CHAPTER 11
STRUCTURES

11.00 INTRODUCTION

The guidance provided in *Chapter 11* is constantly under review for potential revision and clarification based upon the input from field staff. Revisions are made as a result of specific issues encountered in structures field construction and to address any changes in construction methods and technology. An emphasis is being placed on providing information which more clearly defines the intent associated with the design and specification requirements. The input from field staff is greatly appreciated and very necessary to ensure continuous improvement of the information provided in this chapter.

11.01 REMOVAL OF BRIDGES

U.S. EPA regulations require that a "Notice of Demolition" be submitted prior to the removal of bridges (40 CFR 61.145). The notice, which requires the specific date of removal be identified, is required when an entire bridge is removed. The item associated with the removal is "Removal of Existing Bridge" with Item Code 2401-6745625 (English) or 2401-204000 (metric).

Office of Location and Environment staff inspect existing bridges for the presence of asbestos. Asbestos is occasionally found in utility conduits (i.e. transite pipe) that are attached to bridges. A tracking report is available that identifies the status of inspections of upcoming bridge projects. The report is available at:
W:\Highway\EnvServices\RegulatedMaterials\PDF Files\BridgeInsp.pdf

For contracts let on or after December 19, 2006, contractors shall submit the "Notice of Demolition", by mail, to the Iowa DNR at least 10 business days prior to start of the bridge demolition. The contractor shall also send a copy of the completed form to the project engineer. The Office of Contracts will provide a partially completed "Notice of Demolition" form to the contractor with the signed contract.
An example of a partially completed "Notice of Demolition" form (Form No. 536101) is available on the internal and external DOT web sites in the public forms libraries.

See Construction Manual Chapter 10.61 for additional information on Demolition Notices.

In some instances, removal of an existing bridge may include structural steel that is coated with hazardous paint. The bridge plans will include a plan note regarding the scrape sample and identified levels of hazardous toxic constituents. The plan notes will also state that for structural steel with hazardous paint, the contractor is required to provide documentation to the Project Engineer regarding the disposition of the structural steel (ie: whether the contractor retains the structural steel or takes the scrap steel to a receiving facility). The plans will state what documentation information is required to be provided. *Appendix 11 – 27* provides a Disposition Form for documenting the disposition of the scrap steel removed from the project.

11.02 GUIDANCE FOR HEAVY EQUIPMENT & MATERIALS ON BRIDGES

For most bridge projects, it is assumed that construction can take place without cranes and construction equipment on the bridge. However, the Contractor will be required to submit for review and approval structural analysis by a licensed Engineer when one of the following loading conditions occurs during bridge construction:

1. For bridges with weight restrictions: all vehicles and equipment exceeding the posted limit.

2. Cranes or other construction equipments that are self propelled or transported to the project site by other means and considered legal or permitted during transport if:
   a. Other components are added resulting in overall weight greater than legally allowed or granted by special permit.
   b. The operational weight including construction loads is greater than legally allowed or granted by special permit.
   c. Load distribution is altered during operation due to the use of outriggers or other devices that are not positioned over beam lines. Such use may result in localized deck overstress.

3. The use of heavy construction equipment on bridge decks with:
   a. Damaged members
   b. Critical load carrying members being replaced or repaired
   c. The presence of other construction loads including equipment and construction material in conjunction with specified load limits in Items 4 & 5.

4. Limitations on the storage of materials on structures is defined in Specification Article 1105.12, D, 4.

Heavy Construction Equipment Submittal Information

Heavy construction equipment will not be allowed on the bridge during construction unless prior written approval of the Engineer is obtained. Approval shall be obtained by submitting a written request to the Engineer. This request shall include the following:

1. A detailed plan adequately describing the equipment and how it is proposed to be used. This plan shall contain, as a minimum, the following information.

