

# ASSEMBLY INSTRUCTION MANUAL

## SINGLE GIRDER TOP RUNNING BRIDGES WITH INDIVIDUAL MOTOR DRIVEN AND HAND GEARED TRUCKS

**Rated Loads;**

**1 thru 15 tons / 2000 thru 30000 lbs.**

**1 thru 15 tonnes / 1000 thru 15000 kg.**

**Follow all instructions and warnings in building this bridge.**

The building of any bridge presents some risk of personal injury or property damage. That risk is greatly increased if proper instructions and warnings are not followed. Before starting construction the builder should become thoroughly familiar with all warnings, instructions and recommendations in this manual.

**Retain this manual for future reference and use.**



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## TO BUILD TOP RUNNING SINGLE GIRDER CRANE BRIDGES

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### GENERAL

The assembly and manufacturing instructions in this manual are for use in conjunction with the manufacturers components identified by Catalog numbers listed under the two types of drives covered by this manual on pages 15 and 16.

Although the supplied components are designed to conform with the requirements of CMAA 74, Specification for Top Running & Under Running Single Girder Electric Overhead Traveling Cranes Utilizing Under Running Trolley Hoist and ANSI B30.17, Safety Standard for Overhead and Gantry Cranes, it is the installer's responsibility to assure that the furnished crane assembly complies in total with all applicable local, state and national codes and standards including those mentioned herein. On a hand powered crane with an electric hoist, a fused safety disconnect switch should be provided and mounted on the bridge near the main collectors. Crane wiring should be done by a licenced electrician and be in accordance with the National Electric Code (ANSI/NFPA 70).

The crane bridges described in this manual are intended for normal indoor service. Bridges to be used for outdoor or unusual service require special consideration.

This manual illustrates specific configurations for the range of coverage shown, specifically from 10 foot thru 60 foot spans and up to and including 15 tonne capacity. Minor deviations to the configurations shown (such as shaft bearing spacing, shaft lengths, etc.) may be made providing that any changes and/or alterations to those shown, be performed only by a properly qualified person. The manufacturer accepts no responsibility for any altered bridge configurations.

Material listed by catalog numbers on pages 15 and 16 are applicable only to crane configurations outlined in this manual, specifically limited to a maximum rated load of 15 tonnes and a maximum span of 60 feet.

Cataloged end trucks listed on page 15 will accommodate rail sizes shown on this page. Maximum wheel loads are shown for each wheel size.

**WARNING**

**NON-FACTORY AUTHORIZATIONS OR MODIFICATION OF EQUIPMENT AND USE OF NON-FACTORY REPAIR PARTS CAN LEAD TO DANGEROUS OPERATION AND INJURY.**

**TO AVOID INJURY:**

- Do not alter or modify equipment without factory authorization.
- Do use only factory provided replacement parts.

Wheel	Wheel Base	ASCE Runway Rail				
		25#	30#	40#	60# & 70#	80# & 85#
6"	4' - 6"	8994#	9560#	11,242#	--	--
6"	6' - 0"	8994	9560	10,076	--	--
6"	7' - 6"	8038	8038	8038	--	--
8"	4' - 6"	--	12,747	14,990	20,986#	22,485#
8"	6' - 0"	--	12,747	14,990	17,308	17,308
8"	7' - 6"	--	12,747	13,802	13,802	13,802
10"	4' - 6"	--	--	--	26,232	28,106
10"	6' - 0"	--	--	--	22,283	22,283
10"	7' - 6"	--	--	--	17,754	17,754

Maximum Wheel Load with Crane Centered on the Wheelbase.

The above chart contains allowable Equivalent Durability Wheel Loads in accordance with CMAA Specification #74, revised 2004.

**RUNWAYS:** Runway beams on which these cranes will operate must be amply strong to support crane bridge, hoisting equipment, and rated load. Runway rails must be level and parallel within  $\pm 1/8"$ . Rail joints must be smooth and held firmly in alignment either by bolted splice bars or welding. Rails should be securely fastened to runway beam.

### MATERIAL TO BE PURCHASED LOCALLY TO COMPLETE A CRANE BRIDGE

**STRUCTURAL STEEL:** All structural steel should be first quality, free from rust and excessive mill scale, and conform to ASTM A 36, Standard Specification for Structural Steel.

For the drawing identifying all dimensions, material sizes, location of cross shafting, brackets, etc.; refer to the following chart:

Bridge Assembly	Page
Individual Drive	9
Hand Powered	10

**BRIDGE BEAMS:** For each rated load, span and type of bridge select bridge beam from the tables shown on pages 17 thru 24.

The beam which is selected to be used for the bridge girder must be straight with flanges parallel to each other and flanges 90 degrees to the web. See Figure 1 below.

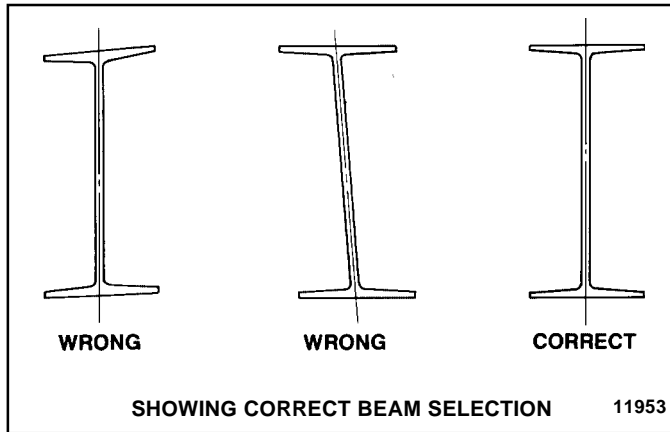


Figure 1.

**NOTICE**

**A.** All of the tables used in selection of structural steel beams have been produced by our engineering department using well established design guides for this type of crane bridge. IT IS IMPORTANT THAT ALL INSTRUCTIONS BE FOLLOWED AND THAT RECOMMENDED COMPONENT APPLICATION LIMITS NOT BE EXCEEDED.

**B.** Assembly of beam and channel requires welding. IT IS EXTREMELY IMPORTANT TO THE SAFETY OF THIS BRIDGE THAT THIS WELDING BE DONE BY A COMPETENT WELL TRAINED WELDER. It is our strong recommendation that the welder used in this construction be qualified as prescribed by the American Welding Society (AWS) Specification for Welding Industrial and Mill Cranes D14.1 - latest issue.

**FABRICATION OF GIRDER FOR BRIDGE BEAM WITH CAPPING CHANNEL**

Refer to Figure 2. Place channel on supports as shown in Step I. The beam is sighted for camber and placed with camber in direction shown in Step II. Weld one end of the channel to the beam. Clamp, with "C" clamps, the channel to the beam flange. Provide sufficient "C" clamps so as to hold the channel in contact with the beam.

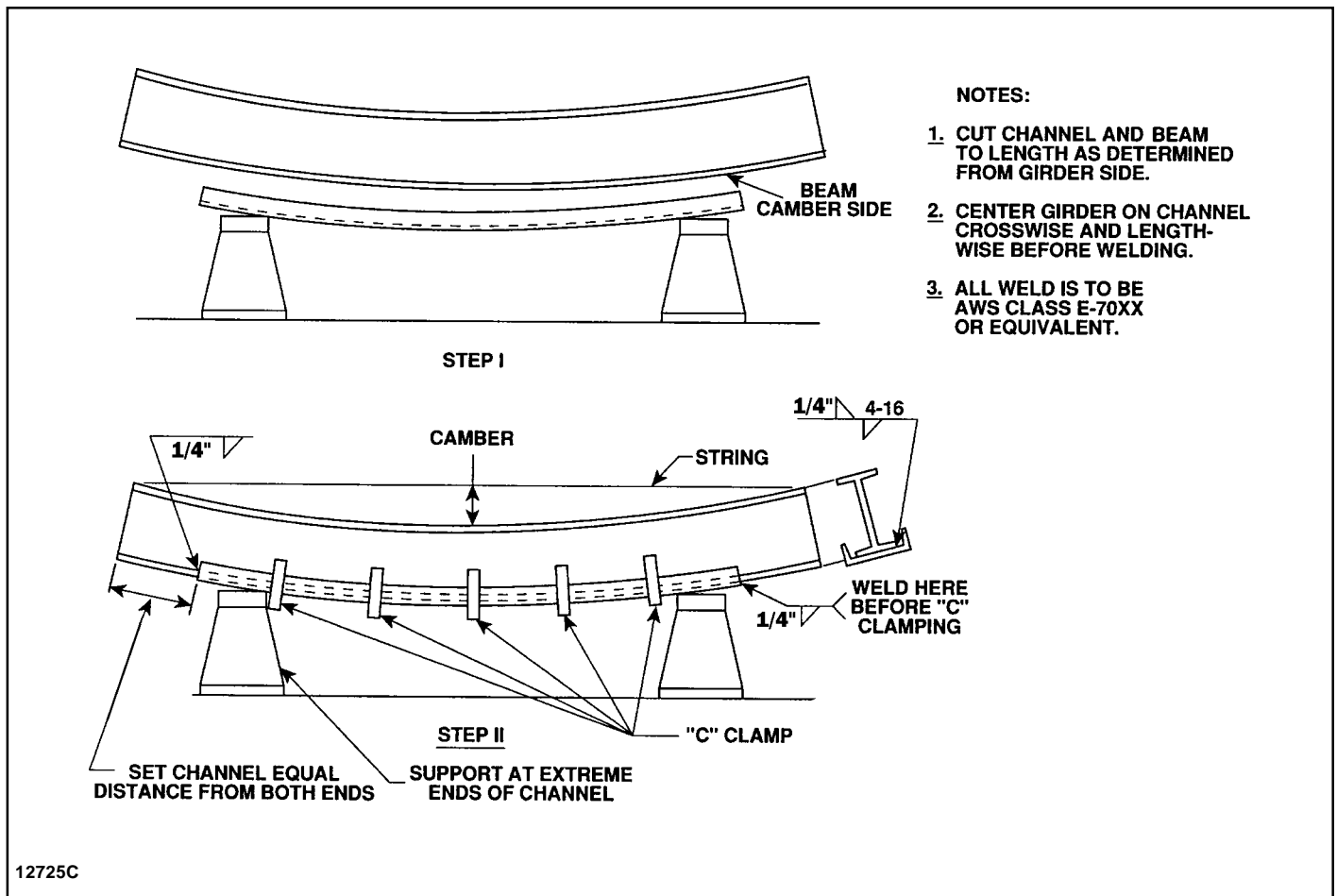



Figure 2.

Weld in accordance with the weld information given, starting at one end, staggering the weld from side to side, proceeding to the opposite end of the channel without interruption. It is important to stagger the weld from side to side in order to retain beam straightness. After welding, draw a taut string from end to end of beam as shown. Beam should either be parallel to string or have some camber. Camber should not exceed 1/888 of span.

**CROSS SHAFTS:** For hand geared cranes, cross shafts are required. The cross shafts are to be of AISI 1018 cold drawn steel, with standard mill tolerance of  $+.000"$ ,  $-.002"$ . For shaft diameter and lengths, refer to Figure 9, Hand Geared Bridge Assembly. The builder must check that the cross shaft couplings clear cross shaft bearings.

 <b>WARNING</b>
<p><b>Trolley stops (clip angles) must be installed on both ends of the bridge beam to prevent hoist trolley from running off the end of the beam, which could result in injury to the operator and others and damage to the load and other property.</b></p>

**ASSEMBLING BRIDGE GIRDER TO END TRUCKS**

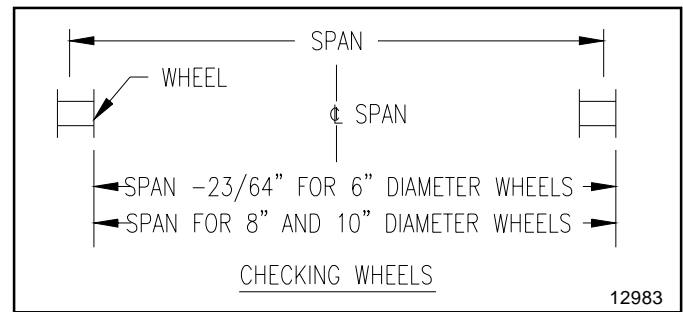
1. Refer to Figure 5-Bridge "Whale's Tail" Bolted End Connection, Figure 5B-Bridge Bolted Plate End Connection and Figure 6-Bridge Welded End Connection. Figure 5 shows a girder end connection that may be optionally purchased as a kit. Figure 5B shows another optional bolted plate girder connection that may be purchased. Figure 6 is an end connection that may be fabricated by the crane builder. Make the notch to the dimensions shown with a  $\frac{1}{2}"$  radius at the intersection of the cuts with a cutting torch and smooth the burned area by grinding. If the girder extends below the truck a second notch may be required

to clear the runway or main conductors. Support beam about two feet from each end on a pair of horses, or other suitable support (adjustable, with clamping ability is preferred). Place beam on supports so that camber side is at top. In case of beams with capping channels the channel side is up. When setting up the beam on supports, make certain that the bottom flange is level.

