

9475.65007

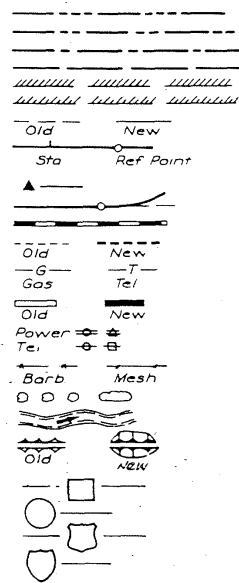
Webster IA 7 #23

CONVENTIONAL SIGNS

State Line
Co. Line
Twp. Line
Sec. Line
Corp. Line
Urban Bdry
R.O.W. Lines
Survey Line

Sec. Corner
Profile Grade
Railroad
Field Tile
Underground Lines
Culverts
Utility Poles
Fencus
Trees Or Brush
Stream
Dike

County Road No.
Primary Road No.
U.S. Road No.
Interstate Road No.



IOWA DEPARTMENT OF TRANSPORTATION

Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM

WEBSTER COUNTY

BRIDGE REPAIR

ON IOWA 7 OVER THE DES MOINES RIVER IN FORT DODGE

SCALES AS NOTED

THE STANDARD SPECIFICATIONS, SERIES OF 1977
OF THE IOWA DEPARTMENT OF TRANSPORTATION,
SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT

(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 1977.
Reinforcing Steel in accordance with Section 1.5, Grade 40 and Grade 60.
Concrete in accordance with Section 1.5, $f'_c = 3,500$ psi.
Structural Steel in accordance with Section 1.7.

CONSTRUCTION PLANS SHOWING PROJECT AS BUILT

Plan Preparation Supervised By: Ron De Bok
Resident Construction Engineer

Date 3-15-83 Iowa Reg. No. 5795

REVIEWED AND FORWARDED TO AMES

Roy W. Kuhn Date 3/23/83
District Construction Engineer

1792
One 50% Reduced and Two Full-Size Prints To Be Made and Returned To

Bob Humphrey
District Engineer

AFTER MICROFILMING RETURN ORIGINAL
TO DISTRICT NO. 1

THIS AS BUILT PLAN INCLUDES

YEAR	WORK	CONTRACTOR	PROJ. INSPECTOR
1982	Bridge Repair	Dormark Const. Co.	Rich Lane

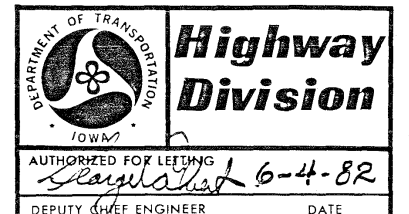
LOCATION MAP

LOCATION MAP SCALE



INDEX OF SHEETS	
NO.	DESCRIPTION
1	TITLE SHEET
2	ESTIMATE SHEET
3-14	DESIGN NO. 682

DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION
STANDARDS REQUIRED (Available at Bridge Design Services)
STANDARD ISSUED REVISED



I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED
UNDER MY SUPERVISION AND THAT ENGINEERING
DECISIONS WITH REGARD TO THE DESIGN WERE
MADE BY ME OR BY OTHER DULY REGISTERED
PROFESSIONAL ENGINEERS UNDER THE LAWS OF
THE STATE OF IOWA.
R. De Bok
2792 6-3-82
IOWA REGISTRATION NUMBER DATE

U.S. DEPT. TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED
DIVISION ENGINEER DATE

LETTING DATE June 15, 1982

STATE CONTROL SECTION NUMBER 94-0700

FILE NO. 26710

WEBSTER COUNTY

PROJECT NO. FN-7-5(13)--21-94

SHEET NO. 1 OF 14

BRIDGE REPAIR
FN-7-5(13)--21-94

WEBSTER COUNTY

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

DATE

JAMES R. SASSAMAN

REG. NO. 2663

DESIGN NO. 682
WEBSTER COUNTY

OVER DES MOINES RIVER
MAINT. NO. 9475.2S007

STA. 213+16 to 224+25

SECTION 19 T-89N R-28W WAHKONSA TWP.

DESIGN FOR REPAIRS TO
MULTISPAN CONTINUOUS PLATE
GIRDER BRIDGE

ESTIMATE OF QUANTITIES

IN LETTING OF

NO.	ITEM	UNIT	TOTAL
1	Temporary Support	L.S.	Lump Sum
2	Bridge Repair	L.S.	Lump Sum

ESTIMATE REFERENCE INFORMATION100-4

Data listed below is for informational purposes only and shall not constitute a basis for any extra work orders.

ITEM NO.	DESCRIPTION

ESTIMATE SHEET

FILE NO. 26710

WEBSTER COUNTY

PROJECT NUMBER

FN-7-5(13)--21-94

STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	5		2	14

GENERAL NOTES

This design is for proposed repairs to the existing Multispan Continuous Welded Plate Girder Bridge, original Design No. 1457, Webster County. Under Design No. 177, Webster County, bridge floor overlay was added.

During painting operations cracks in two adjacent girders (Girders B & C) of the westbound roadway near Pier 5 as shown in these plans were discovered. The westbound roadway is closed to traffic and will not be open to traffic until this proposed repair is completed. The eastbound roadway is presently carrying two way traffic.

Design Sheets 2, 3, 4, & 5 of 12 are sheets from original Design No. 1457. These sheets are included for information. However, some of the sheets have notes or details added that are to be part of this contract. These additions are encircled in a heavy wavy line.

The intent of this design is to repair the two cracked girders. Girder "B" must be repaired before work is started on repairing Girder "C".

Girder "B" repair basically consists of adding splice plates to the top flange. To accomplish this requires the removal of a small amount of the deck slab; the removal of one shear connector from the top flange; the removal of the top portion of four intermediate web stiffener plates; drilling the splice connection holes in the top flange; bolting splice plates into position; rebuilding the slab and overlay; paint steel. Girder "C" repair basically consists of adding splice plates to the top flange and to the web. To accomplish this requires the installation of several strong-back beams; the removal and replacement of some of the deck slab; the removal of two shear lugs, the removal of a small test sample from the girder; the removal and replacement of bolts at one field splice and at several diaphragms; manipulation of the girder; the removal of two pier stiffener plates; drilling splice connection holes; the installation of new splice and stiffener plates; the painting of repaired structural steel.

The test sample removed from Girder "C" and the 4" ϕ core removed from Girder "B" is to be delivered to the Bridge Design Office of the Iowa D.O.T. Highway Division in Ames.

The contractor's equipment on the bridge is to be restricted to the north lane and as near to gutter as practicable. Prior to repair of Girder "B", equipment should be west of Pier #5.

The concrete removal shall be in accordance with Section 2401 of the Standard Specifications. All reinforcing is to be left in place except that which is noted to be cut and removed. Except for test sample from Girder "C" all material removed (concrete, reinforcing, shear lugs, stiffeners, etc.) shall become the property of the contractor and removed from the site.

All concrete shall be Class "D" Structural Concrete except for top 1 3/4 inches of slab, which shall be Floor Repair Concrete. At the contractor's option, all new concrete may be Floor Repair Concrete. Section 2413 of the Standard Specs. shall apply, except if machine finishing for the roadway surface is not practicable, a manual type screed or metal plate, with approved vibrators attached, shall be used. Top surface of slab shall match the existing roadway surface, as near as practicable (transverse grooving is necessary only if existing surface is grooved).

All new structural steel (including H.T.S. bolts) listed in "Girder B Repair Material List" shown on Design Sheet 6 of 12 and in "Girder C Repair Material List" shown on Design Sheet 11 of 12 will be furnished fully fabricated to the contractor at no cost. The steel will be available at Paxton & Vierling Steel Co. in Omaha, Nebraska. The contractor is to haul the steel to the job site.

No field welding on the girders or new structural steel which is a part of the permanent structure will be allowed (not even tack welding) unless approved by the Bridge Engineer.

Structural steel (new steel and existing steel with damaged paint) in the repair area that will not be in contact with concrete shall be blast cleaned and painted in accordance with Section 2508 of the Standard Specs., unless otherwise noted. Surfaces of the existing girder which will be in contact with the new splice plates shall be carefully blast cleaned, free from dirt, paint, loose mill scale or other foreign material. Faying surfaces of splice plates and girder at field splice are to be blast cleaned also.

Final coat of paint shall be tinted to match color of paint adjacent to the repair area.

Except for item of "Temporary Support" as shown and noted on Design Sheets 7 & 8 of 12, the lump sum bid for "Bridge Repair" shall include the costs for all labor, equipment, and materials to accomplish the repair as shown and noted on Design Sheets 6, 9, 10, 11 & 12 of 12 and includes the following:

1. The hauling of the structural steel from the fabricating shop to the bridge site.

2. The furnishing and installation of materials for supporting the slab as shown on Design Sheet 12 of 12.

3. The removal and rebuilding of a portion of bridge slab (involves furnishing and placing 464 lbs. of reinforcing steel, 5.1 c. y. of structural concrete and 22.7 sq. yds. of Bridge Floor Overlay).

4. The cutting and grinding required to remove three shear lugs, a test sample from Girder C, two bearing stiffeners, upper portion of four intermediate web stiffeners, a small portion of a pier diaphragm, and a 4" ϕ saw cut hole from Girder "B".

5. The field drilling of all holes in steel as noted or shown, and the erection or installation of all new steel.

6. The removal of bolts from the connection of two intermediate diaphragms and two pier diaphragms fastened to Girder C and removal of bolts from a field splice. The rebolting of these same connections with new bolts.

7. The cleaning and painting of structural steel as noted.

TEMPORARY SUPPORT NOTES

A W36 beam is currently stored in the Iowa D.O.T. maintenance yard at Gowrie in Webster County and is available to the contractor. The contractor is to cut the beam to the lengths required for the three strongbacks.

All of the steel for the strongback assemblies (including the beams, hanger rods, plates, end bracing angles, etc.) shall remain the property of the Iowa DOT at the completion of this project. The contractor shall haul all of the above materials to the Ft. Dodge maintenance yard and store them in an area designated by the engineer.

The lump sum bid for "Temporary Support" shall include the costs for all labor, equipment and materials required for the strongbacks and includes the following:

1. The cutting, loading and hauling of the W36 beams from Gowrie to the job site.

2. The furnishing of all other materials (including about 5800 lbs. of structural steel), fabrication and labor to install the strongbacks.

3. The furnishing of stiffeners and bolts and the installation of the stiffeners onto the bridge girders at two of the strongback locations.

4. The removal of the strongbacks and the hauling of the steel items to Ft. Dodge and the unloading and storing of them as designated by the engineer.

SPECIFICATIONS:

Design: AASHTO Series of 1977.
Construction: Iowa Department of Transportation Specifications, Series of 1977, 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 1977.
Reinforcing Steel in accordance with Section 1.5, Grade 40 and Grade 60.
Concrete in accordance with Section 1.5, f'c = 3,500 psi.

Structural Steel in accordance with Section 1.7.

TOTAL ESTIMATED QUANTITIES			
Item No.	Item	Unit	Quantity
1	Temporary Support	L. S.	Lump Sum
2	Bridge Repair	L. S.	Lump Sum

LOCATION:
Wahkonsa Twp.
T-89N R-28W
Section 19
Ia.#7 Over Des Moines River
Webster County
Karl King Bridge

Design For Repairs To
MULTISPAN CONTINUOUS PLATE GIRDER BRIDGE
Bridge Maintenance No. 9475.2S007
GENERAL NOTES & QUANTITIES
Station: 213+16 to 224+25 May, 1982
WEBSTER COUNTY
IOWA DEPARTMENT OF TRANSPORTATION-HIGHWAY DIVISION
Design Sheet No.: 1 Of 12 File No.: 26710 Design No.: 682

DESIGNED BY: J. Phillips
DETAILED BY: E. Rogers

TRACED BY:
CHECKED BY: M. Pullmann

SECTION LEADER: S. S. S. S.

