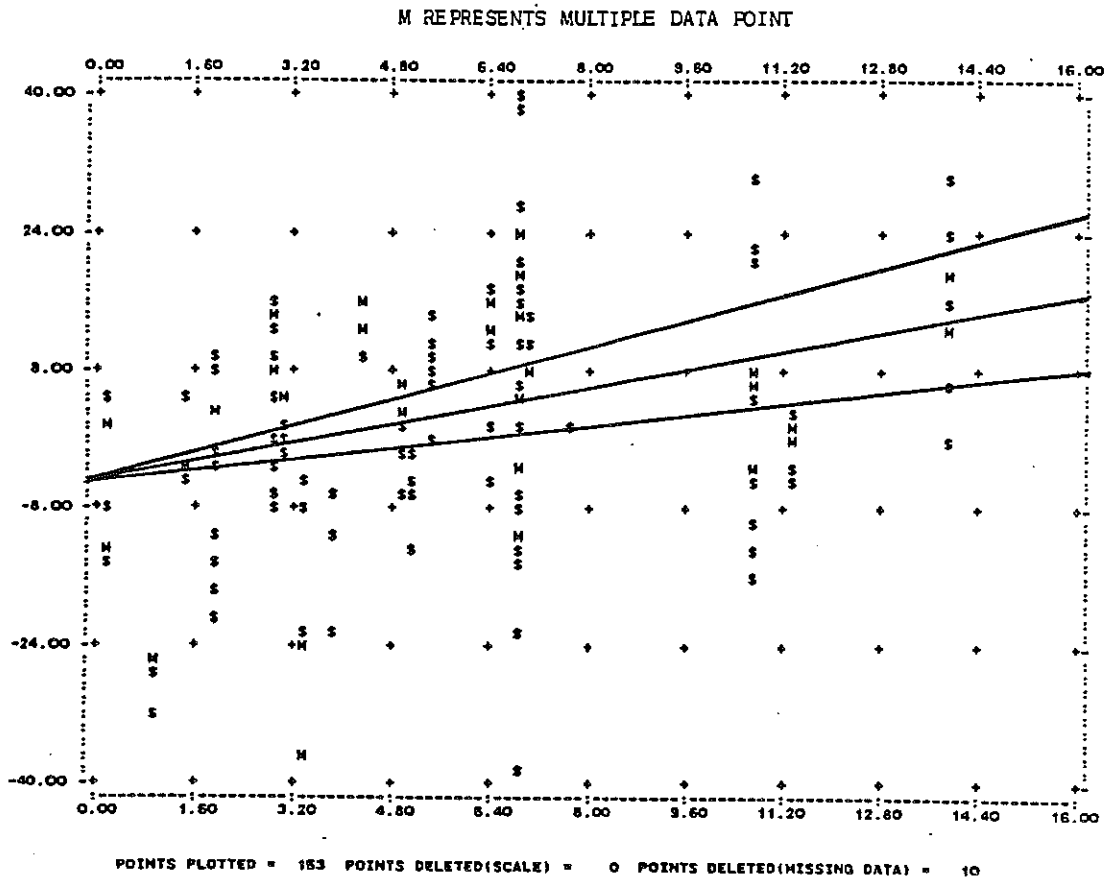
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.36295	2.09497E-12

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	3629.3671	3629.3671	23.5166	100.000
RESIDUAL	155	23921.4671	154.3320		
TOTAL	156	27550.8342			

Figure B10. Penetration from nominal (mils) vs. age from first exposure to traffic (years), all beams exposed to traffic spray from below, lower flange quadrant nearest oncoming traffic, NFB.



POINTS PLOTTED = 153 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 10

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 5
SAMPLE SIZE = 153
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = FFB

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	6.08669	3.77374
2	FFB	2.55379	14.38266

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-6.14883	
1	AGE TE	1.42978	0.37515

STANDARD ERROR OF ESTIMATE = 13.37630
COEFFICIENT OF DETERMINATION = 0.14074
COEFFICIENT OF DETERMINATION (ADJ) = 0.13505
MULTIPLE CORRELATION COEFFICIENT = 0.37515
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.36748

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.28750	0.07544	4.973	100.000

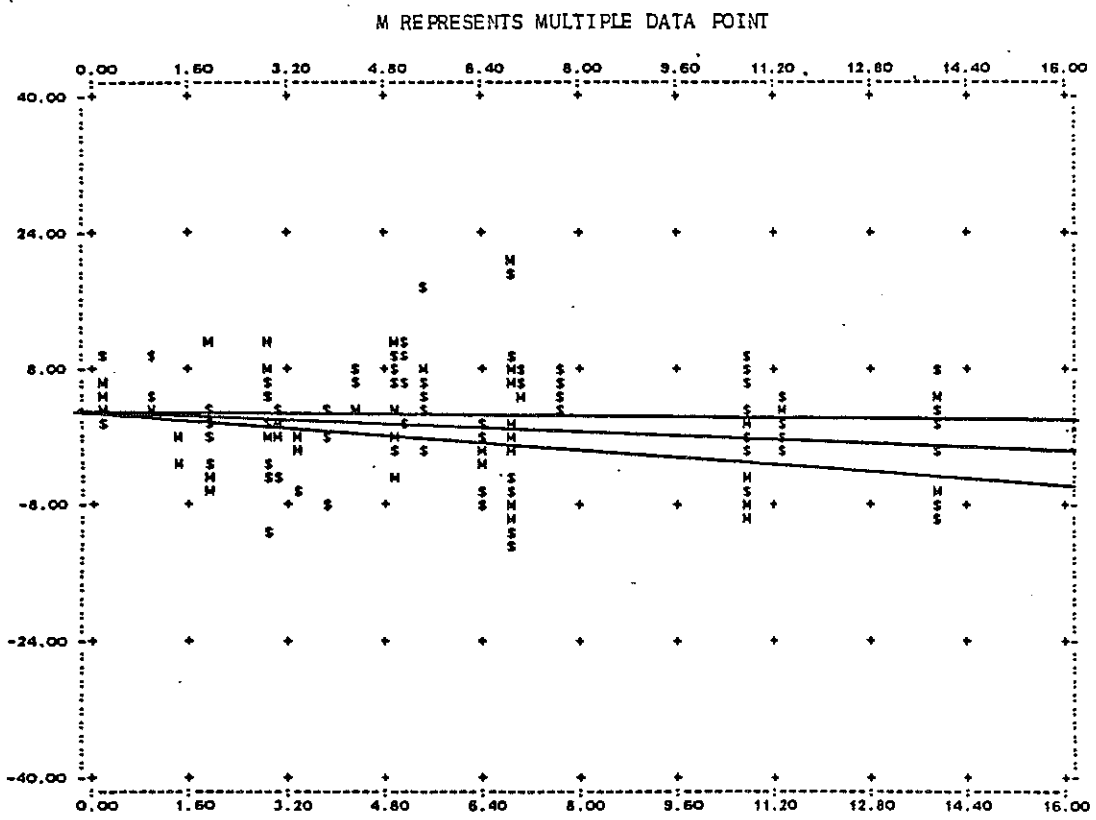
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.37515	3.11691E-12

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	4425.1304	4425.1304	24.7317	100.000
RESIDUAL	151	27017.7402	178.9254		
TOTAL	152	31442.8706			

Figure B11. Penetration from nominal (mils) vs. age from first exposure to traffic (years), all beams exposed to traffic spray from below, lower flange quadrant farthest from oncoming traffic, FFB.



POINTS PLOTTED = 163 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 0

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 6
SAMPLE SIZE = 163
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = WEBM

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	6.08129	3.66916
2	WEBM	1.43926	6.28124

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	3.06801	
1	AGE TE	-0.26799	-0.15655

STANDARD ERROR OF ESTIMATE = 6.22303
COEFFICIENT OF DETERMINATION = 0.02451
COEFFICIENT OF DETERMINATION (ADJ) = 0.01845
MULTIPLE CORRELATION COEFFICIENT = 0.15655
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.13582

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.13326	0.07784	-2.011	95.404

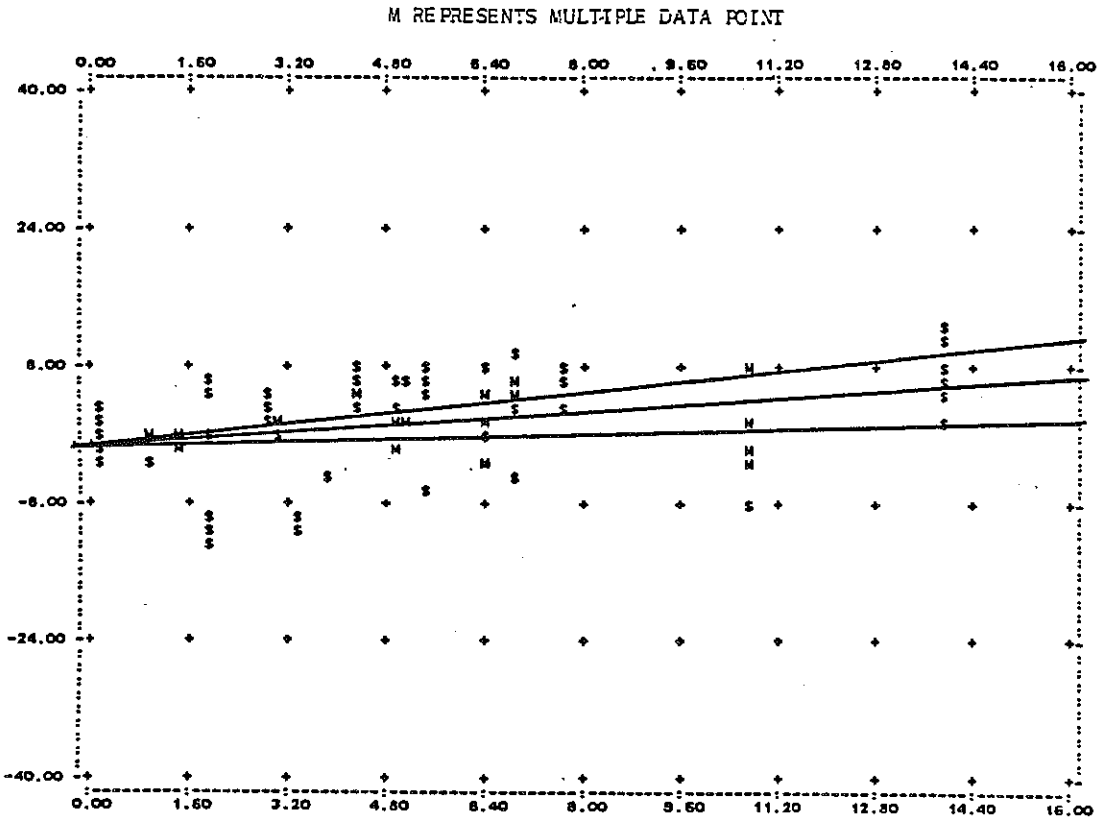
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	-0.15655	-4.66172E-13

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	156.6377	156.6377	4.0448	95.402
RESIDUAL	161	6234.9111	38.7262		
TOTAL	162	6391.5487			

Figure B12. Penetration from nominal (mils) vs. age from first exposure to traffic (years), all beams exposed to traffic spray from below, middle 1/3 of web, WEBM.



