

OFFICE MEMORANDUM



MICHIGAN
DEPARTMENT OF STATE HIGHWAYS

July 24, 1970
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To: R. L. Greenman
Engineer of Testing and Research

From: L. T. Oehler

Subject: ASTM A 588 Steel in Bridge Structures in Detroit. Research Project
62 G-122. Supplement to Research Report No. R-740, dated May 11, 1970.

A recommendation in Report No. R-740 read, "Other similar structures should also be inspected to determine if a similar dirt accumulation occurs."

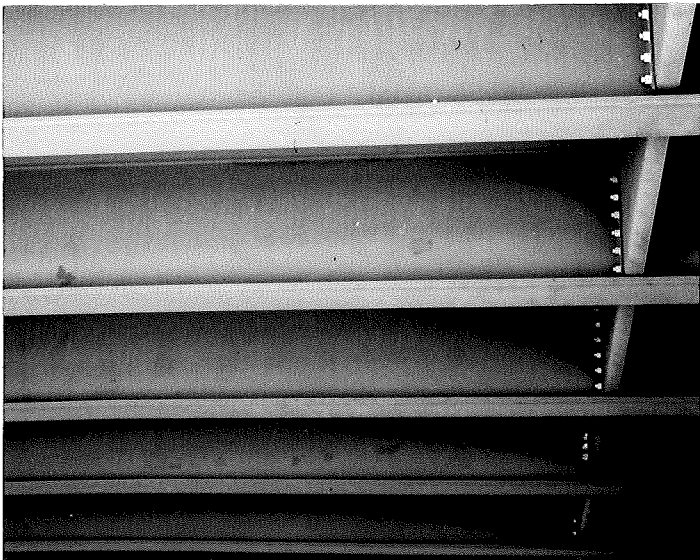
Accordingly an inspection was made of two other similar structures in the Detroit area on July 9, 1970 by N. C. Jones and A. J. Permoda of the Department and by Messrs. R. Wakefield, A. Hancock and R. Reiterman of Bethlehem Steel Corporation. Steel in the two structures was completely blast cleaned before erection.

Messrs. N. C. Jones and A. J. Permoda report no noticeable abnormal rust scale formation and delamination on beams of I 75 over US 25 (Fort St) built in 1966. There were a few delamination spots, though no noticeable heavy scale formation, on three adjoining beams of eastbound M 102 over northbound I 75, as shown in the attached photograph. The structure was built in 1967. The latter will continue under observation and a closer inspection from a raised platform, if subsequently advisable.

TESTING AND RESEARCH DIVISION

LTO:AJP:sjt

L. T. Oehler
Engineer of Research



Spots are noted on webs of 2nd, 3rd and 4th inner beams.

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May 11, 1970

To: R. L. Greenman
Engineer of Testing and Research

From: L. T. Oehler

Subject: ASTM A 588 Steel in M 102 Structure over I 696 in Detroit. Research Project 62 G-122. Research Report No. R-740.

In accordance with J. C. Brehler's memorandum of March 31, 1970 to J. G. Hautala, N. C. Jones, P. J. Marek, and M. Rothstein an inspection of subject structure was made to examine the localized heavier-than-expected rusting and rust scaling that was noted earlier on the west end of the beams in the lower level over I 696 (area where test panels are exposed).

The inspection of the bridge, built in 1964, was made on April 22, 1970 by the following people.

<u>MDSH</u>	<u>Bethlehem Steel Corp.</u>	<u>Wayne County Road Comm.</u>
N. C. Jones	J. B. Horton	S. W. Curtiss & crew
M. Rothstein	J. C. Zoccola	
R. G. Perry	R. Wakefield	
A. Williams	C. Bengstrom	
L. T. Oehler	A. Hancock	
A. J. Permoda		
F. M. Cassel		

The inspection confirmed the rust scale formation (up to 30 mils thick) and the scale delamination (Fig. 1). This was confined to the west end of the lower structures carrying westbound and eastbound M 102 over I 696, extending into the center lane on the southbound roadway. This condition was also noted in some spots, under leaky joints, in the remainder of the structure. Other areas of the structure presented a tight oxide appearance.

After the inspection the group met in the District office to discuss this phenomenon and to review Bethlehem's corrosion data covering the 4-yr exposed test panels, removed earlier. Test panel information is as follows:

1. The bridge test panels showed an average loss of 0.9 - 1.0 mil loss per year per surface; with the rate still linear over this period.
2. The control (roof exposed) panels showed an average loss about half of above; with the rate decreasing to about 0.12 mils per year per surface over the last time period of 2 yrs.



Figure 1. Combination road dirt, salt, and oxide formation shows localized descaling on A 588 steel beams.

Bethlehem Laboratory personnel stated that the behavior in "2)" above was normal and expected; and that "1)" above was higher than expected and not normal. They believed the latter was due to a measured progressive accumulation of salt and road dirt on the beam surfaces which retained moisture and accelerated the corrosion rate. This was localized because of: a) lower clearance on the west end of the structure, b) greater traffic volume on southbound I 696 in the morning when dew-moistened steel would tend to entrap road dirt, and c) snow-fence effect near west abutment wall allowing dirt to pile-up on the steel beams.

Recommendations

The group felt that the noted localized abnormal corrosion behavior should continue under observation, but did not require other immediate action. Other similar structures should also be inspected to determine if a similar dirt accumulation occurs. Eventually, and probably after the next scheduled test panel removal, a recommendation would be made whether to remove the complicating dirt accumulation by either water or compressed air.

TESTING AND RESEARCH DIVISION

LeRoy T. Oehler

Engineer of Research
Research Laboratory Section

LTO/AJP:slt