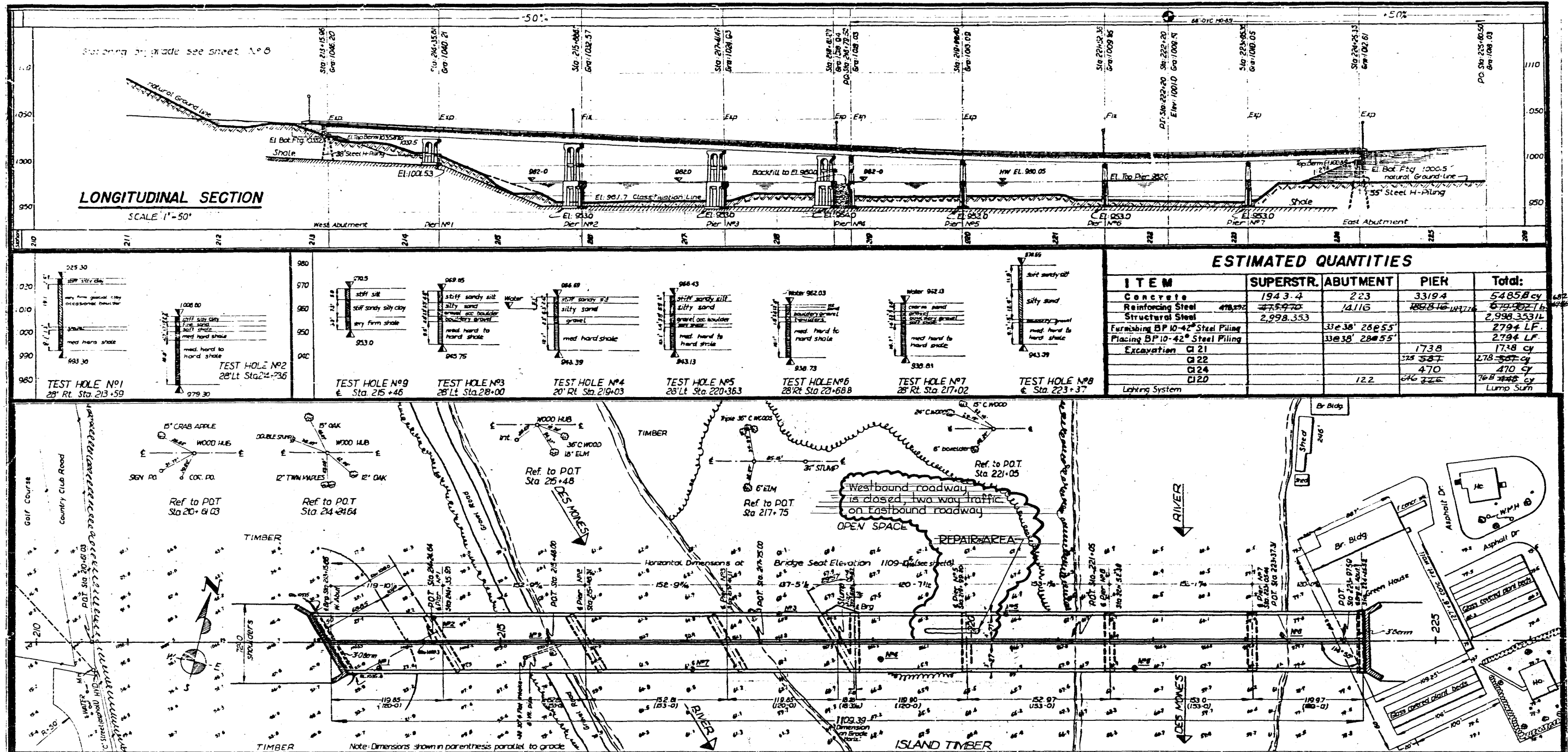
WEBSTER COUNTY

PROJECT NUMBER

FN-7-5(13)-21-94

STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	6		3	14

B.Marks: Sta 220+60 40" spike in root 24" cottonwood
B.Marks: Arrowhead on fire hyd. NE. cor. "C" St. & "A" Ave.
El. 967.01
El. 1120.90



General Notes:

This bridge is designed for H-20 loading with an allowance of 12" sq. ft. roadway for future wearing surface. Approach fills are not a part of this contract but are to be in place 90 days before abutment piles are driven. Bridge Contractor to level off and shape berms to elevations shown.

SPECIFICATIONS:

Design: A.A.S.H.O. Series of 1953 with modification shown on sheet 11.
Construction: Std. Spec. Ia. State Highway Comm. Series of 1956 plus current Special Provisions.

SITUATION PLAN

SCALE 1"=50'

Revised 10-21-58 Reinforcing Steel Quantities changed (see Sheet No. 14)
Revised 1-28-58 Excavation & Reinforcing Quantities changed (see Sheet No. 5)

MULTISPAN CONTINUOUS PL. GIRDER BRIDGE
30° SKEW 546'x58' SECTION AND
546'x58' SECTION WITH 18'-3" TRANSITION SECTION
CONCRETE FLOOR AND SUBSTRUCTURE - STEEL RAIL OVER
DES MOINES RIVER
SITUATION PLAN

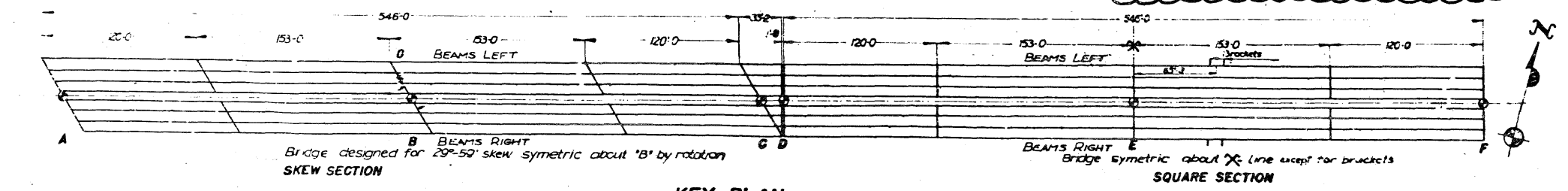
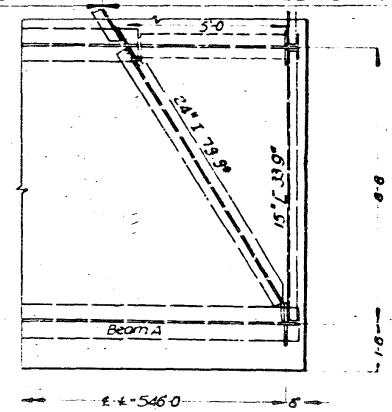
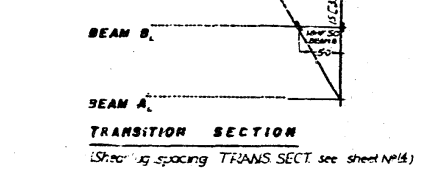
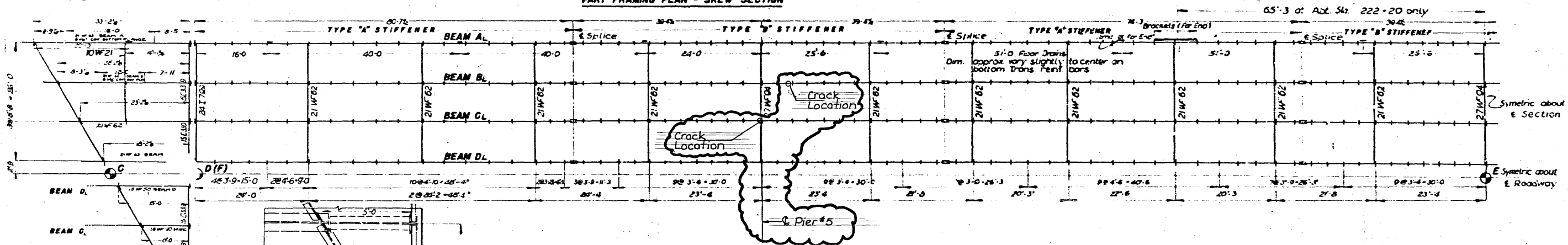
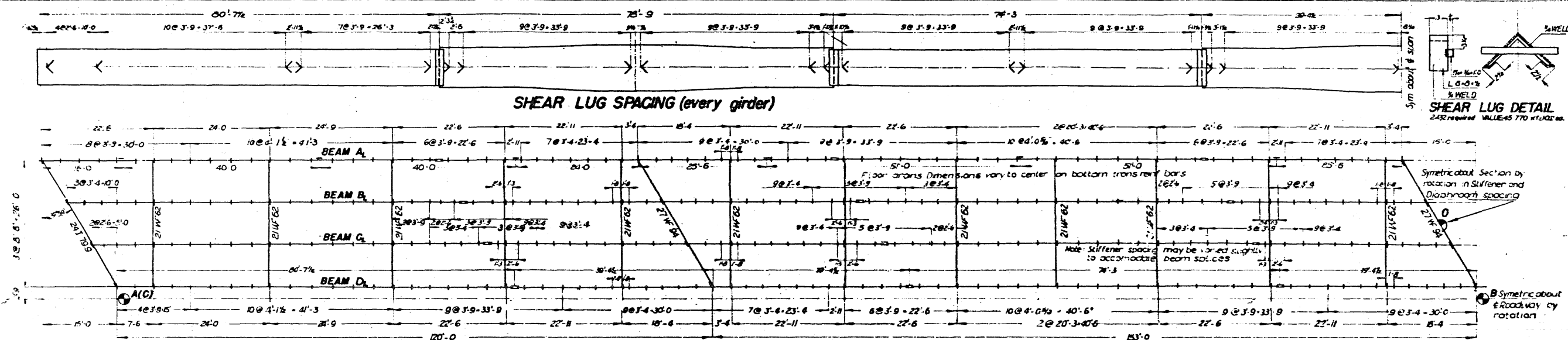
LOCATION:
Section 19
Township 14N, Range 14E, Section 19
Webster Co.
over DES MOINES RIVER

DESIGN NO. 682
FILE NO. 26710
DES. NO. 2 OF 12

STATION 213+16 TO STATION 224+25 PROJECT FN-13
WEBSTER COUNTY
DECEMBER 1957 Lechner ENGINEERING CO. SHEET 1 OF 5

Design No. 1457 Webster Co. File No. 18762

THIS SHEET FROM ORIGINAL
DESIGN IS INCLUDED FOR
INFORMATION ONLY.



KEY PLAN
SCALE: 1" = 50'

THIS SHEET FROM ORIGINAL
DESIGN IS INCLUDED FOR
INFORMATION ONLY.

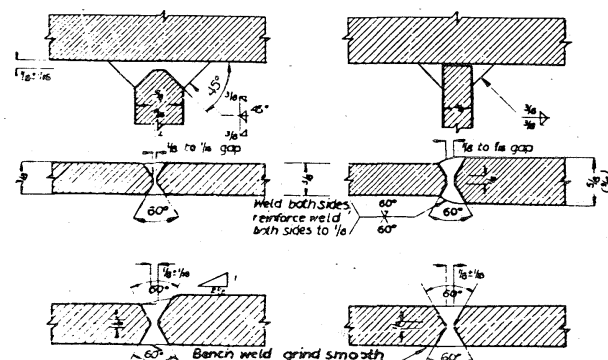
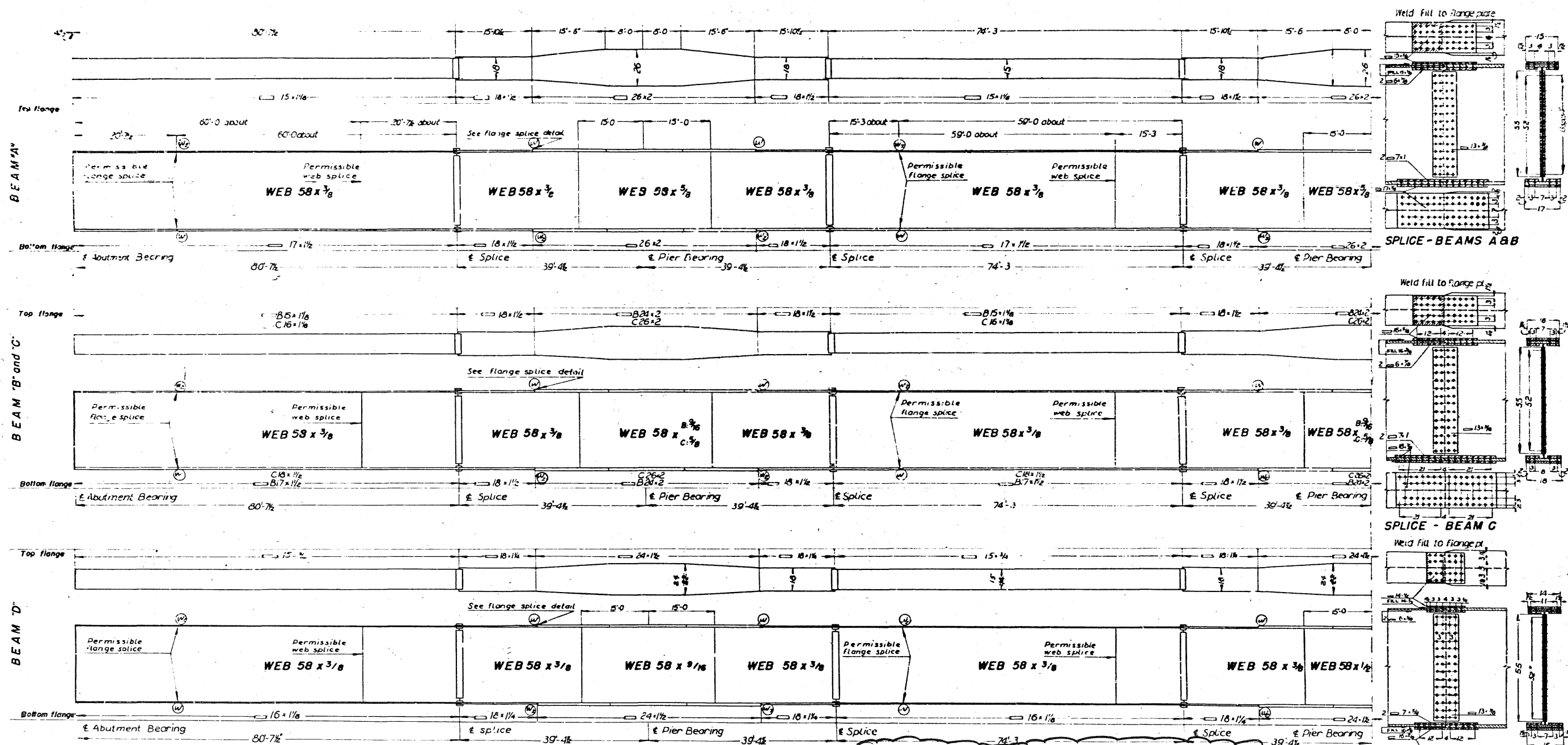
NOTE: INTERMEDIATE STIFFENERS to be 5/8" x 1/2". See sheet NO. 11 for sizes of stiffeners at BEARING POINTS & DIAPHRAGM CONNECTIONS

SPECIAL WELD NOTE: All welding shall be in the electric arc process and shall comply with requirements of the Standard Spec. for Welded Highway Bridges, 1954 of the American Welding Society. All operators and processes shall be qualified in accordance with the foregoing specification in the type of electrode and position in which the work will be performed. The fabricator is to furnish to the Highway Commission satisfactory photographic evidence of the acceptability of transverse welds in the flange plates of the girders. Such welds are to be photographed "in situ" width of flange, but welds are to be photographed at least half width of flange. These photographs are to show the internal structure of the welds, and may be made by the use of X-ray, radium, radio active cobalt, or other approved process, at the option of the fabricator. Cost of this photographic inspection is to be included in the price bid for structural steel.