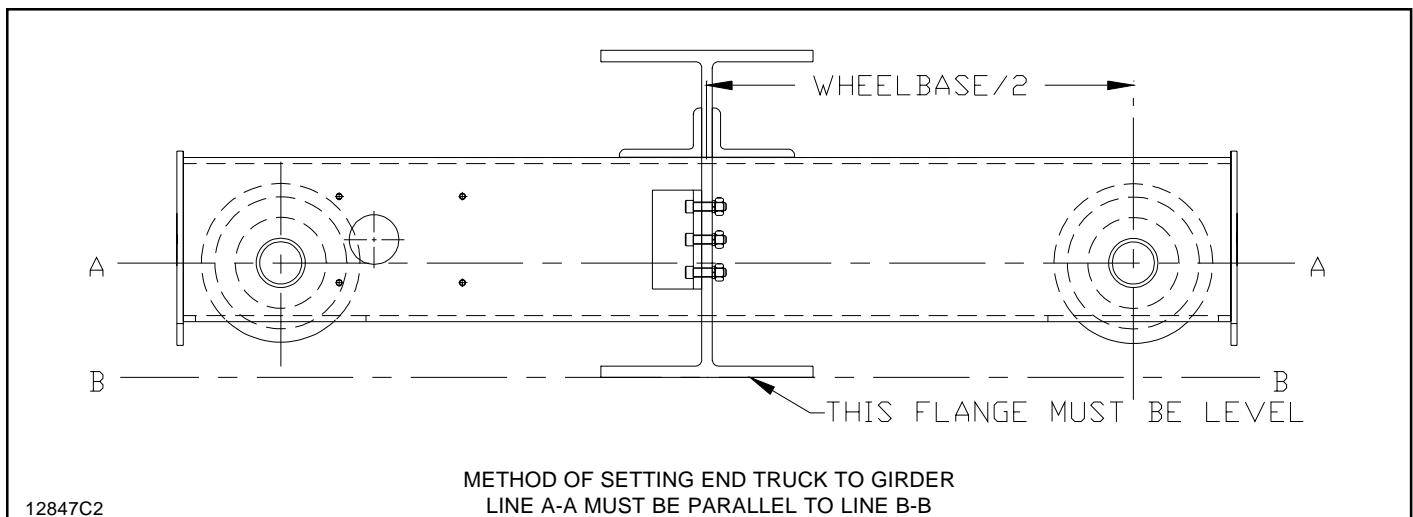
2. Locate end trucks in the notch of the girder, one at each end of the girder. Make certain trucks are level with each other and are level with the bottom flange of the beam as shown in Figure 3. The girder web is centered on the truck wheelbase.

It is quite possible that the top flange of the girder is not level even though the bottom flange is level. **DO NOT LEVEL FROM ROUGH TRUCK STRUCTURE.** Correct operation of the hoist-trolley requires that the bottom flange is level.

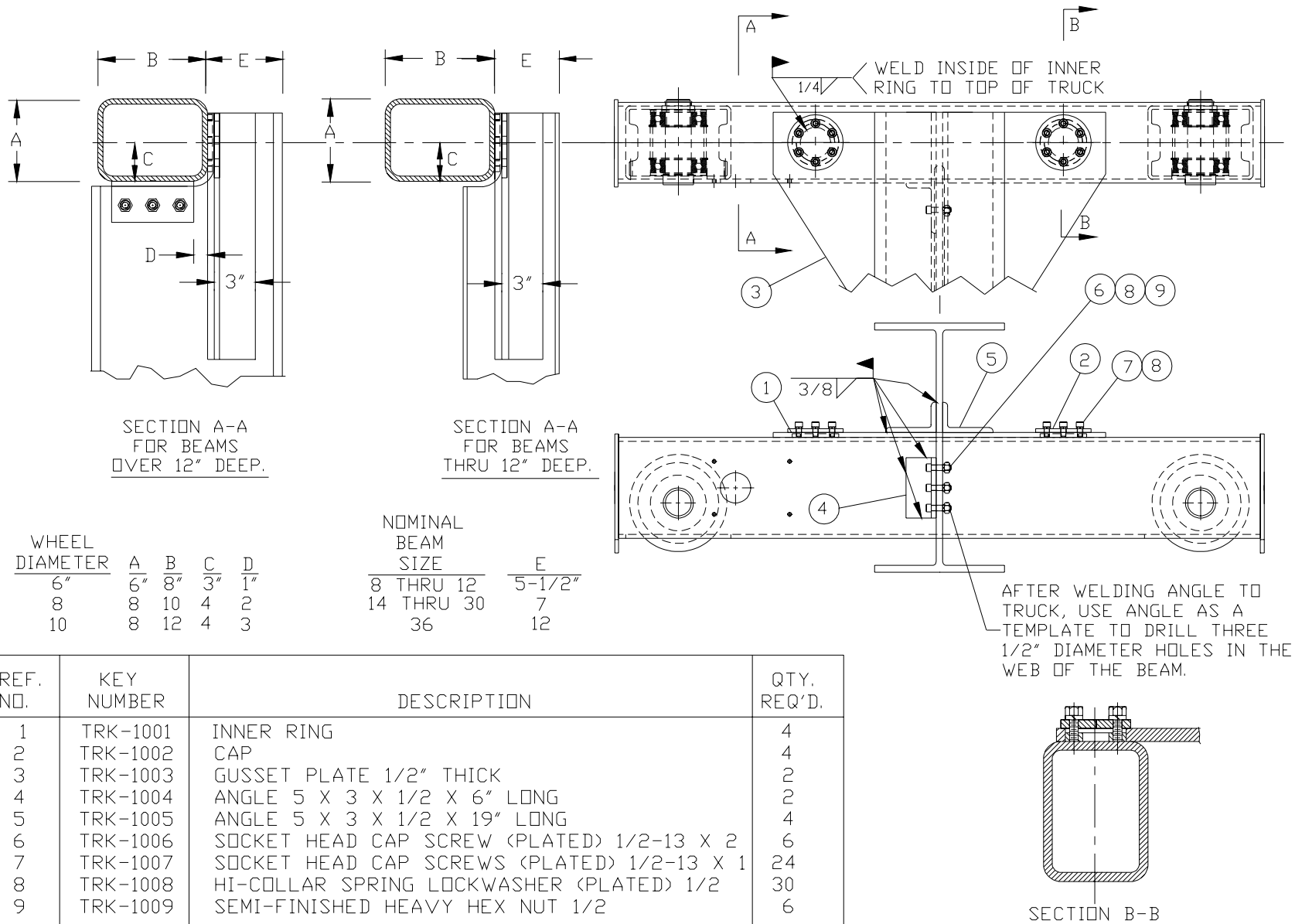
3. To check the distance between the trucks, push all truck wheels toward the center of the span. The distance from the outside of the wheel on one side of the span to the inside of the wheel on the other side of the span should equal the span length for the 8" and 10" diameter wheels. For the 6" diameter wheels this dimension should be the span length minus  $\frac{23}{64}"$ . See Figure 4. The tolerance on these distances is  $\pm 1/32"$ .



**Figure 4.**



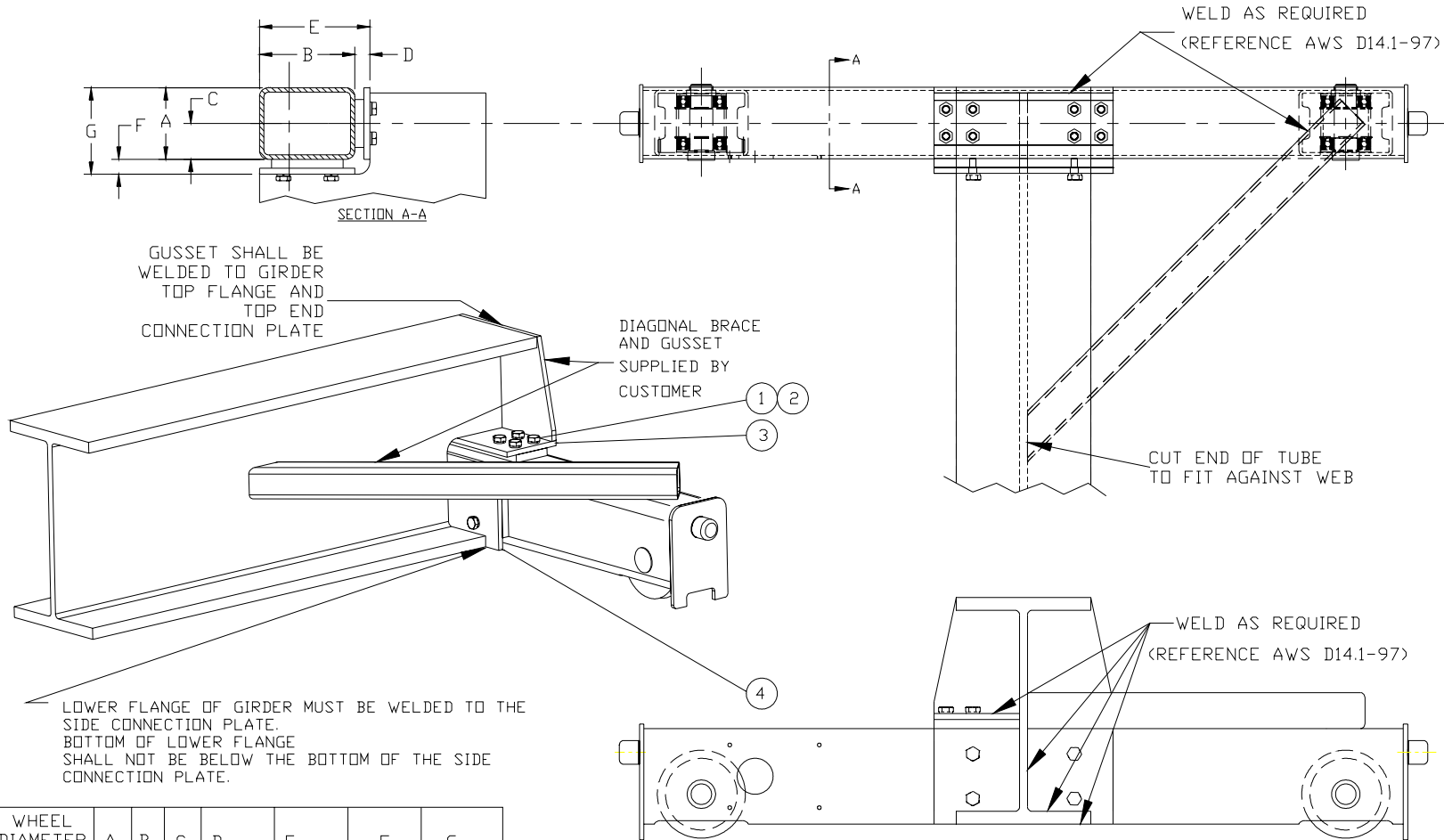
**Figure 3.**



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Figure 5. Bridge "Whale's Tail" Bolted End Connection.

\*FOR STANDARD UNITS ONLY



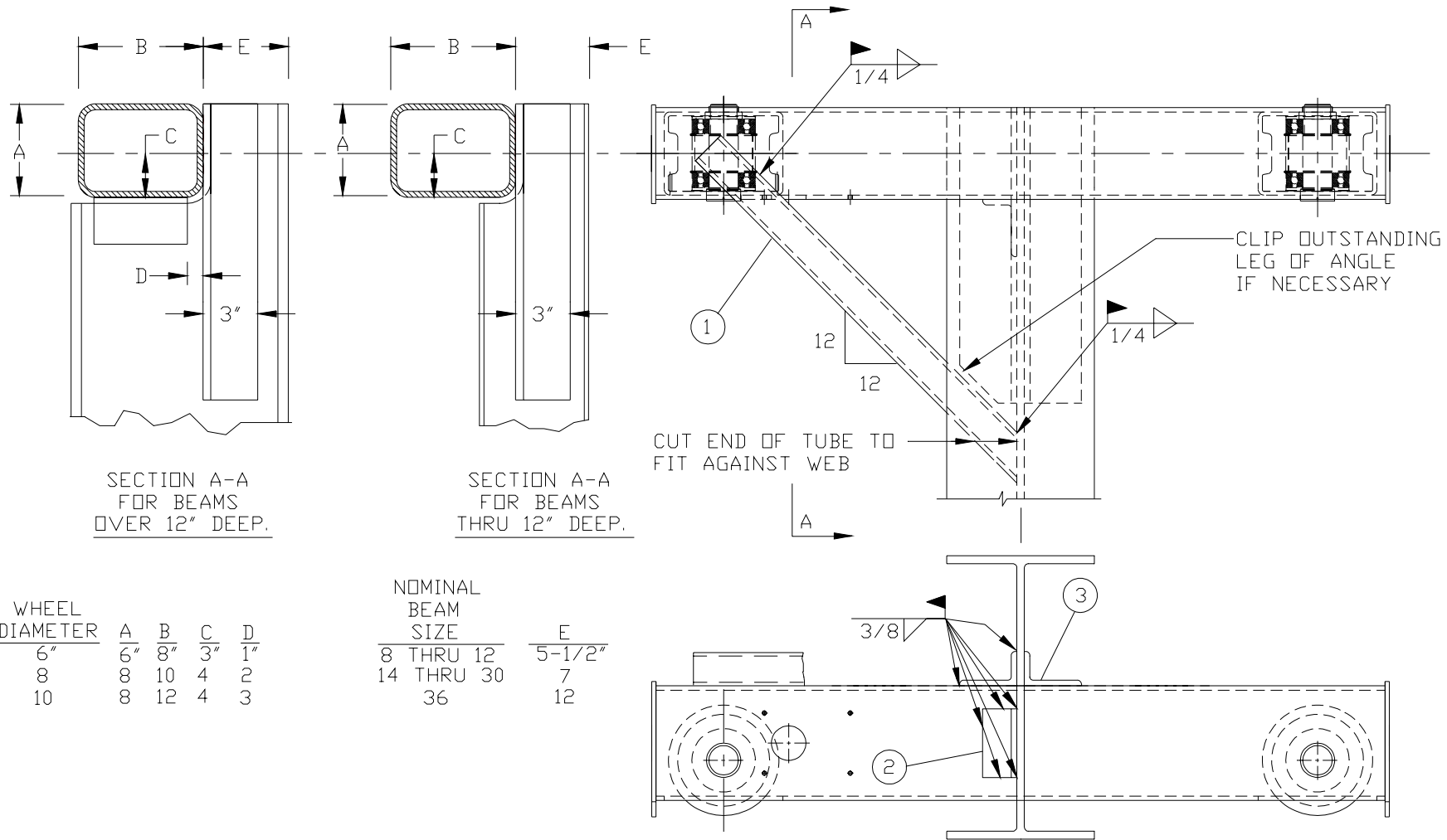
LOWER FLANGE OF GIRDER MUST BE WELDED TO THE SIDE CONNECTION PLATE. BOTTOM OF LOWER FLANGE SHALL NOT BE BELOW THE BOTTOM OF THE SIDE CONNECTION PLATE.

