	BY: Rolando Ionta	DATE: 16-May-00
	CHK'D: Bogdan Mazurczyk	DATE: 16-May-00
	Project No. YY-XXX	
	Description: Client Name Here	
	Lifting Beam Emergency Inspection & Repair Recommendations	
Three copies of this report to "Mr. XXXX" 5/16/00.		
Tape No. 5 5/3/00; 7:54:24 AM		
<u>Purpose of Inspection:</u>		
<p>"Mr. XXXX" of "XXXX Company" requested that CMM perform an emergency inspection of the 375 Ton Lifting Beam used on the Charging Aisle Crane. The lifting beam has been removed from service and is presently located on the south end of the Teeming Aisle.</p>		
<u>Field Inspection Procedure:</u>		
<p>The field inspection was performed by Rolando Ionta and Bogdan Mazurczyk on May 3, 2000. The field inspection was video taped so that photos could be captured.</p>		
<u>Results of Inspection and Repair Recommendations.</u>		
<ol style="list-style-type: none"> 1- The subject lifting beam is depicted on Client drawing XXXX-1. 2- The main load members of the lifting beam, consisting of the Top Flanges, Vertical Side Plates and the Bottom Flanges, are A.S.T.M. A-242 material spec. per the drawing. This is denoted as a Low Alloy, High Strength Steel with physical properties of 70,000 PSI Minimum Tensile Strength and 50,000 PSI Minimum Yield Strength. This is also known as COR-TEN A steel. 3- The COR-TEN A material can be heated and welded using general practices in accordance with the attached material property card. 4- The specific deficiencies and associated repair recommendations are denoted in the attached video capture photographs. 5- Supplemental weld repair procedures as referenced in some of the photographs are included with this report. 6- Two types of the deficiencies observed during the visual inspection are concluded to have been caused by torsional loading, which are due to some type of abnormal usage or loading condition of the lifting beam. The two types of deficiencies observed are: <ol style="list-style-type: none"> a- Cracking of the diaphragm plates. See photos 7 & 8. b- Cracking of the top cover plate. See photos 14 & 15. 7- The dented/bent bottom flange depicted in photo 7 indicates that the lifting beam struck an object or was pinched/wedged with another object. 8- The bent side plate depicted in photos 4 & 5 indicate the lifting beam may have been pinched under the trolley. 9- After the recommended repairs are performed, the lifting beam can be re-used but should be periodically visually inspected so that similar failures do not reappear. 		



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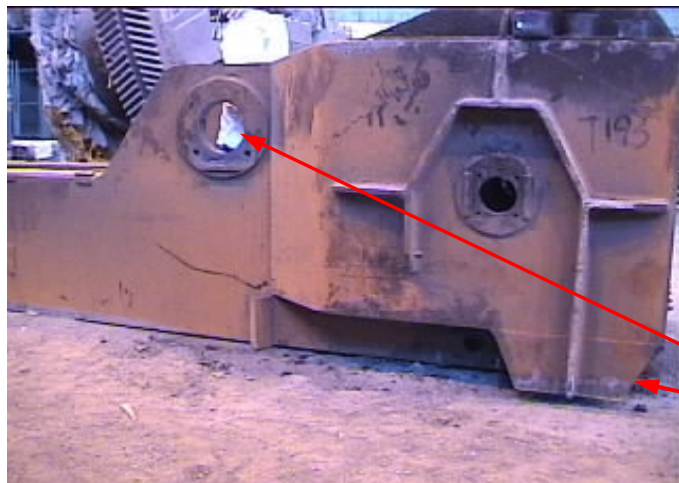
Description: Client Name Here

