



U.S. Department
of Transportation

**Federal Highway
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

DEC 22 1977

Refer to: HNG-14

Mr. Daniel H. Copeland
Executive Director
Bridge Grid Flooring Manufacturers
Association
231 South Church Street
Mt. Pleasant, Pennsylvania 15666

Dear Mr. Copeland:

This is to summarize the results of several contacts you and your consultant, Dr. Ahomad Ahmadi, have had with Mr. Benjamin Tang and Mr. James H. Hatton, Jr., of the Federal Highway Administration, Office of Engineering, regarding the acceptability of proposed details for mounting a shaped concrete parapet on a grid reinforced concrete bridge deck. The principal issue under consideration was the adequacy of the anchorage of the "Z" bar connecting the parapet to the deck. The finite element analysis supplied with your September 8 letter to Mr. Hatton dispelled our concerns on that issue. Therefore, the parapet attachment detail shown in the enclosed drawing, which was forwarded with your November 3 letter to Mr. Hatton, is satisfactory, subject to the comments below, and acceptable for use on the National Highway System projects if proposed by a State highway agency.

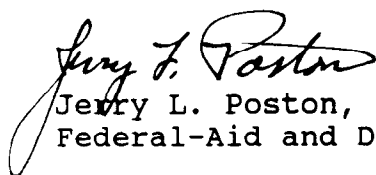
The comments we would offer relative to the details on the drawing are as follows:

- o The quantity of steel, both vertical and longitudinal in the parapet is less than that used in a comparable crash-tested parapet. However, given that the base of the parapet is wider in the detail you supplied than was the base in the tested parapet and that the tested parapet was not damaged by the testing, we would not insist upon an increase in the reinforcement except as indicated in the next comment.

- o In an earlier drawing you provided there was a note that read, "within 4200 mm on both sides of an [open] joint in the parapet...and at the end of the bridge, reduce maximum spacing of vertical reinforcement to half the shown spacing." While we consider the length along the parapet over which the reduced spacing of the vertical reinforcement applies to be somewhat conservative, in view of the previous comment, the reduced spacing requirement should be added to the drawing supplied with your November 3 letter.
- o An important factor revealed by the finite element analysis was that the toe of the "Z" bar is below the neutral axis of the bridge deck. A special provision should be developed to ensure that the lower horizontal portion of the "Z" bar, the toe, will, with proper consideration for cover, be placed as low in the grid reinforced deck as permitted by the grid to ensure that the toe will always be below the neutral axis of the deck.
- o In the finite element analysis, good shear transfer at the interface between the bottom of the parapet and the top of the deck was assumed. The construction specifications should ensure that the contact surface on the deck is properly cleaned and prepared prior to placement of the parapet concrete to ensure proper performance.

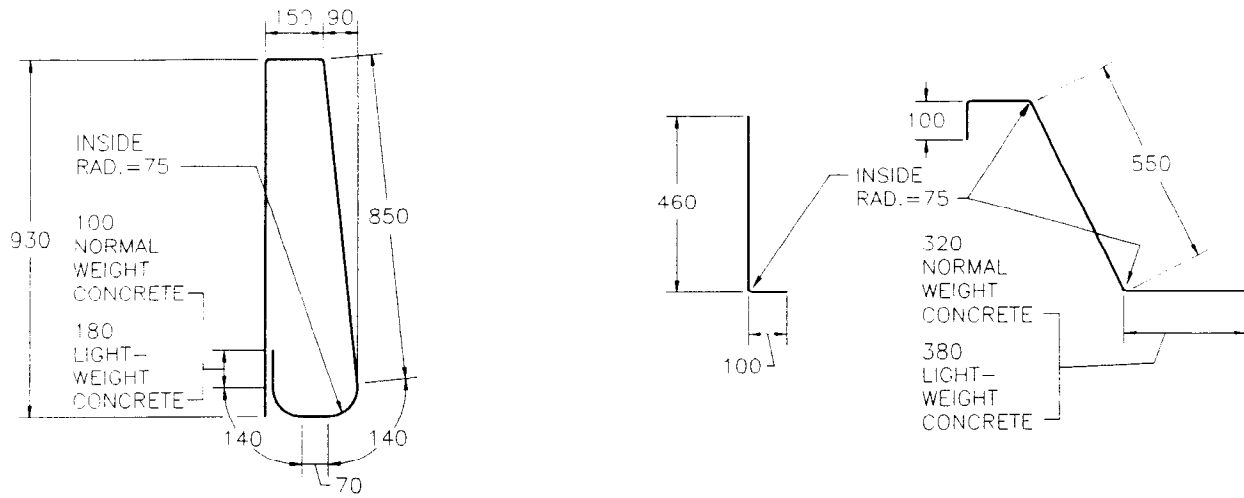
If you have any further questions, please feel free to continue to contact Mr. Hatton.