MULTISPAN CONTINUOUS PL. GIRDER BRIDGE
30° SKEW 546'x58' SECTION AND
546'x58' SECTION WITH 18'-3" TRANSITION SECTION
CONCRETE FLOOR AND SUBSTRUCTURE—STEEL RAIL OVER
DES MOINES RIVER
SUPERSTRUCTURE DETAILS
STATION 213+16 TO STATION 224+25 PROJECT FN-13
WEBSTER COUNTY
DECEMBER 1957 Lechner ENGINEERING CO. SHEET 10 OF 13
Design No. 1457 Webster Co. File No. 13762

DESIGN NO. 682
FILE NO. 26710
DES. SH. NO. 3 OF 12

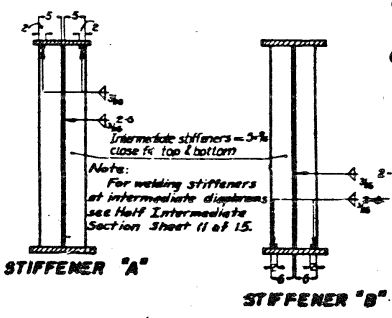
10
15
5 of 14



FLANGE WELD DETAILS

WEB WELD DETAILS
BENCH WELD

FLANGE SPLICE DETAILS
BENCH WELD



INTERMEDIATE STIFFENERS

THIS SHEET FROM ORIGINAL DESIGN IS INCLUDED FOR INFORMATION ONLY.

WELD NOTE: See Spec. Note sheet 10
WELDING PROCEDURE SHALL COMPLY WITH
1956 Specification of American Welding Society
for welded Highway and Railway Bridges.

ERECTION NOTE:

Splice points are to be supported by falsework or other approved means as directed by the engineer and adjusted as closely as possible to the dimensions shown on the diagram "Girders as fabricated and erected" before riveting or bolting is completed.
Use: RIVETS 7/8" or 1 1/2" BOLTS

DESIGN NO. 682
FILE NO. 26710
DES. SH. NO. 4 OF 12

MULTISPAN CONTINUOUS PL. GIRDER BRIDGE
30° SKEW 546'x58' SECTION AND
546'x58' SECTION WITH 18'-3" TRANSITION SECTION
CONCRETE FLOOR AND SUBSTRUCTURE—STEEL RAIL OVER
DES MOINES RIVER
SUPERSTRUCTURE DETAILS
STATION 213+16 TO STATION 224+25 PROJECT FN-13
WEBSTER COUNTY
DECEMBER 1957 *Lectner* ENGINEERING CO. SHEET 9 OF 15

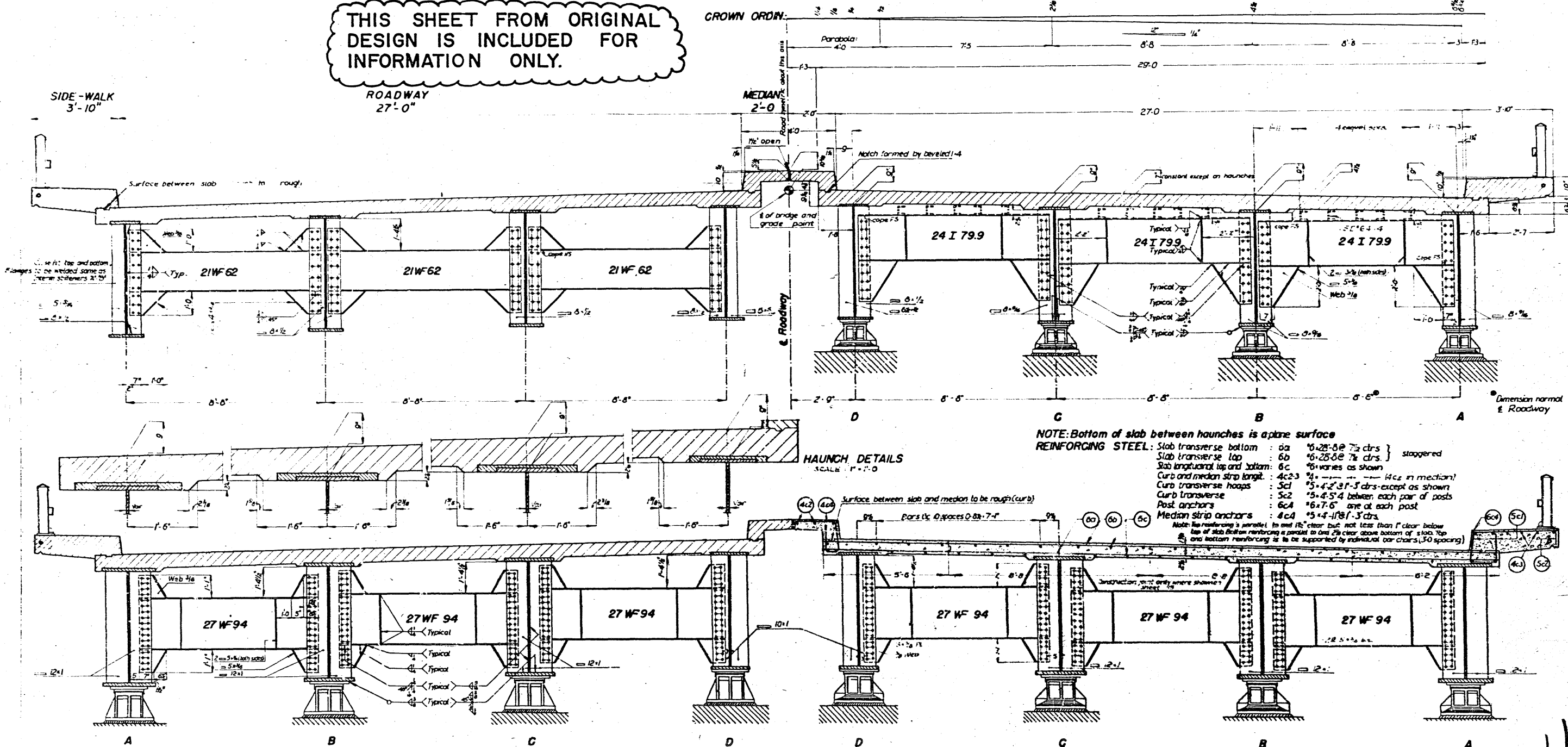
Design No. 1457 Webster Co. File No. 18762

Revised 8-27-58 Weld symbols corrected and note added re. welding of stiffeners at diaphragms.
Revision 2-3-58 Top flange widths, Beam "D", changed.

HALF INTERMEDIATE SECTION

THIS SHEET FROM ORIGINAL
DESIGN IS INCLUDED FOR
INFORMATION ONLY.

HALF SECTION NEAR ABUTMENT & PIER 4



SUPERSTRUCTURE NOTES: This bridge is designed for H-20-44 loading plus 19 lbs. per sq. ft. of roadway for future wearing surface with the following modifications:
Except for the floor slab, this bridge is designed so that an increase in the H-20 live load and impact of 100% will not increase the total unit stress to more than 150% of the specification stresses.

The floor slab as shown includes 1/2" of wearing surface.
Field connections may be riveted or bolted except as noted or shown.
Splice connections and Abutment and Pier diaphragm connections, if bolted, require "HIGH TENSILE STRENGTH BOLTS". The estimated weight for this connection is based on "HIGH TENSILE STRENGTH BOLTS".
All open holes are to be 15/16" unless otherwise noted.
All rivets and bolts are to be 7/8" unless otherwise noted.
Bottom flanges are to be perpendicular to webs at reaction points.

Beam splices are to be subpunched and reamed. Before reaming of beams are to be assembled to proper as shown on sheet "BEAMS AS FABRICATED AND ERECTED" for inspection. After inspection all holes are to be reamed and all parts match-marked. Masonry plates are to be set in place and canvas bearing surfaces of unfinished masonry plates are to be flat and true. Shop coat is to be omitted on tops of top flanges of beam one on other surfaces in contact with concrete.
Parts inaccessible after erection are to be given three coats of paint in the shop. Forms for slab and curbs are to be supported by the beams.

SPECIFICATIONS: Design - A.A.S.H.O. 1953 (with modifications as noted)
Construction - IOWA STATE HIGHWAY COMMISSION
Series of 1956, plus current special provisions.

DESIGN NO. 682
FILE NO. 26710
DES. SH. NO. 5 OF 12

Revised 8-27-58 Weld symbol and note for stiffeners at intermediate diaphragms added.

MULTISPAN CONTINUOUS PL. GIRDER BRIDGE
30° SKEW 546'x 58' SECTION AND
546'x 58' SECTION WITH 18'-3" TRANSITION SECTION
CONCRETE FLOOR AND SUBSTRUCTURE - STEEL RAIL OVER
DES MOINES RIVER

SUPERSTRUCTURE DETAILS
STATION 213+16 TO STATION 224+25 PROJECT FN-13
WEBSTER COUNTY
DECEMBER 1957 *Lechner* ENGINEERING CO. SHEET 11 OF 15

Design No. 1457 Webster Co. File No. 18762

GIRDER "B" REPAIR MATERIAL LIST

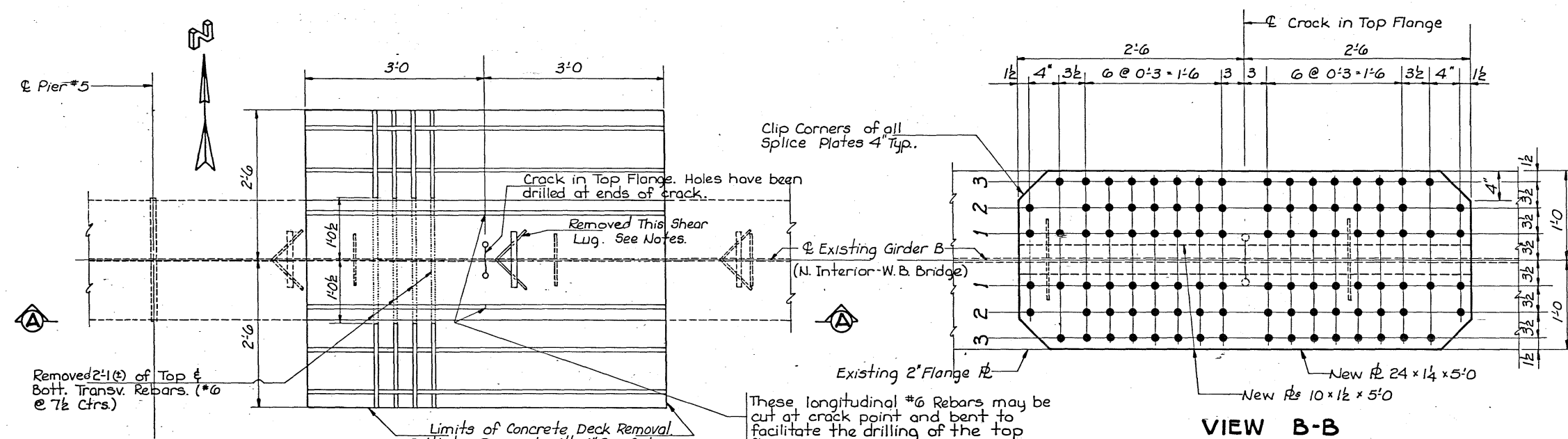
Steel		
Pc	Size	Weight
Flange Splice	1-# 24x14x5'0"	510
" "	2-# 10x12x5'0"	510

Steel Sub-Total (lbs.) 1020
All Materials must meet Charpy toughness requirement.

7/8" H.T.S. A325 BOLT LIST

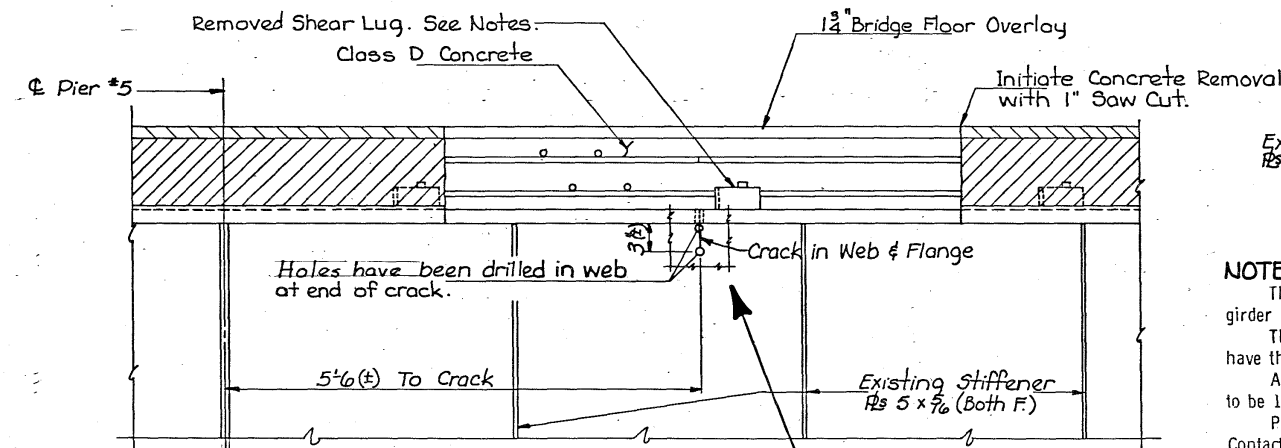
Actual No.	Grip	Length inches	Location
100	4 3/4	64	Flange Splice

100	Washers		
	Bolts & Washers +2%	WT. =	168
	Weight Structural Steel	=	1188
	Class D Concrete	=	0.7 Cu. Yds.
	Bridge Floor Overlay	=	3.3 Sq. Yds.
	Reinforcing Steel	=	147 Lbs.



