

MEMORANDUM

DEPARTMENT OF TRANSPORTATION
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Date: June 15, 2000

To: CDOT & Consultant Design & Construction Personnel

From: S. W. Horton, Bridge Branch Manager

Subject: Bridge Deck Cover & Overlay Thickness

With this memorandum, CDOT's policy on bridge decks has been changed as follows:

- The maximum thickness of overlays (either asphalt or concrete) on new bridge decks has been changed from 4" to 3".
- The top cover over reinforcing steel in bridge decks has been changed from 2.5" to 2" when an overlay is placed on the deck when the deck is constructed.
- The thickness of asphalt overlays placed when the deck is constructed has been changed from 2" to 3"

The thickness of the asphalt wearing surfaces on new bridge decks shall be increased from two inches to three inches without provisions for additional asphalt thickness in the future. This requirement has several advantages:

- With 3" of asphalt it is possible to remove and replace two inches of asphalt without threatening the integrity of a waterproofing membrane.
- With 3" of asphalt placed at new construction, and no additional future thickness, expansion devices in the bridge will always be at the correct elevation. This will reduce the need to taper future overlays, and the tendency to pave over expansion devices.
- The three inch thick lift for new decks will allow the use of larger aggregate which has the potential of increasing the resistance to wheel rutting. The 2" lift for repaving is based on the common practice of placing 2" on rehabilitation projects.

When specifying a concrete riding surface, dead load and rail height provisions for 3" maximum overlay shall be provided. Depending on the replace-ability and permeability of the deck, an overlay (of a type and depth to be determined during design, but not to exceed 3") may or may not be used at the time of initial construction. This requirement has several advantages:

- It is consistent with the new requirements for asphalt for dead load and rail heights.
- It permits the current practice of placing a 2" silica fume concrete overlay on bridge decks that cannot be replaced without shoring the superstructure.
- CDOT is currently evaluating different strategies for protecting bare concrete decks, the 3" provides maximum flexibility regardless of the outcome of future policies.
- It allows for the placement of 3" of asphalt over waterproofing membrane, if necessary, in the future.

On rehabilitation projects, the maximum thickness of asphalt on bridges built with this new policy will be 3". The maximum thickness of asphalt on bridges built before this new policy will remain at 4"; however, three inches of asphalt shall be used for these existing bridges when:

- the expansion joints and overlay are being replaced,
- or when there are no expansion joints, and
- there are no foreseeable drainage or grade problems caused by using a three inch thick mat.

The top cover on bridge decks which receive an overlay will be decreased from 2.5" to 2". This applies to both concrete and asphalt-over-waterproofing-membrane overlays that are placed when the deck is constructed. In 1981 the policy to use 2.5" of cover, waterproofing membranes and epoxy coated rebars for bridge decks was fully implemented. Since then experience indicates that the effectiveness of waterproofing membranes and epoxy coatings are adequate enough to allow CDOT to return to using 2" of cover (as specified by AASHTO) when the deck has a protective overlay. The 2" will result in some cost saving by increasing the effective depth used in design. It may potentially also result in smaller crack widths at the deck surface and better crack control.

Bare concrete decks without an overlay will continue to have 3" of cover. Given the absence of a protective overlay the additional inch of cover over 2" is used for corrosion protection, wear, and grooving.

Using a silane sealer on bare concrete decks is recommended (see CDOT Standard Specifications for Construction, Subsection 515.03 & 515.05). The silane protected surface does wear off in the travel lanes, but remains in the shoulder and low curb areas where corrosion is often a problem. Because the protected surface wears away, re-applying the silane on future safety and maintenance projects is recommended.

The minimum thickness of concrete bridge decks will continue to be 8". Staff Bridge is currently working on developing LRFD deck design charts for the Bridge Design Manual. Using 9" minimum for bare concrete decks without overlay and 3" of cover will be considered for greater simplicity and uniformity of the design tables. The final decision is pending the development of the charts.

On side-by-side precast box girders, the depth of the cast-in-place portion of the deck shall be as determined by design, though the combined composite thickness of the cast-in-place portion with the top flange of the box shall not be less than 8".

These policy changes are effective immediately for all projects except those currently in progress where the new policy would adversely impact the project schedule.

SWH/PKP

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