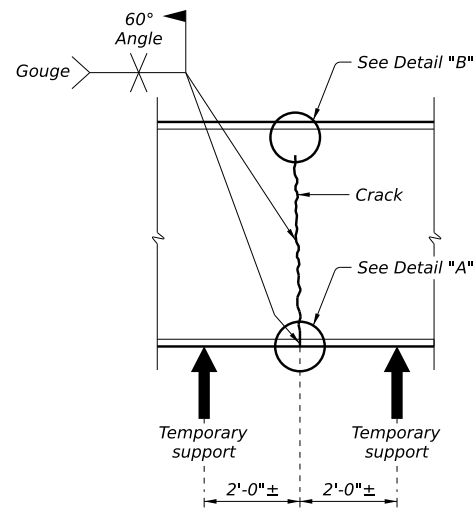
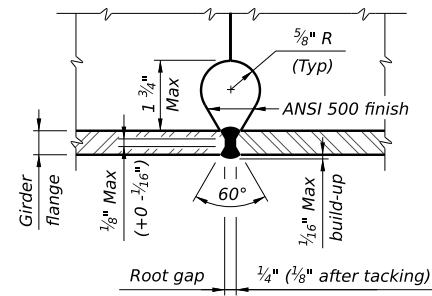


DISCLAIMER: This standard is governed by the Texas Engineering Practice Act. No warranty of any kind is made by TxDOT for any purpose whatsoever. The use of this standard for the conversion of this standard to other formats or for incorrect results or damages resulting from its use. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

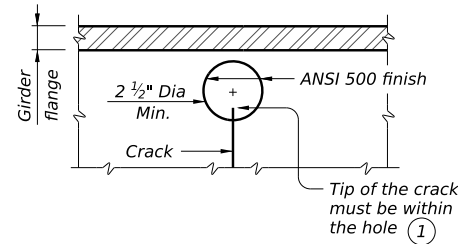


CRACKED BEAM

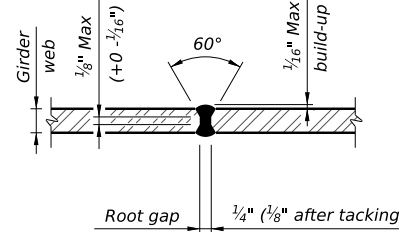
(Showing crack in web and bottom flange)



DETAIL "A"



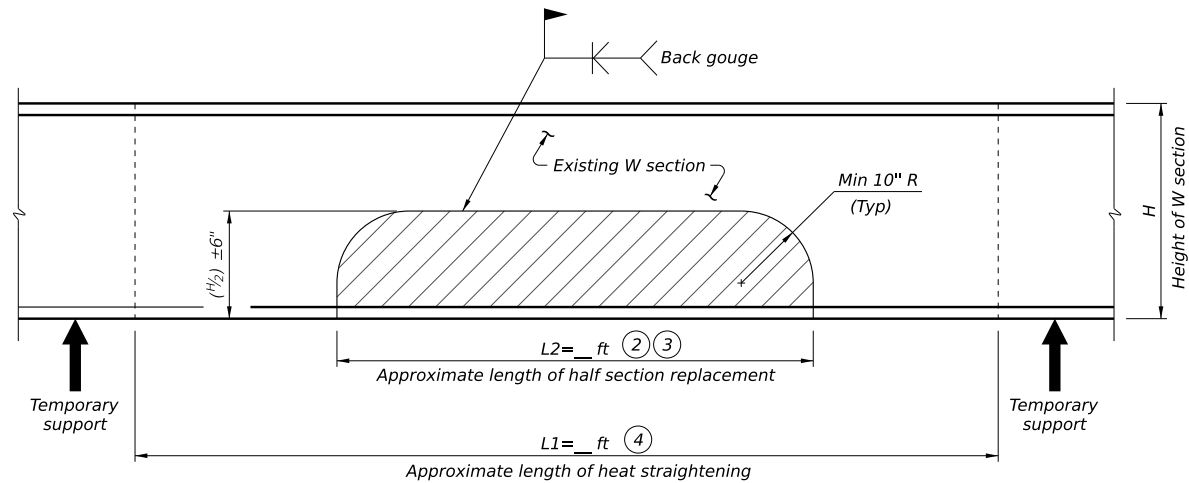
DETAIL "B"