WHEEL DIAMETER	A	B	C	D	E	F	G
6"	6"	8"	3"	1 1/4"	9 1/4"	1 1/4"	7 1/4"
8	8	10	4	1 1/4	11 1/4	1 1/4	9 1/4
10	8	12	4	1 3/4	13 3/4	1 3/4	9 3/4

REF. NO.	KEY NUMBER	6" & 8" WHEEL DIAMETER			10" WHEEL DIAMETER		
		DESCRIPTION	QTY. REQ'D.	KEY NUMBER	DESCRIPTION	QTY. REQ'D.	
1	TRK-1101	*ASTM A325 5/8-11 BOLTS	12	TRK-1105	*ASTM A325 3/4-10 BOLTS	14	
2	TRK-1102	*HI-COLLAR SPRING LOCKWASHER (PLATED) 5/8	12	TRK-1106	*HI-COLLAR SPRING LOCKWASHER (PLATED) 3/4	14	
3	TRK-1103	*GRIDER CONNECTION TOP PLATE 1/2" THICK	1	TRK-1107	*GRIDER CONNECTION TOP PLATE 1/2" THICK	1	
4	TRK-1104	*GRIDER CONNECTION SIDE PLATE 1/2" THICK	1	TRK-1108	*GRIDER CONNECTION SIDE PLATE 1/2" THICK	1	

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Figure 5B. Bridge Bolted Plate End Connection



WHEEL DIAMETER	A	B	C	D
6"	6"	8"	3"	1"
8	8	10	4	2
10	8	12	4	3

NOMINAL BEAM SIZE	E
8 THRU 12	5-1/2"
14 THRU 30	7
36	12

ITEM	DESCRIPTION	QTY. REQ'D.
1	SQUARE TUBE 3 X 3 X 1/4 X AS REQUIRED *	2
2	ANGLE 5 X 3 X 1/2 X 6" LONG	2
3	ANGLE 5 X 3 X 1/2 X 19" LONG	4

\* LENGTH IS APPROXIMATELY .71 TIMES WHEELBASE

Figure 6. Bridge Welded End Connection.

4. There are measuring dimples available on the inside faces of the truck above the axles. To check the squareness, use a spring scale on the end of a steel tape and measure diagonally across the crane. Then measure across the opposite diagonal with the same force on the scale. These dimensions should be within 1/16" of each other.

Any other method of squaring the trucks that gives comparable results may be used.

After squaring the trucks double check the span at both ends of the trucks.

5. After assuring that the trucks are accurately positioned and squared, complete girder connections as shown in Figures 5, 5B and 6.

6. For the bolted end connection, first clamp the horizontal gusset plate (Ref. No. 3) to the top of the truck so that the center of the holes is in line with the center of the trucks. If truck tube is warped use shims to level the connection. Do not twist truck tube.

Do not use excessive heat or weld that might cause distortion. Alternate welds as much as possible. Weld the angles (Ref. No. 5), long leg horizontal, to the web of the girder and to the gusset plate. Next, place the rings (Ref No. 1) in the holes on the gusset plates and weld to the top of the truck. Place the cap (Ref. No. 2) on the inner ring and hold in place with a couple of bolts. Bolt the connection (Ref. Nos. 2, 7 and 8).

7. Position the angle (Ref. No. 4), short leg, against the side of the truck and weld in place. Using the angle as a template drill three ½" diameter holes in the web of the girder and bolt up (Ref Nos. 6, 8 and 9).

8. For the welded end connection weld the angles (Ref. No. 3), long leg horizontal, to the truck and to the girder web. Position the angle (Ref. No. 2), short leg, against the side of the truck and weld in place to the truck and to the girder web. Weld the brace (Ref. No. 1) in place. All welded connections must have this brace.

### Note

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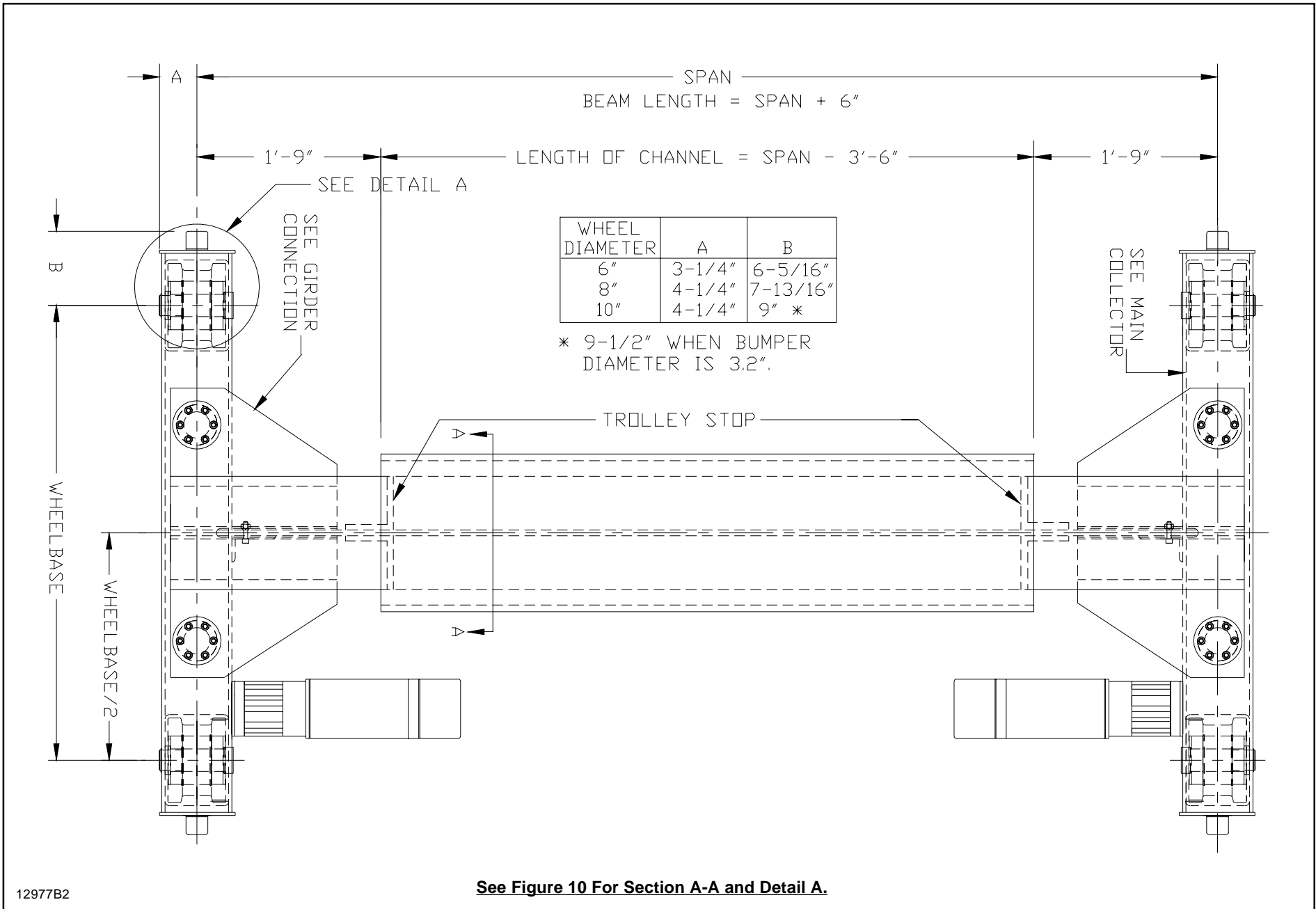
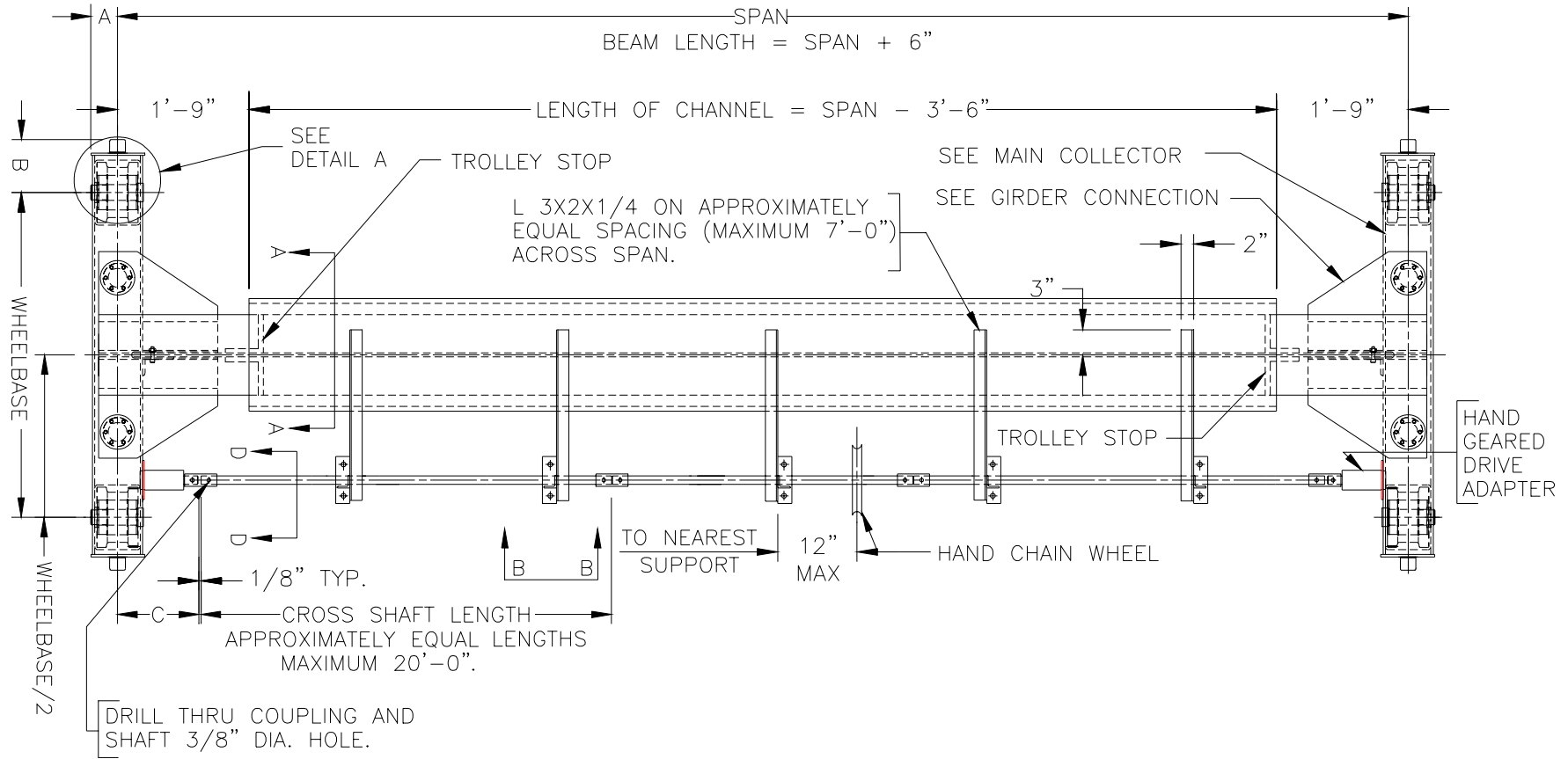


Figure 8. Motor Driven Bridge Assembly.

