# SPECIAL PROVISION

# SPECIFICATION 680 – BRIDGE DECK SMOOTHNESS

## 680-1 DESCRIPTION

**680-1.01 Scope** - This work shall consist in measuring the roughness for bridge concrete deck lots acceptance. The work shall be performed at the locations shown in the plans or indicated by the Engineer, in accordance with these specifications, and in conformance with the lines, grades and details shown on the plans or established by the Engineer.

a. The Contractor will accomplish roughness test during the construction in process to evaluate the performed work and to ease the correction procedures.

b. The Authority will perform the final measurements of surface roughness for the acceptance or rejection of the bridge concrete deck lots.

### 680-1.02 Equipment

a. Bridge concrete deck smoothness will be measured based upon the Profile Index (PI) as determined by the 25 feet computerized California type profilograph (non-uniformly spaced wheels), or a compatible device that correlates its results with the California type profilograph. The provided equipment shall comply with the ASTM E-1274, or the ASTM E-950 (Class I) in case the compatible device is selected. All bridge lanes including the bridge approach slabs shall be tested.

b. The PI will be determined using the equipment's software. The PI units will be setup in inches per mile and will be carried out to one decimal point. The profilogram is the graph that presents the roughness profile and it will be recorded using a vertical scale of one inch equal one inch, or full scale, vertically. The equipment will be setup using a blanking band of 0.2 inches and a "must correct" bump or depression limit of 0.4 inches in a length of 25 feet for the purpose of the PI computations. Motive power may be manual or by a propulsion unit attached to the assembly. The equipment will be moved longitudinally at the right wheel path along the bridge lanes, in the direction of traffic, at a speed no greater than 3 MPH.

c. A bridge concrete deck lot is defined as 528 feet (0.1 mile) of a bridge lane. The profilograph measurements will be initiated, and ended, with the profile wheel located at the beginning, or end, of the bridge concrete decks. For lanes with 12-feet width or less, the wheel path will be located at 3 feet from and parallel to the right edge of pavement. For lane width greater than 12 feet, the profile will be taken on the right edge from the approximate lane marking.

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**680-1.03 Surface and Tolerances Requirements**

a. The Contractor shall furnish equipment and employ methods that produce a riding surface having a Profile Index (PI) within the acceptance zone presented in Table 680-1. During construction, the Contractor shall verify its PI production. The profilograph will be calibrated and operated by qualified technical personnel in compliance with the equipment's manufacturer recommendations and protocols. On bridge concrete deck lots, the Contractor may fill the transverse joints with an appropriated material, flush with the surface, to minimize the influence of the joint in the PI computations. The final profilograph evaluation will be made with the Authority's equipment after the bridge concrete decks and bridge approach slabs have been completed.

b. At the construction phase, the Contractor may submit correction proposal for those lots with PI falling in the penalties zone stated in Table 680-1. If the Contractor proposes correction by diamond grinding method, the Authority will require pachometer measurements by the Contractor to assure that top reinforcement cover is maintained. The maximum grinding depth shall be equal to 1/4 inch. The Authority may require the drilling of 1/4 inch holes to verify the pachometer depth readings to the top of the reinforcement. The Authority may reject the Contractor's correction proposal and the bridge concrete deck lots will remain with the penalty. If the Authority accepts the correction to take place, the affected lot will be measured and a new PI will be calculated for acceptance. If the corrected bridge concrete deck lot results in damages, the full computed damage would be applied. Only one corrective effort will be permitted on the bridge concrete deck lots. For bridge concrete deck lots less than 0.10 miles in length, the penalties will be reduced proportionally with the actual length of the lot. Segments shorter than 15 feet will not be considered for penalties computations. No penalties will be applied to the Contractor until the corrections and the final evaluation takes place.

c. If the Authority requires or specifies correction by diamond grinding method on the bridge concrete deck surface, the top reinforcement cover shall be maintained as indicated in the plans. The Authority will require pachometer measurements by the Contractor to verify the top reinforcement cover. The maximum grinding depth shall be equal to 1/2 inch. The Authority may require the drilling of 1/4 inch holes to verify the pachometer depth readings to the top of the reinforcement. The bridge concrete deck lot will be measured and a new PI will be calculated for acceptance in accordance with Table 680-1. If the bridge concrete deck lot results in damages, the full computed damage would be applied. Only two corrective efforts will be permitted on the bridge concrete deck lots. For bridge concrete deck lots less than 0.10 miles in length, the

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penalties will be reduced proportionally with the actual length of the lot. Segments shorter than 15 feet will not be considered for penalties computations. No penalties will be applied to the Contractor until the corrections and the final evaluation takes place.

d. Lots with a PI falling in the rejected zone stated in Table 680-1, will be immediately submitted to a major slab reconstruction, at the Contractor's expense, prior to continuing the paving operation.

e. The final smoothness evaluation will be made with the Authority's profilograph. The Contractor will be responsible to clean the pavement, bridge concrete deck and bridge approach slabs, and mark the wheel path of the areas to be tested. Also, traffic control will be the Contractor's responsibility during the testing operations and to provide survey services and reference points tied to the stationing system of the project. No compensation will be provided for these services.

f. All accesses of bridge will be evaluated for smoothness compliance as per the specification for PCC Pavement or Hot Plant-Mix Bituminous Pavement Smoothness, as applicable.

g. When the contract requires the transitioning to pavements and structures using Hot Plant-Mix Bituminous courses as specified in the plans, the final paved surface resulting from such work shall comply with the smoothness requirements for a Level #5 as per Specification 410 - Hot Plant-Mix Bituminous Smoothness.

**TABLE 680-1**

**ACCEPTANCE CRITERIA FOR BRIDGE CONCRETE DECK LOTS**

| Type of Facility | Acceptance | | | | Rejected | |
|---|---|---|---|---|---|---|
| | PI | Penalty | PI | Penalty | PI | Penalty |
| New Construction or Bridge Rehabilitation | $\leq 30$ | None | $30 < PI \leq 60$ | Penalty of $500 per every PI above | $> 60$ | Major Slab Reconstruction |