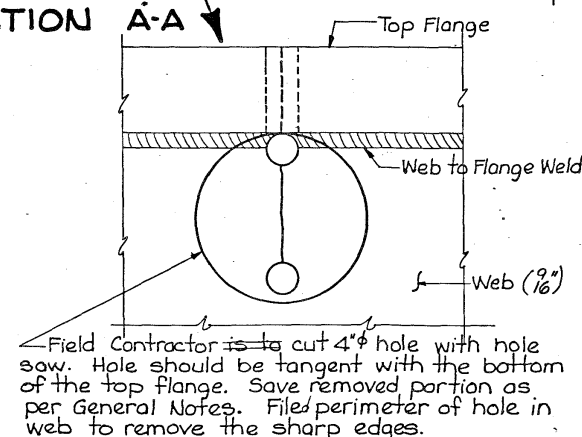
PART PLAN VIEW PRIOR TO REPAIR

NOTE: Furnish 19 - #6x4'8" Rebars to lap-splice transverse rebars.
Furnish 2-#6x4'8" Rebars to lap splice top longitudinal rebars.



SECTION A-A

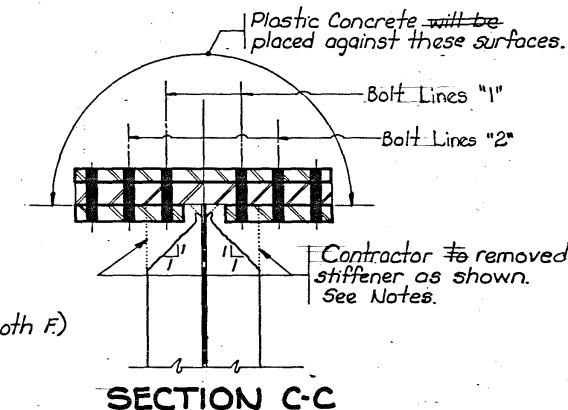
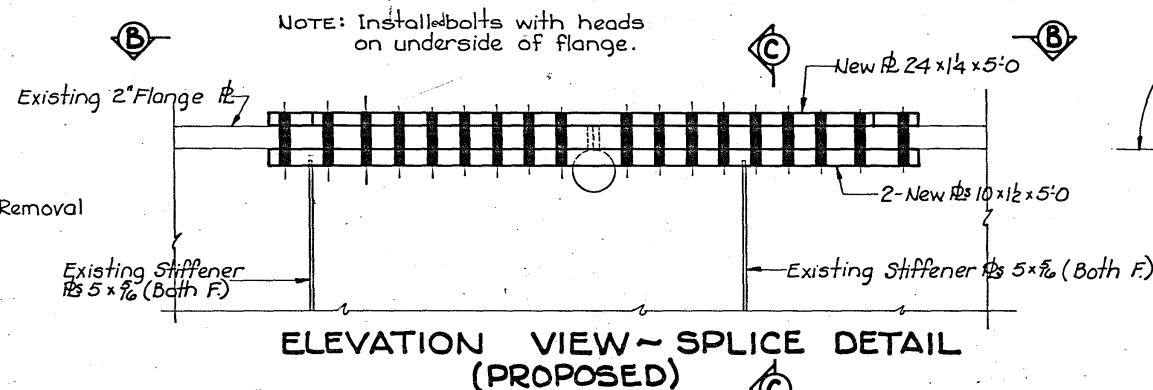
NOTE: Inspect the area of web adjacent to the 4" Ø saw cut hole. The field contractor shall remove the paint from both sides of the web by blast cleaning an area within a one foot radius of the hole. The Iowa D.O.T. District Materials Engineer's Office will inspect this area of web both visually and by the use of dye penetrant to insure that there are no more cracks in the web. Any cracks found shall be repaired as directed by the Engineer. Cost of these repairs shall be considered as extra work.



PART ELEVATION

NOTES-GIRDER "B" REPAIR

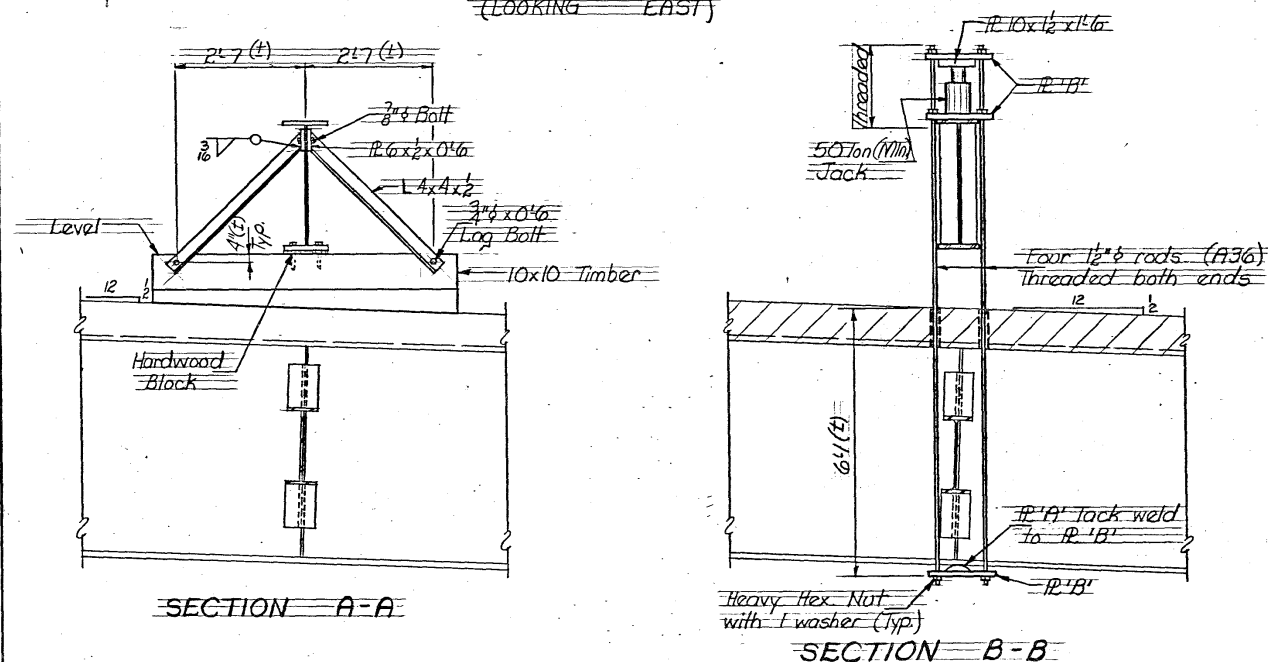
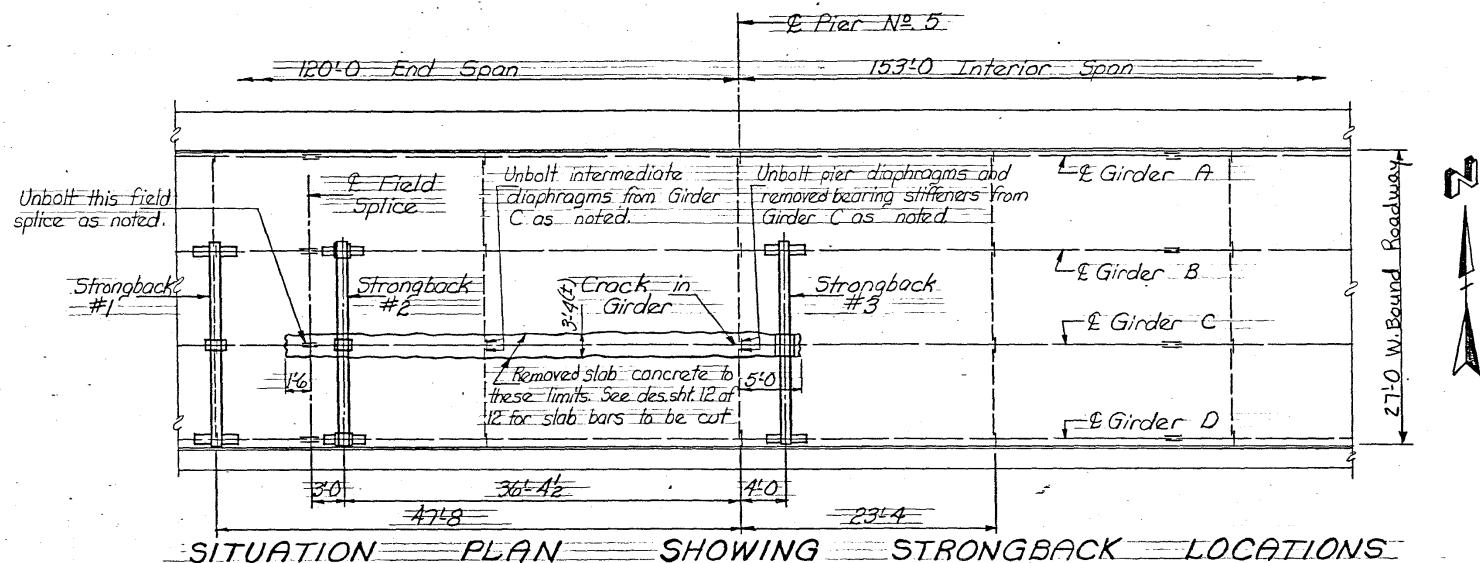
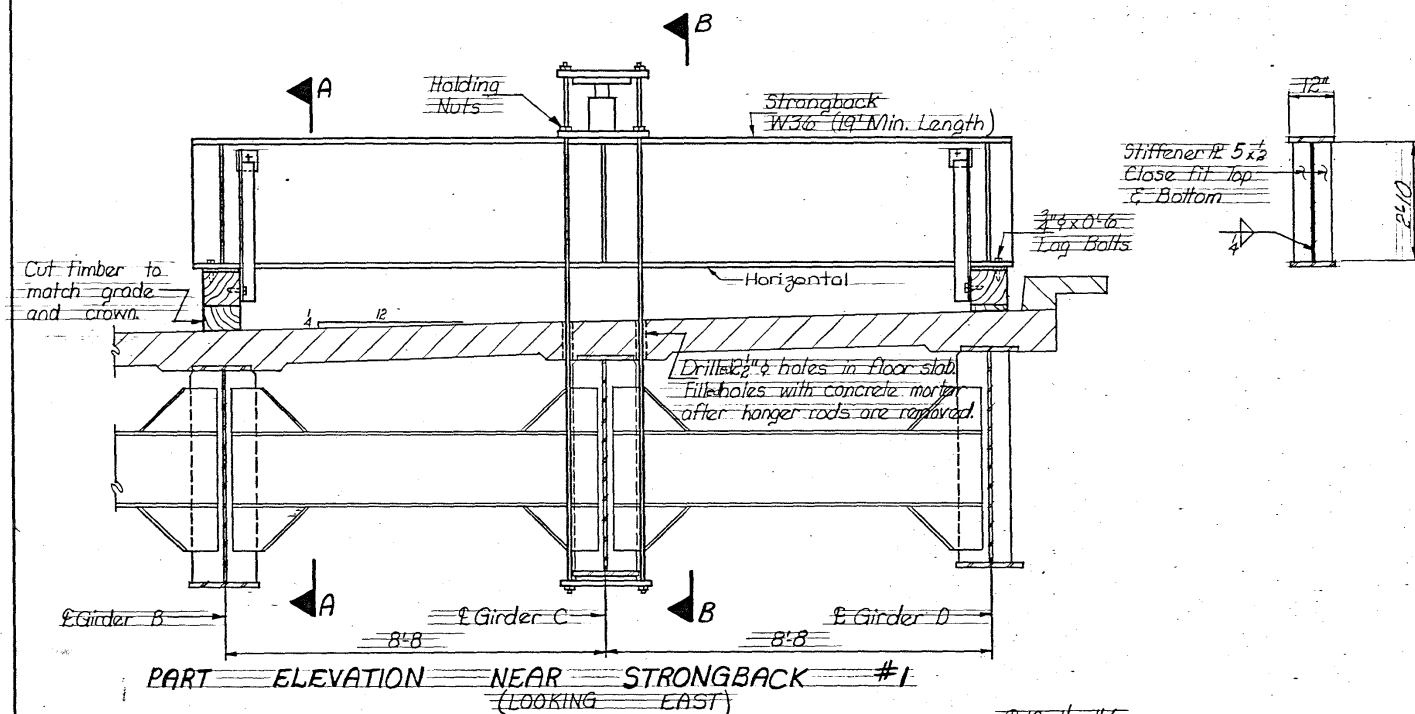
The details on this sheet show the proposed repair on the north interior girder (Girder B) of the westbound bridge near Pier 5.
The structural steel shall be A-36 or A-588 or A-572. All the plates shall have the minimum Charpy V-notch toughness of at least 15 ft-lb@40° F.
All bolts are to be 7/8" Ø H.T.S. A-325 bolts. All holes in new material are to be 15/16" Ø and done in the shop.
Painting of new structural steel shall be in accordance with Article 2508. Contact surfaces and surfaces against which plastic concrete is to be placed shall receive prime coat only.
The steel is to be fabricated in accordance with the Iowa D.O.T. Specifications, Series of 1977, plus current Supplemental Specifications.
The splice plates shall be in place on Girder B before any repair work is started for Girder C.
After slab and reinforcing bars are removed at Girder B as noted and shown, remove one angle shear lug and the upper portion of four intermediate stiffeners (see Cutting Notes on Design Sheet 10 of 12). Blast clean the girder flange in the area that will be in contact with the new splice plates.
Locate the splice plates relative to the crack and two holes drilled in the girder flange.
Using the splice plates as a template, drill all holes in the two lines nearest the web (bolt lines 1) and install the bolts in these lines prior to drilling any holes in the outside lines. Bolts shall be torqued beginning at one end and proceeding toward the other end, or beginning with bolts near the centerline and working toward the ends of the plates. After all bolts have been torqued in bolt lines 1, drilling may be started on bolt lines 2. After all bolts have been torqued in lines 2, drilling may be started on lines 3. Bolts for lines 2 & 3 shall be torqued beginning near the centerline of splice and working toward the ends of the plates.
Place new reinforcing bars. Rebuild slab to 1 3/4 inches of top surface with Class D Structural Concrete and the remaining 1 3/4 inches with Bridge Floor Overlay concrete. Top and bottom surfaces are to match existing surfaces.



