TO:

SUPERSEDED BY EI 77-031
EFFECTIVE 5/1/1977

ENGINEERING INSTRUCTION

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

SUBJECT: STANDARD DETAILS FOR HIGHWAY BRIDGES, REVISIONS TO

Subject Code: 7.35-11

Distribution: ☐ Main Office ☐ Regions ☒ Special

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Deputy Chief Engineer (Structures)

Code: EI-76-62

Date: ~~10/8/76~~

Supersedes:

Attached is a revision to Sections 21.11, 23.1 and 25.3 of Standard Details for Highway Bridges.

By implementation of these revisions, epoxy-coated reinforcing bars shall be used in the top mat of all monolithic bridge decks and concrete approach slabs.

Provision is also made for the use of latex modified and high density-low slump concrete top courses in two-course construction. At this time, these materials will not be specified for new deck construction. Future use of them will be made only when specifically authorized by the Deputy Chief Engineer (Structures).

This instruction is effective immediately. Projects under design with 9-1/4-inch monolithic decks shall be revised if practical to do so.

Page		
27	Art. 21.11	Revised
	Art. 21.12	Deleted to make space for revision to Art. 21.11. This article was to be deleted when revised GLD Drawings are issued in the very near future.
28	No change	
79	Art. 23.1.1	Revised
	Art. 23.1.2	Revised
79-1	Art. 23.1.2	Added due to Art. 23.1.2
	Art. 23.1.2(a)	No change
79-2		Added
80		No change
94-2		No change
94-3	Art. 25.3	First two covering dimensions revised.

21.10.3 CLEARANCES OVER NAVIGABLE WATERWAYS

1. Horizontal and vertical clearances as shown on the Coast Guard Permit Application shall be shown in plan and elevation as noted in 21.9.1, Layout Drawings.
2. Vertical clearances will be shown above maximum navigable water surface for bridges over the Barge Canal, and over mean (ordinary) high water elevation for others.

21.10.4 WATER ELEVATIONS

Except for the table described in Article 21.10.1, only the following water elevations are to be shown on the plans:

1. Design High Water Elevation for all waterway crossings except where the waterway elevations are completely controlled.
2. Normal pool elevation and maximum navigable water surface for all canal crossings.
3. All water elevations indicated on the Coast Guard Permit.

(All elevations are to be shown and identified on the "ELEVATION A-A" detail of the preliminary plan.)

21.11 - REINFORCED CONCRETE APPROACH SLABS:

All bridges shall be provided with a reinforced concrete approach slab. (See current BDD Sheets.)

Epoxy-coated bars shall be used in the top mat.

The cover to the top steel shall be 2-1/2 inches, which includes a 1/2-inch construction tolerance.

21.12 - DEPTH OF CONCRETE FASCIA ON MULTIPLE SPAN STRUCTURES:

Deleted.

21.13 GRANITE CURBS

Granite curbs shall be used on all bridges where curbs are required and should be so shown on the plans.

21.14 SIDEWALKS ON BRIDGES

When required, raised sidewalks shall have a minimum clear width of 4 feet. Sidewalks on or adjacent to walls, may be jointly supported on the embankment and walls.

21.15 DETAILS OF RAILINGS

Complete plan or elevation of railing shall be detailed. These views may be schematic. The location of the railing shall be set by tying in one or more posts to the end of slab or end of wingwall. Location of special posts and rail expansion joints shall be shown.

21.16 BRIDGE DRAINAGE

The spacing of bridge drains shall be based on a 5-minute storm of a 10-year frequency. Bridge drains are to be provided to maintain a maximum puddle width determined by the following conditions:

a. Maximum puddle width is limited to 12 feet.

b. Maximum puddle depth is one-half inch less than the curb height.

c. Lane width clear of puddle must be a minimum of 8 feet.

Recommended design practice for hydraulic computations shall be those of the Federal Highway Administration as published in Circular HEC No. 12 - Drainage of Highway Pavements, March 1969.

SECTION 23 - DECK SYSTEMS

23.1 - Concrete Deck Slabs:

23.1.1 - Monolithic Decks

Structural concrete deck slabs shall have a thickness of 8-1/2 inches, including a monolithic wearing surface. The top 1-1/2 inches shall be neglected in the design. The cover to the top steel shall be 2-1/2 inches, which includes a 1/2-inch construction tolerance. The bottom cover shall be one inch.

Epoxy-coated reinforcing bars shall be used in the top mat.

23.1.2 - Two-Course Bridge Decks

Two-course construction for new bridge decks may be used only when specifically authorized by the Deputy Chief Engineer (Structures).