WEB WELD

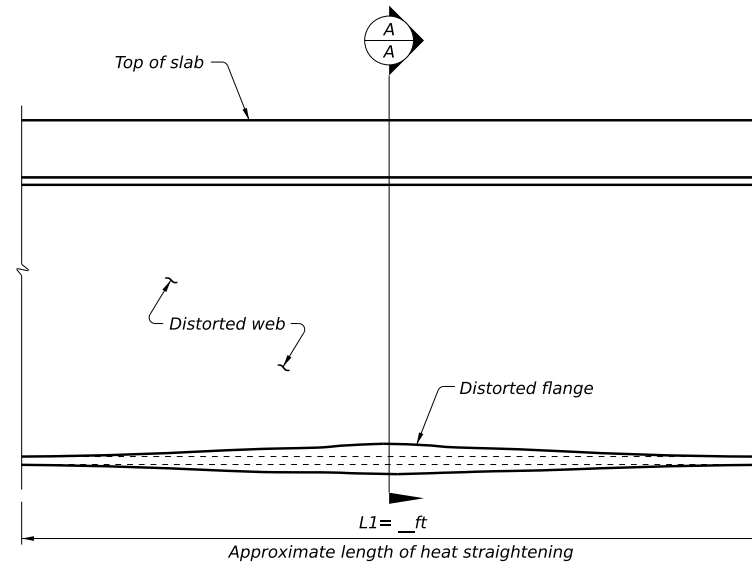
WELD AND CRACK ARREST DETAILS

- ① Verify location of crack tip before drilling crack arrest hole by magnetic particle testing or dye penetrant testing. After drilling, verify crack arrest hole captured entire crack tip by repeating the test.



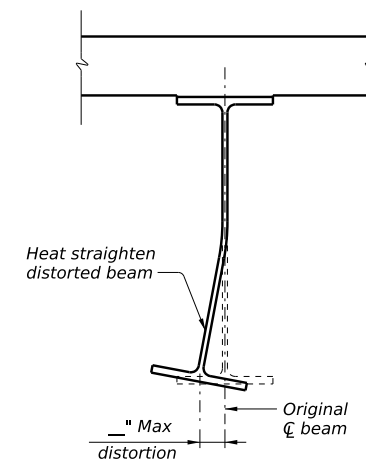
HALF-SECTION REPLACEMENT

- ② Remove damaged section.
- ③ Splice new W section.
- ④ Heat straighten.
- ⑤ Limits of defect removal.
- ⑥ Depth of defect. Do not grind deeper into the flange.



BEAM ELEVATION

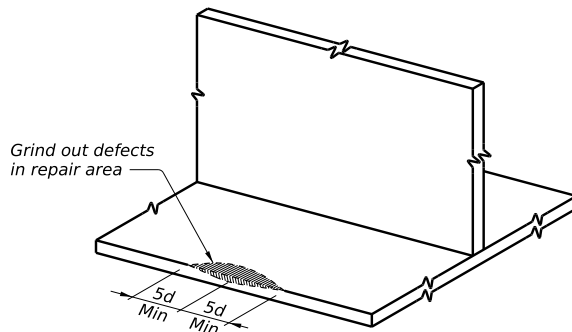
HEAT STRAIGHTENING



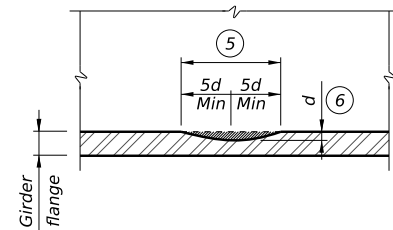
SECTION A-A

Repairs performed in accordance with these details will result in a load rating that meets or exceeds the original design loading of the structure.

SHEET 1 OF 2



ISOMETRIC



ELEVATION

DEFECT REMOVAL DETAILS

P.E. SEAL
REQUIRED
PRELIMINARY
SUBJECT TO REVISION

This document is released for informational purposes under the authority of XXXX XXXX P.E. XXXXX on XX/XX/XX. It is not to be used for regulatory approval, permit, bidding, or construction purposes.

Texas Department of Transportation		Bridge Division	
STEEL BEAM REPAIR			
(Not to be used as a standard)			
NBI: XX-XXX-XXXX-XX-XXX			
FILE: WD-SBR-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT February 2024	CONT SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY	SHEET NO.

DATE:
FILE:

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

CRACKED BEAM REPAIR AND DEFECT REMOVAL PROCEDURES:

1. Set traffic control. Close lanes on top of the bridge as directed by the Engineer.
2. Check gap (if any) between top of top flange and bottom of deck for any debris and clear to allow complete contact to occur.
3. Remove the diaphragms, if necessary, for heat-straightening.
4. Heat-straighten to bring web and flange into required alignment to restore girder section. If necessary, trim or grind the sharpened edges of cracked flange to align girder web and flange.
5. Install temporary supports and jacks and apply force (each side of crack) to bring top flange in contact with deck.
6. Drill crack arrest hole and weld access hole in web to allow flange weld. Use of torches to create holes is not allowed.
7. Prepare beam flange and web for welding. Extend flange and web if necessary by weld build up.
8. Weld bottom flange (Leave temporary supports in place as needed to keep weld from cracking).
9. Weld web (temporary support not necessary).
10. Grind out nicks and gouges in bottom flange as shown. Achieve a smooth transition from damaged steel to undamaged steel using a minimum 5:1 taper. Do not exceed the depth of the defect during grinding. Grind flange edge to remove 3/16" of material within the impact zone. Grind marks should run parallel to the beam.
- *11. Repair/replace/re-weld damaged diaphragms as shown in the detail after the beam is restored in both shape and alignment.
12. Clean and paint the repair area as directed by the Engineer.
- *13. Inject epoxy into any remaining gap between top flange and deck. The length of flange separation that must be injected is approximately ___feet.
14. Open the roadways to normal traffic as directed by the Engineer.

