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Chapter Twenty-three

MISCELLANEOUS STRUCTURES

The primary responsibility of the Bridge Bureau is to design highway bridges. However, the Bureau is also responsible (partially or entirely) for the structural design of a variety of other highway-related structures. Chapter Twenty-three briefly discusses these.

23.1 WALLS

23.1.1 Responsibilities

The Geotechnical Section, Road Design Section and Bridge Bureau typically collaborate on the design of walls. The Bridge Bureau is generally responsible for the structural design of cast-in-place, concrete retaining walls. The Road Design Section determines the height of retaining wall.

The Geotechnical Section is generally responsible for the design of reinforced earth structures, bin walls and gabions.

23.1.2 Conventional Retaining Walls

Reference: LRFD Article 11.6

Retaining walls are essentially the same as abutments with the exception of the absence of bridge-bearing loads and the handling of live-load surcharge (LS) as specified in LRFD Article 3.11.6.2. As such, loads on retaining walls should be determined as specified in Section 19.1.2, and the appropriate design and detailing provisions of Section 19.1.3 should be applied.

Foundations supporting retaining walls should be selected and designed according to Chapter 20. Conventional retaining walls are generally of the reinforced concrete type. The resistance of reinforced concrete retaining walls in terms of flexure and shear should be determined according to Chapter 16.

23.1.3 Prefabricated Earth Retaining Systems

Reference: LRFD Articles 11.8, 11.9 and 11.10

Prefabricated earth retaining systems include, among others, mechanically stabilized earth (MSE) walls, prefabricated modular walls, anchored walls, etc., all defined in LRFD Article 11.2. Typically, the wall contractor is responsible for the design of the wall system, checked by the Geotechnical Section, which typically selects the wall type.

MSE walls should be considered as alternatives to conventional retaining walls where substantial total or differential settlements are anticipated. The decision to use a conventional retaining wall or a MSE wall (or other prefabricated earth retaining system) will be made by the Geotechnical Section.

23.2 OTHER STRUCTURE TYPES

23.2.1 Structural Supports for Signs, Luminaires and Traffic Signals

The Department has adopted the use of the **AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals**. The MDT Traffic Engineering Section is primarily responsible for these supports, and the Department has developed standard designs which will apply in most cases.

In certain cases, the Bridge Bureau will become involved in the design of structural supports for these roadside appurtenances. See the following for a description of the Bridge Bureau's involvement:

1. Coordination. Section 3.1.6.1 discusses supports for sign structures, traffic signals and luminaries, and it discusses the coordination between the Bridge Bureau and Traffic Engineering Section.
2. Cantilever/Overhead Signs. Section 18.9.1 of the **MDT Traffic Engineering Manual** specifically discusses the structural design of cantilever and overhead sign structures, including the role of the Bridge Bureau.

23.2.2 Buried Structures

Buried structures include reinforced concrete culverts, metal pipes, structural plate pipes, etc. The structural design of buried structures is based on Section 12 of the LRFD Specifications. The MDT Hydraulics Section is primarily responsible for these drainage appurtenances, and the Department has developed standard designs which will apply in most cases. Occasionally, the Hydraulics Section may request the Bridge Bureau to check the structural adequacy of a proposed or existing culvert.

23.2.3 Sound Barriers

The structural design of sound barriers is based on the **AASHTO Guide Specifications for Structural Design of Sound Barriers (1989 Edition)**.

23.2.4 Miscellaneous

Occasionally, the Bridge Bureau is requested to provide other structural engineering services for the Department. The engineer responsible for this work must determine the appropriate design code for the assignment.