WHEEL DIAMETER	A	B	CROSS SHAFT DIAMETER	COUPLING CATALOG NUMBER	PILLOW BLOCK CAT. NO.	C	D	HAND CHAIN WHEEL	HAND CHAIN	E
6"	3-1/4"	7 1/8"	1-3/16"	8280	904625	7-5/16"	4-3/4"	913115	8282	4.507"
8"	4-1/4"	8 11/16"	1-3/16"	8280	904625	8-5/16"	4-3/4"	913115	8282	5.680"
10"	4-1/4"	10 3/8"*	1-3/16"	8280	904625	8-5/16"	4-3/4"	332189-3	8282	6.901"

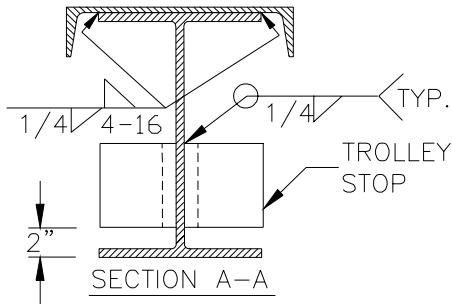
SEE MATERIAL TABLES FOR REQUIRED NUMBER OF CROSS SHAFT BEARINGS AND COUPLINGS,  
 \* 10 7/8" WHEN BUMPER DIAMETER IS 3.2".



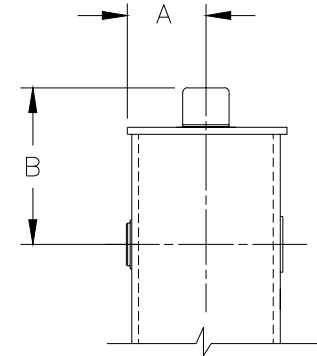
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See Figure 10 For Sections A-A Thru D-D And Detail A.

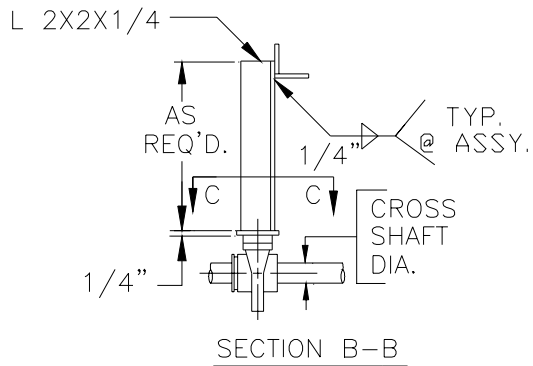
Figure 9. Hand Geared Bridge Assembly.



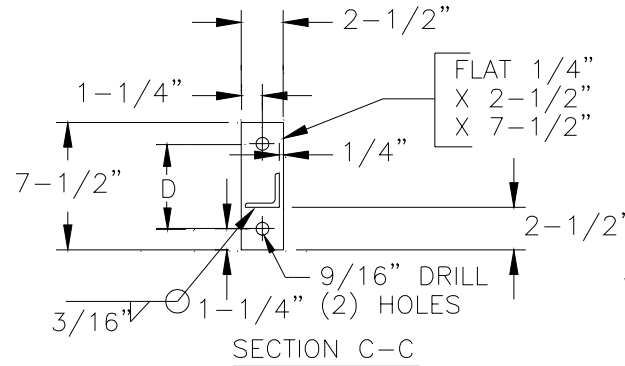
TROLLEY STOP		 4"
BRIDGE BEAM FLG. WIDTH	ANGLE SIZE	
3-5/8 TO 4	3-1/2 x 3-1/2 x 1/2	LONGEST SIDE OF ANGLE MOUNTED PERPENDICULAR TO GIRDER WEB
4-1/8 TO 6-1/4	5 x 3-1/2 x 1/2	
6-5/8 TO 8-1/4	6 x 3-1/2 x 1/2	
8-5/8 TO 10-1/2	7 x 4 x 1/2	
10-5/8 TO 13	8 x 4 x 1/2	



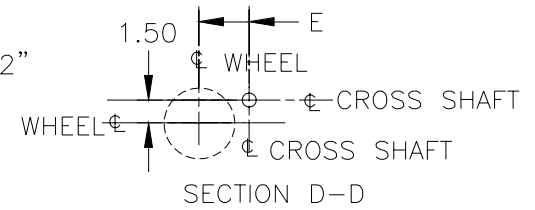
DETAIL A



SECTION B-B



SECTION C-C



SECTION D-D

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For Cross Shaft Diameter, Dimension D and Dimension E, See Figure 9.

Figure 10. Bridge Details.

## **INSTRUCTIONS FOR ASSEMBLING INDIVIDUAL DRIVE CRANE BRIDGES**

1. Refer to Figure 8, Motor Driven Bridge Assembly.
2. Prepare bridge girder with capping channel, if required (See Page 3). Notch girder as shown in Figures 5 and 6.
3. Follow instructions for assembling bridge girder to end trucks as outlined on Page 4.
4. The gear case (with wheel pinion), motor and brake are shipped as an assembly. Bolt this assembly to the side of the truck with four socket head cap screws with lockwashers. Install vent plug in place of pipe plug at top of the gear case.
5. The electrical enclosure and fused disconnect switch is to be mounted where required by the crane builder. Assure all clearances.
6. Locate and weld trolley stop angles at the ends of the girder as shown on Figure 8.

## **INSTRUCTIONS FOR ASSEMBLING A HAND GEARED CRANE BRIDGE**

1. Refer to Figure 9, Hand Geared Bridge Assembly.
2. Prepare bridge girder with capping channel, if required (See Page 3). Notch girder as shown in Figures 5 and 6.
3. Follow instructions for assembling bridge girder to end trucks as outlined on Page 4.
4. Mount and bolt the hand geared drive adapter for the cross shaft to the side of the truck with four socket head cap screws with lockwashers.
5. Locate and clamp cross shaft support angles to the girder. Recheck that angles are level and square and finish welding according to Figure 9.
6. Form pillow block supports by mounting the angle and plate together as shown in Section C-C of Figure 10. Mount the completed assembly to the pillow blocks by bolting.
7. Place the proper number of pillow blocks (with support angles) and couplings on each shaft section. Check to insure that the vertical angle is in the correct relationship with the cross shaft support angle (back of angle to back of angle). Notice that the separate bearing locking collar has a counterbore on one side. This counterbore fits over the protruding inner race of the pillow block bearing. Place locking collar on the shaft properly.
8. Place the hand chain wheel and guide on the appropriate shaft section (near the center of the crane) within 12" of a bearing support. For cranes 10 tonnes and more, a keyway 5/16" x 5/32" needs to be cut into the cross shaft location at the hand chain wheel. Put key in place.
9. Set shafting in place, align pillow blocks to cross shaft support angles and clamp in place.

10. Check horizontal and vertical alignment of the cross shaft by using a taut line. Weld pillow block support angles to the cross shaft support angles when alignment is assured.

11. Set space between cross shafts to 1/8". Position couplings and drill 3/8" diameter holes through the shaft and coupling using the holes in the coupling as a guide. The coupling has a predrilled hole through one side only. The shaft and coupling are then secured by hex head bolts with lockwashers and nuts.

12. Slide bearing locking collars into place next to pillow blocks. Make sure that the counterbore in the collar is fitted over the extended race of the bearing. Fasten to shaft with set screw in locking collar.

13. Locate and weld trolley stop angles at the ends of the girder as shown on Figure 9.

## **PAINTING**

After all welding is completed and prior to installing the cross conductors, wire brush all steel and remove all scale, weld splatter, flux and any other foreign matter. Grease spots are to be cleaned using commercially available solvent. Wash with clear water an area six inches either side of all welds to remove flux residue.

The electrical panel must be closed, and areas such as the switch handle, Off-On identification, wheel gear and pinion, and nameplate, etc., must be masked prior to painting.

Any national brand zinc-rich, chromate primer may be used and applied according to the manufacturer's directions. Final coat is recommended to be high gloss enamel, especially suited for steel surfaces and as recommended by any national brand paint manufacturer. Application must be in accordance with manufacturer's recommendations.

## **MARKINGS**

Codes require that the capacity of the bridge be shown on both sides of the crane, legible from the floor. Normal practice for marking is to use capacity in tons. For example: 1 TON, 2 TON, etc. Stencil forms are readily available that may be used with brush on or spray-can paint. Commercially available block letters and numerals with adhesive backing could also be used. Selection of size should be such that the sign can be easily read from the operating floor.

The builder's name shall also be placed on the crane in a prominent location along with a serial number or other means of crane identification.

## **NOTICE**

The crane builder and user are responsible for marking the crane and also to check for compliance with all local, state and national codes.

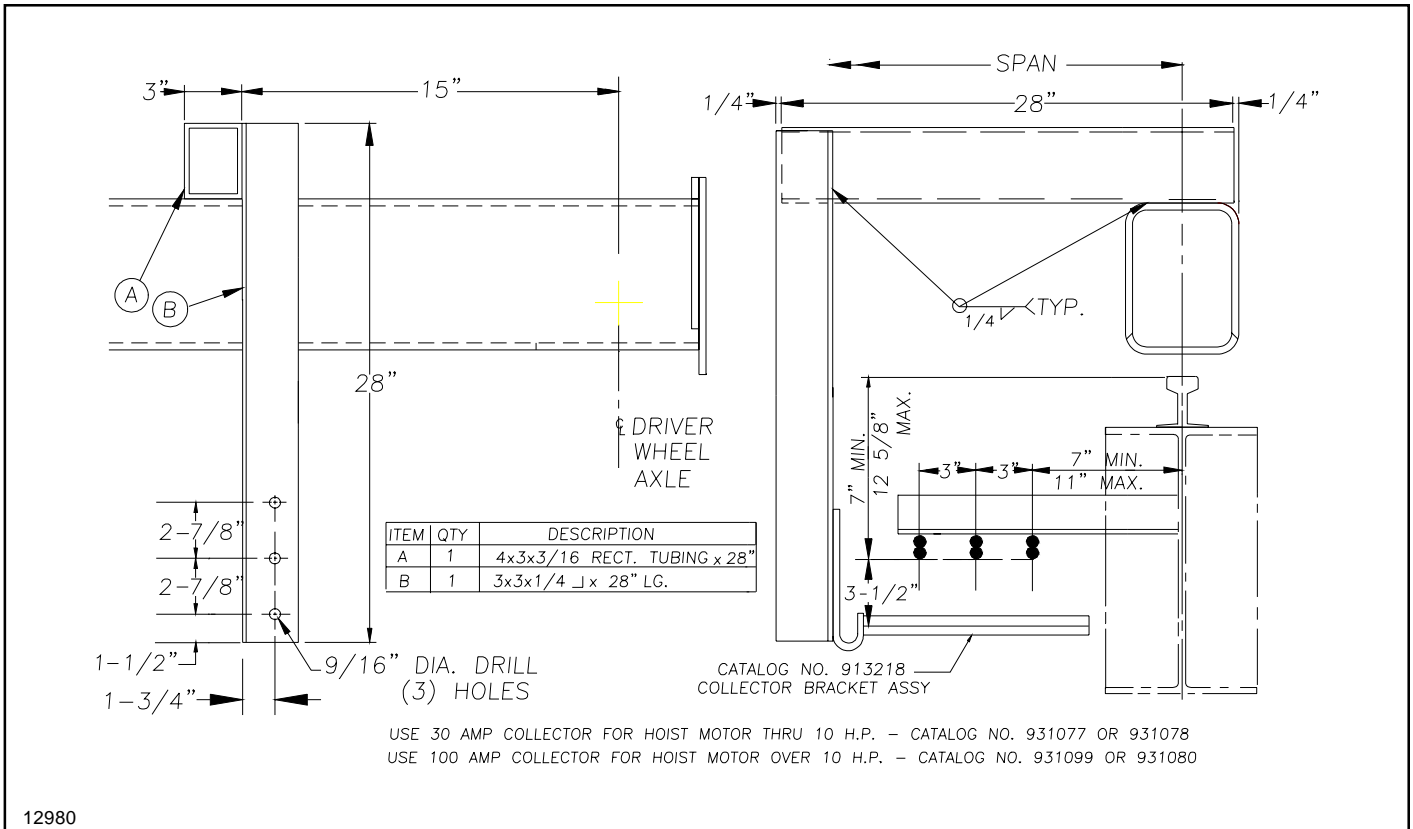


Figure 11. Main Collector Assembly.

### PUSH BUTTON SYSTEM

The preferred way of operating the controllers on the crane from the floor is a festooned system sold as a kit. This is to be installed as shown in the literature supplied with this system.

### CROSS CONDUCTOR SYSTEM

A cross conductor system is a means of providing electric current from the main conductors to the moving hoist-trolley.

The preferred cross conductor system is a festooned system sold as a kit and it is to be installed as shown in the literature supplied with this system.