POINTS PLOTTED = 80 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 0

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 1
SAMPLE SIZE = 80
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = CORATE

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	5.69248	3.73455
2	CORATE	1.75662	5.22406

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-1.14528	
1	AGE TE	0.50978	0.36443

STANDARD ERROR OF ESTIMATE = 4.69589
COEFFICIENT OF DETERMINATION = 0.13281
COEFFICIENT OF DETERMINATION (ADJ) = 0.12169
MULTIPLE CORRELATION COEFFICIENT = 0.36443
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.34884

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.14750	0.10544	3.456	99.812

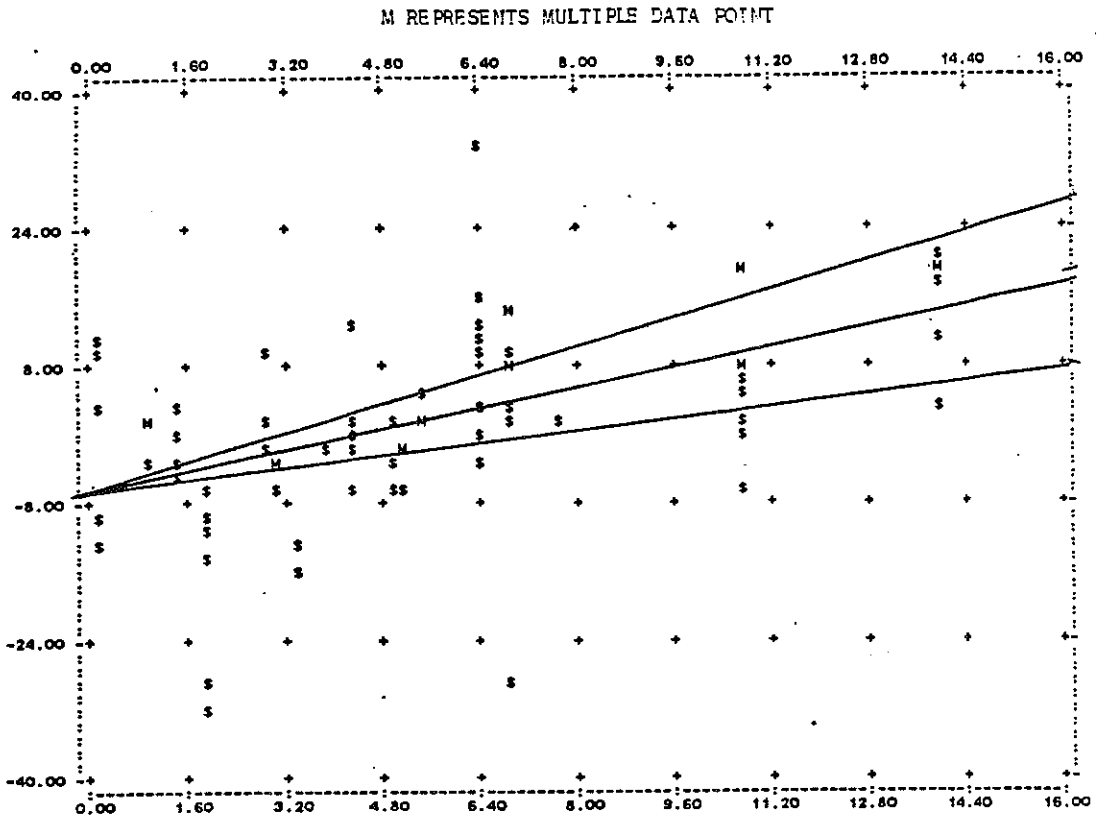
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.36443	4.19513E-12

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	286.3305	286.3305	11.9458	99.911
RESIDUAL	78	1869.6393	23.9697		
TOTAL	79	2155.8698			

Figure B13. Penetration from nominal (mils) vs. age from first exposure to traffic (years), first 3 beams exposed to traffic spray from below, whole beam.



POINTS PLOTTED = 74 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 6.

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 2
SAMPLE SIZE = 74
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = FFT

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	5.67296	3.86672
2	FFT	1.83149	11.33340

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-6.75097	
1	AGE TE	1.51287	0.51616

STANDARD ERROR OF ESTIMATE = 8.77415
COEFFICIENT OF DETERMINATION = 0.26642
COEFFICIENT OF DETERMINATION (ADJ) = 0.25623
MULTIPLE CORRELATION COEFFICIENT = 0.51616
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.50618

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.29585	0.10094	5.114	100.000

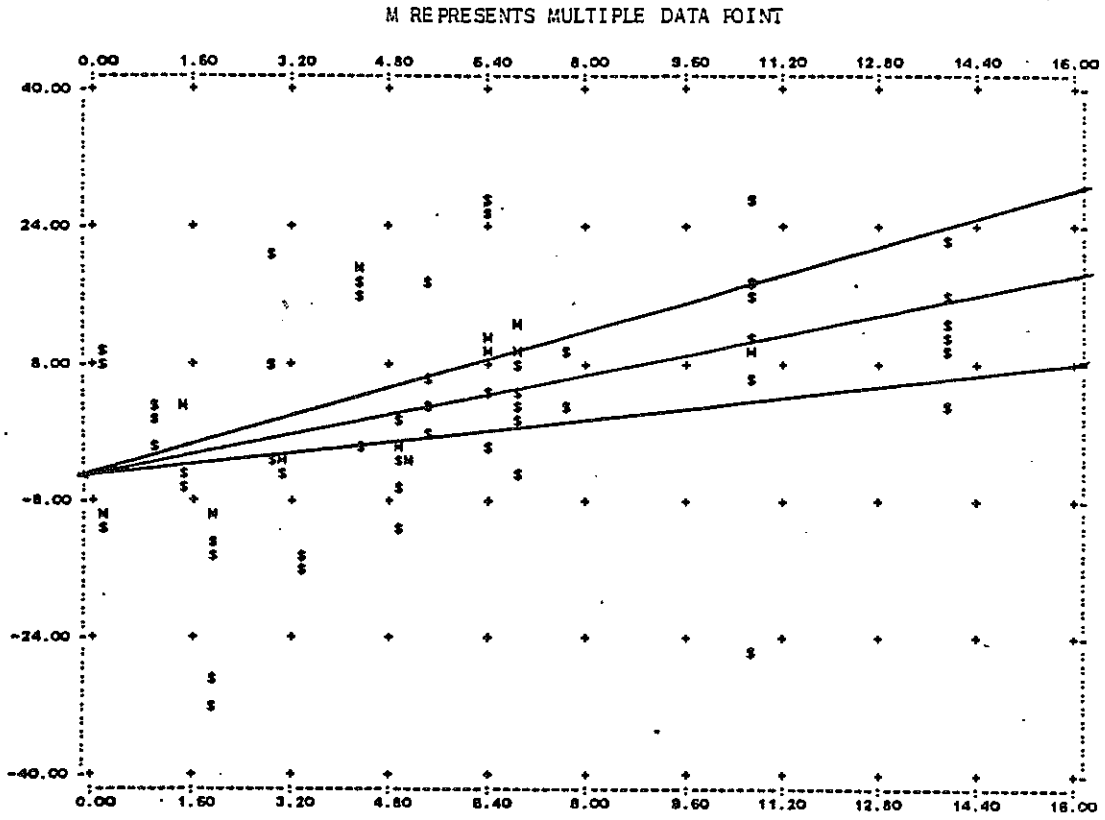
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.51616	-2.47961E-12

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	2498.1160	2498.1160	26.1490	100.000
RESIDUAL	72	6878.4465	95.5340		
TOTAL	73	9376.5625			

Figure B14. Penetration from nominal (mils) vs. age from first exposure to traffic (years), first 3 beams exposed to traffic spray from below, upper flange quadrant farthest from oncoming traffic, FFT.



POINTS PLOTTED = 77 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 3

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 3
SAMPLE SIZE = 77
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = NFT

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	5.69749	3.79388
2	NFT	3.38325	12.07905

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-5.08759	
1	AGE TE	1.48676	0.46697

STANDARD ERROR OF ESTIMATE =	10.75212
COEFFICIENT OF DETERMINATION =	0.21807
COEFFICIENT OF DETERMINATION (ADJ) =	0.20764
MULTIPLE CORRELATION COEFFICIENT =	0.46697
MULTIPLE CORRELATION COEFFICIENT (ADJ) =	0.45567

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.32509	0.10211	4.573	99.998

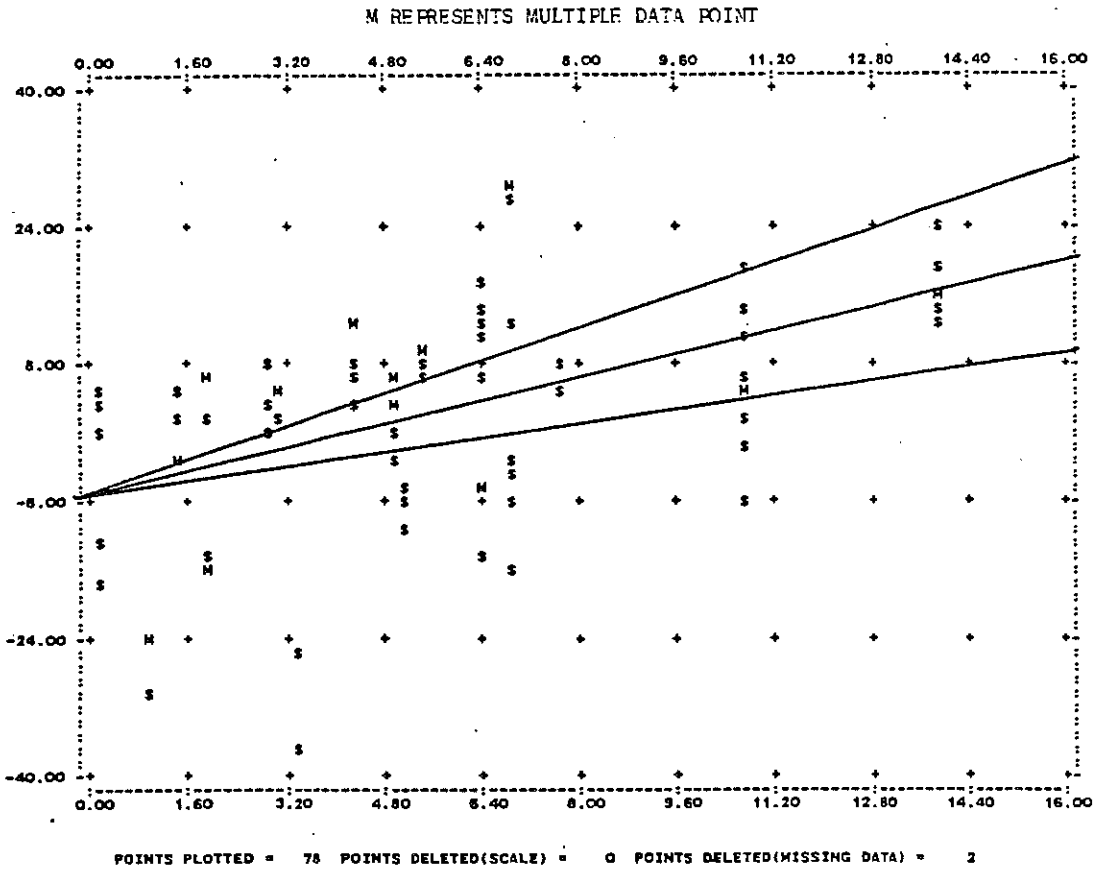
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.46697	6.9788E-12

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	2418.0510	2418.0510	20.9159	99.998
RESIDUAL	75	8670.6132	115.6082		
TOTAL	76	11088.6643			

Figure B15. Penetration from nominal (mils) vs. age from first exposure to traffic (years), first 3 beams exposed to traffic spray from below, upper flange quadrant nearest oncoming traffic, NFT.



POINTS PLOTTED = 78 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 2

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 4
SAMPLE SIZE = 78
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = NFB

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	5.68992	3.76976
2	NFB	2.37897	13.45509

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-7.56724	
1	AGE TE	1.74604	0.48975

STANDARD ERROR OF ESTIMATE = 11.80789
COEFFICIENT OF DETERMINATION = 0.23986
COEFFICIENT OF DETERMINATION (ADJ) = 0.22986
MULTIPLE CORRELATION COEFFICIENT = 0.48975
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.47943

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.35695	0.10001	4.897	99.999

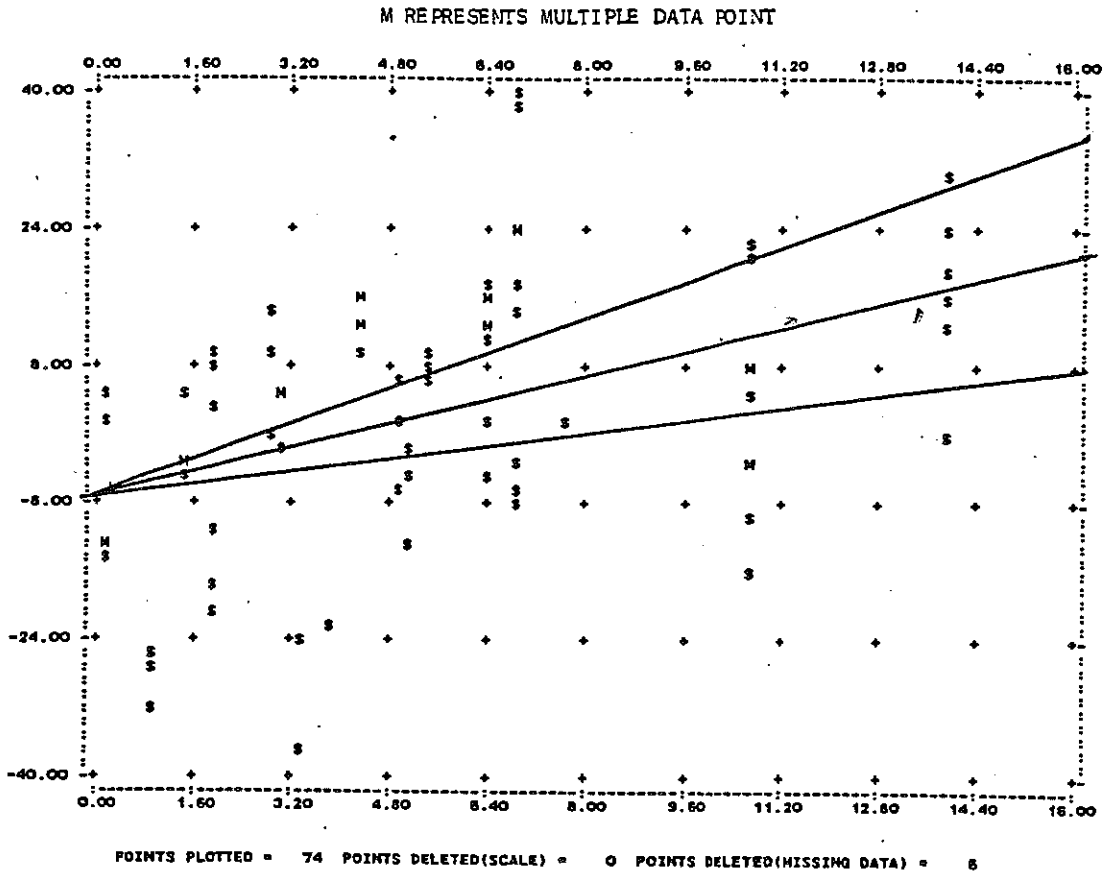
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.48975	4.78593E-12

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	3343.6457	3343.6457	23.9815	99.999
RESIDUAL	76	10596.3946	139.4262		
TOTAL	77	13940.0403			

Figure B16. Penetration from nominal (mils) vs. age from first exposure to traffic (years), first 3 beams exposed to traffic spray from below, lower flange quadrant nearest oncoming traffic, NFB.