Design For Repairs To
MULTISPAN CONTINUOUS PLATE GIRDER BRIDGE
Bridge Maintenance No. 9475.25007
REPAIR DETAILS-GIRDER B
Station: 213+16 to 224+25 May, 1982
WEBSTER COUNTY
IOWA DEPARTMENT OF TRANSPORTATION-HIGHWAY DIVISION
Design Sheet No.: 6 Of 12 File No.: 26710 Design No.: 682

WEBSTER COUNTY

STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	6		8	14



STRONGBACK SUPPORT NOTES

Install Strongback #1 as shown on this sheet. Care shall be taken when drilling the holes in the slab for the hanger rods that they miss the girder flange. Apply a jacking force of 35 tons and tighten holding nuts to sustain this applied jacking force.

Install Strongback #3 as shown on Design Sheet 8 of 12. Remove an area of slab concrete under the strongback so the hanger rods can be installed. Install stiffeners on web of Girder "C". Apply a jacking force of 55 tons and tighten holding nuts to sustain this applied jacking force.

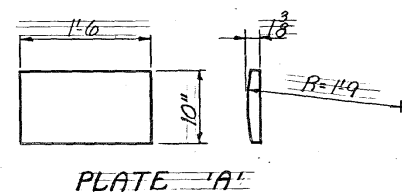
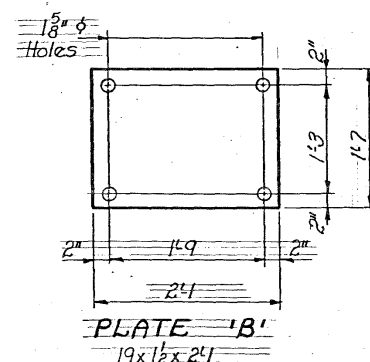
Remove portion of slab over Girder "C" from the pier to the field splice as noted and shown.

Install Strongback #2 as shown on Design Sheet 8 of 12. Install hanger rods to support Girder "C" and tighten holding nuts so they are snug. Remove bolts from intermediate diaphragms and from field splice as noted and shown. Match mark splice plates so they can be reinstalled in same position. Apply a jacking force to raise the girder one inch measured at the field splice and tighten holding nuts to sustain this jacking force.

After splice plates are installed at the crack location on Girder "C", install the angle stiffeners on web of Girders "B", "C", & "D" at Strongback #2 location. Remove hanger rods on Strongback #2 that support Girder "C" and install rods to tie down Strongback #2 to Girders "B" and "D". Prior to jacking Girder "C" downward, it is necessary to provide lateral support to the bottom flange of Girder "C". A suggested method for this lateral support is shown on Design Sheet 8 of 12. To ensure stability of Girder "C" near the jack location, the upper portion of Girder "C" should have lateral support as approved by the engineer.

With a jacking force between the girder and Strongback #2, move Girder "C" downward so that it can be bolted at the field splice and at the intermediate diaphragms.

Remove all three strongbacks and rebuild floor slab.

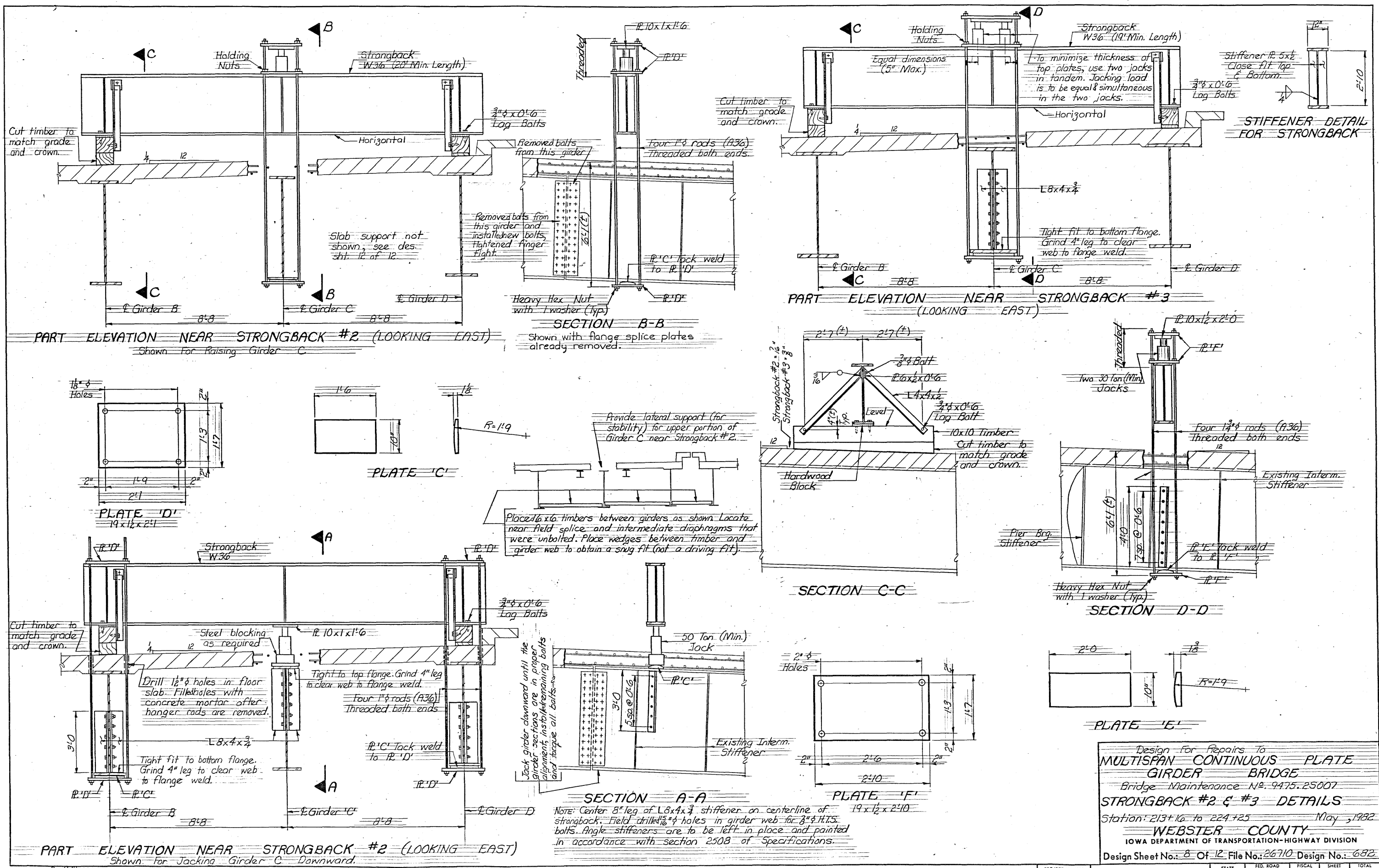


Design for Repairs to
MULTISPAN CONTINUOUS PLATE GIRDER BRIDGE
 Bridge Maintenance No. 9475.25007
STRONGBACK #1 DETAILS
 Station: 213+16 to 224+25 May, 1982
WEBSTER COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION-HIGHWAY DIVISION
 Design Sheet No. 7 Of 12 File No. 26710 Design No. 682

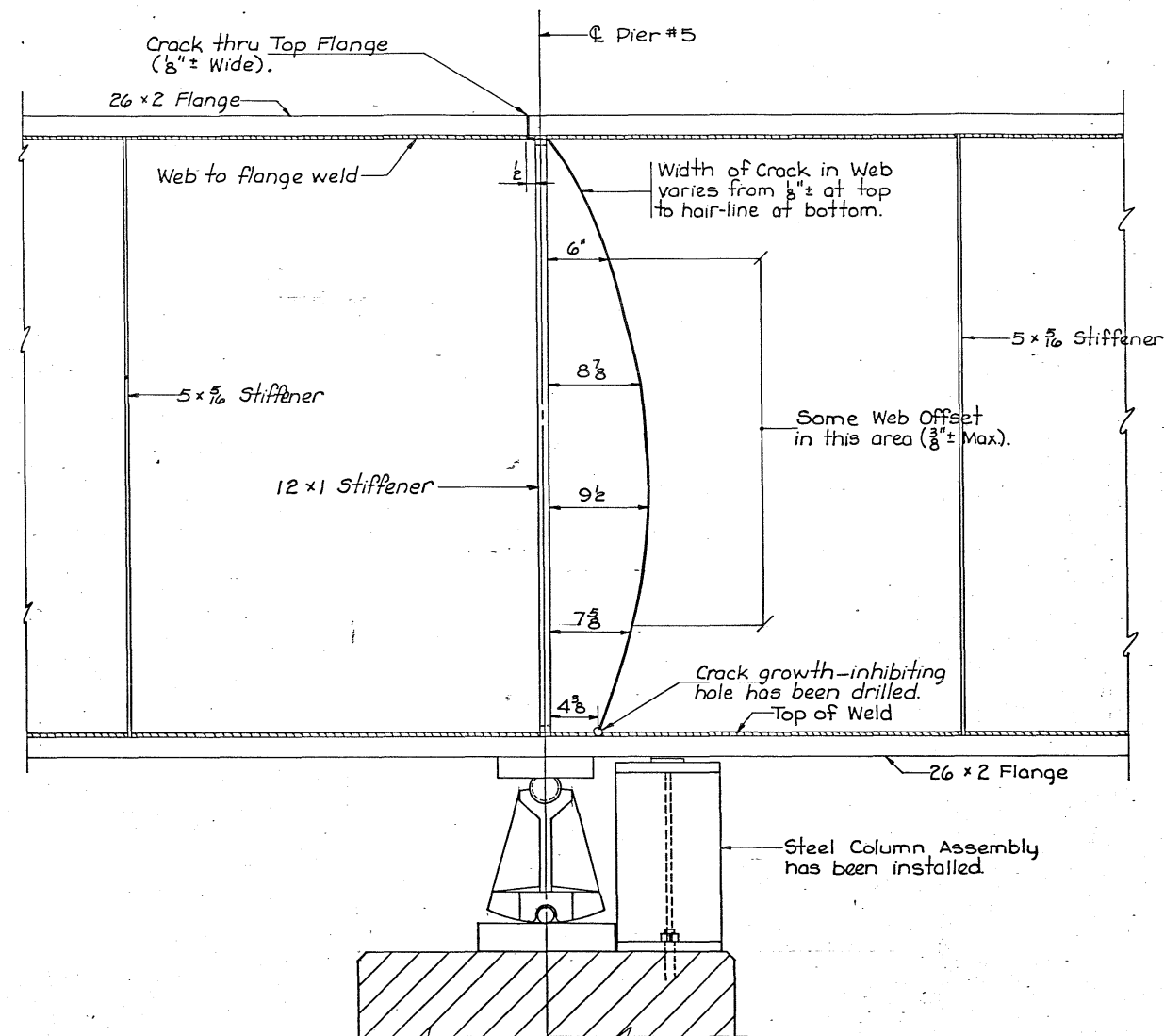
DESIGNED BY: L. Phillips
 CHECKED BY: B. Rydman
 TRACED BY: B. Rydman
 CHECKED BY: B. Rydman

WEBSTER COUNTY

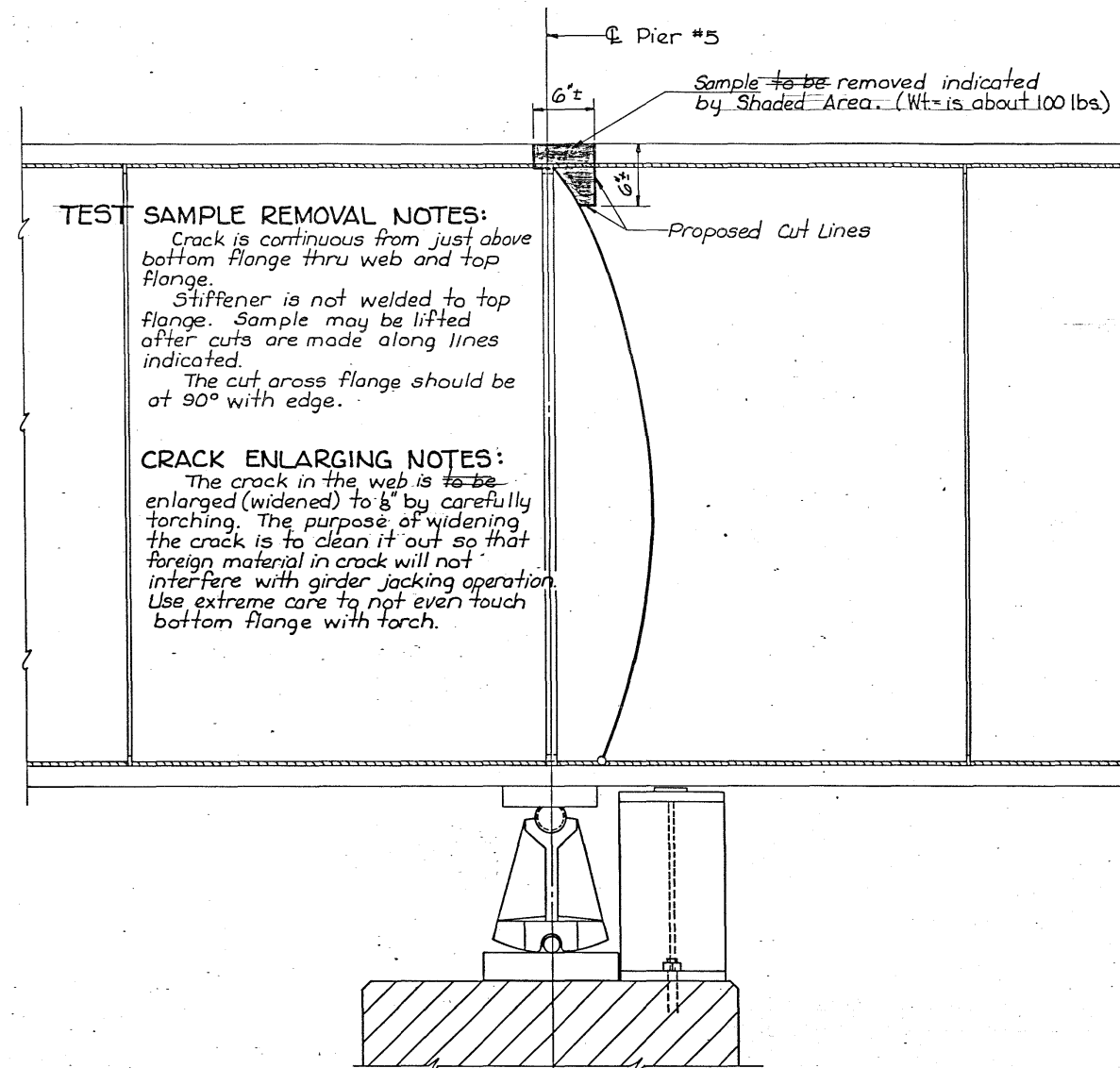
STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	6		9	14



Design for Repairs to
MULTISPAN CONTINUOUS PLATE GIRDER BRIDGE
 Bridge Maintenance No. 9475-25007
STRONGBACK #2 & #3 DETAILS
 Station: 213+16 to 224+25 May, 1982
WEBSTER COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION-HIGHWAY DIVISION
 Design Sheet No. 8 Of 12 File No. 26710 Design No. 682



PART ELEVATION~ GIRDER C (LOOKING SOUTH)
SHOWING EXISTING CONDITION



TEST SAMPLE REMOVAL NOTES:

Crack is continuous from just above bottom flange thru web and top flange.