### MAIN COLLECTOR ASSEMBLY

Refer to Figure 11, Main Collector Assembly.

The collectors listed (Catalog Numbers 931077, 931078, 931080 and 931099) are compatible with and will operate only on conductor bars listed as Catalog Numbers for Crane Runways on page 14. The builder must check to ensure that the proper spacing and location of the conductors will clear all obstructions in the building.

### ⚠ WARNING

Ordinarily the crane is grounded to the runway beam through the contact with the crane wheels. Certain environments may prevent proper grounding by this means. In those cases, a 4th runway conductor and collector should be provided to assure adequate grounding.

This also applies to the cross conductors and the electrical contact between the trolley wheels and the bridge girder.

### INSTALLATION OF THE CRANE BRIDGE

Installation of the crane on the runway shall be performed only by a qualified crane installer. For information regarding attaching and lifting or moving the loads during installation, refer to ANSI B30.17 - latest edition, Chapter 17-3 and other applicable codes.

### ⚠ WARNING

Before installing the crane on the runway, lock the runway conductor disconnect switch in the open (off) position.

Prior to the start of any crane erection the building should be measured for spans of rails and clearances. These measurements should be checked against the corresponding crane measurements to insure correctness of "fit". After assurances that the crane fits the building, determine orientation of the crane position with respect to the runway.

These types of cranes are usually lifted into position on the runway rails in one piece.


Immediately after the crane is placed on the runway rails check wheel flange clearances to the rail. Clearance between side of rail head and inside flange of wheel will vary from 3/4" to 1-1/8" depending on the wheel and rail combination and whether or not the truck is centered on the rail. Total wheel float will not be less than the 3/4" recommended by CMAA Specification #74.

**NOTE:** It is suggested that the trolley and hoist be installed on the crane bridge at this time so that all wiring connections can be completed.

### FUSE AND MAINLINE DISCONNECT PANELS

Mainline disconnect panels and fuse bridge control panels are provided as options to assist users in complying with OSHA codes. When ordering with crane, they will be completely installed inside of electrical enclosures.

Electrical service is to be connected to the crane equipped with fuse panels and mainline disconnect panels as shown in the proper wiring diagram. Wiring diagrams are in Part No. 113533-83, Wiring Diagrams for Bridge Control Panels.

 <b>CAUTION</b>
<b>Power supply must be same voltage, frequency and phase as specified on crane motor nameplate.</b>

### LUBRICATION

1. Wheel bearings are permanently lubricated and require no additional lubricant.

2. Drive wheel gears are to be lubricated with an open type gear grease which is heavy, plastic, extreme pressure and tacky; such as MOBILTAC 375 NC or equal.

3. The gear case lubricant should be changed every year or 2000 hours of service for moderate usage. The lubricant should be changed more frequently if the service is more severe. Use 17 oz. of AGMA lubricant number 5, compounded, (Mobilgear 630) if the ambient temperature is 15° to 60°F or AGMA lubricant number 7, compounded, (Mobilgear 634) if the ambient temperature is 50° to 125°F.

4. It is recommended that the areas of the cross shaft covered by bearing and couplings be coated with FEL-PRO C5-A, or equal, anti-seize lubricant.

Before crane operation the vent plug must be in the proper location in the gear case. The vent plug replaces the pipe plug in the highest location on the end of the gear case. See Part No. 113533-82, Operating Instructions and Parts List, Drive Gear Case, included with drive.

### BRAKE

A separate piece of literature in the literature package covers parts and adjustment of the brake.

### OPERATION

Prior to placing the crane into service, OSHA requires that the user perform and record certain tests including proof loading the crane. Refer to ANSI B30.17-latest edition for information concerning these requirements.

### SPECIFICATIONS

Specifications may be purchased from:

<u>Specification</u>	<u>Address</u>
AGMA	American Gear Manufacturers Association 1500 King Street, Suite 201 Alexandria, VA 22314-2730
ANSI	American National Standards Institute 11 W. 42nd Street, 13th Floor New York, NY 10036
ASCE	American Society of Civil Engineers 1801 Alexander Bell Drive Reston, VA 20191-4400
ASTM	American Society for Testing and Materials 100 Barr Harbor Drive West Conshohocken, PA 19428-2959
AWS	American Welding Society 550 N. W. LeJune Road Miami, FL 33126
CMAA	Material Handling Industry 8720 Red Oak Blvd., Suite 201 Charlotte, NC 28217-3992 (CMAA is Crane Manufacturers Association of America, Inc.)
NFPA	National Fire Protection Association 11 Tracy Drive Avon, MA 02322-9908
OSHA	Superintendent of Documents U.S. Government Printing Office Washington, DC 20402 (OSHA is Title 29 CFR Parts 1901.1 to 1910.999)

**MATERIAL LISTED BELOW IS REQUIRED TO BUILD THESE BRIDGE CRANES**

**THESE TRUCKS ARE COMMON TO ALL BRIDGES**

End Truck Assembly (One Right and One Left Hand Truck)					
Rated Load Range (tonnes)	For Spans Thru (ft)	Catalog Number	Wheel Base	Wheel Dia. (in)	Min. Rail (#/yd.)
1 thru 5	36	TRFA0604.5AR2	4' - 6"	6	25
	48	TRFA0606.0AR2	6' - 0"	6	25
	60	TRFA0607.5AR2	7' - 6"	6	25
5 thru 10	36	TRFA0804.5AR3	4' - 6"	8	30
	48	TRFA0806.0AR3	6' - 0"	8	30
	60	TRFA0807.5AR3	7' - 6"	8	30
5 thru 10	36	TRFA0804.5BR3	4' - 6"	8	60
	48	TRFA0806.0BR3	6' - 0"	8	60
	60	TRFA0807.5BR3	7' - 6"	8	60
10 thru 15	36	TRFA1004.5BR3	4' - 6"	10	60
	48	TRFA1006.0BR3	6' - 0"	10	60
	60	TRFA1007.5BR3	7' - 6"	10	60
	60	*TRFA1007.5BR4	7' - 6"	10	60

\*Bumpers are larger than standard (3.2" diameter).  
Bumpers and rail sweeps are standard.  
The wheelbase of the end truck shall be 1/8 of the span or greater - per CMAA 74.

**HAND GEARED BRIDGE COMPONENTS**

Rated Load Range (tonnes)	For Spans Thru (ft)	Cross Shaft Bearing Assembly		Cross Shaft Coupling		Hand Chain Wheel and Guide - 1 Ass'y. Req'd.	Hand Chain with Open Link (36 Feet)
		Number Req'd.	Catalog Number	Number Req'd.	Catalog Number		
1 thru 10	12	1		2		913115	8282
	22	2		2			
	28	3		3			
	36	4	904625	3	8280		
	42	5		4			
	52	6		4			
	60	7		4			
10 thru 15	12	1		2		332189-3	8282
	22	2		2			
	28	3		3			
	36	4	904625	3	8280		
	42	5		4			
	52	6		4			
	60	7		4			

1 End Truck Assembly - See Truck Chart.  
1 Hand Geared Drive Adapter Assemblies Per Truck  
(2 Req'd. per Crane): Catalog Number 232342-6

**CATALOG NUMBERS REQUIRED FOR OPTIONAL EQUIPMENT**

**Festoon Systems**

**Main Collectors**

Description	Catalog Numbers for Span of							
	50'	60'	70'	80'	90'	100'	150'	200'
Crane Runway Kit	931119	931120	931121	931122	931123	931124	931125	931126

Description	Catalog Number
Collector Pole & Bracket	901590
30A Main Collectors Short Arm	931077
Long Arm	931078
100A Main Collectors Short Arm	931099
Long Arm	931080

\*12 Conductor - Flat Cable (#14-4C & #16-8C)  
#14 Power Cable Good for 10 HP @ 460V or 5 HP @ 230V (20 Amps).

**Catalog Number for Bolted Bridge End Connection: 444697-10**

**90A Insulated Figure 8 Runway Conductors.**

Description	Catalog Numbers for Span of							
	50'	60'	70'	80'	90'	100'	150'	200'
Crane Runway Kit	931119	931120	931121	931122	931123	931124	931125	931126

**MATERIAL LISTED BELOW IS REQUIRED TO BUILD THESE BRIDGE CRANES**

**INDIVIDUAL DRIVE - MOTOR DRIVEN BRIDGE COMPONENTS**

**1 Speed - VFC Motors**

**Traverse Gear Cases**

Motor HP	Motor RPM	200V, 3Ph, 60Hz		230/460V, 3Ph, 60Hz		575V, 3Ph, 60Hz	
		Motor Cat. No.	Brake Cat. No.	Motor Cat. No.	Brake Cat. No.	Motor Cat. No.	Brake Cat. No.
1/2	1200	331981-57	108461-F1	331981-58	108461-F1	331981-59	108461-F2
3/4	1200	331981-77	913314	331981-78	913314	331981-79	913315
1	1200	331981-42	913314	331981-43	913314	331981-44	913315
1/2	1800	331981-52	108461-F1	331981-53	108461-F1	331981-54	108461-F2
3/4	1800	331981-72	108461-F1	331981-73	108461-F1	331981-74	108461-F2
1	1800	331981-02	108461-F1	331981-03	108461-F1	331981-04	108461-F2
1-1/2	1800	329925-11	913314	329925-11	913314	329925-12	913315
2	1800	329925-21	913316	329925-21	913316	329925-22	913317
3	1800	329925-31	913316	329925-31	913316	329925-32	913317

Traverse Gear Case Cat. No.	Gear Ratio	Bridge FPM with 1200 RPM Motor	Bridge FPM with 1800 RPM Motor
444689-1	13.04	50	75
444689-2	8.96	Not Used	100
444689-3	6.97	Not Used	125
444689-4	6.08	Not Used	150

**2 Speed Motors**

Motor HP	Motor RPM	200V, 3Ph, 60Hz		230V, 3Ph, 60Hz		460V, 3Ph, 60Hz		575V, 3Ph, 60Hz	
		Motor Cat No.	Brake Cat No.	Motor Cat No.	Brake Cat No.	Motor Cat No.	Brake Cat No.	Motor Cat No.	Brake Cat No.
.5/.25	1200/600	331982-56	108461-F1	331982-57	108461-F1	331982-58	108461-F1	331982-59	108461-F2
.75/.38	1200/600	331982-76	913314	331982-77	913314	331982-78	913314	331982-79	913315
1/5	1200/600	331982-41	913314	331982-42	913314	331982-43	913314	331982-44	913315
.5/.17	1800/600	331982-51	108461-F1	331982-52	108461-F1	331982-53	108461-F1	331982-54	108461-F2
.75/.25	1800/600	331982-71	108461-F1	331982-72	108461-F1	331982-73	108461-F1	331982-74	108461-F2
1/.33	1800/600	331982-01	108461-F1	331982-02	108461-F1	331982-03	108461-F1	331982-04	108461-F2
1.5/.5	1800/600	330031-11	913314	330031-12	913314	330031-13	913314	330031-14	913315
2/.67	1800/600	330031-21	913316	330031-22	913316	330031-23	913316	330031-24	913317
3/1	1800/600	330031-31	913316	330031-32	913316	330031-33	913316	330031-34	913317

**Controls (All 3Ph, 60Hz) (NA = Not Available or Not Applicable)**

Total HP	200V		230V		460V		575V	
	Control	D.B.R.	Control	D.B.R.	Control	D.B.R.	Control	D.B.R.
<b>Variable Frequency Control</b>								
1	448550-11	448491-31	448550-21	448491-31	448550-42	448491-62	445351-52	444946-E1
2	448550-12	448491-32	448550-22	448491-32	448550-42	448491-62	445351-52	444946-E1
3	448550-13	448491-33	448550-23	448491-33	448550-43	448491-63	445351-53	444946-E2
5	448550-15	448491-34	448550-25	448491-34	448550-45	448491-64	445351-55	444946-E3
7.5	448550-17	444946-64	448550-27	444946-64	448550-47	444946-79	445351-57	444946-E4
10	448550-19	444946-65	448550-29	444946-65	448550-49	444946-80	445351-59	444946-E5

Total HP	200V	230V	460V	575V	Total HP	200V	230V	460V	575V
<b>1 Speed Control - without Soft Start</b>					<b>1 Speed Control - with Soft Start</b>				
1	444231-11	444231-21	444231-41	444231-51	1	444711-11	444711-21	444711-41	444711-51
2	444231-12	444231-22	444231-42	444231-52	2	444711-12	444711-22	444711-42	444711-52
3	444231-13	444231-23	444231-43	444231-53	3	444711-13	444711-23	444711-43	444711-53
5	444231-15	444231-25	444231-45	444231-55	5	444711-15	444711-25	444711-45	444711-55
7.5	444231-17	444231-27	444231-47	444231-57	7.5	NA	NA	444711-47	444711-57
10	444231-19	444231-29	444231-49	444231-59	10	NA	NA	444711-49	444711-59
<b>2 Speed Control - without Soft Start</b>					<b>2 Speed Control - with Soft Start</b>				
1	444232-11	444232-21	444232-41	444232-51	1	444712-11	444712-21	444712-41	444712-51
2	444232-12	444232-22	444232-42	444232-52	2	444712-12	444712-22	444712-42	444712-52
3	444232-13	444232-23	444232-43	444232-53	3	444712-13	444712-23	444712-43	444712-53
5	444232-15	444232-25	444232-45	444232-55	5	444712-15	444712-25	444712-45	444712-55
7.5	444232-17	444232-27	444232-47	444232-57	7.5	NA	NA	444712-47	444712-57
10	444232-19	444232-29	444232-49	444232-59	10	NA	NA	444712-49	444712-59



**BEAM SIZE SELECTION FOR VARIOUS SPANS**

**ENGLISH MEASURE (TONS) - MOTOR DRIVEN BRIDGE**

1. Section designation is in accordance with AISC.
2. Beam sizes listed are American standard (S) beams, wide flange (W) and channel (C) sections.
3. Use ASTM A 36 grade steel, first quality, free of rust and excessive mill scale.
4. The bridge is designed in accordance with CMAA Specification 74, revised 1994 and is based on the following assumptions:

Rated Load	Hoist + Trolley Dead Load	* Wheel Diameter	Allowable Flange Width	Allowable Flange Thickness
1 Ton	500#	4"	9-1/8"	11/16"
2	500	4	11-1/4	11/16
3	800	4	11	15/16
5	1100	6-1/2	11	1-5/32
7-1/2	1200	6-1/2	11	1-5/32
10	2500	8	13-3/4	1-1/2
15	3200	8	13-3/4	1-1/2

\*LTI four wheel trolleys (one per hoist) with the wheels equally loaded.  
 Tons are short tons.  
 DLFB, DLFT and HLF are assumed to be 1.1, 1.1 and .15 respectively.  
 IFD is assumed to be .1.  
 Assumed additional dead load (for cross conductors) is 6 #/'.  
 The bridge is assumed to be an indoor bridge.