Sincerely yours,

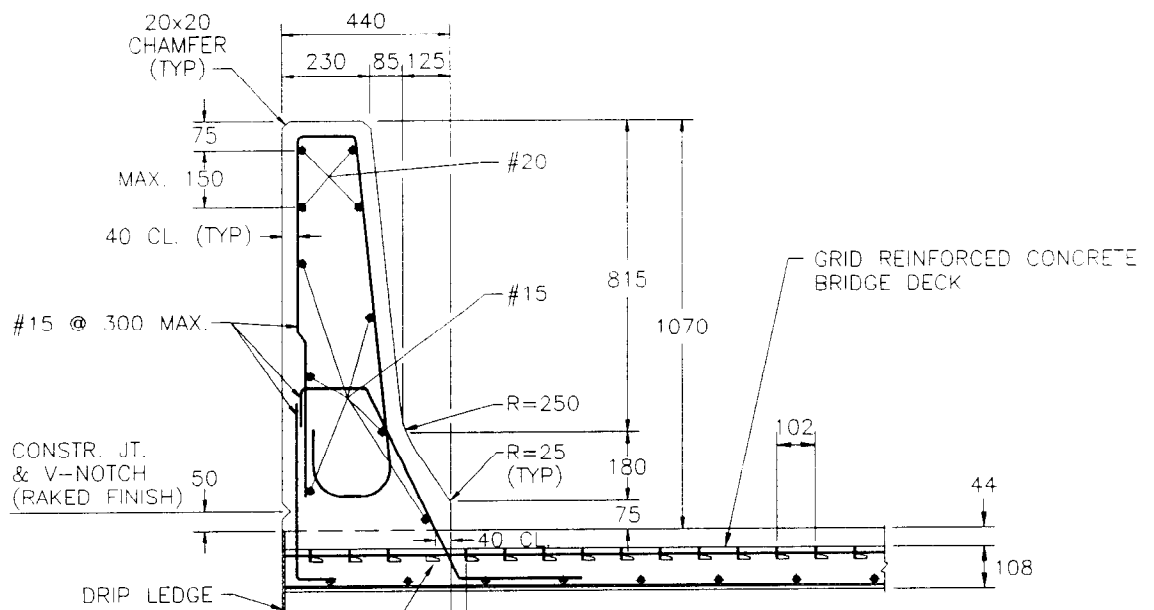

 Jerry L. Poston, Chief
 Federal-Aid and Design Division

Federal Highway Administration
 HNG-14:JHatton:366-1329:gm:12-22-95:COPELAND
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PARAPET REINFORCEMENT



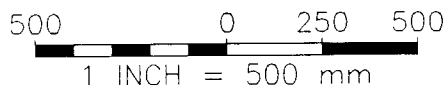
FIRST CROSS BAR BENEATH PARAPET OMITTED FOR 4 1/4" GRID FLOOR, FIRST TWO CROSS BARS OMITTED FOR 5 3/16" GRID FLOORS.

89 MAXIMUM DIMENSION FROM FACE OF PARAPET TO FIRST CROSS BAR BEYOND PARAPET

TYPICAL CONCRETE PARAPET DETAIL

NOTES:

1. 4 1/4" FULL DEPTH GRID REINFORCED CONCRETE BRIDGE DECK SHOWN, DETAILS ARE APPROPRIATE FOR 5 3/16" FULL DEPTH DECK DESIGNS AS WELL.
2. HALF DEPTH GRIDS SHALL BE FULL DEPTH FOR A MINIMUM DISTANCE OF 915 mm FROM THE OUTSIDE EDGE OF THE DECK.
3. ATTACHMENT DETAIL APPLICABLE FOR ALL OVERLAY TYPES.
4. ALL DIMENSIONS IN mm UNLESS NOTED OTHERWISE.



TYPICAL ATTACHMENT OF CONCRETE PARAPET TO GRID REINFORCED CONCRETE BRIDGE DECK