Stiffener is not welded to top flange. Sample may be lifted after cuts are made along lines indicated.

The cut across flange should be at 90° with edge.

CRACK ENLARGING NOTES:

The crack in the web is to be enlarged (widened) to 5" by carefully torching. The purpose of widening the crack is to clean it out so that foreign material in crack will not interfere with girder jacking operation. Use extreme care to not even touch bottom flange with torch.

PART ELEVATION~ GIRDER C

Design For Repairs To
**MULTISPAN CONTINUOUS PLATE
GIRDER BRIDGE**
Bridge Maintenance No. 9475.23007
REPAIR DETAILS GIRDER C
Station: 213+16 to 224+25 May, 1982
WEBSTER COUNTY
IOWA DEPARTMENT OF TRANSPORTATION-HIGHWAY DIVISION
Design Sheet No.: 9 Of 12 File No.: 26710 Design No.: 682

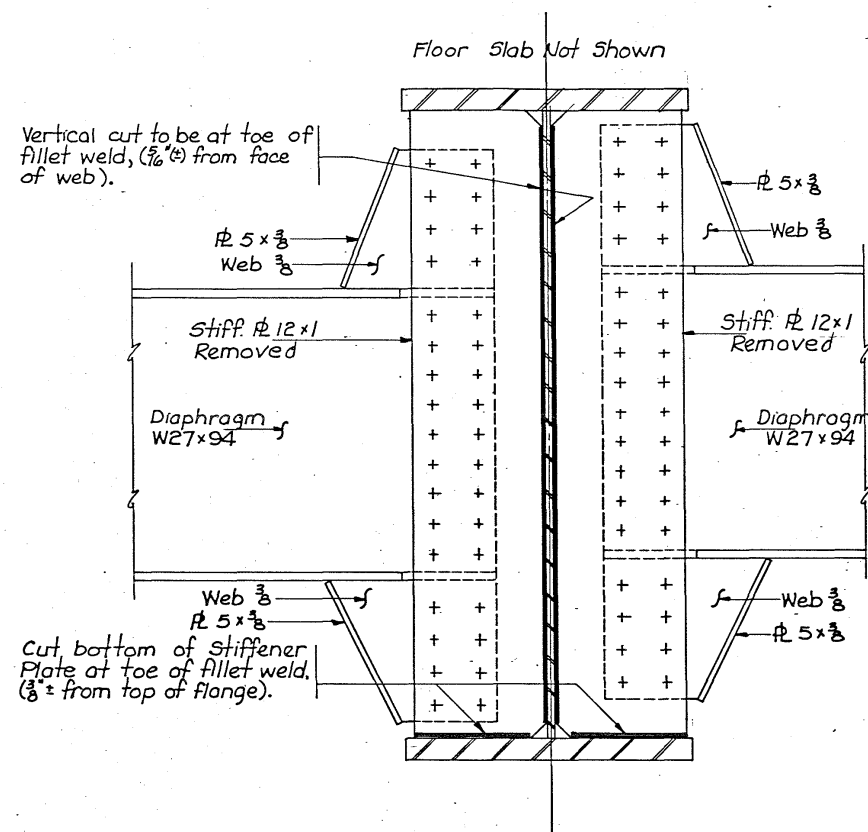
DESIGNED BY: L. Phillips
DETAILED BY: E. Gause

TRACED BY: H. Pollmann
CHECKED BY: H. Pollmann

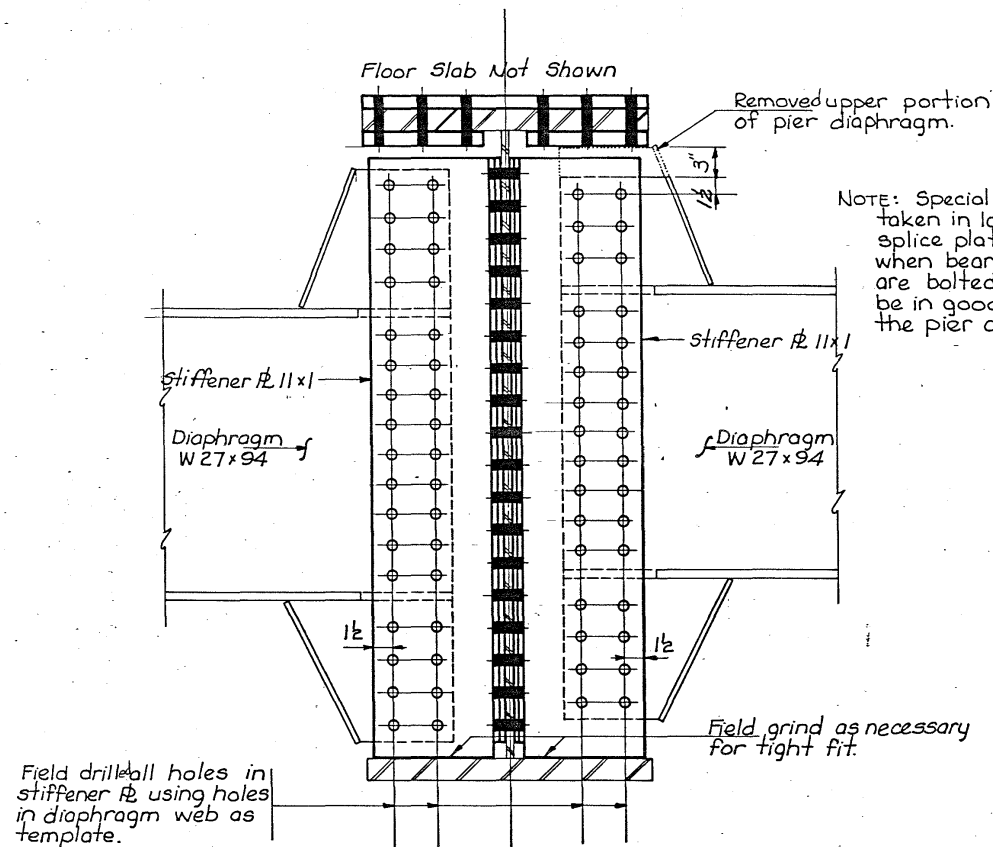
WEBSTER COUNTY

PROJECT NUMBER

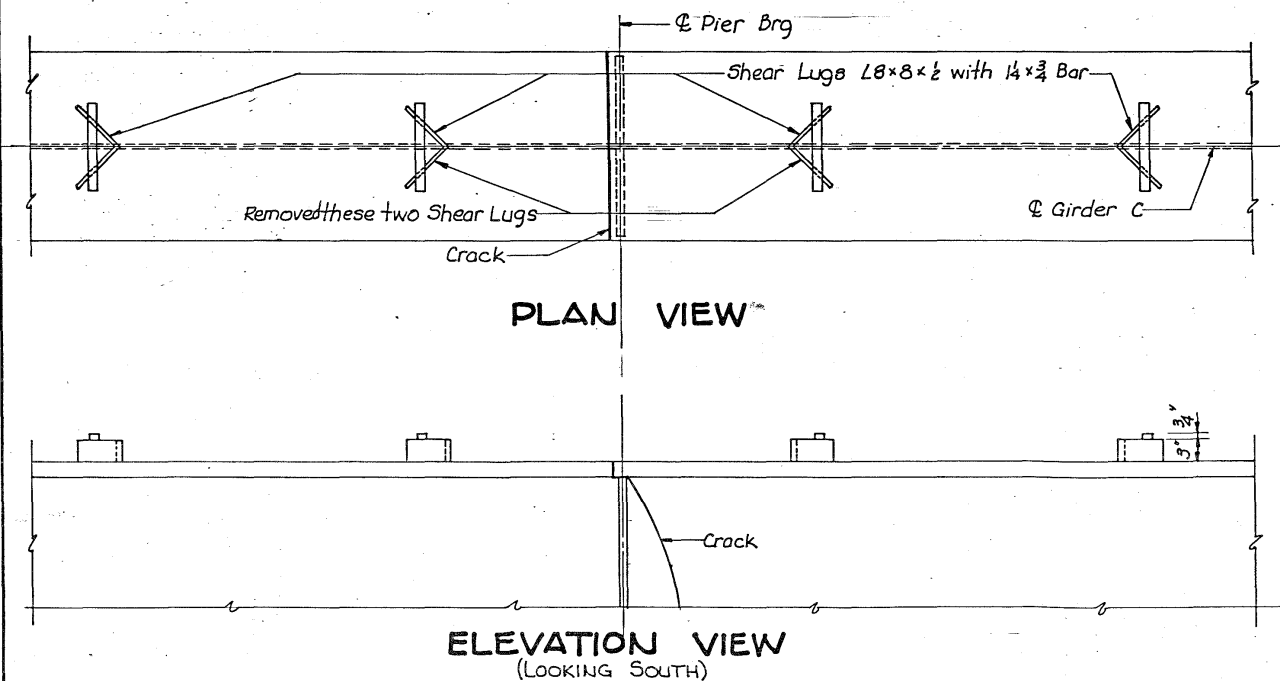
STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	8		11	14



SECTION THRU GIRDER C
Showing Existing Condition



SECTION THRU GIRDER C
Showing Repaired Condition



CUTTING NOTES

A test sample of the girder, two angle shear lugs and two bearing stiffeners are to be removed from Girder C near the crack location. One angle shear lug and upper portion of four intermediate web stiffeners are to be removed from Girder B.

To remove shear lugs, cut the angles about 1/4 inch above flange and grind off remainder so that resulting surface is ANSI 125 or smoother. Use extreme care to not gouge flange.

To remove bearing stiffeners, make a horizontal cut about 1/4 inch above bottom flange of girder and a vertical cut about 1/4 inch from face girder web. Use extreme care to avoid any undercut or gouging of the girder from the cutting operation. Grind any remaining weld and stiffener so that the resulting surface of the web and flange is ANSI 125 or smoother.

Care shall be taken that the full thickness of web and flange is maintained and no undercut, gouging or over-grind of the web or flange takes place.

All cutting may be done by either the oxygen cutting or the air carbon-arc process. Cutting may be done manually provided a guide is used and a straight cut is attained.

If oxygen cutting is used the cut shall be made in such a location that stiffener or angle only is severed, and not at a location where the cut would extend into the fillet welds. If air carbon-arc is used the cut shall be made no closer to the web or flange than 1/8 inch. With whatever process is used the contractor shall demonstrate to the engineer prior to start of work that he can accomplish the work without damage to the girder.

NOTES FOR INSTALLING NEW STEEL ON GIRDER C

No work is to be done on repair of Girder C until the repair work on Girder B is completed.

A suggested work sequence for installing the new steel on Girder C is as follows:

1. Install Strongbacks #1 & #3 as shown and noted on Design Sheets 7 & 8 of 12.
2. Install support system for slab as shown and noted on Design Sheet 12 of 12.
3. Remove some floor slab concrete and cut and remove some slab bars as noted and shown.
4. Remove two angle shear lugs welded to top girder flange (see Cutting Notes). Remove upper portion of two pier bearing stiffeners and a portion of a pier diaphragm. Remove a sample of the girder adjacent to crack as shown on Design Sheet 9 of 12.
5. By flame cutting, enlarge the crack opening by about 1/8 inch for the remaining depth of the web. Install Strongback #2 with the hanger rods tightened just snug. Remove bolts from two intermediate diaphragms and from the field splice as noted. With a jacking force at Strongback #2, raise Girder C one inch, measured at the field splice. Tighten holding nuts to sustain this jacking force.
6. Blast clean the girder flange in the area that will be in contact with the new splice plates.
7. Using the splice plates as a template, drill all holes in girder flange. Bolts shall be torqued beginning at one end and proceeding to the other end, or beginning with bolts near the centerline and working toward the ends of the plates.
8. Remove bolts connecting pier diaphragms to Girder C. The pier diaphragm between the interior girders may be removed if it interferes with drilling of holes for web splice. If the pier diaphragm is removed, the contractor is to furnish the H.T.S. bolts for reconnecting the diaphragm to Girder B.
9. Remove pier bearing stiffeners (See Cutting Notes).
10. Blast clean the girder web in the area that will be in contact with the new splice plates.
11. Using the splice plates as a template, drill holes in the girder web. Grind the bottom of the bearing stiffener so that there is a good bearing fit onto the girder flange when the bolts can be installed to fasten stiffener to girder. Bolts shall be torqued beginning with the ones fastening the bearing stiffeners and proceeding to the outer edges of the web splice plates.
12. Using pier diaphragms as a template, field drill holes in new bearing stiffeners. Install bolts to connect pier diaphragms to stiffeners.
13. Using Strongback #2, jack Girder C downward and bolt girder at field splice and at intermediate diaphragms (See Strongback Support Notes on Design Sheet 8 of 12).
14. Remove the strongback beams shown on Design Sheets 7 & 8 of 12.
15. Remove additional slab concrete, install new reinforcing bars, and rebuild slab as noted and shown on Design Sheet 12 of 12.
16. Remove support system for slab.
17. Paint steel as noted.

