

8-2 PROTECTION AGAINST DEICING CHEMICALS AND FREEZE-THAW ENVIRONMENT

Our experience with concrete deterioration and reinforcing steel corrosion has shown that it is necessary to vary design details to suit the diverse climatic conditions and traffic volumes found in California. Design details which have produced adequate structures in mild climates have resulted in expensive maintenance problems on structures which are subjected to freeze-thaw cycles, deicing chemicals, and chain wear.

To define variations in specifications and details needed to suit conditions of traffic and exposure, the State is divided into two types of environmental areas, which are defined as follows:

Non-Freeze-Thaw Area

Mild climate where frost is rare or moderate climate where frost or light freezing occurs, but chains are seldom used. Salting of the deck is only done in rare or emergency instances. This area includes all portions of the State not specifically itemized as a freeze-thaw area in Attachment 3.

Freeze-Thaw Area

Severe climate where freeze-thaw cycles and heavy salting occur frequently and where chains are used. A list of State Highway routes showing post mile limits for this area is given in Attachment 3.

Details and specifications for structures which are dependent on locations and traffic volume are shown in Table 1 in Attachment 1. Interchange structures connecting two State Highways are to be treated as mainline structures. Special treatment will usually not be used on overcrossings. In special cases where overcrossings are expected to be subjected to heavy applications of salt, or frosting or icing will occur, the need for details suitable to the area will be specified in the preliminary report.

Table 1 in Attachment 1 and the route tabulations in Attachment 3 are provided so that usual situations can be handled routinely. Deck protective systems may also be provided on other selected structures under certain conditions, or in other special cases the normal protective system may be eliminated. These special cases should be discussed with the Design Office Chief and Area Bridge Maintenance Engineer.



Attachment 2 is a map showing the approximate locations of the freeze-thaw areas. This map is for illustrative purposes only and should not be used to determine whether a structure is in a freeze-thaw area.

Advances in structure protection practices are such that new sealing materials and reinforcing steel protection will continue to come to our attention. To obtain operational history on new products, the Bridge Preservation Committee will on occasion want to apply new seals, seal-overlay, concrete additives, etc., to selected structures in freeze-thaw areas.

Some of the requirements shown in Table 1 will be covered in the special provisions. However, the following items should be considered in preparing plans and estimating quantities:

1. Show proper concrete cover for deck slabs.
2. For structures which are to be protected by the use of epoxy-coated rebar, quantities of epoxy-coated rebar should be shown separately. If a portion of a bar requires coating, for estimating quantity, assume the whole bar to be coated.
3. Show polyester concrete overlay where required.

Barton J. Newton
State Bridge Engineer
Deputy Division Chief, Structure Policy & Innovation
Division of Engineering Services