The structural concrete deck slab shall have a thickness of 7-1/2 inches. The cover to the top steel shall be 1-1/2 inches, which includes a 1/2-inch construction tolerance. The bottom cover shall be one inch. Uncoated reinforcing bars shall be used. The overlay shall consist of one of the following systems, applied as noted:

a. Asphalt Concrete Top Course. An approved membrane system shall be used. Asphalt concrete wearing surface shall be 2-1/2 inches thick.

b. Latex Modified Concrete Top Course. Thickness shall be 1-1/2 inches.

c. High Density-Low Slump Portland Cement Concrete Top Course. Thickness shall be 2 inches.

Note (1): Specified thicknesses of latex modified and high density-low slump concretes include 1/4-inch extra for tined finishing.

Note (2): When latex modified concrete and high density-low slump concretes are specified as optional materials, the designer must make provision on the plans for variations due to the difference in thicknesses of the two materials.

23.1.2(a) - Bridge Consisting of Simple and Continuous Spans

The procedure as set forth in Art. 23.1.2 - Continuous Span Bridges - shall be as followed for all spans.

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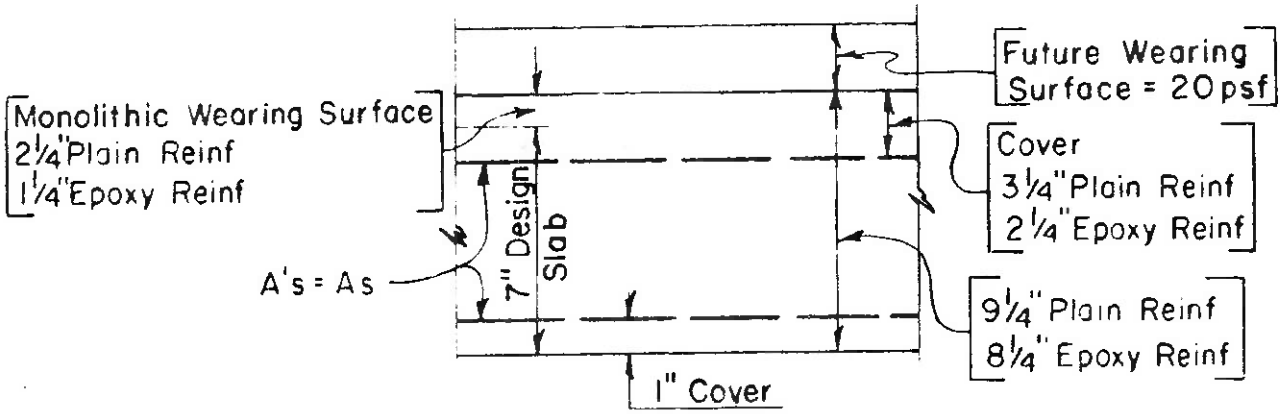
SLAB DESIGN TABLE

CONCRETE REINFORCEMENT ASTM A615 GRADE 60

$f_s = 24{,}000$ psi $f_c = 1{,}200$ psi $n = 10$



BAR SIZE AND SPACING	MAXIMUM DESIGN SPAN		MAXIMUM OVERHANG	
	BARS ⊥ TRAFFIC	BARS ∥ TRAFFIC	TYPES I, II, III, VII SECTIONS	TYPES IV & VI SECTIONS
#6 @ 5"	10'-3"	7'-7"	4'-0"	3'-9"
#6 @ 5¼"	10'-1"	7'-5"	3'-11"	3'-8"
#6 @ 5½"	9'-10"	7'-3"	3'-11"	3'-8"
#6 @ 5¾"	9'-8"	7'-2"	3'-10"	3'-7"
#6 @ 6"	9'-6"	7'-0"	3'-10"	3'-7"
#6 @ 6¼"	9'-4"	6'-10"	3'-9"	3'-6"
#6 @ 6½"	9'-2"	6'-9"	3'-9"	3'-6"
#5 @ 5"	9'-1"	6'-8"	3'-9"	3'-6"
#5 @ 5¼"	8'-10"	6'-6"	3'-8"	3'-5"
#5 @ 5½"	8'-8"	6'-5"	3'-8"	3'-5"
#5 @ 5¾"	8'-5"	6'-2"	3'-7"	3'-4"
#5 @ 6"	8'-1"	6'-0"	3'-6"	3'-4"
#5 @ 6¼"	7'-9"	5'-9"	3'-6"	3'-3"
#5 @ 6½"	7'-6"	5'-6"	3'-5"	3'-3"
#5 @ 6¾"	7'-2"	5'-4"	3'-4"	3'-2"
#5 @ 7"	6'-11"	5'-2"	3'-4"	3'-2"
#5 @ 7¼"	6'-9"	5'-0"	3'-4"	3'-1"
#5 @ 7½"	6'-6"	4'-10"	3'-3"	3'-1"
#4 @ 5"	6'-4"	4'-9"	3'-3"	3'-1"

TYPES I, II, III, IV, VI & VII SECTIONS ARE SHOWN ON BDD 73-70.