POINTS PLOTTED = 74 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 5

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 5
SAMPLE SIZE = 74
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = FFB

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	5.67296	3.86672
2	FFB	3.14892	15.48839

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-7.06048	
1	AGE TE	1.79966	0.44929

STANDARD ERROR OF ESTIMATE = 13.93287
COEFFICIENT OF DETERMINATION = 0.20186
COEFFICIENT OF DETERMINATION (ADJ) = 0.19078
MULTIPLE CORRELATION COEFFICIENT = 0.44929
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.43678

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.42173	0.10529	4.267	99.994

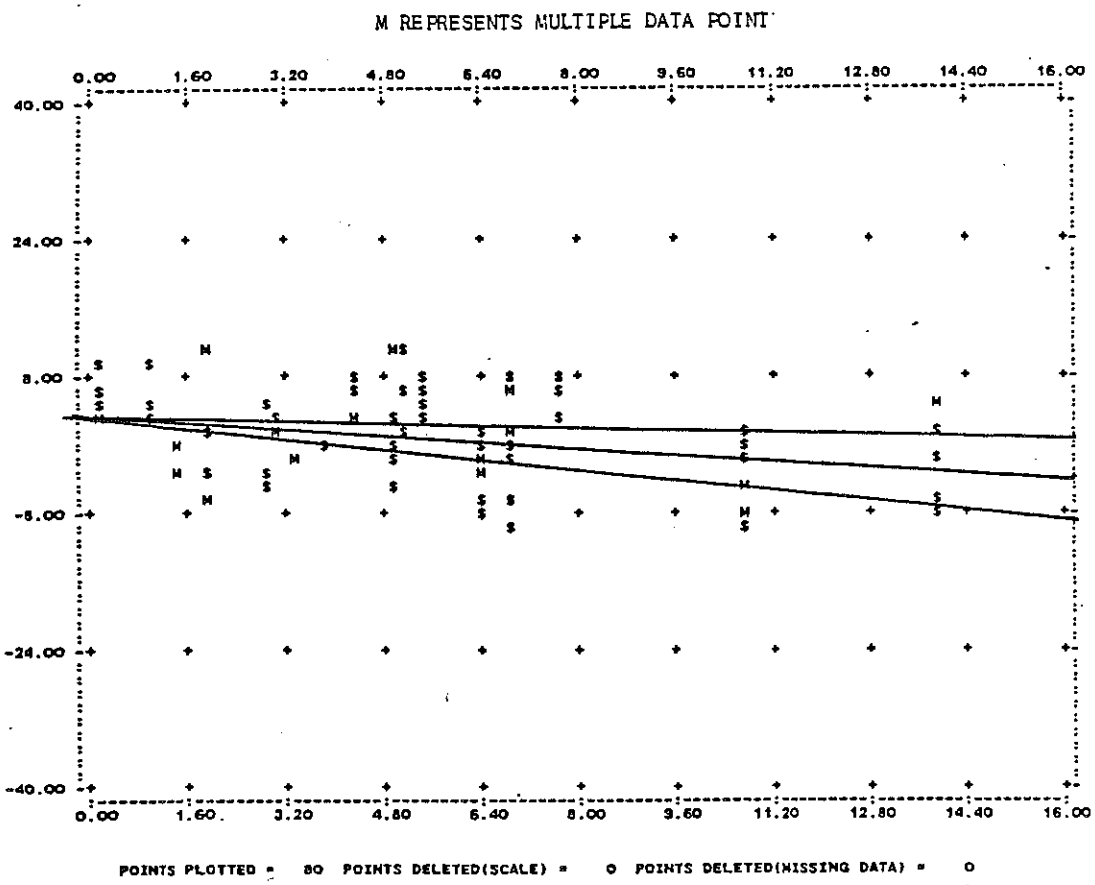
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.44929	2.27904E-12

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	3535.0052	3535.0052	18.2100	99.994
RESIDUAL	72	13976.9853	194.1248		
TOTAL	73	17511.9905			

Figure B17. Penetration from nominal (mils) vs. age from first exposure to traffic (years), first 3 beams exposed to traffic spray from below, lower flange quadrant farthest from oncoming traffic, FFB.



MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 8
SAMPLE SIZE = 80
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = WEBM

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	5.69248	3.73455
2	WEBM	1.11625	5.33459

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	3.78607	
1	AGE TE	-0.46901	-0.32833

STANDARD ERROR OF ESTIMATE = 5.07104
COEFFICIENT OF DETERMINATION = 0.10780
COEFFICIENT OF DETERMINATION (ADJ) = 0.09637
MULTIPLE CORRELATION COEFFICIENT = 0.32833
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.31043

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.15277	0.10695	-3.070	99.708

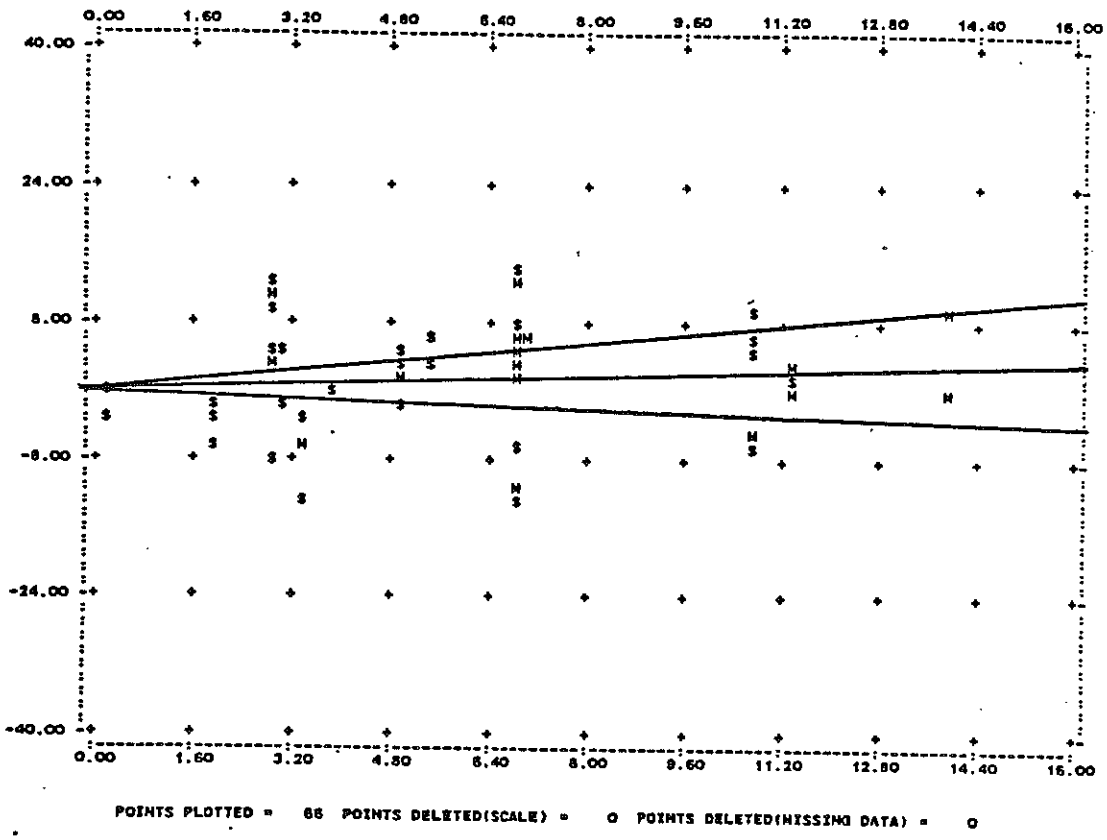
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	-0.32833	3.05817E-12

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	242.3612	242.3612	9.4247	99.705
RESIDUAL	78	2005.8077	25.7155		
TOTAL	79	2248.1689			

Figure B18. Penetration from nominal (mils) vs. age from first exposure to traffic (years), first 3 beams exposed to traffic spray from below, middle 1/3 of web, WEBM.



MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 1
SAMPLE SIZE = 66
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = CORATE

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	8.60333	3.51133
2	CORATE	1.95242	6.65176

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	0.51720	
1	AGE TE	0.21735	0.11474

STANDARD ERROR OF ESTIMATE = 6.65926
COEFFICIENT OF DETERMINATION = 0.01316
COEFFICIENT OF DETERMINATION (ADJ) = 0.00000
MULTIPLE CORRELATION COEFFICIENT = 0.11474
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.00000

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.23623	0.12417	0.924	64.114

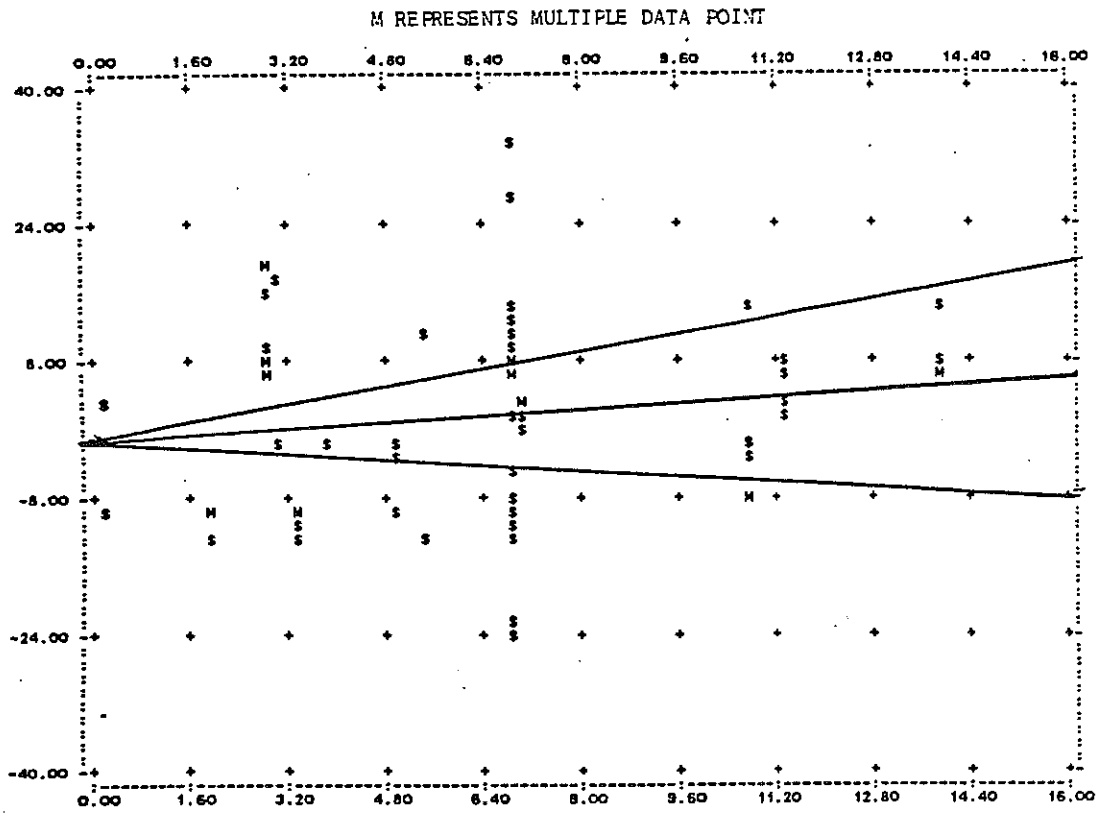
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.11474	4.320136-13

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	37.8602	37.8602	0.8538	64.104
RESIDUAL	64	2838.1246	44.3457		
TOTAL	65	2875.8648			

Figure B19. Penetration from nominal (mils) vs. age from first exposure to traffic (years), fifth or later beams exposed to traffic spray from below, whole beam.