5. If any of the above assumptions are exceeded contact the factory for beam selection.

6. No additional loading such as footwalks, platforms, cabs, machinery, etc., is allowed.
7. Beam substitution is allowed by going to an increased span, but **not** by going to an increased load.

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>2 Ton Rated Load</b>						
10	10X 25.4	10X 25.4	7X 9.8	10X 26	12X 22	7X 9.8
12	12X 31.8	10X 25.4	7X 9.8	10X 26	12X 22	7X 9.8
14	12X 31.8	10X 25.4	7X 9.8	10X 30	12X 22	7X 9.8
16	12X 35.0	10X 25.4	8X 11.5	10X 30	12X 22	7X 9.8
18	12X 40.8	12X 31.8	8X 11.5	10X 30	10X 26	9X 13.4
20	12X 40.8	12X 31.8	8X 11.5	12X 35	16X 36	10X 15.3
22	12X 50.0	12X 31.8	8X 11.5	14X 38	16X 36	10X 15.3
24	---	12X 31.8	8X 11.5	10X 39	16X 36	10X 15.3
26	---	12X 31.8	9X 13.4	12X 40	16X 36	10X 15.3
28	---	12X 40.8	7X 9.8	12X 45	16X 36	10X 15.3
30	---	12X 40.8	7X 9.8	14X 48	16X 36	12X 20.7
32	---	12X 40.8	9X 13.4	12X 50	12X 40	12X 20.7
34	---	15X 42.9	8X 11.5	12X 53	12X 40	12X 20.7
36	---	15X 42.9	9X 13.4	14X 61	14X 43	12X 20.7
38	---	15X 42.9	9X 13.4	14X 61	14X 43	12X 20.7
40	---	15X 42.9	10X 15.3	16X 67	18X 50	10X 15.3
42	---	---	---	18X 76	18X 50	10X 15.3
44	---	---	---	---	18X 50	10X 15.3
46	---	---	---	---	16X 50	12X 20.7
48	---	---	---	---	18X 50	12X 20.7
50	---	---	---	---	18X 50	12X 20.7
52	---	---	---	---	21X 62	12X 20.7
54	---	---	---	---	21X 62	12X 20.7
56	---	---	---	---	21X 68	12X 20.7
58	---	---	---	---	21X 62	15X 33.9
60	---	---	---	---	21X 62	15X 33.9

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>1 TON RATED LOAD</b>						
10	7X 15.3	7X 15.3	6X 8.2	8X 18	8X 15	7X 9.8
12	8X 18.4	7X 15.3	6X 8.2	8X 18	8X 15	7X 9.8
14	8X 18.4	7X 15.3	6X 8.2	8X 21	8X 15	7X 9.8
16	10X 25.4	7X 15.3	6X 8.2	8X 21	8X 18	8X 11.5
18	10X 25.4	8X 18.4	7X 9.8	8X 21	8X 18	8X 11.5
20	12X 31.8	8X 18.4	7X 9.8	8X 24	12X 22	7X 9.8
22	12X 40.8	8X 18.4	10X 15.3	8X 28	12X 22	7X 9.8
24	12X 40.8	10X 25.4	7X 9.8	10X 30	12X 22	7X 9.8
26	12X 40.8	10X 25.4	7X 9.8	10X 33	12X 22	7X 9.8
28	---	10X 25.4	7X 9.8	10X 33	12X 22	7X 9.8
30	---	12X 31.8	8X 11.5	10X 39	12X 22	7X 9.8
32	---	12X 31.8	8X 11.5	12X 40	12X 22	7X 9.8
34	---	12X 31.8	8X 11.5	12X 45	12X 26	10X 15.3
36	---	12X 31.8	8X 11.5	12X 45	12X 26	10X 15.3
38	---	12X 40.8	7X 9.8	12X 50	14X 30	9X 13.4
40	---	15X 42.9	8X 11.5	14X 53	14X 30	9X 13.4
42	---	15X 42.9	8X 11.5	---	14X 30	12X 20.7
44	---	15X 42.9	9X 13.4	---	16X 36	10X 15.3
46	---	15X 42.9	9X 13.4	---	16X 36	10X 15.3
48	---	15X 42.9	12X 20.7	---	16X 36	10X 15.3
50	---	---	---	---	18X 50	10X 15.3
52	---	---	---	---	18X 50	10X 15.3
54	---	---	---	---	18X 50	10X 15.3
56	---	---	---	---	18X 50	12X 20.7
58	---	---	---	---	18X 50	12X 20.7
60	---	---	---	---	21X 62	12X 20.7

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>3 TON RATED LOAD</b>						
10	12X 40.8	12X 31.8	8X 11.5	12X 35	10X 39	12X 20.7
12	12X 40.8	12X 40.8	7X 9.8	12X 35	10X 39	12X 20.7
14	12X 40.8	12X 40.8	7X 9.8	16X 40	10X 39	12X 20.7
16	18X 54.7	12X 40.8	7X 9.8	14X 43	10X 39	12X 20.7
18	18X 54.7	12X 40.8	7X 9.8	14X 48	12X 40	12X 20.7
20	20X 66.0	12X 40.8	7X 9.8	14X 48	14X 43	12X 20.7
22	20X 66.0	12X 40.8	9X 13.4	14X 48	14X 43	12X 20.7
24	24X 80.0	12X 40.8	12X 20.7	12X 50	18X 50	10X 15.3
26	24X 80.0	18X 54.7	9X 13.4	14X 53	18X 50	10X 15.3
28	20X 86.0	18X 54.7	9X 13.4	12X 58	18X 50	10X 15.3
30	20X 96.0	18X 54.7	9X 13.4	12X 58	18X 50	10X 15.3
32	---	18X 54.7	9X 13.4	14X 61	18X 50	10X 15.3
34	---	18X 54.7	9X 13.4	16X 67	16X 50	12X 20.7
36	---	18X 54.7	12X 20.7	14X 68	16X 50	12X 20.7
38	---	18X 54.7	12X 20.7	14X 74	16X 50	12X 20.7
40	---	20X 66.0	12X 20.7	16X 89	16X 57	12X 20.7
42	---	20X 66.0	12X 20.7	16X 89	16X 57	12X 20.7
44	---	20X 66.0	12X 20.7	---	18X 60	12X 20.7
46	---	20X 66.0	12X 20.7	---	18X 60	12X 20.7
48	---	20X 66.0	15X 33.9	---	21X 62	12X 20.7
50	---	20X 66.0	15X 33.9	---	21X 68	12X 20.7
52	---	20X 66.0	15X 33.9	---	21X 62	15X 33.9
54	---	24X 80.0	15X 33.9	---	21X 68	15X 33.9
56	---	24X 80.0	15X 33.9	---	21X 68	15X 33.9
58	---	24X 80.0	15X 33.9	---	21X 73	15X 33.9
60	---	24X 80.0	15X 33.9	---	24X 76	15X 33.9

**ENGLISH MEASURE (TONS) - MOTOR DRIVEN BRIDGE**

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>5 TON RATED LOAD</b>						
10	18X 54.7	12X 40.8	7X 9.8	16X 50	18X 50	10X 15.3
12	18X 54.7	12X 40.8	8X 11.5	16X 50	18X 50	10X 15.3
14	20X 66.0	12X 40.8	12X 20.7	14X 53	12X 50	12X 20.7
16	20X 66.0	18X 54.7	9X 13.4	16X 57	16X 50	12X 20.7
18	20X 66.0	18X 54.7	9X 13.4	16X 57	16X 50	12X 20.7
20	24X 80.0	18X 54.7	10X 15.3	18X 65	24X 62	10X 15.3
22	20X 86.0	18X 54.7	12X 20.7	18X 65	16X 57	12X 20.7
24	20X 86.0	20X 66.0	9X 13.4	18X 71	16X 57	12X 20.7
26	24X106.0	20X 66.0	9X 13.4	14X 74	16X 57	12X 20.7
28	24X106.0	20X 66.0	9X 13.4	16X 77	18X 60	12X 20.7
30	24X106.0	20X 66.0	9X 13.4	14X 82	18X 65	12X 20.7
32	---	20X 66.0	10X 15.3	14X 82	18X 65	12X 20.7
34	---	20X 66.0	12X 20.7	16X 89	18X 71	12X 20.7
36	---	20X 66.0	15X 33.9	16X 89	18X 71	12X 20.7
38	---	20X 66.0	15X 33.9	16X 100	18X 71	12X 20.7
40	---	24X 80.0	12X 20.7	16X 100	21X 83	12X 20.7
42	---	24X 80.0	15X 33.9	---	21X 83	12X 20.7
44	---	24X 80.0	15X 33.9	---	21X 83	12X 20.7
46	---	24X 80.0	15X 33.9	---	21X 93	12X 20.7
48	---	24X 80.0	15X 33.9	---	21X 83	15X 33.9
50	---	24X 80.0	15X 33.9	---	21X 83	15X 33.9
52	---	24X 80.0	15X 33.9	---	21X 83	18X 42.7
54	---	24X 90.0	15X 40.0	---	24X 84	18X 42.7
56	---	24X106.0	15X 33.9	---	24X 94	15X 33.9
58	---	24X106.0	15X 33.9	---	24X 94	15X 33.9
60	---	24X106.0	15X 40.0	---	24X 94	18X 42.7

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>10 TON RATED LOAD</b>						
10	24X 80.0	20X 66.0	9X 13.4	21X 83	18X 71	12X 20.7
12	20X 86.0	20X 66.0	10X 15.3	16X 89	21X 83	12X 20.7
14	24X 106.0	24X 80.0	10X 15.3	21X 93	21X 83	12X 20.7
16	24X 106.0	24X 80.0	10X 15.3	16X 100	21X 93	12X 20.7
18	24X 106.0	24X 80.0	12X 20.7	16X 100	21X 93	12X 20.7
20	24X 106.0	24X 90.0	12X 20.7	18X 119	21X 93	12X 20.7
22	24X 121.0	24X 80.0	15X 33.9	18X 119	21X 93	15X 33.9
24	---	24X 90.0	15X 33.9	18X 119	21X 93	15X 33.9
26	---	24X 106.0	12X 20.7	24X 131	21X 93	18X 51.9
28	---	24X 106.0	12X 20.7	21X 132	27X 114	15X 33.9
30	---	24X 106.0	12X 20.7	33X 141	27X 114	15X 33.9
32	---	24X 106.0	12X 20.7	24X 146	27X 114	18X 42.7
34	---	24X 106.0	15X 33.9	24X 146	27X 114	18X 42.7
36	---	24X 106.0	15X 33.9	24X 146	30X 132	15X 33.9
38	---	24X 106.0	15X 40.0	24X 146	30X 132	15X 33.9
40	---	24X 121.0	15X 40.0	24X 162	30X 132	15X 33.9
42	---	24X 121.0	18X 42.7	24X 162	30X 132	18X 42.7
44	---	---	---	---	30X 132	18X 42.7
46	---	---	---	---	24X 146	18X 42.7
48	---	---	---	---	24X 146	18X 51.9
50	---	---	---	---	24X 162	18X 42.7
52	---	---	---	---	24X 162	18X 42.7
54	---	---	---	---	24X 162	18X 42.7
56	---	---	---	---	24X 162	18X 42.7
58	---	---	---	---	36X 170	18X 42.7
60	---	---	---	---	36X 170	18X 51.9