Lifting Beam Emergency Inspection & Repair Recommendations

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**PHOTO No. 1**

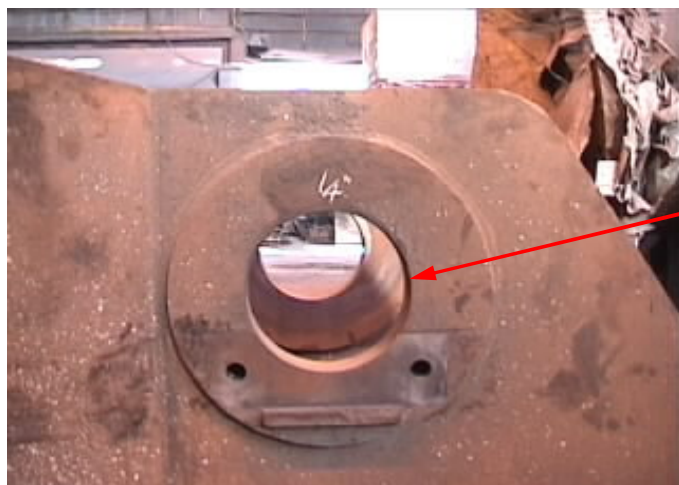
This is a general view of the 375 Ton Lifting Beam used on the Charging Crane. This photo was taken upside down to depict the lifting beam markings. The subject lifting beam is depicted on Client drawing XXXX-1. The drawing specifies the material to be A.S.T.M. A-242 for the main load members, which is a Low Alloy High Strength material also known as COR-TEN A.

**PHOTO No. 2**

General view of the Crane Lifting Beam at start of the visual inspection.

The lifting beam, as depicted in this photo, is upside down with the top of the lifting beam resting on the ground.

Bores for hook adaptor pins.
Top of side plate on far side is bent, see photos 4, 5 & 6 for details.

**PHOTO No. 3**

Close-up view of one of the bores for the hook adaptor pins. There are a total of four (4) bores. All four (4) bores are vertically elongated approximately 1/4".

Repair- Line Bore existing bores to accommodate a new bushing, Stitch weld four (4) bushings in place.



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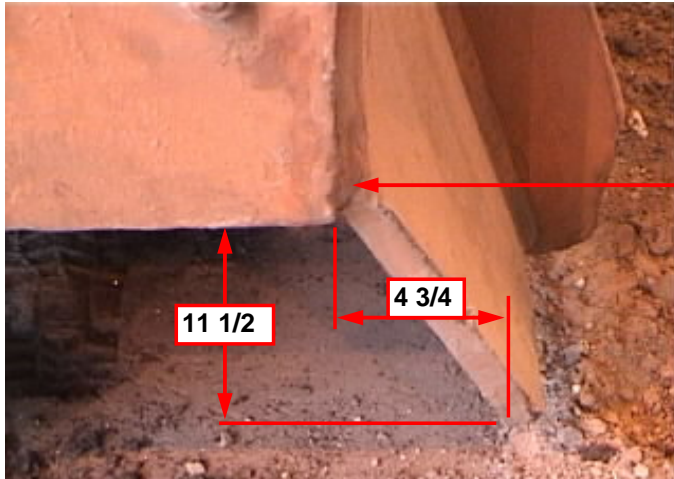
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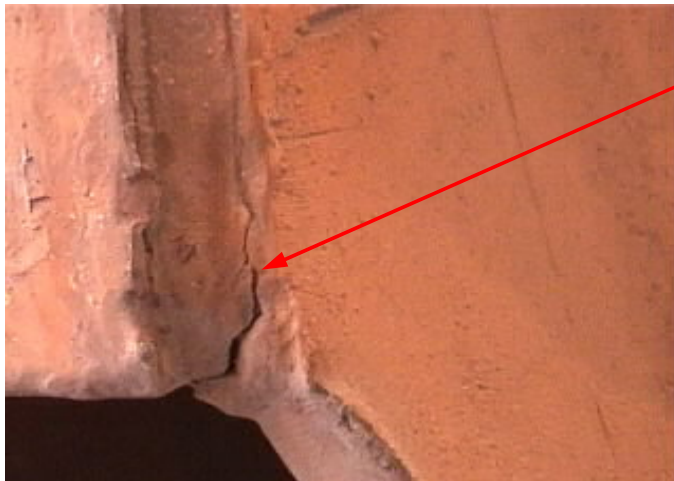
**PHOTO No. 4**

Close up view showing a bent vertical side plate in one of the top corners of the lifting beam.

A 2" long crack through the weld is also present in the corner.

Repair:

- 1- Heat side plate & stiffener.
- 2- Straighten side plate & Stiffener.
- 3- Gouge out cracked weld and re-weld, see photo 5.

**PHOTO No. 5**

Closer view of the 2" long crack in the weld depicted in photo 4. The crack is visible on both sides of the weld. The crack does not extend into the base metal.

