Michigan Department of Transportation
Criteria for Selection of
Traffic Signal Mast Arm Poles and Mast Arms
For Local Agencies

Description - These criteria set forth the requirements and guidelines necessary for selection of a traffic signal mast arm poles and mast arms for intersection traffic control. Traffic signal mast arm poles and mast arms must be designed to meet the strength and fatigue requirements of the American Association of State Highway and Transportation Officials (AASHTO) 2001 Standard Specifications for Structural Supports of Highway Signs, Luminaires and Traffic Signals, 4th Edition and the interim specifications.

There are three traffic signal mast arm poles and mast arms approved for use by the Michigan Department of Transportation (MDOT). Each are designed according to the AASHTO 2001 Standard Specifications for Structural Supports of Highway Signs, Luminaires and Traffic Signals, 4th Edition and the interim specifications. The design of each structure satisfies strength requirements and is based on fatigue calculations that are controlled by importance factors, which classify the probability of failure for a constant amplitude fatigue limit state.

Traffic Signal Mast Arm Poles and Mast Arm Categories - Traffic signal mast arm poles and mast arms are separated into three categories of importance:

A. **Category I**
B. **Category II**
C. **Category III**

Inspection - Traffic signal mast arm poles and mast arms designed according to AASHTO 2001 Standard Specifications for Structural Supports of Highway Signs, Luminaires and Traffic Signals fatigue requirements are heavier and more costly than those designed according to 1994 AASHTO Specifications. The initial installation cost of the Category I traffic signal mast arm poles and mast arm (including foundation) can be as much as 13 percent more than Category II and 21 percent more than Category III. However, Category II and III designs require long-term inspection costs whereas the Category I design does not (National Cooperative Highway Research Report 469, Fatigue-Resistant Design of Cantilever Signal, Sign, and Light Supports).

If Category II or III traffic signal mast arm poles and mast arms are used, they must be inspected once every two years for defects that may be caused by cyclic loads as a result of fatigue. These structures are designed for finite life and will require long-term inspection cost. If a local agency elects to have a Category II or III structure on a state trunkline, MDOT will provide the biennial inspection for these structures and charge per structure the cost of the inspection to the local agency requesting the use of Category II or III structures. The inspection of each structure will continue on a biennial basis over a 30 year service life once structure installation has been completed.

Category I poles are designed for infinite life, which is defined as more than 25 years,

and do not require scheduled inspection. Therefore, no long-term inspection costs are associated with Category I structures.

Estimated Cost - The total estimated cost to install the foundation, fabricate and erect the mast signal pole and arm on the foundation for each of the three categories is shown below. The cost estimate assumes a 29 foot pole with luminaire on top and a 50 foot arm. Cost may vary depending on arm length and lighting needs. These cost estimates are based on 2005 foundation, fabrication and erection costs (assumes four mast signal poles and arms at one intersection). The biennial inspection cost per structure must be included in the foundation, fabrication, and erection cost as a non-Federal participation cost for category II and III traffic signal mast arm pole and mast arm. See MDOT Traffic and Safety Note 261-Series for Traffic Signal Mast Arm Poles and Mast Arms inspection cost requirements.

Category I $97,000 (as of January 26, 2007)

Category II $85,500 (as of January 26, 2007)

Category III $79,800 (as of January 26, 2007)

Specifications - All structures are required to be fabricated and constructed according to the 2003 MDOT Standard Specification for Construction, the MDOT Frequently Used Special Provision for Traffic Signal Mast Arm Pole and Mast Arm (Trunkline), and the standard drawing for Category I, II, and III traffic signal mast arm poles and mast arms. Inspection will be according to the MDOT Procedure for Inspection of Traffic Signal Mast Arm Poles and Mast Arms.

Supporting Documents:
(located at: http://mdotwas1.mdot.state.mi.us/public/tands/plans.cfm , in the "Traffic Signals" Category and "Mast Arm Traffic Signals" Sub-category)
(to use the links, an active connection to the Internet is required)

Traffic and Safety Note 261B

SIG-281-A, Category I Special Detail

SIG-282-A, Category II Special Detail

SIG-283-A, Category III Special Detail

SIG-284-A, Mast Arm Pole Foundation Special Detail

Mast Arm Pole and Mast Arm Cat I, II, III Photos

Contact Lansing Signals (517-373-2323) for current mast arm special provisions.