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>7½ TON RATED LOAD</b>						
10	20X 75.0	20X 66.0	9X 13.4	18X 65	16X 57	12X 20.7
12	24X 80.0	20X 66.0	9X 13.4	18X 71	16X 57	12X 20.7
14	24X 80.0	20X 66.0	9X 13.4	18X 71	18X 65	12X 20.7
16	20X 86.0	20X 66.0	10X 15.3	14X 82	18X 65	12X 20.7
18	24X 106.0	20X 66.0	12X 20.7	14X 82	18X 71	12X 20.7
20	24X 106.0	24X 80.0	10X 15.3	10X 88	18X 71	12X 20.7
22	24X 106.0	24X 80.0	10X 15.3	16X 89	21X 83	12X 20.7
24	24X 106.0	24X 80.0	12X 20.7	21X 93	21X 83	12X 20.7
26	24X 121.0	24X 80.0	12X 20.7	16X 100	21X 83	12X 20.7
28	---	24X 80.0	15X 33.9	16X 100	21X 93	12X 20.7
30	---	24X 80.0	15X 33.9	27X 114	21X 93	12X 20.7
32	---	24X 90.0	15X 33.9	30X 132	21X 93	12X 20.7
34	---	24X 106.0	12X 20.7	---	21X 93	12X 20.7
36	---	24X 106.0	12X 20.7	---	21X 93	15X 33.9
38	---	24X 106.0	12X 20.7	---	21X 93	15X 33.9
40	---	24X 106.0	12X 20.7	---	21X 93	18X 42.7
42	---	24X 106.0	15X 33.9	---	27X 102	18X 42.7
44	---	24X 106.0	15X 33.9	---	27X 114	15X 33.9
46	---	24X 106.0	15X 33.9	---	27X 114	15X 33.9
48	---	24X 106.0	15X 33.9	---	27X 114	15X 33.9
50	---	24X 106.0	15X 40.0	---	27X 114	15X 33.9
52	---	24X 121.0	15X 40.0	---	27X 114	18X 42.7
54	---	24X 121.0	18X 42.7	---	30X 124	15X 33.9
56	---	24X 121.0	18X 58.0	---	30X 132	15X 33.9
58	---	---	---	---	30X 124	18X 42.7
60	---	---	---	---	30X 132	18X 42.7

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>15 TON RATED LOAD</b>						
10	24X 106.0	24X106.0	12X 20.7	18X 119	18X 119	15X 33.9
12	---	24X106.0	12X 20.7	21X 132	18X 119	15X 33.9
14	---	24X106.0	12X 20.7	24X 146	18X 119	15X 33.9
16	---	24X106.0	12X 20.7	24X 146	30X 132	15X 33.9
18	---	24X106.0	15X 33.9	24X 146	30X 132	18X 42.7
20	---	24X106.0	15X 33.9	24X 162	24X 146	18X 42.7
22	---	24X121.0	18X 42.7	24X 162	24X 146	18X 42.7
24	---	---	---	24X 162	24X 146	18X 58.0
26	---	---	---	24X 162	24X 162	18X 42.7
28	---	---	---	36X 182	24X 162	18X 42.7
30	---	---	---	36X 194	24X 162	18X 42.7
32	---	---	---	36X 194	24X 162	18X 42.7
34	---	---	---	36X 210	24X 162	18X 58.0
36	---	---	---	36X 210	36X 182	18X 42.7
38	---	---	---	---	36X 182	18X 42.7
40	---	---	---	---	36X 182	18X 42.7
42	---	---	---	---	36X 182	18X 51.9
44	---	---	---	---	36X 194	18X 42.7
46	---	---	---	---	36X 194	18X 42.7
48	---	---	---	---	36X 194	18X 42.7
50	---	---	---	---	36X 194	18X 58.0
52	---	---	---	---	36X 210	18X 42.7
54	---	---	---	---	36X 210	18X 42.7
56	---	---	---	---	36X 210	18X 42.7
58	---	---	---	---	36X 210	18X 58.0
60	---	---	---	---	---	---

## BEAM SIZE SELECTION FOR VARIOUS SPANS

### ENGLISH MEASURE (TONS) - HAND GEARED BRIDGE

- Section designation is in accordance with AISC.
- Beam sizes listed are American standard (S) beams, wide flange (W) and channel (C) sections.
- Use ASTM A 36 grade steel, first quality, free of rust and excessive mill scale.
- The bridge is designed in accordance with CMAA Specification 74, revised 1994 and is based on the following assumptions:

Rated Load	Hoist + Trolley Dead Load	* Wheel Diameter	Allowable Flange Width	Allowable Flange Thickness
1 Ton	500#	4"	9-1/8"	11/16"
2	500	4	11-1/4	11/16
3	800	4	11	15/16
5	1100	6-1/2	11	1-5/32
7-1/2	1200	6-1/2	11	1-5/32
10	2500	8	13-3/4	1-1/2
15	3200	8	13-3/4	1-1/2

\*LTI four wheel trolleys (one per hoist) with the wheels equally loaded.  
 Tons are short tons.  
 DLFB, DLFT and HLF are assumed to be 1.1, 1.1 and .15 respectively.  
 IFD is assumed to be 0.  
 Assumed additional dead load (for cross conductors and cross shaft) is 13 #/'.  
 The bridge is assumed to be an indoor bridge.

- If any of the above assumptions are exceeded contact the factory for beam selection.

- No additional loading such as footwalks, platforms, cabs, machinery, etc., is allowed.
- Beam substitution is allowed by going to an increased span, but **not** by going to an increased load.

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>2 TON RATED LOAD</b>						
10	10X 25.4	10X 25.4	7X 9.8	10X 19	12X 22	7X 9.8
12	10X 25.4	10X 25.4	7X 9.8	12X 22	12X 22	7X 9.8
14	10X 25.4	10X 25.4	7X 9.8	12X 22	12X 22	7X 9.8
16	10X 25.4	10X 25.4	7X 9.8	10X 26	12X 22	7X 9.8
18	12X 31.8	10X 25.4	7X 9.8	10X 26	12X 22	7X 9.8
20	12X 31.8	12X 31.8	8X 11.5	10X 30	10X 26	9X 13.4
22	12X 35.0	12X 31.8	8X 11.5	10X 30	16X 36	10X 15.3
24	12X 40.8	12X 31.8	8X 11.5	14X 34	16X 36	10X 15.3
26	12X 40.8	12X 31.8	8X 11.5	12X 35	16X 36	10X 15.3
28	12X 50.0	12X 31.8	8X 11.5	12X 40	16X 36	10X 15.3
30	---	12X 40.8	7X 9.8	12X 40	16X 36	10X 15.3
32	---	15X 42.9	8X 11.5	14X 43	16X 36	10X 15.3
34	---	15X 42.9	8X 11.5	14X 48	12X 40	12X 20.7
36	---	15X 42.9	8X 11.5	14X 53	14X 43	12X 20.7
38	---	15X 42.9	8X 11.5	14X 61	14X 43	12X 20.7
40	---	15X 50.0	9X 13.4	14X 61	18X 50	10X 15.3
42	---	---	---	16X 67	18X 50	10X 15.3
44	---	---	---	16X 67	18X 50	10X 15.3
46	---	---	---	16X 67	18X 50	10X 15.3
48	---	---	---	18X 76	18X 50	10X 15.3
50	---	---	---	18X 76	18X 50	12X 20.7
52	---	---	---	---	24X 62	10X 15.3
54	---	---	---	---	24X 62	10X 15.3
56	---	---	---	---	21X 62	12X 20.7
58	---	---	---	---	21X 62	12X 20.7
60	---	---	---	---	24X 62	12X 20.7

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>1 TON RATED LOAD</b>						
10	7X 15.3	7X 15.3	6X 8.2	8X 15	8X 15	7X 9.8
12	7X 15.3	7X 15.3	6X 8.2	8X 15	8X 15	7X 9.8
14	7X 15.3	7X 15.3	6X 8.2	8X 15	8X 15	7X 9.8
16	8X 18.4	7X 15.3	6X 8.2	8X 18	8X 15	7X 9.8
18	8X 23.0	8X 18.4	7X 9.8	8X 18	8X 18	8X 11.5
20	10X 25.4	8X 18.4	7X 9.8	8X 21	12X 22	7X 9.8
22	10X 25.4	10X 25.4	7X 9.8	10X 26	12X 22	7X 9.8
24	12X 31.8	10X 25.4	7X 9.8	10X 26	12X 22	7X 9.8
26	12X 31.8	10X 25.4	7X 9.8	10X 30	12X 22	7X 9.8
28	12X 35.0	10X 25.4	7X 9.8	10X 30	12X 22	7X 9.8
30	12X 40.8	12X 31.8	8X 11.5	14X 34	12X 22	7X 9.8
32	12X 40.8	12X 31.8	8X 11.5	12X 35	12X 22	7X 9.8
34	15X 42.9	12X 31.8	8X 11.5	14X 38	12X 26	9X 13.4
36	---	12X 31.8	9X 13.4	12X 40	14X 30	9X 13.4
38	---	12X 40.8	9X 13.4	14X 43	14X 30	9X 13.4
40	---	15X 42.9	8X 11.5	14X 48	14X 30	9X 13.4
42	---	15X 42.9	8X 11.5	14X 48	16X 36	10X 15.3
44	---	15X 42.9	8X 11.5	14X 53	16X 36	10X 15.3
46	---	15X 42.9	8X 11.5	21X 62	16X 36	10X 15.3
48	---	---	---	21X 68	16X 36	12X 20.7
50	---	---	---	24X 76	18X 50	10X 15.3
52	---	---	---	24X 76	18X 50	10X 15.3
54	---	---	---	---	18X 50	10X 15.3
56	---	---	---	---	18X 50	10X 15.3
58	---	---	---	---	24X 62	10X 15.3
60	---	---	---	---	24X 62	10X 15.3

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>3 TON RATED LOAD</b>						
10	12X 31.8	12X 31.8	8X 11.5	10X 30	10X 39	12X 20.7
12	12X 35.0	12X 31.8	8X 11.5	10X 30	10X 39	12X 20.7
14	12X 40.8	12X 40.8	7X 9.8	12X 35	10X 39	12X 20.7
16	12X 40.8	12X 40.8	7X 9.8	12X 35	10X 39	12X 20.7
18	12X 40.8	12X 40.8	7X 9.8	12X 35	12X 40	12X 20.7
20	12X 40.8	12X 40.8	7X 9.8	14X 38	14X 43	12X 20.7
22	12X 40.8	12X 40.8	7X 9.8	16X 40	14X 43	12X 20.7
24	12X 50.0	12X 40.8	7X 9.8	14X 43	14X 43	12X 20.7
26	18X 54.7	15X 42.9	8X 11.5	12X 45	18X 50	10X 15.3
28	20X 66.0	15X 50.0	8X 11.5	14X 48	18X 50	10X 15.3
30	20X 66.0	18X 54.7	9X 13.4	14X 48	18X 50	10X 15.3
32	20X 66.0	18X 54.7	9X 13.4	14X 53	18X 50	10X 15.3
34	24X 80.0	18X 54.7	9X 13.4	14X 61	18X 50	10X 15.3
36	24X 80.0	18X 54.7	9X 13.4	18X 65	18X 50	10X 15.3
38	24X 80.0	18X 54.7	9X 13.4	16X 67	18X 50	10X 15.3
40	20X 86.0	18X 54.7	9X 13.4	16X 67	18X 50	10X 15.3
42	---	18X 54.7	9X 13.4	16X 77	24X 62	10X 15.3
44	---	18X 54.7	12X 20.7	16X 89	24X 62	10X 15.3
46	---	20X 66.0	9X 13.4	16X 89	24X 62	10X 15.3
48	---	20X 66.0	9X 13.4	27X 102	24X 62	10X 15.3
50	---	20X 66.0	10X 15.3	27X 114	21X 62	12X 20.7
52	---	24X 80.0	10X 15.3	27X 114	21X 62	12X 20.7
54	---	24X 80.0	10X 15.3	27X 114	24X 62	12X 20.7
56	---	24X 80.0	10X 15.3	30X 124	24X 68	12X 20.7
58	---	24X 80.0	12X 20.7	---	24X 68	12X 20.7
60	---	24X 80.0	12X 20.7	---	24X 68	12X 20.7