Design For Repairs To
MULTISPAN CONTINUOUS PLATE GIRDER BRIDGE
Bridge Maintenance No. 9475.25007
REPAIR DETAILS GIRDER C
Station: 213+16 to 224+25
WEBSTER COUNTY
IOWA DEPARTMENT OF TRANSPORTATION-HIGHWAY DIVISION
Design Sheet No.: 10 Of 12 File No.: 26710 Design No.: 682

DESIGNED BY: P. Phillips
DETAILED BY: E. Gault

TRACED BY: M. Pollmann
CHECKED BY: M. Pollmann

WEBSTER COUNTY

PROJECT NUMBER

STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	8		12	14

GIRDER C REPAIR MATERIAL LIST

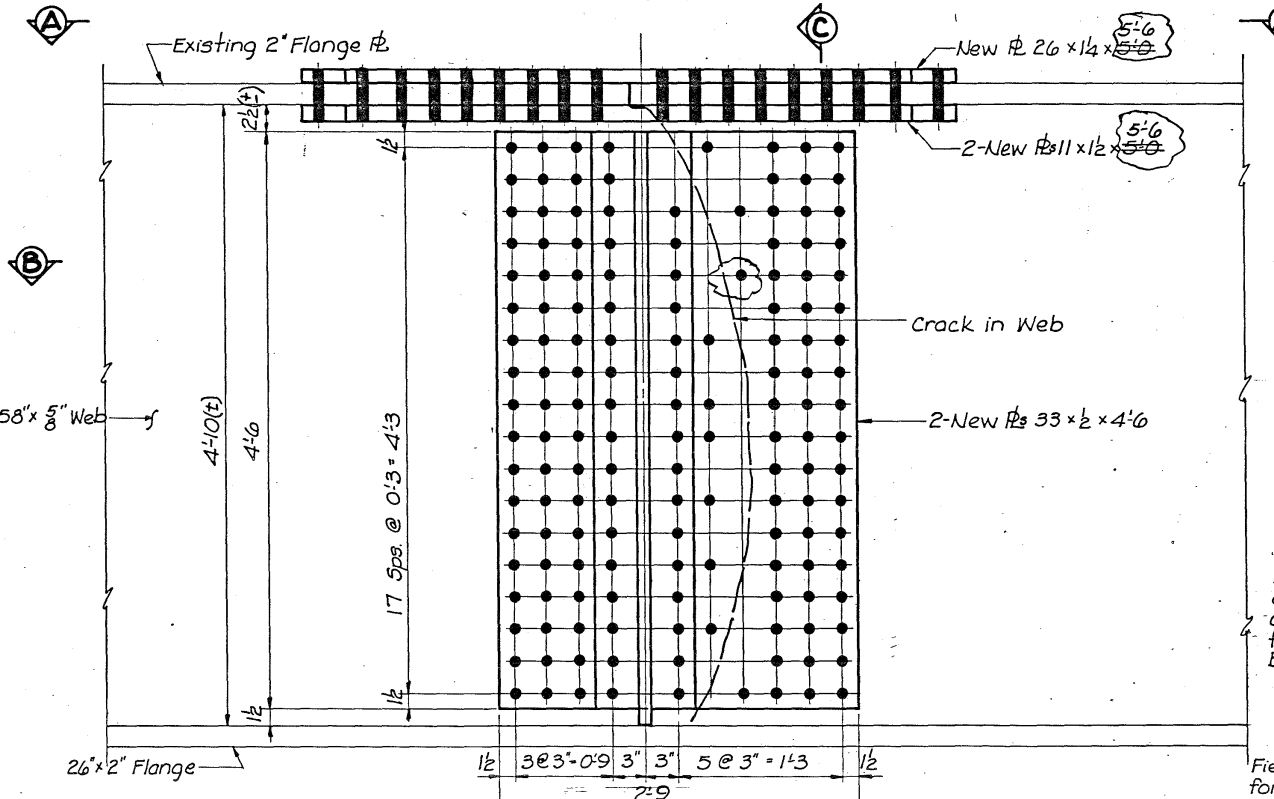
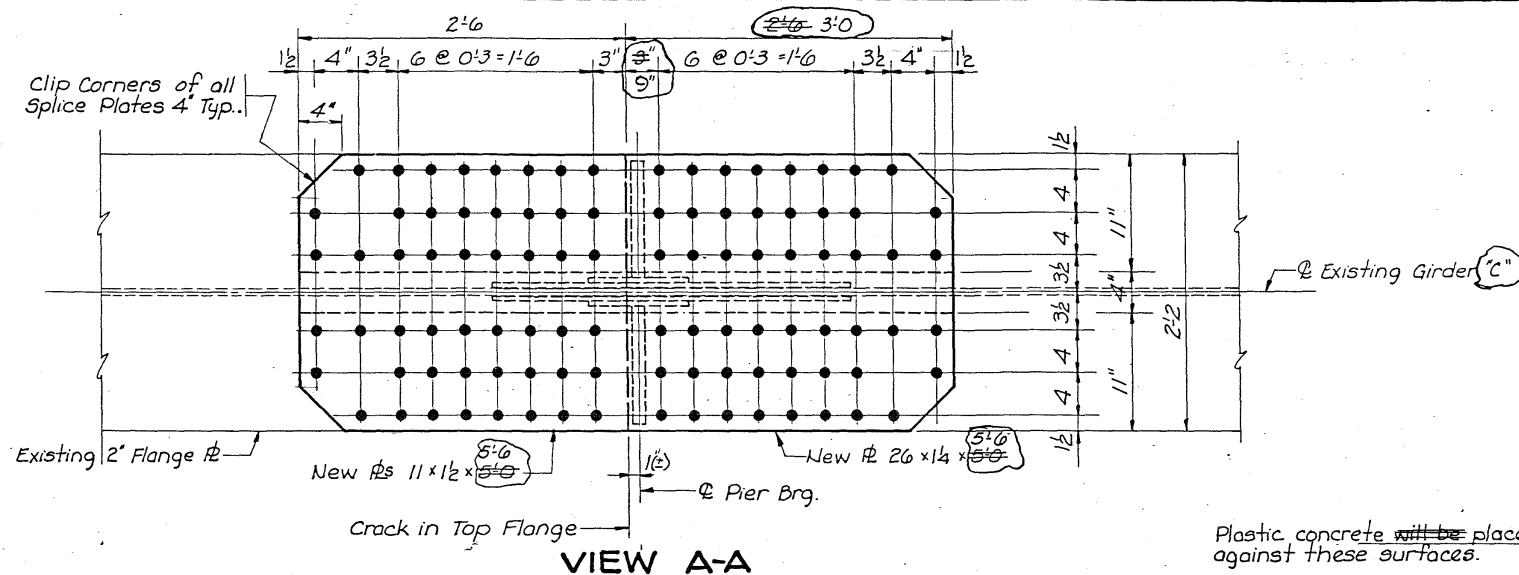
Steel			
Pc	Size	Wt. lbs. Inc. Weld	
Flange Splice	1- ϕ 26 x 14 x 5/8	5% 553	6
"	2- ϕ 11 x 12 x 5/8	5% 564	6
Web Splice	2- ϕ 33 x 2 x 4/6	505	
Stiffener Plates	2- ϕ 9 x 2 x 4/6	138	
"	2- ϕ 11 x 1 x 4/7 8	351	

Steel Sub-Total (lbs) 2105
All Materials must meet Charpy toughness requirement. 2209

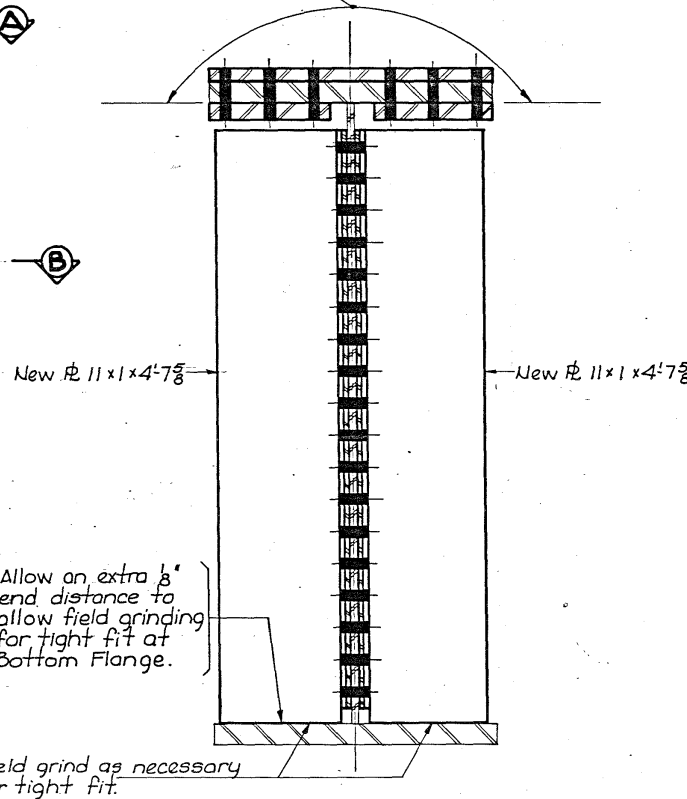
7/8" H.T.S. A325 BOLT LIST

Actual No.	Grip	Length inches	Location
100	4 3/4	64	Flange Splice
118	1 3/8	3	Web Splice
34	2 3/8	4	Brg. Stiffener to Web Splice
36	1 1/2	3	Pier Diaphragm to Stiff.
30	1 3/8	2 3/4	" " " "
40	7/8	2 1/4	Interm. " " "
56	1 1/8	2 1/2	Field Splice Web
40	3	4 1/2	" " Top Flange
60	3 3/8	4 3/4	" " Bottom "

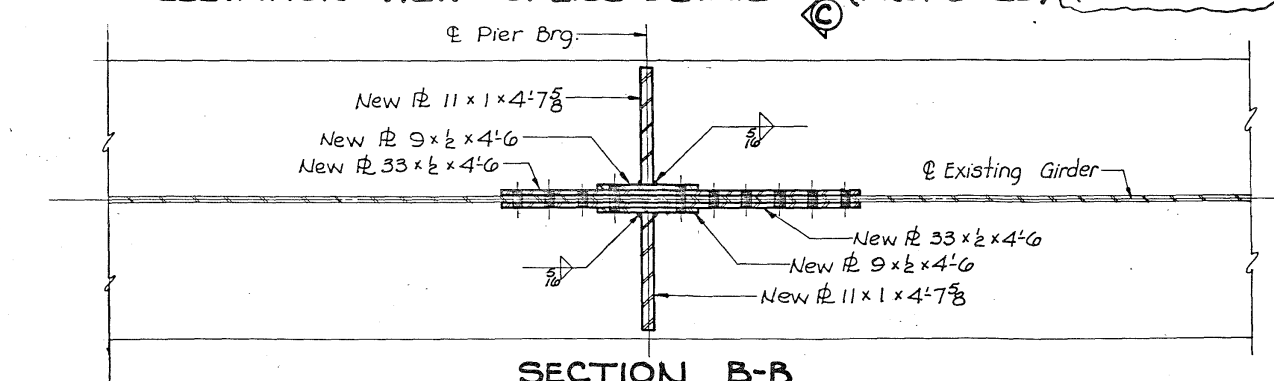
514 Washers
Bolts & Washers + 2% Wt. = 657
Total Weight Structural Steel = 2765 lbs.
2876



ELEVATION VIEW~ SPLICE DETAIL (PROPOSED) (LOOKING SOUTH)



SECTION C-C



SECTION B-B

NOTES:

The details on this sheet show or list all new structural steel required for the proposed girder repair. The pier bearing stiffeners and angle shear lugs which must be removed prior to installation of this new material are not shown. The field splice and the diaphragms that will be unbolted and will require new bolts for reconnecting are not shown.
The structural steel shall be A-36 or A-588 or A-572. All the plates shall have the minimum Charpy V-Notch Toughness of at least 15 ft.-lb. @ 40°F.
All bolts are to be 7/8" H.T.S. A325 bolts. All holes in new material are to be 1/8" and done in the shop unless otherwise noted.
Painting of new structural steel shall be in accordance with Article 2508. Contact surfaces and surfaces against which plastic concrete is to be placed shall receive prime coat only.
Holes in new 11"x1" plates are not shown. They will be field drilled using existing diaphragms as templates.
The steel is to be fabricated in accordance with the I.D.O.T. Specifications, Series of 1977, plus current Supplemental Specifications.