HALF SECTION REPLACEMENT PROCEDURE:

1. Set traffic control. Close lanes on top of the bridge as directed by the Engineer.
2. Check gap (if any) between top of top flange and bottom of deck for any debris and clear to allow complete contact to occur.
3. Remove the diaphragms, if necessary, for heat straightening.
4. Heat straighten existing steel girder in accordance with Item 784, "Steel Member Repair."
5. Install temporary supports and jacks and apply force to push the girder up and bring the top flange in contact with deck.
6. Install half section replacement member.
- *7. Repair/replace/re-weld damaged diaphragms as shown in the detail after the beam is restored in both shape and alignment.
8. Clean and paint the repair area as directed by the Engineer.
- *9. Inject epoxy into any remaining gap between top flange and deck. The length of flange separation that must be injected is approximately ___ feet.
10. Open the roadways to normal traffic as directed by the Engineer.

HEAT-STRAIGHTENING PROCEDURE:

1. Set traffic control. Close lanes on top of the bridge as directed by the Engineer.
2. Check gap (if any) between top of top flange and bottom of deck for any debris and clear to allow complete contact to occur.
3. Remove the diaphragms, if necessary, for heat straightening.
4. Heat-straighten distorted beam in accordance with Item 784, "Steel Member Repair."
5. Remove defects and grind the flange smooth in the damaged area as shown and as described in the Cracked Beam Repair and Defect Removal Procedures.
- *6. Repair/replace/re-weld damaged diaphragms as shown in the detail after the beam is restored in both shape and alignment.
7. Clean and paint the repair area as directed by the Engineer.
- *8. Inject epoxy into any remaining gap between top flange and deck. The length of flange separation that must be injected is approximately ___ feet.
9. Open the roadways to normal traffic as directed by the Engineer.

NOTE TO DESIGNER:

This sheet is to be used as a guide for steel beam repairs. Details with appropriate notes from this guide should be prepared for the specific application. Designer must calculate required jacking force for the temporary supports. Existing diaphragm detail or a raster image from as-built must be added if diaphragm repair is needed. Adding photos of damaged steel structure showing current condition is recommended.

Use Item 784-6002 for beam repair.

Use Item 784-6003 for diaphragm repair.

This sheet cannot be used without modification. The details shown may need to be amended if the exact existing conditions are not covered. In all cases, details and notes not required must be deleted. This note and the phrase "Not to be used as a standard" must be removed and the sheet must be signed and sealed by a Professional Engineer.

GENERAL NOTES:

Notify TxDOT Bridge Division at least two weeks in advance by e-mailing BRG-FO-STL@txdot.gov prior to beginning work to allow for inspection of repairs by a Bridge Division structural steel inspector.

Use heat-straightening to repair and restore the shape of beams and diaphragms. Heat-straighten the members in accordance with Item 784, "Steel Member Repair." Apply sufficient force combined with heat to accomplish work but do not fracture member. Repair additional damage caused by Contractor's operations at no additional cost to the Department. Removal and replacement of diaphragm members is an acceptable alternative to straightening. No additional payment will be made for removal and replacement of diaphragms.

**Provide temporary supports and jacks to allow jacking of beam to restore contact of flange to bottom of deck.

**Provide ASTM A709 steel with minimum Grade 36 in accordance with Item 442, "Metal for Structures" for new diaphragms.

**Provide ASTM A709 steel with Grade 50W for half section replacement in unpainted structures, and ASTM A709 steel with grade 50, 50S, or 50W for half section replacement in painted structures in accordance with Item 442, "Metal for Structures."

**Radiographic inspection of flange and web welds are required.

**Provide Type IX epoxy for gap injection in accordance with DMS 6100 "Epoxy and Adhesives."


**Restore the paint protection for repaired beams and diaphragms with System XX per Item 446, "Field Cleaning and Painting Steel," and as directed by the Engineer. Match the appearance coat with the existing structure. Assume existing paint coating contains hazardous materials, unless otherwise noted.

* Remove this step if it does not apply

** Remove this paragraph if it does not apply

*** Designer to specify the applicable paint system

SHEET 2 OF 2

 Texas Department of Transportation				Bridge Division	
<h2 style="margin: 0;">STEEL BEAM REPAIR</h2>					
<p>(Not to be used as a standard)</p> <p>NBI: XX-XXX-XXXX-XX-XXX</p>					
FILE: WD-SBR-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT	
©TxDOT	February 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS					
		DIST	COUNTY	SHEET NO.	

P.E. SEAL
 REQUIRED
PRELIMINARY
 SUBJECT TO REVISION

This document is released for informational purposes under the authority of XXX XXXX
 P.E. XXXXX on XX/XX/XX.
 It is not to be used for regulatory approval, permit, bidding, or construction purposes.