   A. The configuration and weight of the equipment proposed to be placed on the bridge, including the dead weight on all wheels/axles.
   B. The proposed location(s) of the equipment on the bridge during all lifting operations.
   C. The weight of all proposed lifts to be made by the equipment.
   D. The load to all wheel/axles/outriggers resulting from the proposed lifting operations, during all critical phases of the lifting operations.

2. The necessary calculations to verify that no component of the bridge will be overstressed during the proposed use of the equipment on the bridge. The calculations shall be certified by a Professional Engineer licensed to practice engineering in the State of Iowa.

11.03 TEMPORARY STRUCTURES FOR THE PROTECTION OF THE PUBLIC

Article 1107.08, L Public Convenience and Safety states; "When the Contractor works on a bridge approach or bridge spanning a roadway or passageway, the Contractor shall take all necessary steps to protect the public using the facility below the bridge from falling debris, material, or construction equipment. The Contractor shall submit a safety procedure to the Engineer prior to the start of work".

There are many situations where the means and methods used by the Contractor in the performance of work on a bridge involve the installation of some type of temporary structure that is not included in the original design or identified in the plans. These temporary structures can vary greatly and need oversight review prior to installation to ensure that what is proposed will perform for the application intended.

Article 1107.08, L requires a safety procedure written plan from the Contractor to be submitted to the Engineer for approval prior to starting work. The written plan is to include the design of the means and methods used to provide protection and information for all design assumptions used in the design.

11.04 RESERVED FOR FUTURE USE

11.05 PILE DRIVING CAP AND HAMMER INFORMATION

Tabled information for the pile driving Caps and Hammers has been placed in *Appendix 11-1*. The listing of Caps and Hammers can also be viewed on the Office of Construction web site on DOTNET or on the Iowa DOT web site at www.dot.state.ia.us. The Office of Construction will continue to support and update this data. Hammers and caps change ownership or new hammers and caps are purchased which will require verification for revision to the Caps and Hammers listing. Hammers and caps that come to the project should be reviewed prior to use to verify the ownership, identification number and weight. Hammers and caps that have been weighed will have the identification number and weight die-stamped on the face. Hammers and caps that have not been weighed and stamped or which are not on the current listing require verification.

Verification involves the weighing of the hammer and cap components at a certified scale.

Hammer weight verification only applies to the ram weight for gravity hammers. Power hammer ram weights are provided in manufacturers hammer specifications and do not require field weighing for verification.

Cap weight verification is required for all driving caps used with gravity or power hammers driving systems. Verification of cap weight must include the following:

Cap weight to include cap, cap cushion, and striker plate.

Cap insert weight when the insert is removable from the cap. Inserts are used in the bottom of some caps to change the shape of the cap opening to fit over H-pile, pipe, concrete, or wood pile. When an insert is required with the cap, it must be weighed and reported separate from the cap weight.

In the case where hammers and caps require verification, the District Materials Office should be notified to assist in weighing, stamping, recording, and reporting to the Office of Construction for update to the Caps and Hammers list. A form for reporting, entitled Identification Record for Pile Hammer and Cap, is provided in *Appendix 11-1A*.

The procedure for reporting changes or updates for caps and hammers was established in May 1986 according to the following.

The sequence for stamped identification number includes the letter D followed by the appropriate District number and three-digit number.

Example: D6001
D = Designation for District
6 = Designation for the District number
001 = Designation for the sequential number stamped

If verification results in a change to the current Caps and Hammers listing, provide a report to the Office of Construction with a request for update to the listing. The information for the update should include the identification number, mass (weight), contractor, and the date the identification stamp was made.

Diesel hammers are identified by manufacturer and model and do not require a stamped identification. Caps for diesel hammers are interchangeable and do require the identification stamp for inclusion in the Caps and Hammers list.

All reference to the ENR (formula) method of driving pile has been removed from the text. Instructions for counties and cities are included in *Appendix 11-22*. Users of the ENR formula for pile driving take note: The information is no longer being supported, however, material tables for different types of piling have been provided.