Weld Repair:

Repair weld per attached standard repair procedures.

**PHOTO No. 6**

Close up view of the opposite side (inside of the lifting beam) of the cracked weld depicted in photos 4 and 5 above.



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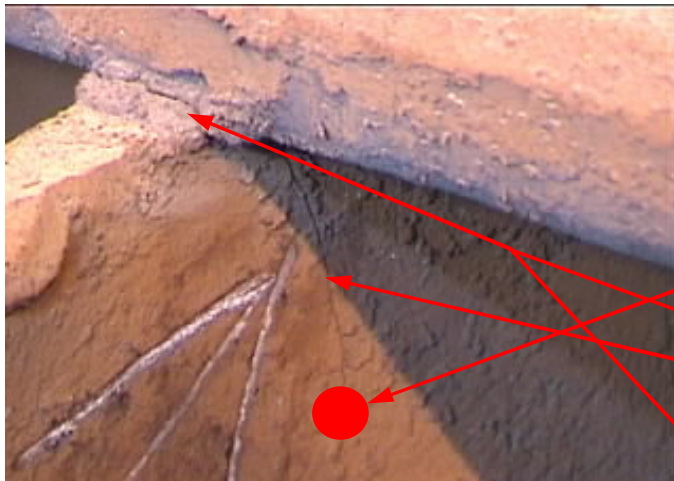
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**PHOTO No. 7**

General view looking at bottom flanges and diaphragm plates. 5 of the 7 diaphragm plates are cracked in the weld and base metal.

Bottom Flange- 1 1/2" COR-TEN A.
Diaphragm Plate- 1" A7 or A283.

Notice 9"L x 4"W x 1 1/4" deep depression in bottom flange from being pinched/struck.

**PHOTO No. 8**

Close up view of the cracked weld and diaphragm plate.

Repairs:

- 1- Locate end of crack in diaphragm plate.
- 2- Drill 1/2" relief hole at end of crack.
- 3- Grind off cracked fillet weld.
- 4- Back gouge and weld per attached repair procedures.
- 5- Re-weld 3/8" fillet weld.

**PHOTO No. 9**

General view of the two 10 1/2" pins that fit into the elongated bores depicted in photos 2 and 3 above.

Both pins are severely worn beyond repair.

Repair- Replace both pins in kind.

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Close up view of the worn step in the pins shown in photo 9 above.

There is a nominal 3/8" step worn into these two pins.

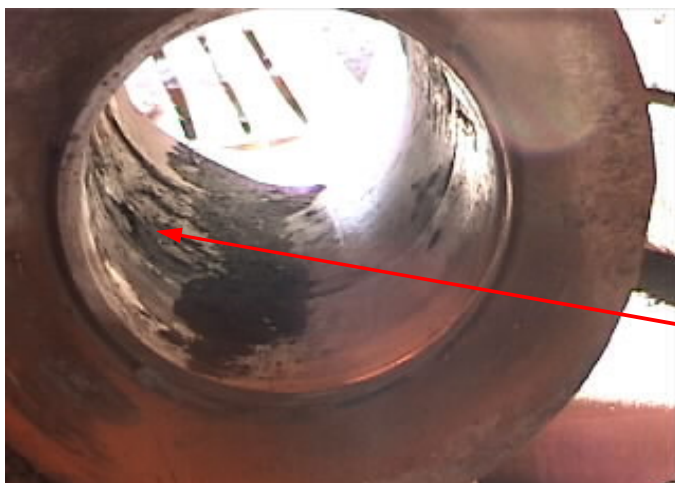
Repair- Replace both pins in kind.

**PHOTO No. 11**

General view of the ladle hook adaptor used to connect the ladle hook to the lifting beam.

10 1/2" pins at lifting beam fit here.