POINTS PLOTTED = 61 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 5

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 2
SAMPLE SIZE = 61
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = FFT

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	6.43405	3.48908
2	FFT	1.97246	11.39635

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-1.11863	
1	AGE TE	0.48043	0.14709

STANDARD ERROR OF ESTIMATE = 11.36752
COEFFICIENT OF DETERMINATION = 0.02163
COEFFICIENT OF DETERMINATION (ADJ) = 0.00505
MULTIPLE CORRELATION COEFFICIENT = 0.14709
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.07106

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.42061	0.12877	1.142	74.217

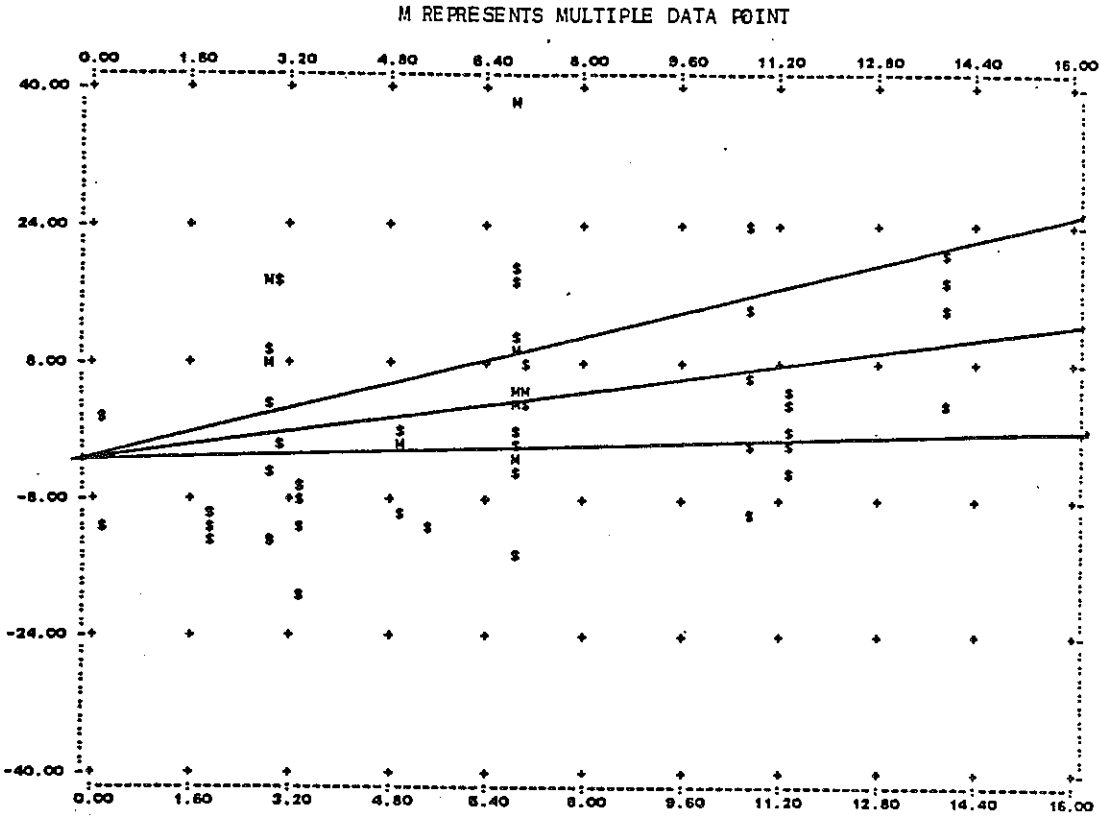
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.14709	2.32402E-13

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	168.5884	168.5884	1.3047	74.202
RESIDUAL	59	7624.0135	129.2206		
TOTAL	60	7792.6019			

Figure B20. Penetration from nominal (mils) vs. age from first exposure to traffic (years), fifth or later beams exposed to traffic spray from below, upper flange quadrant farthest from oncoming traffic, FFT.



POINTS PLOTTED = 62. POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 4

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 3
SAMPLE SIZE = 62
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = NFT

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	6.52185	3.51120
2	NFT	3.40613	11.80128

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-3.25949	
1	AGE TE	1.02204	0.30409

STANDARD ERROR OF ESTIMATE = 11.33573
COEFFICIENT OF DETERMINATION = 0.09247
COEFFICIENT OF DETERMINATION (ADJ) = 0.07734
MULTIPLE CORRELATION COEFFICIENT = 0.30409
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.27810

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.41338	0.12299	2.473	98.383

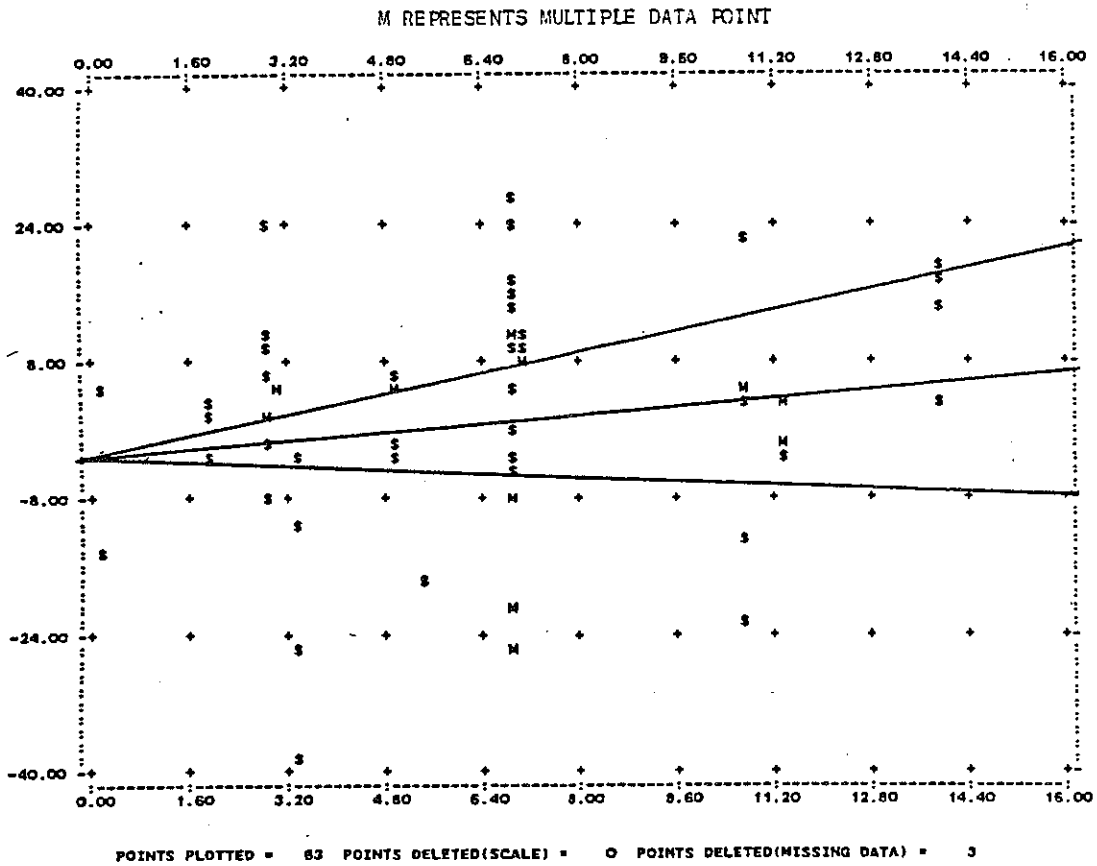
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.30409	1.50324E-12

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	785.5577	785.5577	6.1133	98.373
RESIDUAL	60	7709.9254	128.4988		
TOTAL	61	8495.4831			

Figure B21. Penetration from nominal (mils) vs. age from first exposure to traffic (years), fifth or later beams exposed to traffic spray from below, upper flange quadrant nearest oncoming traffic, NFT.



POINTS PLOTTED = 63 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 3

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 4
SAMPLE SIZE = 63
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = NFB

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	6.66049	3.57473
2	NFB	1.03762	13.32023

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-3.22722	
1	AGE TE	0.64032	0.17184

STANDARD ERROR OF ESTIMATE = 13.22921
COEFFICIENT OF DETERMINATION = 0.02953
COEFFICIENT OF DETERMINATION (ADJ) = 0.01362
MULTIPLE CORRELATION COEFFICIENT = 0.17184
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.11671

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.47000	0.12613	1.362	82.208

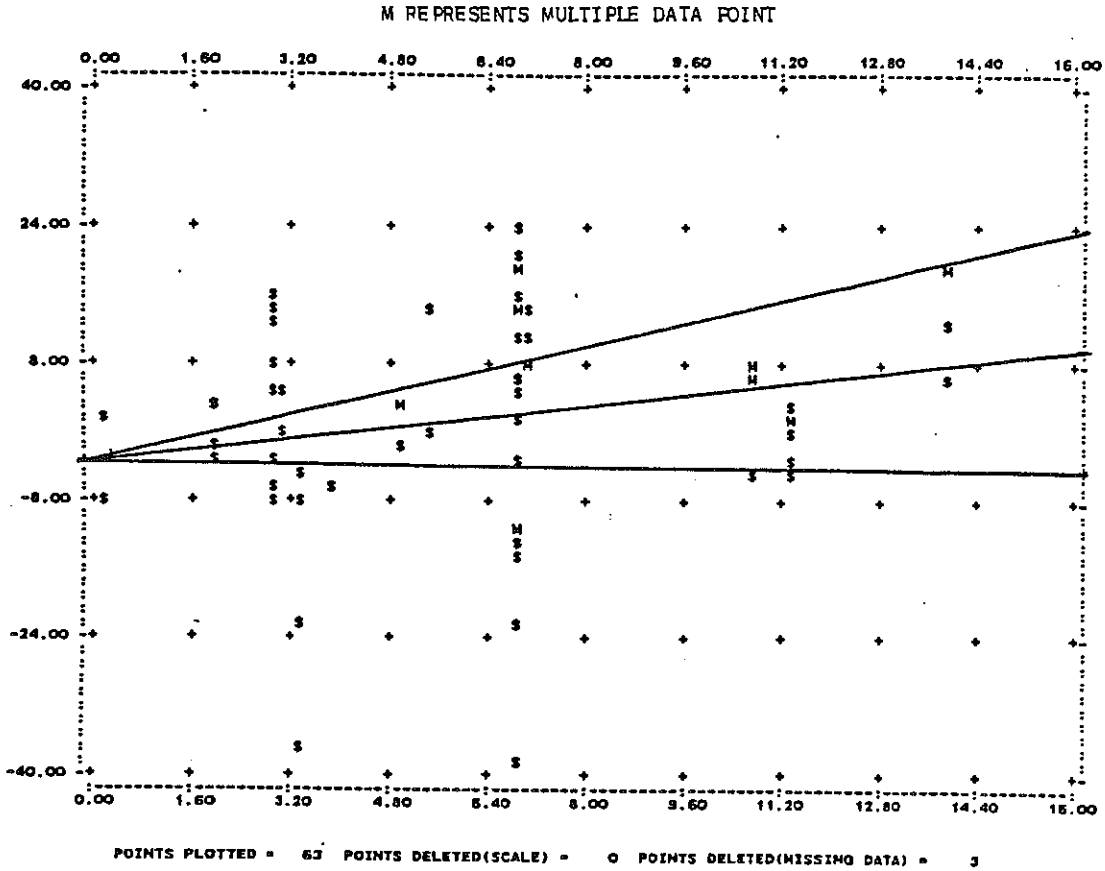
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.17184	0.00000

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	324.8422	324.8422	1.8561	82.192
RESIDUAL	61	10675.7292	175.0120		
TOTAL	62	11000.5713			

Figure B22. Penetration from nominal (mils) vs. age from first exposure to traffic (years), fifth or later beams exposed to traffic spray from below, lower flange quadrant nearest oncoming traffic, NFB..