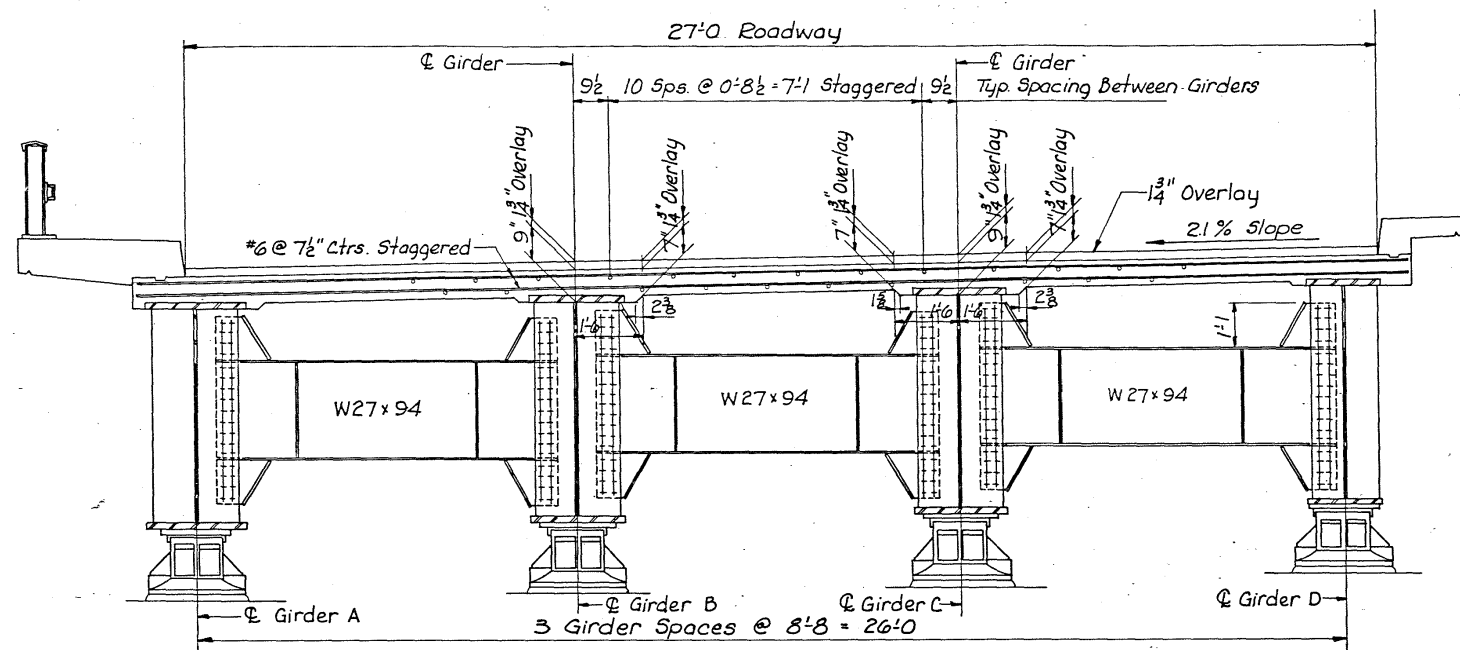
Revised 5-28-82: Flange splice plates lengthened 6'. Some clarifying notations added to aid field contractor.

Design For Repairs To
MULTISPAN CONTINUOUS PLATE GIRDER BRIDGE
Bridge Maintenance No. 9475.25007
REPAIR DETAILS GIRDER C
Station: 213+10 to 224+25 May, 1982
WEBSTER COUNTY
IOWA DEPARTMENT OF TRANSPORTATION-HIGHWAY DIVISION
Design Sheet No. 11 Of 12 File No. 26710 Design No. 682

DESIGNED BY: [Signature]
CHECKED BY: [Signature]

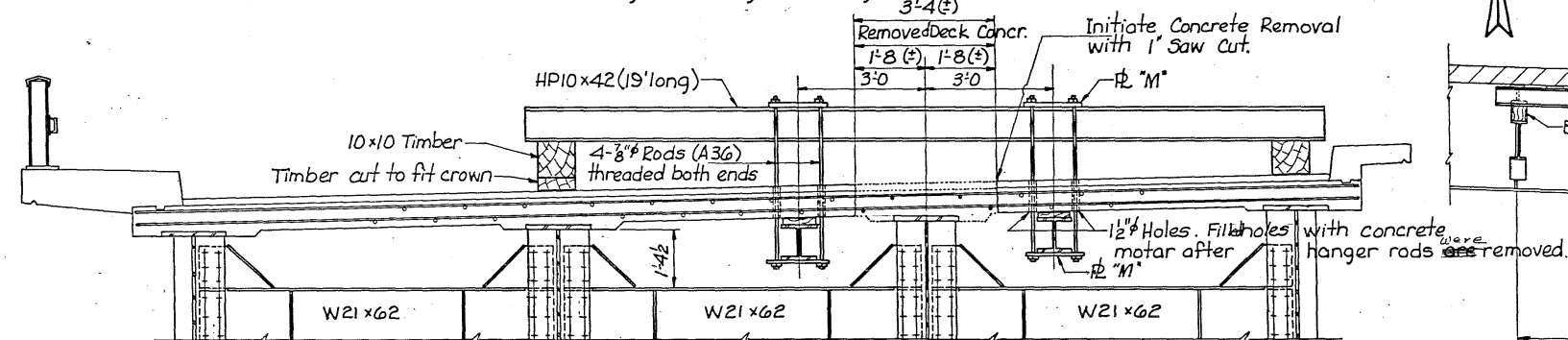
WEBSTER COUNTY

PROJECT NUMBER: FN-7-5(13)--21-94
STATE: IOWA
FISCAL YEAR: 1982
SHEET NO.: 13
TOTAL SHEETS: 14



SECTION NEAR PIER

Showing Existing - Looking East



SECTION NEAR INTERMEDIATE DIAPHRAGM

Removed two top longitudinal rebars 2'-6" each side of Pier Brg. and replaced with 2-#6x7'-6" bars. Lap splice existing bars. (Min. lap = 1'-3").

1 1/2" Bridge Floor Overlay - 194 Sq. Yds. Required

#6x4'-8" @ 7 1/2" Ctrs. Lap Splice with existing bars.

#6x4'-8" @ 7 1/2" Ctrs. Lay on Splice Plate.

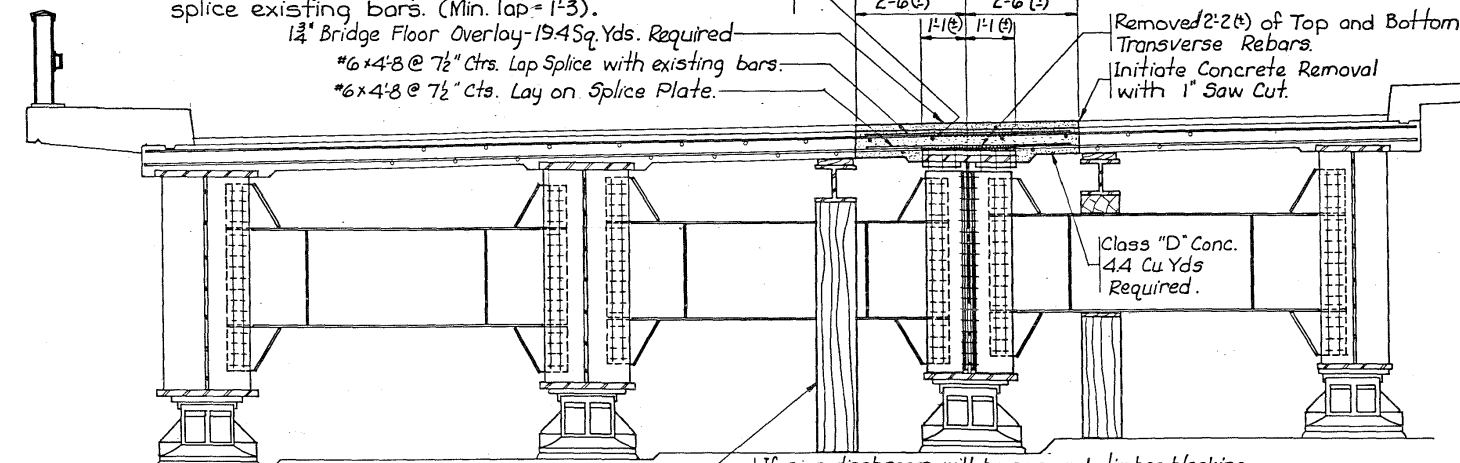
Removed Deck Concrete 2'-6" (2) 2'-6" (2)

1'-1" (2) 1'-1" (2)

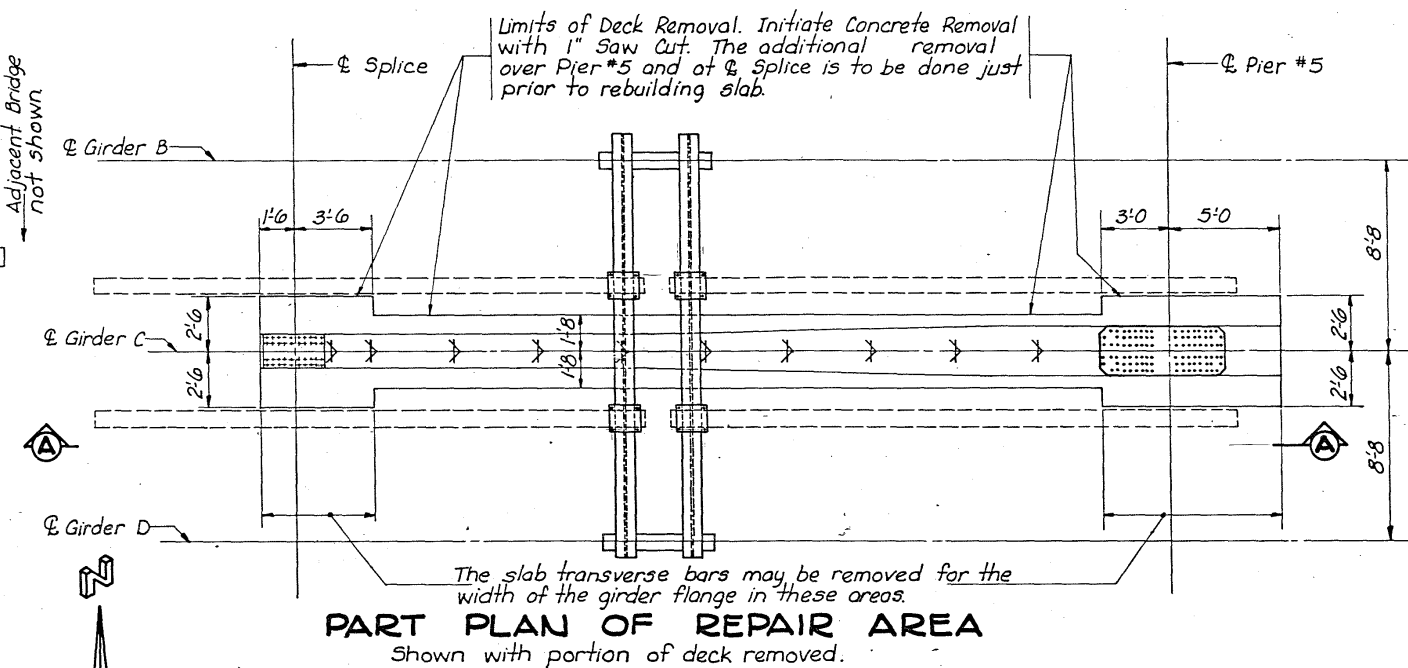
Removed 2'-2" of Top and Bottom Transverse Rebars.

Initiate Concrete Removal with 1" Saw Cut.

Class "D" Conc. 44 Cu Yds Required.

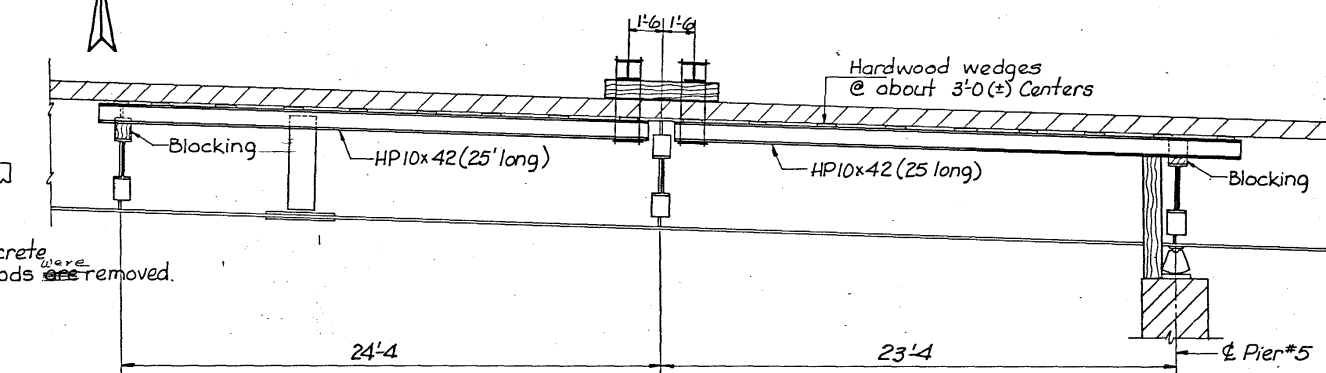


SECTION NEAR PIER



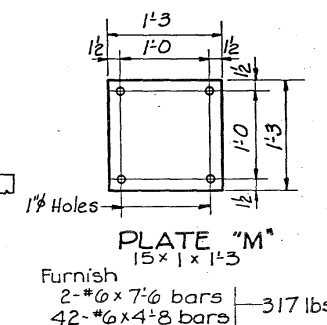
PART PLAN OF REPAIR AREA

Shown with portion of deck removed.



SECTION A-A

Showing Slab Support System



NOTE: Materials utilized for the temporary slab support system are to remain the property of the Contractor.

Design For Repairs To
MULTISPAN CONTINUOUS PLATE GIRDER BRIDGE
 Bridge Maintenance No. 9475.25007
REPAIR DETAILS - GIRDER C
 Station: 213+16 to 224+25 May, 1982
WEBSTER COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 Design Sheet No.: 12 Of 12 File No.: 26710 Design No.: 682

DESIGNED BY: L. Phillips
 CHECKED BY: H. Bollmann

TRACED BY: H. Bollmann

WEBSTER COUNTY

PROJECT NUMBER

STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	6		14	14