Iowa Department
of Transportation
Highway Division

SINGLE SPAN
REINFORCED CONCRETE BOX CULVERT STANDARDS

GENERAL NOTES :

1. THE RCB CULVERT SECTIONS ARE DESIGNED FOR HS20-44 LIVE LOAD AND EARTH FILLS OF VARYING HEIGHTS.
2. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 140 pcf. Z = 170 FOR CRACK CONTROL.
3. LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 36 psf/FT.
4. METAL BAR CHAIRS SPACED AT NOT OVER 3'-0 C-C IN EITHER DIRECTION ARE TO BE USED TO SUPPORT ALL SLAB AND FLOOR STEEL AS OUTLINED IN THE STANDARD SPECIFICATIONS (ARTICLE 2404.07).
5. THE CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR EDGE OR END OF REINFORCING BAR TO BE 2" UNLESS OTHERWISE NOTED.
6. LONGITUDINAL REINFORCING IS NOT TO EXTEND THRU THE CONSTRUCTION JOINTS, EXCEPT FOR 5#1 DOWEL BARS IN SLAB.
7. ALL REINFORCING STEEL IS TO BE SECURELY WIRED IN PLACE BEFORE THE CONCRETE IS POURED (ARTICLE 2404.06).
8. FLOOR OF BARREL IS TO BE FINISHED SMOOTH. SIDES OF FOOTING ARE TO BE FORMED TO INSURE CORRECT LINE AND GRADE.
9. ALL EXPOSED CORNERS 90° OR SHARPER TO BE FILLETED WITH A ¾" DRESSED AND BEVELED STRIP.
10. THE PERMISSIBLE CONSTRUCTION JOINT AT THE TOP OF THE WALLS MAY BE LOWERED AT THE CONTRACTOR'S OPTION WITH ENGINEER'S APPROVAL.
11. THE REINFORCEMENT SUPPLIED FOR THIS STRUCTURE SHALL BE GRADE 60 REINFORCEMENT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. THE DESIGN STRESSES ARE BASED ON GRADE 60 REINFORCEMENT.
12. THE VERTICAL BARS IN THE WALLS MAY BE SPLICED ABOVE THE FOOTING AT THE CONTRACTOR'S OPTION AS FOLLOWS:

BAR SIZE NUMBER	4	5	6	7	8	9
MINIMUM SPLICE LENGTH	17"	21"	25"	34"	44"	56"

THIS SPLICE, IF USED WILL BE AT THE CONTRACTOR'S EXPENSE.

13. REBAR CLEARANCES WILL BE AS FOLLOWS:
    - VERTICAL, TOP 2"
    - VERTICAL, BOTTOM 3", OR 3½" IF THE OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
    - TRANSVERSE 2"
    - EDGE CLEARANCES 2" EXCEPT, TOP OF FLOOR 2½" TO NEAR TRANSVERSE REINF BAR OR BOTTOM OF FLOOR 3½" TO NEAR TRANSVERSE REINF BAR.
14. ALL CONSTRUCTION JOINTS SHALL BE FORMED WITH A BEVELED KEYWAY EXCEPT AT BELL JOINTS.

    ALL BEVELED KEYWAYS SHALL BE CENTERED.

    KEYWAY SIZE SHALL BE 2x4 EXCEPT AS FOLLOWS : KEYWAY BETWEEN THE FLOOR AND WALL SHALL BE 2x6 WHEN THE WALL IS GREATER THAN 10 INCHES WIDE.
15. IF 0'OF FILL IS SPECIFIED, DETAILS FOR PAVING NOTCH AND REFERENCE TO EPOXY COATING OF SLAB REINFORCING STEEL, IF APPLICABLE, SHALL BE INCLUDED IN THE FINAL PLANS.

SPECIFICATIONS :

DESIGN: AASHTO SERIES OF 1983, EXCEPT AS MODIFIED IN "GENERAL NOTES 2 & 3" ABOVE.
CONSTRUCTION: STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION SPECIFICATION, CURRENT SERIES, PLUS CURRENT SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS.

DESIGN STRESSES :

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 1983:
REINFORCING STEEL IN ACCORDANCE WITH SECTION 8, GRADE 60.
CONCRETE IN ACCORDANCE WITH SECTION 8, f'c = 3,500 PSI.

INDEX FOR CULVERT STANDARDS :

