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## 13.1 Scope

Movable bridges shall not be used unless Consented to by the Ministry.

## 13.7 Mechanical system design

### 13.7.18 Bearings

#### 13.7.18.4 Plain bearings

##### 13.7.18.4.3 Lubricated plain bearings

Add the following:

Use of self-lubricated non-bronze bushings shall be Consented to by the Ministry.

*Commentary: Self-lubricated non bronze bushings may be appropriate for some applications.*

##### 13.7.18.4.4.2 Non-metallic bearings

*Commentary: Self-lubricated bearing materials may be appropriate for some applications. For proprietary bearing materials the coefficients of friction shall be as advised by the suppliers.*

## 13.9 Electrical system design

### 13.9.2 General requirements for electrical installations

#### 13.9.2.1 Corrosion Protection

Add the following:

External wiring to control panels and consoles shall be of type listed in the Canadian Electrical Code CEC Standard (CSA C22.1), Table 19, for exposed wiring in wet locations. Wireways and trays shall not be used outside the operator's house except with armoured cables. Tray and fittings shall be stainless steel complete with cover (to reduce the problems of birds and their residue). The designer shall detail all wireways such that they do not impose a tripping hazard for the operator.

*Commentary: Wires in rigid galvanized steel conduit is the preferred method for bridges. Armoured cable with PVC jacket may be an acceptable alternative.*

#### 13.9.11 Electrical control systems

##### 13.9.11.1 Operating sequence and interlocking requirements

*Commentary: CCTV systems are suggested to assist the operator in monitoring mechanisms not visible from the operator's cabin.*

## 13.9.11.2 Control logic

### 13.9.11.2.3 Programmable logic controller (PLC)

Add the following paragraph:

The PLC shall be provided with a communication card installed to allow remote communication monitoring by the Ministry at its Provincial Control Centre.

## 13.10 Additional Requirements

### 13.10.1 Operation and Maintenance Handbook

The designer should provide the Operation and Maintenance Handbook, not the Contractor. In addition to the relevant drawings to describe the work, the handbook shall also include:

- A regular schedule of inspection, and lubrication;
- A schedule of operating or testing the bridge. The test operations should occur at regular intervals and should include emergency operating conditions;
- Calibration and set points of all devices; and
- A copy of the testing and commissioning records.

### 13.10.2 Spare Parts

The design shall include a list of spare parts in the Plans that the Contractor must provide...

*Commentary: The list should be reviewed to include PLC and UPS spare parts.*