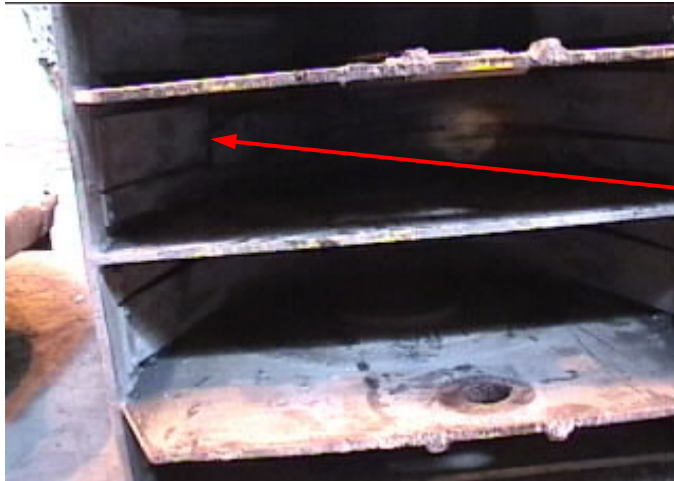
Ladle hook pin fit here.

**PHOTO No. 12**

Close-up view of the 10 1/2" bore for the lifting beam pins in the adaptor shown in photo 11 above.

Inside/bore of bushing is severely galled.

Repair:
Closely inspect all bushings for wear and/or cracking. Replace bushings in sets as required.

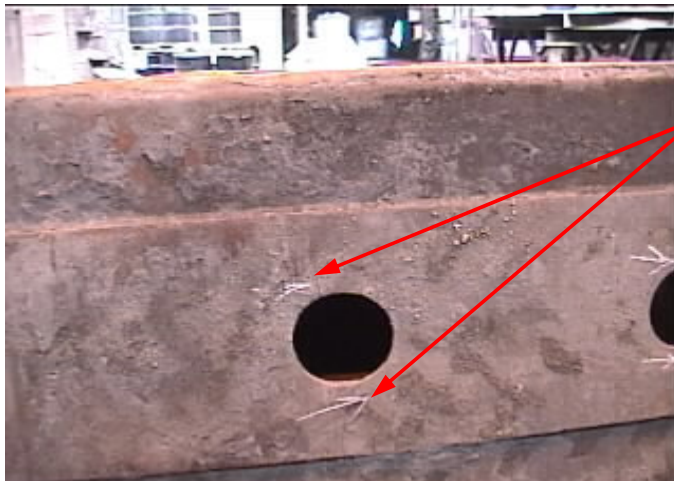
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General view of lifting beam sheave pockets on opposite end of the bent side plate depicted in photo 4.

The sheave guards in the center pocket are severely worn and cracked (not depicted in photo due to lighting).

Repair:

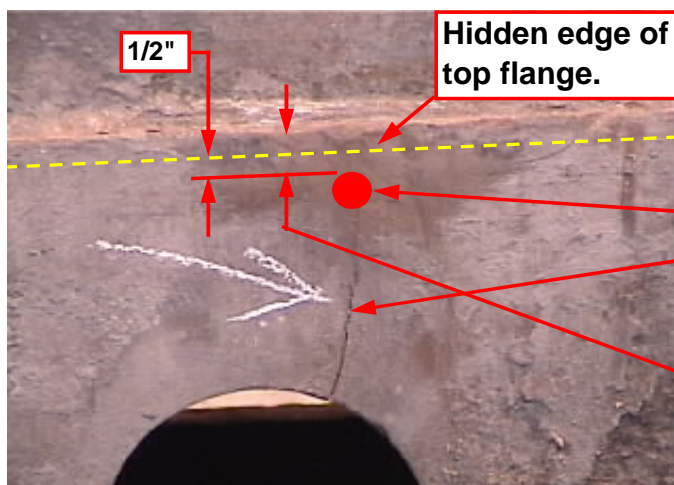
Replace sheave guards in center pocket in kind.

**PHOTO No. 14**

General view of the 3/8" top cover plate.

Seven out of the eight 6" diameter burned clearance holes have radial cracks starting at the inside edge of the hole and propagate out towards the fillet weld.

Since the top flange is normally in compression, this type of failure mode indicates that the lifting beam was subjected to torsional loading due to some type of abnormal loading condition.

**PHOTO No. 15****Repair:**

- 1- Drill a 1/2" relief hole with the edge of the hole clearing the edge of the bottom flange by 1/2".
- 2- Gouge out and weld the crack per attached repair procedures.
- 3- Do not weld relief hole.
- 3- Do not gouge out or weld crack between relief hole and edge of cover plate.