

CONSOLIDATED RAIL CORPORATION
ELEMENTS OF BRIDGE MANAGEMENT SYSTEM

Written policy encompassing all aspects of the BMS

- Assigns responsibility for overseeing inspections, maintenance and capital reconstruction of bridges.
- Audit function/Quality Assurance program
- Establishes a system for evaluating and prioritizing bridges requiring maintenance repairs and capital reconstruction
- Establishes load capacity by rail line segment
 1. As built design capacity
 2. Historical rating information
 3. Bridge rating analysis
- Establishes a bridge inventory for all structures in the BMS
 1. Bridge list
 2. Bridge plans
 3. Bridge correspondence files

Written policy encompassing all aspects of the inspection process

- Continuing education and certification of inspections
 1. Minimum criteria of experience and education
 2. Regular training seminars (Training Modules)
 - a. Uniform course material
 - b. Trained trainers (n/a management)
 - c. Safety training
 3. Written tests to determine inspector knowledge

Establishes inspection procedures (MW 201, MW 202)

- Frequency of inspections
- Levels of inspections
 1. Regular, periodic inspection
 2. Special inspection
 3. Annual inspection
- Condition code criteria

Establishes provisions for special inspections

- Criteria for underwater inspections
- Identification of scour prone bridges and schedule of U/W inspection
- Criteria for detailed steel inspections
- Process of engineering analysis and testing of bridges for load capacity

CONSOLIDATED RAIL CORPORATION
BRIDGE MANAGEMENT SYSTEM POLICY

I. Purpose and Scope

- A. The purpose of this policy is to provide quality assurance that undergrade bridges over which Conrail operates can safely carry imposed railroad loadings. In addition, the policy addresses inspection of overhead structures by Conrail bridge inspectors and the coordination with other agencies in the inspection of overhead vehicular structures.
- B. This policy prescribes the requirements necessary to maintain Conrail's Bridge Management System according to accepted engineering standards.

II. Application

This policy applies in its entirety to all Conrail employees engaged and charged with the responsibility for bridge inspection, bridge analysis and bridge maintenance and construction.

III. Administration and Qualification

- A. Responsibility for the maintenance of Conrail's Bridge Management System resides with the Manager – Bridge and Buildings with twenty years of experience in bridge management.
- B. Each of Conrail's three operating Divisions has a Structures Department managed by a Supervisor of Structures. The Supervisor has direct control over a staff of Division Bridge Inspectors who are trained and certified by Conrail.

IV. Inspection System

- A. The Bridge Management System begins with the inspection process which is comprehensive and thorough.
- B. Each bridge on the Conrail system is inspected (according to the frequency and level of inspection as set forth in the MW 201) by the Division Bridge Inspectors. Inspection records will be retained for three years.
- C. If, during the course of his normal inspection, the Division Bridge Inspector finds a condition which requires more immediate attention, the inspector reports this to his supervisor. The Division Bridge Inspector will take immediate action if he discovers a restrictive condition.
- D. Based on the condition of the bridges inspected during the year, each Division prepares an Annual Bridge Inspection itinerary, listing the structures to be inspected by a Bridge Inspection Team consisting of the Manager – Bridge and Buildings and the Supervisor of Structures for the territory inspected and the Division Bridge Inspector.

IV. Inspection System (Continued)

- E. At the conclusion of the Annual Bridge Inspection, the Bridge Inspection Team compares the condition evaluation of each bridge inspected and ranks the bridges in priority order for maintenance or capital expenditure items.
- F. The Manager – Bridge and Buildings and Supervisor of Structures prepares a report consisting of the completed Priority Lists plus specific evaluations and recommendations for selected bridges.
- G. In the case of overhead bridges, Conrail inspects such bridges with respect to safety of rail operations below the structure and to identify and monitor obvious deficiencies in the structure itself. Unless specifically Conrail's responsibility for maintenance, such deficiencies are reported to the agency or municipality which is responsible for maintenance.