POINTS PLOTTED = 63 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 3

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 5
SAMPLE SIZE = 63
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = FFB

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	8.65330	3.58153
2	FFB	2.25444	12.62164

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-3.24420	
1	AGE TE	0.82645	0.23452

STANDARD ERROR OF ESTIMATE = 12.36982
COEFFICIENT OF DETERMINATION = 0.05500
COEFFICIENT OF DETERMINATION (ADJ) = 0.03951
MULTIPLE CORRELATION COEFFICIENT = 0.23452
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.19876

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.43883	0.12447	1.884	93.584

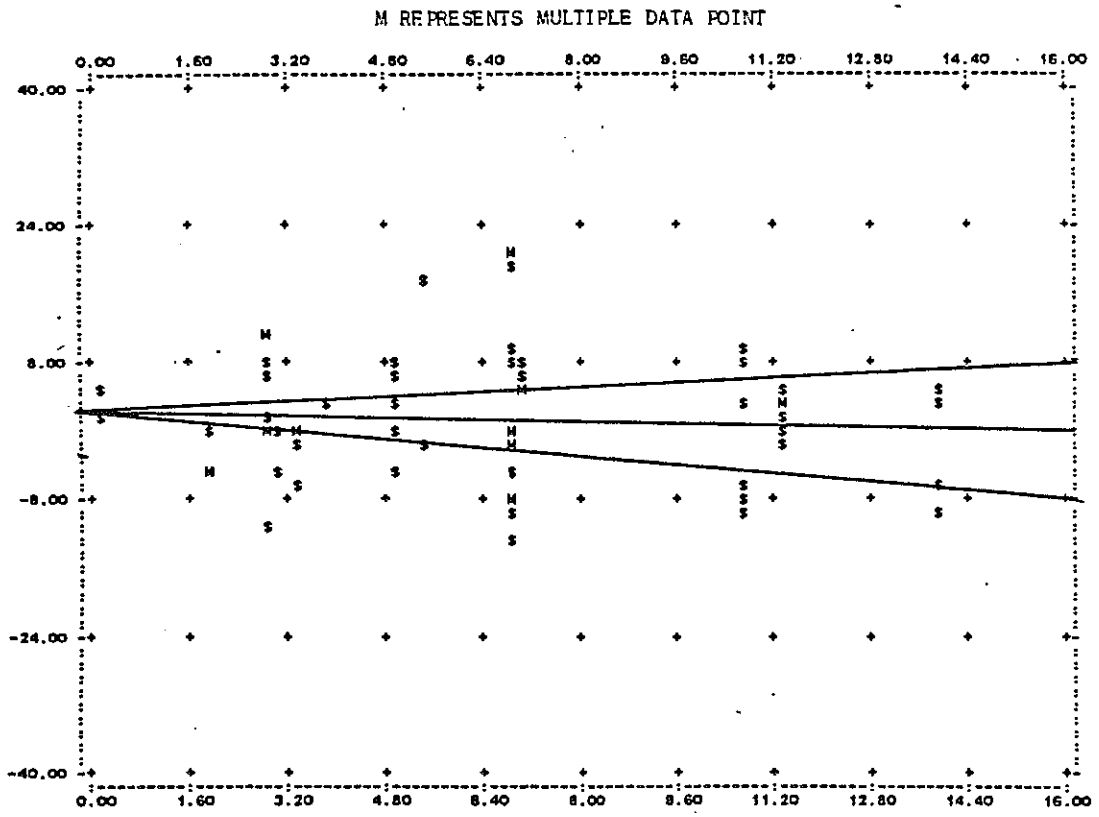
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.23452	0.00000

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	543.2087	543.2087	3.5501	93.569
RESIDUAL	61	9333.7575	153.0124		
TOTAL	62	9876.9662			

Figure B23. Penetration from nominal (mils) vs. age from first exposure to traffic (years), fifth or later beams exposed to traffic spray from below, lower flange quadrant farthest from oncoming traffic, FFB.



POINTS PLOTTED = 68 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 0

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 8
SAMPLE SIZE = 66
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = WEBM

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	6.60323	3.51133
2	WEBM	1.37424	7.39335

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	2.13799	
1	AGE TE	-0.11566	-0.05493

STANDARD ERROR OF ESTIMATE = 7.43964
COEFFICIENT OF DETERMINATION = 0.00302
COEFFICIENT OF DETERMINATION (ADJ) = 0.00000
MULTIPLE CORRELATION COEFFICIENT = 0.05493
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.00000

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.26280	0.12481	-0.440	33.871

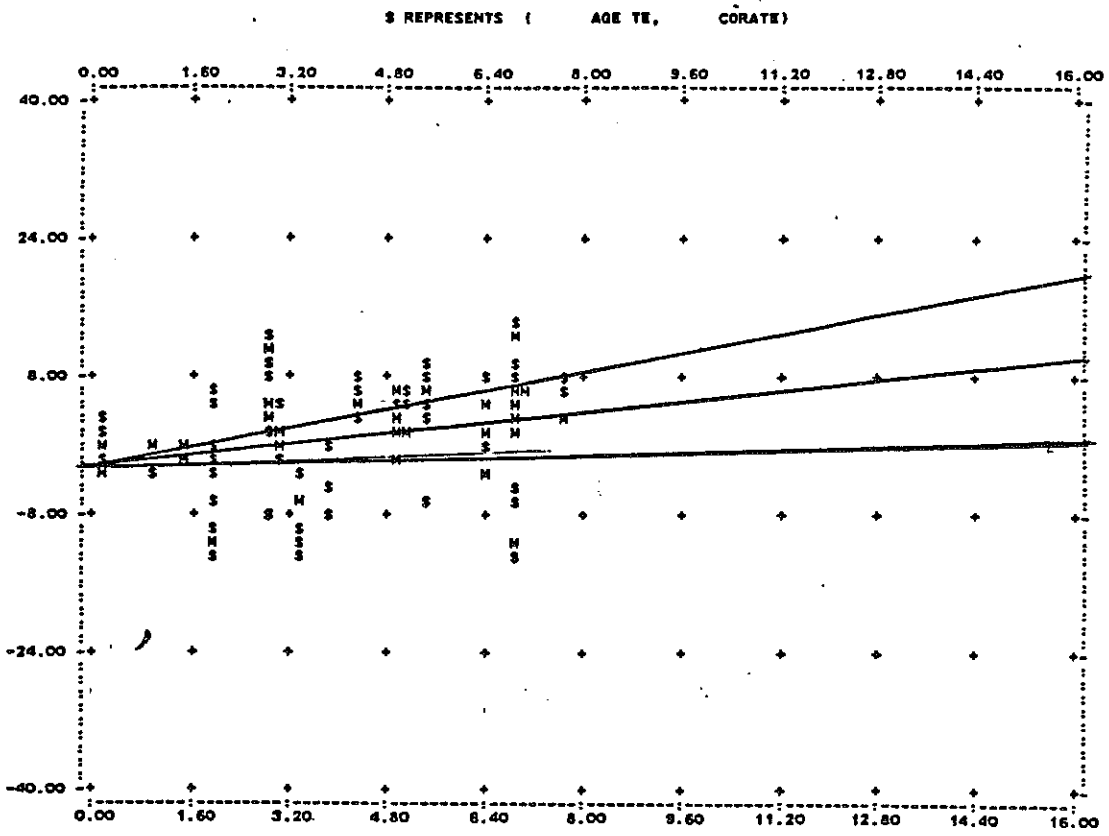
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	-0.05493	0.00000

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	10.7211	10.7211	0.1937	33.867
RESIDUAL	64	3542.2851	55.3482		
TOTAL	65	3553.0062			

Figure B24. Penetration from nominal (mils) vs. age from first exposure to traffic (years), fifth or later beams exposed to traffic spray from below, middle 1/3 of web, WEBM.



POINTS PLOTTED = 128 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 0

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 1
SAMPLE SIZE = 128
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = CORATE

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	4.50506	2.22930
2	CORATE	1.59875	6.03238

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-2.27990	
1	AGE TE	0.86095	0.31817

STANDARD ERROR OF ESTIMATE = 5.74155
COEFFICIENT OF DETERMINATION = 0.10123
COEFFICIENT OF DETERMINATION (ADJ) = 0.09410
MULTIPLE CORRELATION COEFFICIENT = 0.31817
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.30676

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.22854	0.08446	3.767	99.975

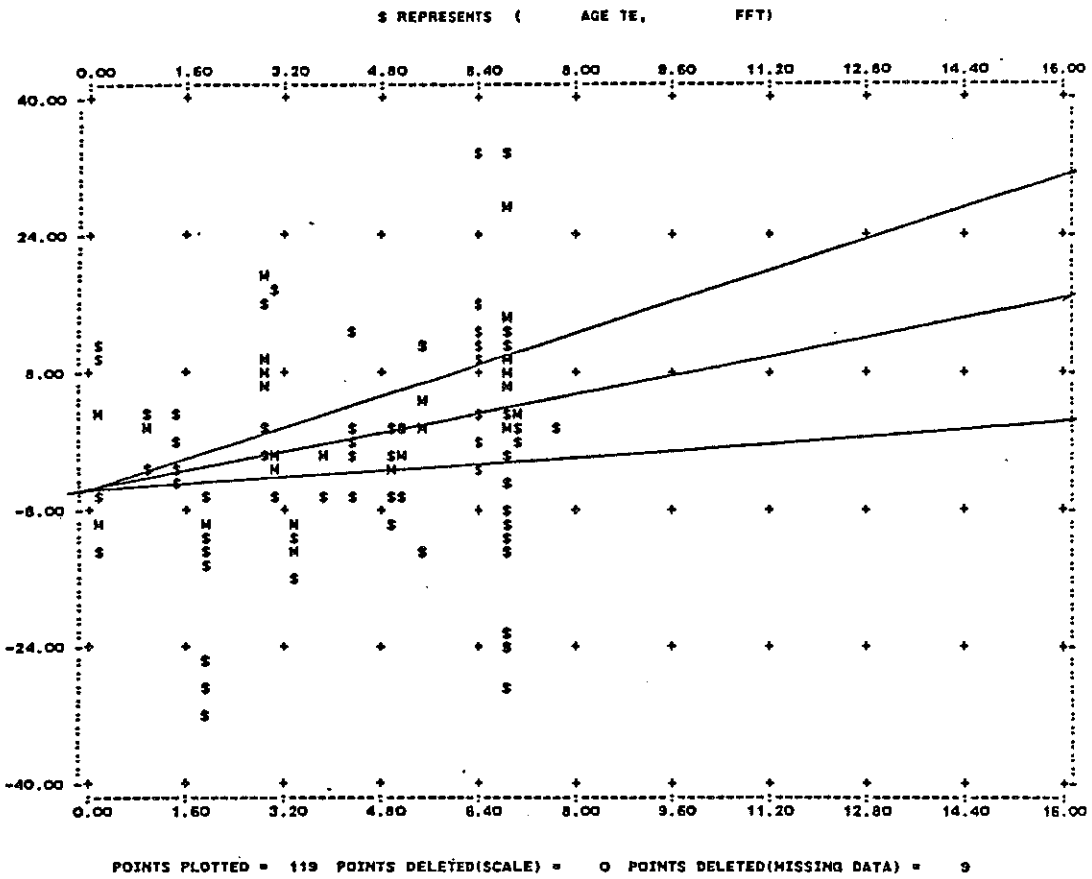
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.31817	3.28873E-12

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	467.8445	467.8445	14.1920	99.975
RESIDUAL	126	4153.6386	32.9654		
TOTAL	127	4621.4830			

Figure B25. Penetration from nominal (mils) vs. age from first exposure to traffic (years), all beams exposed to traffic spray from below for less than 8 years, whole beam.



MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 2
SAMPLE SIZE = 119
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = FFT

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	4.39950	2.24917
2	FFT	0.36983	11.56950

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-6.00802	
1	AGE TE	1.44967	0.28162

STANDARD ERROR OF ESTIMATE = 11.14788
COEFFICIENT OF DETERMINATION = 0.07942
COEFFICIENT OF DETERMINATION (ADJ) = 0.07156
MULTIPLE CORRELATION COEFFICIENT = 0.28182
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.26750

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.45628	0.08870	3.177	99.811

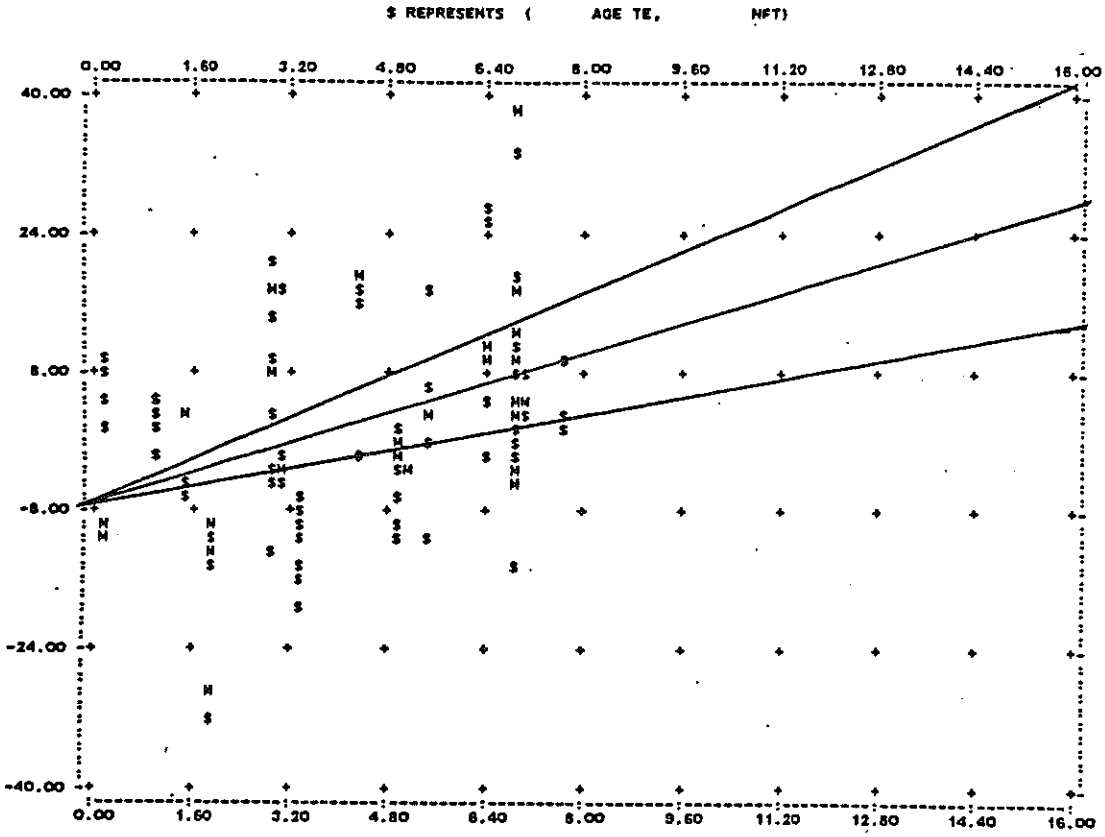
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.28162	0.00000

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	1254.4878	1254.4878	10.0944	99.810
RESIDUAL	117	14540.2124	124.2753		
TOTAL	118	15794.7002			

Figure B26. Penetration from nominal (mils) vs. age from first exposure to traffic (years), all beams exposed to traffic spray from below for less than 8 years, upper flange quadrant farthest from oncoming traffic.