RCB 3-1-89	CULVERT BARREL DETAILS, VARIABLE DIMENSIONS AND QUANTITIES TABLE - 3' SPAN.
RCB 4-1-89	CULVERT BARREL DETAILS, VARIABLE DIMENSIONS AND QUANTITIES TABLE - 4' SPAN.
RCB 5-1-87	CULVERT BARREL DETAILS, VARIABLE DIMENSIONS AND QUANTITIES TABLE - 5' SPAN.
RCB 6-1-87	CULVERT BARREL DETAILS, VARIABLE DIMENSIONS AND QUANTITIES TABLE - 6' SPAN.
RCB 8-1-87	CULVERT BARREL DETAILS, VARIABLE DIMENSIONS AND QUANTITIES TABLE - 8' SPAN.
RCB 10-1-87	CULVERT BARREL DETAILS, VARIABLE DIMENSIONS AND QUANTITIES TABLE - 10' SPAN.
RCB 12-1-87	CULVERT BARREL DETAILS, VARIABLE DIMENSIONS AND QUANTITIES TABLE - 12' SPAN.
FWH 0-1-87	BENT BAR DETAILS, BILL OF REINFORCING FOR ONE HEADWALL, 0° SKEW - 12' & 10' SPANS.
FWH 0-2-87	BENT BAR DETAILS, BILL OF REINFORCING FOR ONE HEADWALL, 0° SKEW - 8', 6', 5', 4' & 3' SPANS.
FWH 0-3-87	DIMENSION TABLE.
FWH 0-4-87	CURTAIN WALL DETAILS AND PLAN VIEW - APRON REINFORCING, TOP & BOTTOM.
FWH 0-5-87	TYPICAL VIEW - FRONT & BACK FACE REINFORCING, SHORT & LONG WINGWALL, TYPICAL SECTION - NEAR CENTER OF APRON, TOP OF WINGWALL DETAILS AND SECTION THRU PARAPET.
FWH 15-1-87	BENT BAR DETAILS AND BILL OF REINFORCING FOR ONE HEADWALL, 15° SKEW - 12' & 10' SPANS.
FWH 15-2-87	BENT BAR DETAILS AND BILL OF REINFORCING FOR ONE HEADWALL, 15° SKEW - 8' & 6' SPANS.
FWH 15-3-87	BENT BAR DETAILS AND BILL OF REINFORCING FOR ONE HEADWALL, 15° SKEW - 5' SPAN.
FWH 15-4-87	DIMENSION TABLE.
FWH 15-5-87	CURTAIN WALL DETAILS AND PLAN VIEW - APRON REINFORCING, TOP & BOTTOM.
FWH 15-6-87	TYPICAL VIEW - FRONT & BACK FACE REINFORCING, SHORT & LONG WINGWALL, TYPICAL SECTION - NEAR CENTER OF APRON, TOP OF WINGWALL DETAILS AND SECTION THRU PARAPET.
FWH 30-1-87	BENT BAR DETAILS AND BILL OF REINFORCING FOR ONE HEADWALL, 30° SKEW - 12' & 10' SPANS.
FWH 30-2-87	BENT BAR DETAILS AND BILL OF REINFORCING FOR ONE HEADWALL, 30° SKEW - 8' & 6' SPANS.
FWH 30-3-87	BENT BAR DETAILS AND BILL OF REINFORCING FOR ONE HEADWALL, 30° SKEW - 5' SPAN.
FWH 30-4-87	DIMENSION TABLE.
FWH 30-5-87	CURTAIN WALL DETAILS AND PLAN VIEW - APRON REINFORCING, TOP & BOTTOM.
FWH 30-6-87	TYPICAL VIEW - FRONT & BACK FACE REINFORCING, SHORT & LONG WINGWALL, TYPICAL SECTION - NEAR CENTER OF APRON, TOP OF WINGWALL DETAILS AND SECTION THRU PARAPET.
FWH 45-1-87	BENT BAR DETAILS AND BILL OF REINFORCING FOR ONE HEADWALL, 45° SKEW - 12' & 10' SPANS.
FWH 45-2-87	BENT BAR DETAILS AND BILL OF REINFORCING FOR ONE HEADWALL, 45° SKEW - 8' & 6' SPANS.
FWH 45-3-87	BENT BAR DETAILS, BILL OF REINFORCING FOR ONE HEADWALL, 45° SKEW - 5' SPAN AND CURTAIN WALL DETAILS - ALL SPANS.
FWH 45-4-87	DIMENSION TABLE.
FWH 45-5-87	PLAN VIEW - APRON REINFORCING, TOP & BOTTOM.
FWH 45-6-87	TYPICAL VIEW - FRONT & BACK FACE REINFORCING, SHORT & LONG WINGWALL, TYPICAL SECTION - NEAR CENTER OF APRON, TOP OF WINGWALL DETAILS AND SECTION THRU PARAPET.
CBJ 1-87	CULVERT BELL JOINT DETAILS AND ESTIMATE OF QUANTITIES TABLE - 3', 4' & 5' SPANS.
CBJ 2-87	CULVERT BELL JOINT DETAILS AND ESTIMATE OF QUANTITIES TABLE - 6' & 8' SPANS.
CBJ 3-87	CULVERT BELL JOINT DETAILS AND ESTIMATE OF QUANTITIES TABLE - 10' & 12' SPANS.
CBJ 4-87	PERMISSIBLE CULVERT BELL JOINT DETAILS.

LATEST REVISION DATE : 04-02

William A. Kinkaid
APPROVED BY :

STANDARD DESIGN

GENERAL INFORMATION

FOR
REINFORCED CONCRETE BOX CULVERTS

HIGHWAY DIVISION
IOWA DEPARTMENT OF TRANSPORTATION

MAY , 1987

RCB-GI-87

REVISED 04-02 - ADDED CBJ 4-87 STANDARD SHEET.
RCBGI.SOI - REVISED : 8/89 ; 3' & 4' SPANS ADDED TO INDEX. ADDED GENERAL NOTE 15.

REVISED: 10/89 AASHTO DESIGN SPECIFICATION MODIFIED
REVISED: 12/96 ; GENERAL NOTE #14 CHANGED.

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