MAXIMUM OVERHANG SHALL BE MEASURED FROM CENTER LINE OF WEB OF FASCIA STRINGER.

REINFORCEMENT PLACED ON A SKEW SHALL HAVE ITS ⊥ SPACING REDUCED BY THE COSINE SQUARED OF THE SKEW ANGLE.

ACI STANDARD HOOKS

Revised April 1975

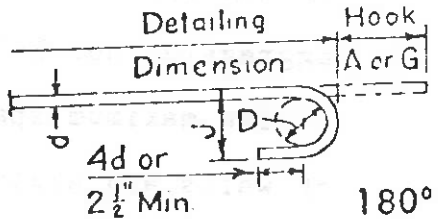
All specific sizes recommended by CRSI below meet requirements of ACI 318-71

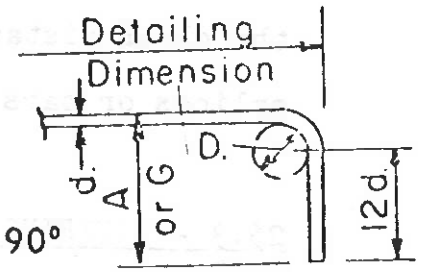
RECOMMENDED END HOOKS
All Grades

D = 6d for #3 through #8
D = 8d for #9, #10, and #11
D = 10d for #14 and #18

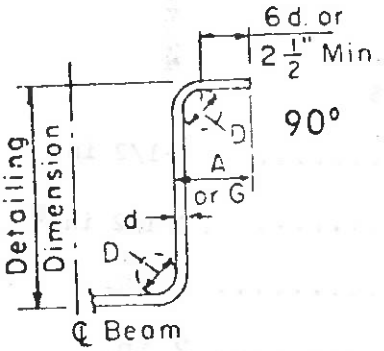
Bar Size	180° HOOKS*		90° HOOKS
	A or G	J	A or G
#3	5	3	6
#4	6	4	8
#5	7	5	10
#6	8	6	1-0
#7	10	7	1-2
#8	11	8	1-4
#9	1-3	11¼	1-7
#10	1-5	1-0¾	1-10
#11	1-7	1-2¼	2-0
#14	2-2	1-8½	2-7
#18	2-11	2-3	3-5

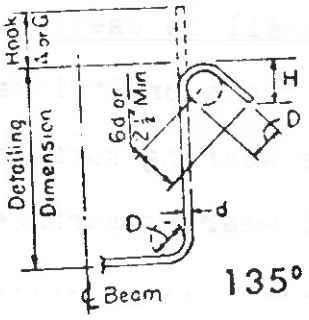
*With Grade 40 only, where available depth is limited, bars may be bent with D = 5d for #3 through #11.





STIRRUP AND TIE HOOKS





STIRRUPS
(TIES SIMILAR)

STIRRUP AND TIE HOOK DIMENSIONS
Grades 40-50-60 ksi

Bar Size	D (in.)	90° Hook	135° Hook	
		Hook A or G	Hook A or G	H Approx.
#3	1½	4	4	2½
#4	2	4½	4½	3
#5	2½	6	5½	3¾

25.2 - SPACING

Except as noted in Sections 24.11 and 25.11, the clear distance between parallel bars shall not be more than 18 inches, nor less than 1-1/2 times the nominal diameter of the bars, 1-1/2 times the maximum size of the coarse aggregate, nor 1-1/2 inch.

The maximum spacing of design reinforcement in the back of walls and abutments shall be 2'-0".

Where reinforcement in beams or girders is placed in two or more layers, the bars in the upper layers shall be placed directly above those in the bottom layer.

The clear distance between bars shall also apply to the clear distance between the contact splice and adjacent splices or bars.

25.3 - COVERING

The following cover shall be used:

Structural Deck Slabs on Beams or Stringers .

Top of slab with separate wearing surface	1-1/2 in.
Top of slab with integral wearing surface	2-1/2 in.*
Bottom of slab	1 in.
Beams and columns	2 in.
Walls and piers above footings (including those adjacent to water)	2 in.
Footings (including unformed bottom) ..... This may be increased to accommodate piles when necessary.	3 in.

* Cover based on use of coated bars in top mat.