POINTS PLOTTED = 122 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 8

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 3
SAMPLE SIZE = 122
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = NFT

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	4.48162	2.26017
2	NFT	2.15738	12.14673

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-7.76048	
1	AGE TE	2.21291	0.41176

STANDARD ERROR OF ESTIMATE = 11.11525
COEFFICIENT OF DETERMINATION = 0.16955
COEFFICIENT OF DETERMINATION (ADJ) = 0.16263
MULTIPLE CORRELATION COEFFICIENT = 0.41176
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.40327

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.44708	0.08319	4.950	100.000

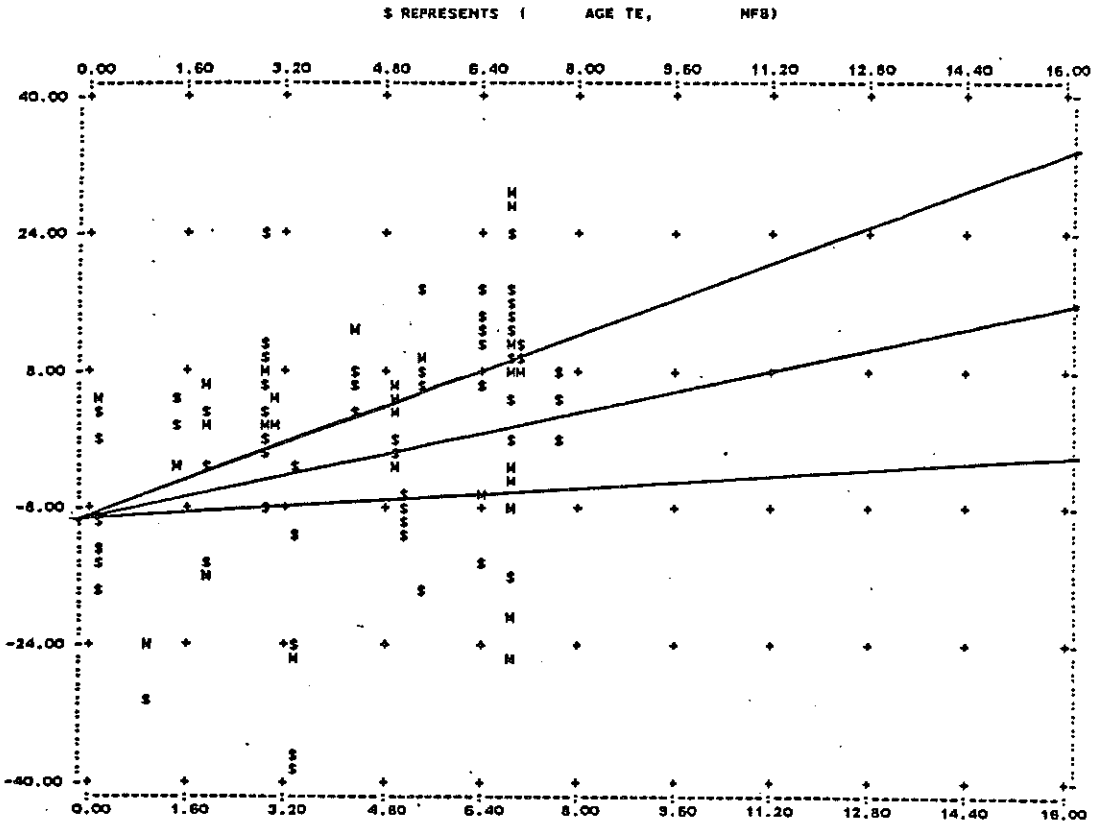
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.41176	0.00000

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	3026.8668	3026.8668	24.4934	100.000
RESIDUAL	120	14825.8470	123.5487		
TOTAL	121	17852.7138			

Figure B27. Penetration from nominal (mils) vs. age from first exposure to traffic (years), all beams exposed to traffic spray from below for less than 8 years, upper flange quadrant nearest oncoming traffic.



POINTS PLOTTED = 122 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 6

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 4
SAMPLE SIZE = 122
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = NFB

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	4.46730	2.25031
2	NFB	0.09484	13.73116

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-9.03837	
1	AGE TE	2.05789	0.33725

STANDARD ERROR OF ESTIMATE = 12.98044
COEFFICIENT OF DETERMINATION = 0.11374
COEFFICIENT OF DETERMINATION (ADJ) = 0.10635
MULTIPLE CORRELATION COEFFICIENT = 0.33725
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.32612

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.52439	0.08594	3.924	99.986

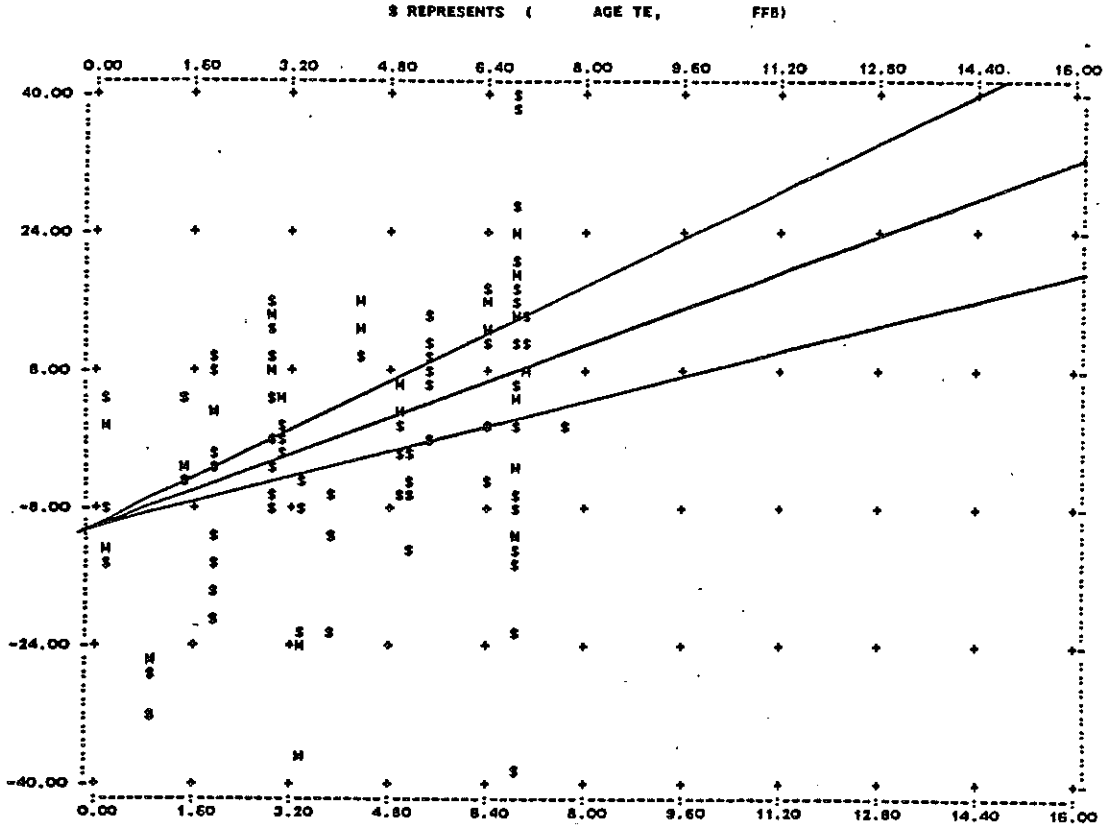
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.33725	1.28277E-12

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	2594.8561	2594.8561	15.4005	99.985
RESIDUAL	120	20219.0310	168.4919		
TOTAL	121	22813.8870			

Figure B28. Penetration from nominal (mils) vs. age from first exposure to traffic (years), all beams exposed to traffic spray from below for less than 8 years, lower flange quadrant nearest oncoming traffic.



POINTS PLOTTED = 118 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 10

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 5
SAMPLE SIZE = 118
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = FFB

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	4.37849	2.24700
2	FFB	1.15712	14.87082

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-10.68538	
1	AGE TE	2.70493	0.40872

STANDARD ERROR OF ESTIMATE = 13.63039
COEFFICIENT OF DETERMINATION = 0.16705
COEFFICIENT OF DETERMINATION (ADJ) = 0.15987
MULTIPLE CORRELATION COEFFICIENT = 0.40872
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.39984

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.56081	0.08474	4.823	100.000

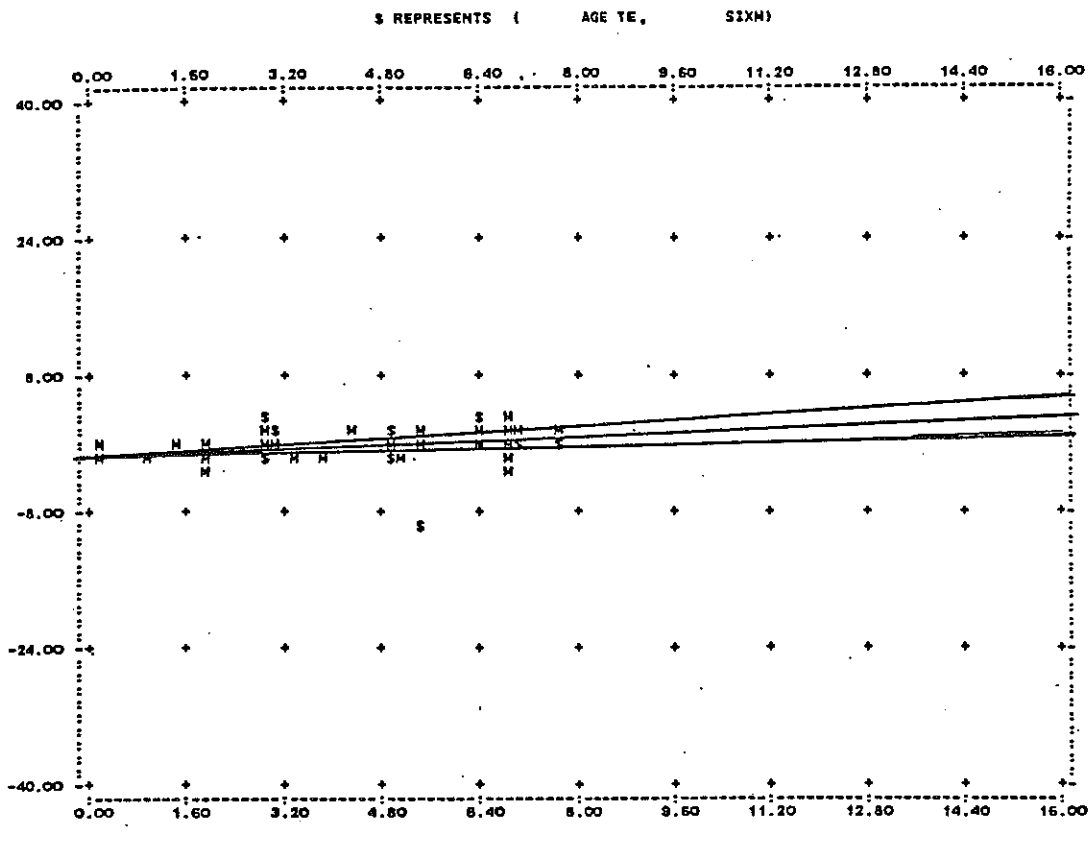
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.40872	4.36758E-13

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	4322.1740	4322.1740	23.2641	100.000
RESIDUAL	116	21551.3551	185.7875		
TOTAL	117	25873.5290			

Figure B29. Penetration from nominal (mils) vs. age from first exposure to traffic (years), all beams exposed to traffic spray from below for less than 8 years, lower flange quadrant farthest from oncoming traffic.