V. Line Capacity

- A. Each Conrail rail line segment is identified by its normal load carrying capacity. This capacity is based on the limiting feature on the line segment.
- B. Capacities are determined by using available historical information of Conrail's predecessor railroads. These limiting capacities are updated according to most recent load rating analysis for specific structures. Structures are rated using the AREMA recommended practice.

VI. Bridge Inventory

- A. An inventory of overhead and undergrade structures (having an opening greater than five feet) on the Conrail system is maintained and updated annually for changes. Conrail references 32 different types of fixed bridges, three different types of movable bridges, and eight different types of undergrade bridge decks. This inventory (i.e., the Bridge List) is maintained in a main frame computer data base.
- B. Updated Bridge Lists are printed for each of Conrail's three operating divisions annually and distributed to all Bridge Department managers, supervisors and bridge inspectors.

VI. Bridge Inventory (Continued)

C. Bridge List information consists of the following:

- (1) Heading information
 - (a) Railroad Line Name
 - (b) Begin and End location designations for the line segment
 - (c) State
 - (d) Begin and End mile post location for the line segment
 - (e) Division number and line code designation for the line segment
- (2) Individual bridge information
 - (a) Conrail bridge number
 - (b) State code designation
 - (c) County code designation
 - (d) Town name
 - (e) Track chart mile post (if different from bridge number)
 - (f) Name of crossing
 - (g) Type of bridge superstructure
 - (h) Type of deck
 - (i) Number of tracks
 - (j) Number of spans
 - (k) Length of spans
 - (l) Total bridge length
 - (m) Horizontal dimension (transverse to track)
 - (n) Vertical dimension (above/below track)
 - (o) Date built
 - (p) Maintenance responsibility (substructure)
 - (q) Maintenance responsibility (superstructure)
 - (r) Load limit for overhead bridges
 - (s) Date rated for most recent rating or capacity calculations
 - (t) Date inspected by year
 - (u) Date of last significant repairs
 - (v) Retirement program status
 - (w) Paint code
 - (x) Use code based on crossing (i.e., over road/stream)
 - (y) Remarks column, specific to the individual bridge

D. A file of bridge plans on microfilm aperture cards is maintained at Conrail headquarters. These plans are filed in bridge number order and are reproducible to full size plans.

E. Conrail maintains various bridge correspondence load rating files which contain historical information about the bridges.

VII. Inspector Training

- A. Each Conrail Bridge Inspector is trained annually and tested for knowledge of Bridge Inspection Policy and Procedure.
- B. Bridge Inspection Policy is outlined in Conrail MW 201, "General Instructions for the Inspection of Bridges, Culverts and Tunnels".
- C. Bridge Inspection Procedure is outlined in Conrail MW 202, "Detailed Instructions for the Maintenance Inspection of Bridges" and Conrail MW 202 R1, "Reference Guide for Making Bridge Inspection Reports".
- D. Training Seminar Modules relating specifically to railroad structures and loadings are used uniformly across the Conrail system to ensure consistent and accurate condition evaluations by the Division Bridge Inspectors.
- E. Conrail Division Bridge Inspectors receive comprehensive safety training to conform with the FRA Bridge Worker Safety Rules.

VIII. Inspection Policy: Conrail MW 201

IX. Inspection Procedures: Conrail MW 202 and MW 202R1

X. Underwater Inspections

- A. Each operating Division maintains a list of bridge structures susceptible to scour conditions which cannot be inspected by probing or soundings by the Division Bridge Inspector. Each Division schedules these structures for underwater diver inspections taking into consideration foundation conditions, history of scour, propensity for flash flooding and high water velocity and substructure type.
- B. The results of the diving inspections are reviewed by the Division Bridge management and referred to the Manager – Bridge and Buildings and his staff if further evaluation is required. The diving inspection reports are maintained in the bridge file on the Division.
- C. Conrail's Underwater Inspection specifications are outlined in the MW 202.