POINTS PLOTTED = 128 POINTS DELETED(SCALE) = 0 POINTS DELETED(MISSING DATA) = 0

MULTIPLE LINEAR REGRESSION ANALYSIS

PROBLEM NUMBER = 14
SAMPLE SIZE = 128
INDEPENDENT VARIABLES = 1

DEPENDENT VARIABLE = SIXH

VAR	LABEL	MEAN	STD DEVIATION
1	AGE TE	4.50506	2.22930
2	SIXH	0.09959	1.68210

REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-1.13476	
1	AGE TE	0.27399	0.36312

STANDARD ERROR OF ESTIMATE = 1.57348
COEFFICIENT OF DETERMINATION = 0.13186
COEFFICIENT OF DETERMINATION (ADJ) = 0.12497
MULTIPLE CORRELATION COEFFICIENT = 0.36312
MULTIPLE CORRELATION COEFFICIENT (ADJ) = 0.35351

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE TE	0.06263	0.06301	4.375	99.998

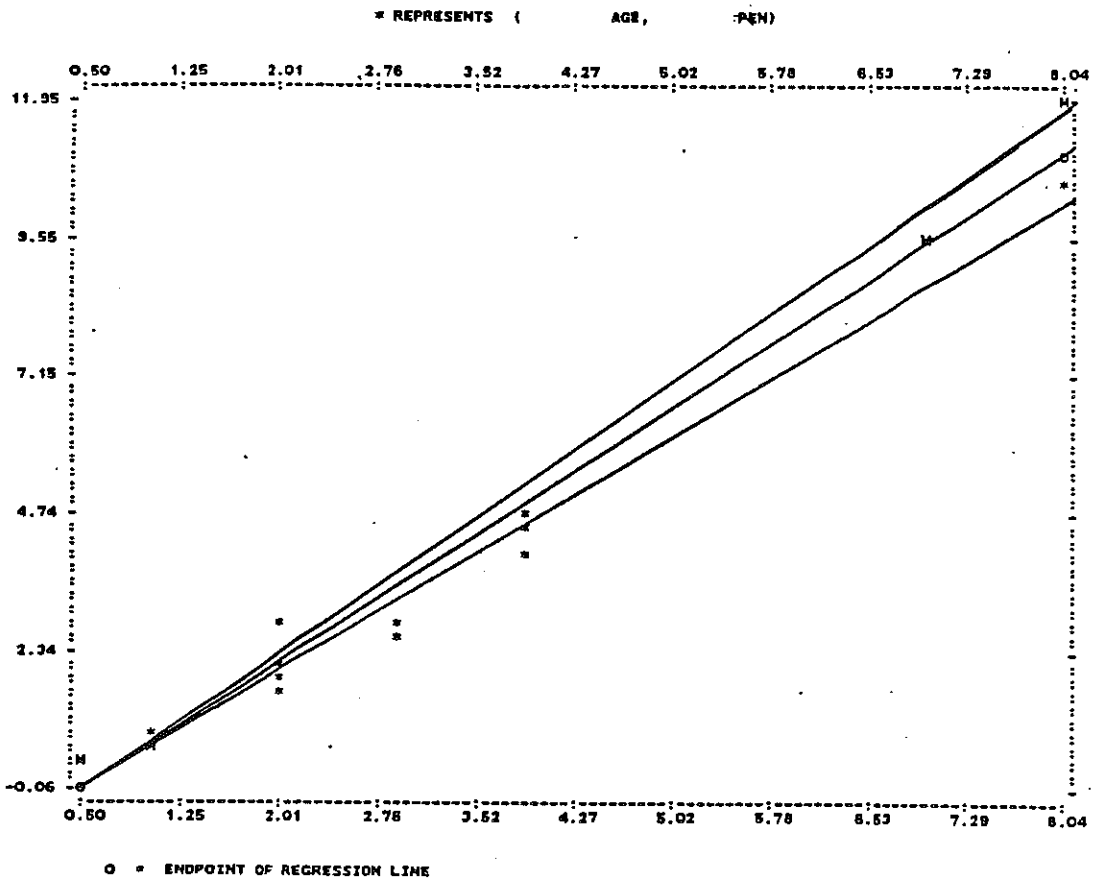
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE TE	0.36312	2.09527E-12

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	47.3824	47.3824	19.1378	99.997
RESIDUAL	126	311.9605	2.4759		
TOTAL	127	359.3429			

Figure B30. Percent reduction from nominal (Ixx) vs. age from first exposure to traffic (years), all beams exposed to traffic spray from below for less than 8 years.



REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-0.79691	
1	AGE	1.47491	0.99137

STANDARD ERROR OF ESTIMATE	=	0.54303
COEFFICIENT OF DETERMINATION	=	0.98281
COEFFICIENT OF DETERMINATION (ADJ)	=	0.98195
MULTIPLE CORRELATION COEFFICIENT	=	0.99137
MULTIPLE CORRELATION COEFFICIENT (ADJ)	=	0.99094

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE	0.04361	0.02931	33.819	100.000

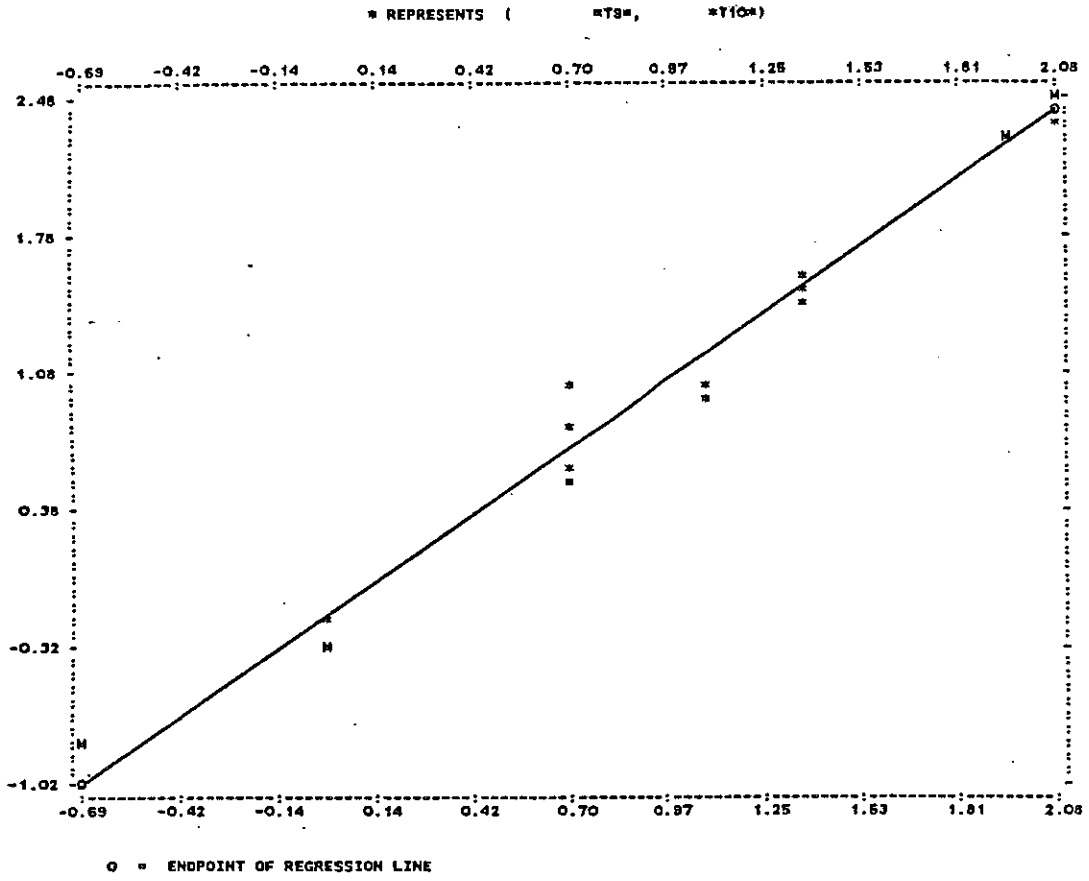
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE	0.99137	3.17518E-10

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	337.2632	337.2632	1143.7145	100.000
RESIDUAL	20	5.8977	0.2949		
TOTAL	21	343.1609			

Figure B31. Average penetration (mils) vs. age of exposure (years), top flange orientation.



REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-0.16066	
1	=T9=	1.21852	0.99372

STANDARD ERROR OF ESTIMATE	=	0.13765
COEFFICIENT OF DETERMINATION	=	0.98748
COEFFICIENT OF DETERMINATION (ADJ)	=	0.98685
MULTIPLE CORRELATION COEFFICIENT	=	0.99372
MULTIPLE CORRELATION COEFFICIENT (ADJ)	=	0.99340

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	=T9=	0.03069	0.02502	39.710	100.000

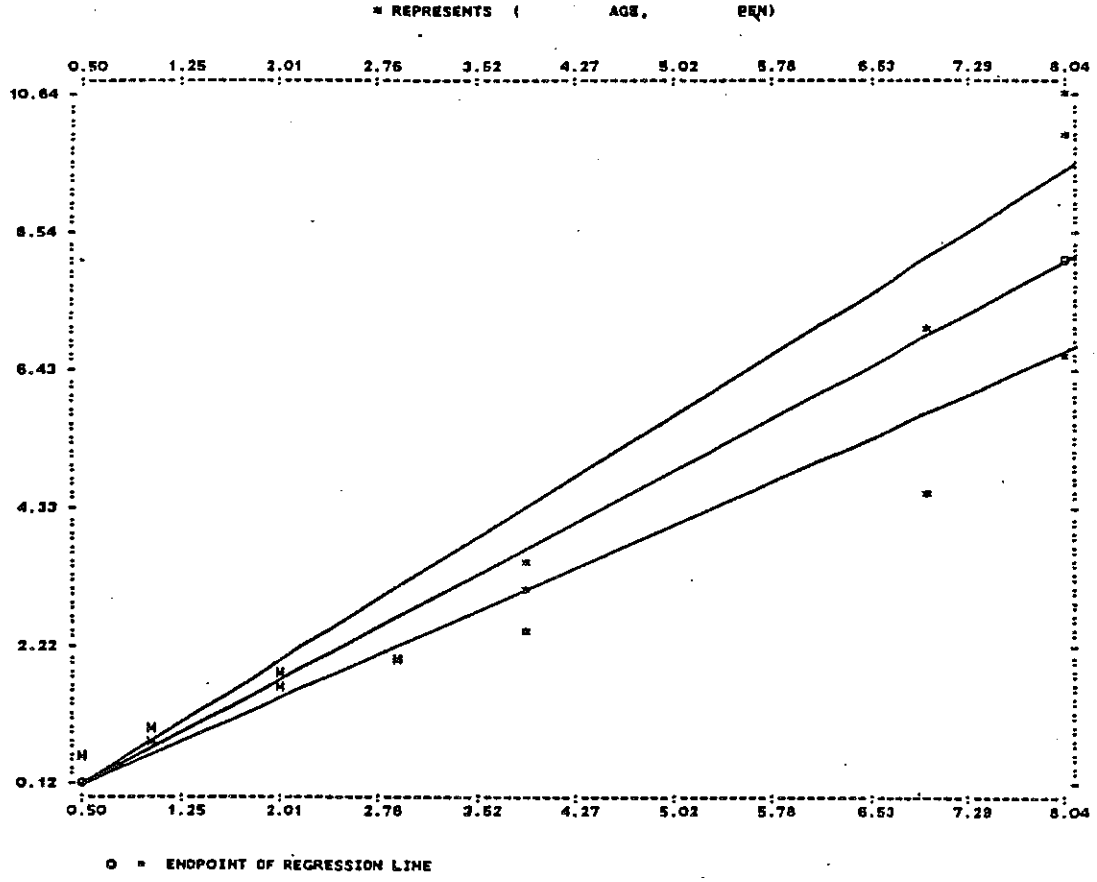
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	=T9=	0.99372	1.452138E-10

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	29.8771	29.8771	1576.9080	100.000
RESIDUAL	20	0.3789	0.0189		
TOTAL	21	30.2560			

Figure B32. Natural log of average penetration (mils) vs. natural log of age of exposure (years), top flange orientation.



REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-0.40570	
1	AGE	1.05046	0.94118

STANDARD ERROR OF ESTIMATE	=	1.05005
COEFFICIENT OF DETERMINATION	=	0.88582
COEFFICIENT OF DETERMINATION (ADJ)	=	0.88011
MULTIPLE CORRELATION COEFFICIENT	=	0.94118
MULTIPLE CORRELATION COEFFICIENT (ADJ)	=	0.93814

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE	0.08433	0.07556	12.456	100.000

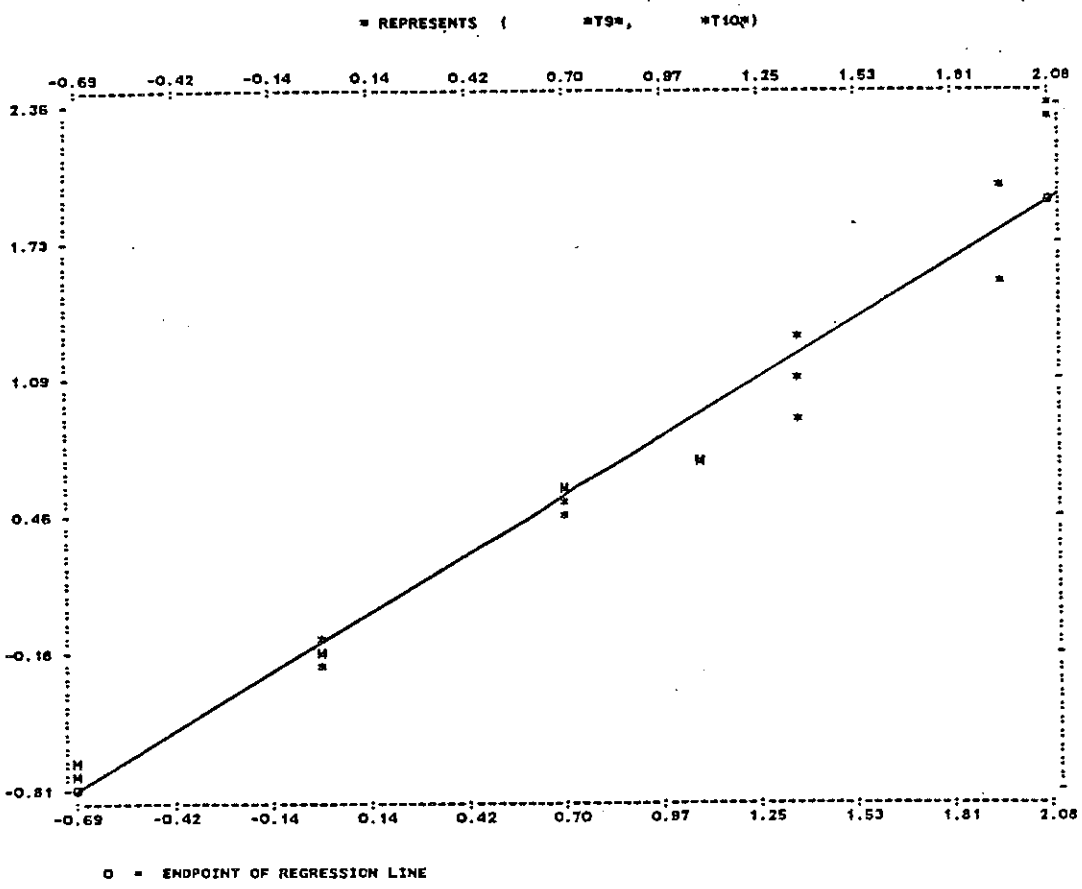
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE	0.94118	0.00000

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	171.0812	171.0812	155.1608	100.000
RESIDUAL	20	22.0521	1.1026		
TOTAL	21	193.1333			

Figure B33. Average penetration (mils) vs. age of exposure (years), web orientation.



REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-0.12781	
1	*T9*	0.98902	0.98244

STANDARD ERROR OF ESTIMATE	=	0.18842
COEFFICIENT OF DETERMINATION	=	0.96516
COEFFICIENT OF DETERMINATION (ADJ)	=	0.96344
MULTIPLE CORRELATION COEFFICIENT	=	0.98244
MULTIPLE CORRELATION COEFFICIENT (ADJ)	=	0.98155

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	*T9*	0.04200	0.04172	23.546	100.000

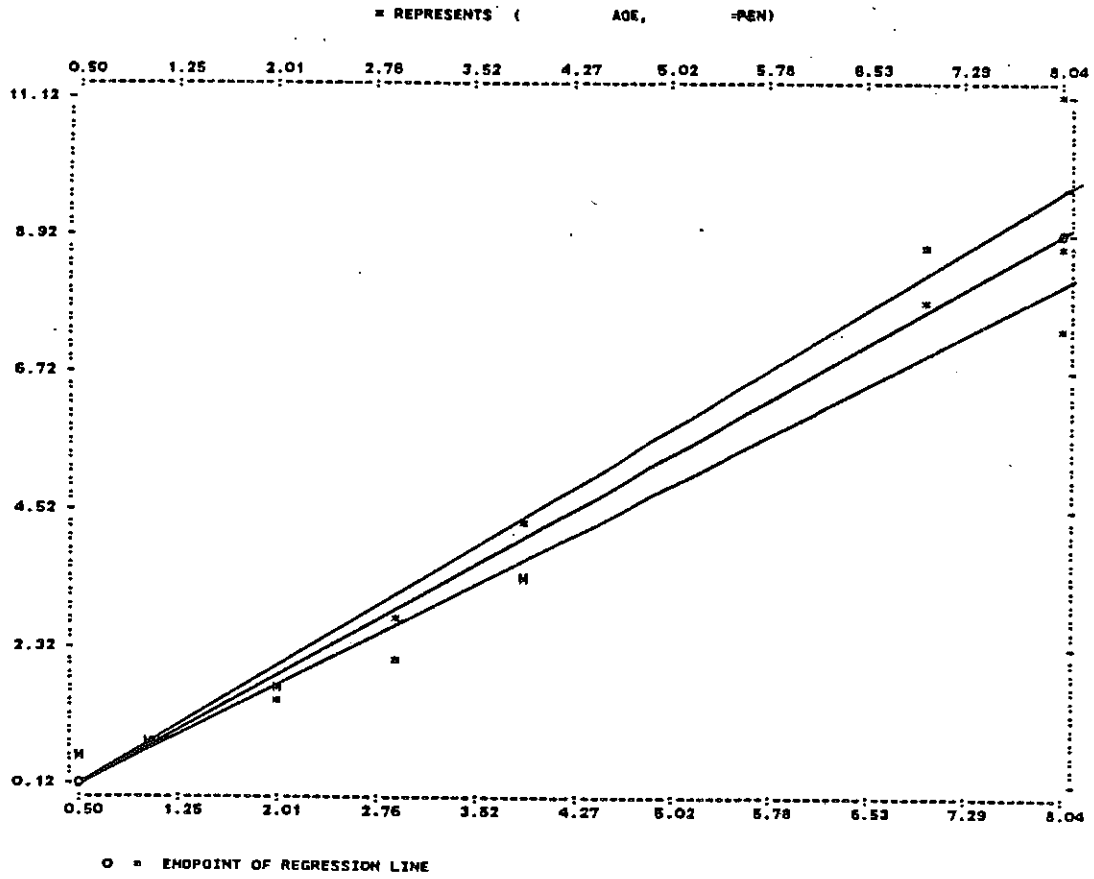
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	*T9*	0.98244	0.00000

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	19.6826	19.6826	554.4133	100.000
RESIDUAL	20	0.7100	0.0355		
TOTAL	21	20.3926			

Figure B34. Natural log of average penetration (mils) vs. natural log of age of exposure (years), web orientation.



REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-0.46412	
1	AGE	1.17400	0.97425

STANDARD ERROR OF ESTIMATE	=	0.73652
COEFFICIENT OF DETERMINATION	=	0.94916
COEFFICIENT OF DETERMINATION (ADJ)	=	0.94661
MULTIPLE CORRELATION COEFFICIENT	=	0.97425
MULTIPLE CORRELATION COEFFICIENT (ADJ)	=	0.97294

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	AGE	0.06076	0.05042	19.322	100.000

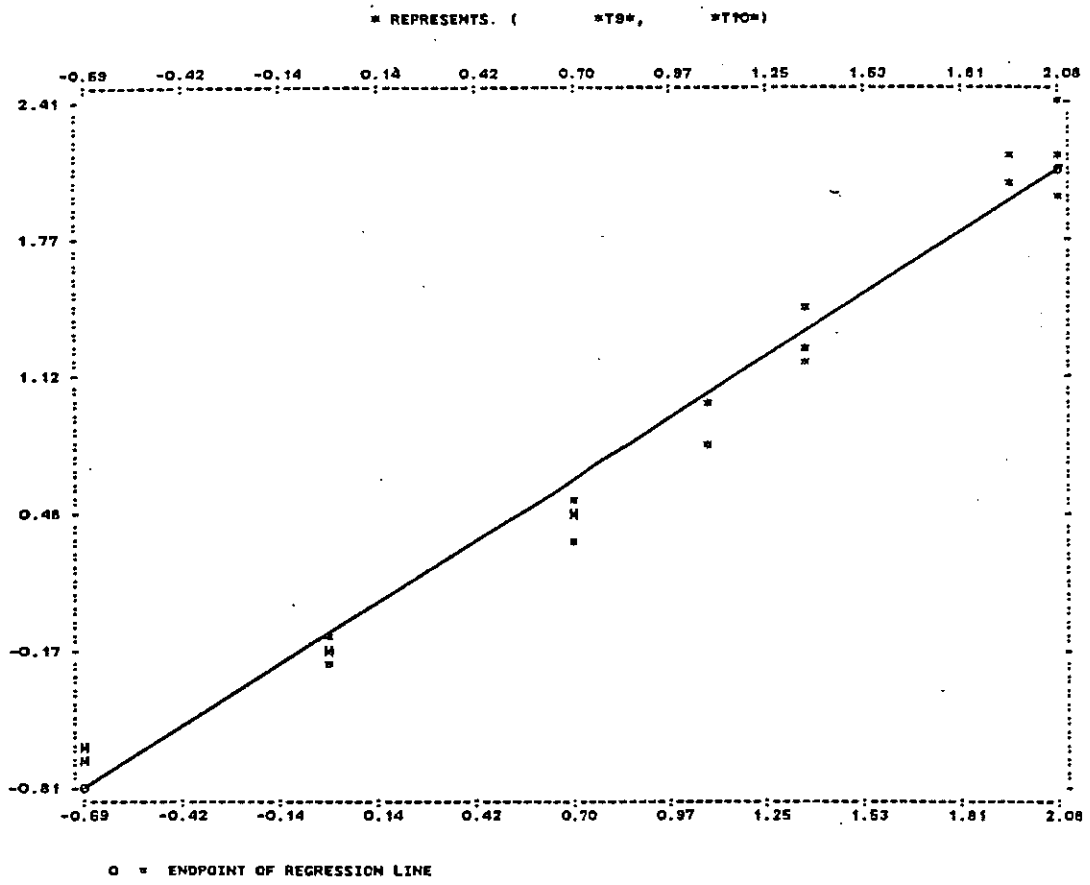
PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	AGE	0.97425	-3.57753E-11

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	213.6845	213.6845	373.3535	100.000
RESIDUAL	20	11.4468	0.5723		
TOTAL	21	225.1313			

Figure B35. Average penetration (mils) vs. age of exposure (years), bottom flange orientation.



REGRESSION COEFFICIENTS AND STANDARDIZED(BETA) COEFFICIENTS -

VAR	LABEL	REGRESSION COEFFICIENT	BETA COEFFICIENT
	INTERCEPT	-0.08780	
1	*T9*	1.04123	0.98740

STANDARD ERROR OF ESTIMATE	=	0.16741
COEFFICIENT OF DETERMINATION	=	0.97495
COEFFICIENT OF DETERMINATION (ADJ)	=	0.97370
MULTIPLE CORRELATION COEFFICIENT	=	0.98740
MULTIPLE CORRELATION COEFFICIENT (ADJ)	=	0.98676

STANDARD DEVIATIONS AND T VALUES OF COEFFICIENTS -

VAR	LABEL	STD ERROR	STD ERR BETA	T VALUE	CONF
1	*T9*	0.03732	0.03539	27.900	100.000

PARTIAL CORRELATIONS AND R2-DELETE -

VAR	LABEL	PARTIAL CORR	R2-DELETE
1	*T9*	0.98740	2.17838E-10

ANALYSIS OF VARIANCE TABLE

SOURCE OF VARIATION	DEGREES FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	CONF LEVEL
REGRESSION	1	21.8155	21.8155	778.3860	100.000
RESIDUAL	20	0.5605	0.0280		
TOTAL	21	22.3760			

Figure B36. Natural log of average penetration (mils) vs. natural log of age of exposure (years), bottom flange orientation.