**ENGLISH MEASURE (TONS) - HAND GEARED BRIDGE**

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>5 TON RATED LOAD</b>						
10	12X 40.8	12X 40.8	7X 9.8	10X 45	18X 50	10X 15.3
12	12X 40.8	12X 40.8	7X 9.8	16X 45	18X 50	10X 15.3
14	15X 42.9	12X 40.8	7X 9.8	18X 46	18X 50	10X 15.3
16	18X 54.7	12X 50.0	8X 11.5	18X 46	18X 50	10X 15.3
18	18X 54.7	18X 54.7	9X 13.4	18X 46	16X 50	12X 20.7
20	18X 54.7	18X 54.7	9X 13.4	16X 50	16X 50	12X 20.7
22	18X 54.7	18X 54.7	9X 13.4	18X 55	24X 62	10X 15.3
24	20X 66.0	18X 54.7	9X 13.4	16X 57	24X 62	10X 15.3
26	20X 66.0	18X 54.7	9X 13.4	16X 57	24X 62	10X 15.3
28	24X 80.0	20X 66.0	9X 13.4	18X 65	16X 57	12X 20.7
30	24X 80.0	20X 66.0	9X 13.4	14X 68	16X 57	12X 20.7
32	24X 80.0	20X 66.0	9X 13.4	24X 76	18X 60	12X 20.7
34	20X 96.0	20X 66.0	9X 13.4	16X 77	18X 65	12X 20.7
36	24X 106.0	20X 66.0	9X 13.4	16X 77	18X 65	12X 20.7
38	24X 106.0	20X 66.0	9X 13.4	16X 89	18X 65	12X 20.7
40	24X 106.0	20X 66.0	9X 13.4	24X 94	18X 71	12X 20.7
42	24X 106.0	20X 66.0	10X 15.3	27X 102	18X 71	12X 20.7
44	---	24X 80.0	10X 15.3	27X 114	21X 73	12X 20.7
46	---	24X 80.0	10X 15.3	27X 114	21X 73	12X 20.7
48	---	24X 80.0	10X 15.3	30X 124	21X 83	12X 20.7
50	---	24X 80.0	12X 20.7	30X 132	21X 83	12X 20.7
52	---	24X 80.0	12X 20.7	---	24X 84	12X 20.7
54	---	24X 90.0	12X 20.7	---	24X 84	12X 20.7
56	---	24X 80.0	15X 33.9	---	24X 84	12X 20.7
58	---	24X 106.0	12X 20.7	---	24X 94	12X 20.7
60	---	24X 106.0	12X 20.7	---	24X 94	15X 33.9

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>10 TON RATED LOAD</b>						
10	20X 66.0	20X 66.0	9X 13.4	18X 71	18X 71	12X 20.7
12	20X 66.0	20X 66.0	9X 13.4	18X 71	18X 71	12X 20.7
14	20X 66.0	20X 66.0	9X 13.4	21X 83	21X 83	12X 20.7
16	20X 75.0	20X 66.0	9X 13.4	21X 83	21X 83	12X 20.7
18	24X 80.0	24X 80.0	10X 15.3	21X 93	21X 83	12X 20.7
20	24X 80.0	24X 80.0	10X 15.3	21X 93	21X 93	12X 20.7
22	24X 80.0	24X 80.0	10X 15.3	21X 93	21X 93	12X 20.7
24	20X 86.0	24X 80.0	10X 15.3	21X 93	21X 93	12X 20.7
26	24X 106.0	24X 80.0	12X 20.7	21X 93	21X 93	12X 20.7
28	24X 106.0	24X 100.0	10X 15.3	27X 114	21X 93	12X 20.7
30	24X 106.0	24X 106.0	12X 20.7	27X 114	27X 114	15X 33.9
32	24X 121.0	24X 106.0	12X 20.7	27X 114	27X 114	15X 33.9
34	---	24X 106.0	12X 20.7	27X 114	27X 114	15X 33.9
36	---	24X 106.0	12X 20.7	18X 119	27X 114	15X 33.9
38	---	24X 106.0	12X 20.7	24X 131	27X 114	15X 33.9
40	---	24X 106.0	12X 20.7	24X 131	27X 114	18X 42.7
42	---	24X 106.0	12X 20.7	21X 132	30X 124	15X 33.9
44	---	24X 106.0	12X 20.7	24X 146	30X 124	15X 33.9
46	---	24X 121.0	12X 20.7	24X 146	30X 132	15X 33.9
48	---	24X 121.0	15X 40.0	24X 146	30X 132	15X 33.9
50	---	---	---	24X 162	30X 132	15X 33.9
52	---	---	---	24X 162	30X 132	15X 33.9
54	---	---	---	36X 210	30X 132	15X 33.9
56	---	---	---	36X 210	33X 141	15X 33.9
58	---	---	---	---	36X 150	18X 42.7
60	---	---	---	---	36X 170	18X 42.7

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>7½ TON RATED LOAD</b>						
10	20X 66.0	20X 66.0	9X 13.4	16X 57	16X 57	12X 20.7
12	20X 66.0	20X 66.0	9X 13.4	16X 57	16X 57	12X 20.7
14	20X 66.0	20X 66.0	9X 13.4	18X 65	16X 57	12X 20.7
16	20X 66.0	20X 66.0	9X 13.4	18X 65	18X 65	12X 20.7
18	20X 66.0	20X 66.0	9X 13.4	18X 65	18X 65	12X 20.7
20	20X 66.0	20X 66.0	9X 13.4	18X 71	18X 65	12X 20.7
22	24X 80.0	20X 66.0	9X 13.4	18X 71	18X 71	12X 20.7
24	24X 80.0	24X 80.0	10X 15.3	18X 71	18X 71	12X 20.7
26	24X 80.0	24X 80.0	10X 15.3	21X 83	18X 71	12X 20.7
28	20X 86.0	24X 80.0	10X 15.3	21X 83	21X 83	12X 20.7
30	24X 106.0	24X 80.0	10X 15.3	21X 83	21X 83	12X 20.7
32	24X 106.0	24X 80.0	10X 15.3	21X 93	21X 83	12X 20.7
34	24X 106.0	24X 80.0	10X 15.3	24X 94	21X 83	12X 20.7
36	24X 106.0	24X 90.0	10X 15.3	27X 102	21X 93	12X 20.7
38	---	24X 106.0	12X 20.7	27X 114	21X 93	12X 20.7
40	---	24X 106.0	12X 20.7	27X 114	21X 93	12X 20.7
42	---	24X 106.0	12X 20.7	30X 132	21X 93	12X 20.7
44	---	24X 106.0	12X 20.7	30X 132	21X 93	12X 20.7
46	---	24X 106.0	12X 20.7	---	24X 94	12X 20.7
48	---	24X 106.0	12X 20.7	---	27X 102	15X 33.9
50	---	24X 106.0	12X 20.7	---	27X 114	15X 33.9
52	---	24X 106.0	12X 20.7	---	27X 114	15X 33.9
54	---	24X 106.0	15X 33.9	---	27X 114	15X 33.9
56	---	24X 106.0	15X 50.0	---	27X 114	15X 33.9
58	---	24X 121.0	18X 58.0	---	27X 114	15X 33.9
60	---	---	---	---	27X 114	15X 33.9

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>15 TON RATED LOAD</b>						
10	20X 96.0	24X 106.0	12X 20.7	18X 119	16X 100	15X 33.9
12	24X 106.0	24X 106.0	12X 20.7	18X 119	27X 114	15X 33.9
14	24X 106.0	24X 106.0	12X 20.7	18X 119	18X 119	15X 33.9
16	24X 106.0	24X 106.0	12X 20.7	18X 119	18X 119	15X 33.9
18	24X 106.0	24X 106.0	12X 20.7	21X 132	30X 132	15X 33.9
20	24X 106.0	24X 106.0	12X 20.7	30X 132	30X 132	15X 33.9
22	24X 106.0	24X 106.0	12X 20.7	30X 132	30X 132	15X 33.9
24	---	24X 106.0	12X 20.7	24X 146	24X 146	18X 42.7
26	---	24X 121.0	15X 33.9	24X 146	24X 146	18X 42.7
28	---	---	---	21X 147	24X 146	18X 42.7
30	---	---	---	36X 160	24X 162	18X 42.7
32	---	---	---	24X 162	24X 162	18X 42.7
34	---	---	---	24X 162	24X 162	18X 42.7
36	---	---	---	24X 162	24X 162	18X 42.7
38	---	---	---	24X 162	24X 162	18X 42.7
40	---	---	---	36X 170	24X 162	18X 42.7
42	---	---	---	36X 182	36X 170	18X 42.7
44	---	---	---	36X 194	36X 170	18X 42.7
46	---	---	---	36X 194	36X 182	18X 42.7
48	---	---	---	36X 210	36X 182	18X 42.7
50	---	---	---	---	36X 182	18X 42.7
52	---	---	---	---	36X 182	18X 42.7
54	---	---	---	---	36X 182	18X 42.7
56	---	---	---	---	36X 182	18X 51.9
58	---	---	---	---	36X 194	18X 42.7
60	---	---	---	---	36X 194	18X 42.7

## BEAM SIZE SELECTION FOR VARIOUS SPANS

### METRIC MEASURE (TONNES) - MOTOR DRIVEN BRIDGE

- Section designation is in accordance with AISC.
- Beam sizes listed are American standard (S) beams, wide flange (W) and channel (C) sections.
- Use ASTM A 36 grade steel, first quality, free of rust and excessive mill scale.
- The bridge is designed in accordance with CMAA Specification 74, revised 1994 and is based on the following assumptions:

Rated Load	Hoist + Trolley Dead Load	* Wheel Diameter	Allowable Flange Width	Allowable Flange Thickness
1 Tonne	227kg	4"	9-1/8"	11/16"
2	227	4	11-1/4	11/16
3	363	4	11	15/16
5	499	6-1/2	11	1-5/32
7-1/2	544	6-1/2	11	1-5/32
10	1134	8	13-3/4	1-1/2
15	1451	8	13-3/4	1-1/2

\*LTI four wheel trolleys (one per hoist) with the wheels equally loaded.  
 DLFB, DLFT and HLF are assumed to be 1.1, 1.1 and .15 respectively.  
 IFD is assumed to be .1.  
 Assumed additional dead load (for cross conductors) is 2.72 kg/ft.  
 The bridge is assumed to be an indoor bridge.

- If any of the above assumptions are exceeded contact the factory for beam selection.

- No additional loading such as footwalks, platforms, cabs, machinery, etc., is allowed.
- Beam substitution is allowed by going to an increased span, but **not** by going to an increased load.

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>2 TONNE RATED LOAD</b>						
10	12X 31.8	10X 25.4	7X 9.8	10X 26	12X 22	7X 9.8
12	12X 31.8	10X 25.4	7X 9.8	10X 30	12X 22	7X 9.8
14	12X 35.0	10X 25.4	9X 13.4	10X 30	12X 22	7X 9.8
16	12X 40.8	12X 31.8	8X 11.5	10X 30	10X 26	12X 20.7
18	12X 40.8	12X 31.8	8X 11.5	12X 35	16X 36	10X 15.3
20	12X 40.8	12X 31.8	8X 11.5	12X 35	16X 36	10X 15.3
22	---	12X 31.8	9X 13.4	10X 39	16X 36	10X 15.3
24	---	12X 40.8	7X 9.8	12X 40	16X 36	10X 15.3
26	---	12X 40.8	7X 9.8	14X 43	10X 39	12X 20.7
28	---	12X 40.8	7X 9.8	12X 45	10X 39	12X 20.7
30	---	12X 40.8	7X 9.8	12X 50	12X 40	12X 20.7
32	---	15X 42.9	8X 11.5	12X 53	12X 40	12X 20.7
34	---	15X 42.9	8X 11.5	12X 58	14X 43	12X 20.7
36	---	15X 42.9	9X 13.4	14X 61	14X 43	12X 20.7
38	---	15X 42.9	10X 15.3	14X 61	14X 43	12X 20.7
40	---	15X 50.0	12X 20.7	18X 76	18X 50	10X 15.3
42	---	---	---	18X 76	18X 50	10X 15.3
44	---	---	---	---	18X 50	10X 15.3
46	---	---	---	---	18X 50	12X 20.7
48	---	---	---	---	18X 50	12X 20.7
50	---	---	---	---	21X 62	12X 20.7
52	---	---	---	---	21X 62	12X 20.7
54	---	---	---	---	21X 68	12X 20.7
56	---	---	---	---	21X 62	15X 33.9
58	---	---	---	---	21X 62	15X 33.9
60	---	---	---	---	21X 62	15X 33.9

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>1 TONNE RATED LOAD</b>						
10	8X 18.4	7X 15.3	6X 8.2	8X 21	8X 15	7X 9.8
12	8X 18.4	7X 15.3	6X 8.2	8X 21	8X 15	7X 9.8
14	8X 23.0	7X 15.3	6X 8.2	8X 21	8X 18	8X 11.5
16	10X 25.4	8X 18.4	7X 9.8	8X 21	8X 18	8X 11.5
18	12X 31.8	8X 18.4	7X 9.8	8X 24	12X 22	7X 9.8
20	12X 31.8	8X 18.4	7X 9.8	8X 24	12X 22	7X 9.8
22	12X 40.8	10X 25.4	7X 9.8	8X 28	12X 22	7X 9.8
24	12X 40.8	10X 25.4	7X 9.8	10X 33	12X 22	7X 9.8
26	12X 50.0	10X 25.4	7X 9.8	10X 33	12X 22	7X 9.8
28	---	10X 25.4	7X 9.8	10X 33	12X 22	7X 9.8
30	---	12X 31.8	8X 11.5	10X 39	12X 22	7X 9.8
32	---	12X 31.8	8X 11.5	12X 40	12X 22	8X 11.5
34	---	12X 31.8	8X 11.5	12X 45	12X 26	10X 15.3
36	---	12X 31.8	10X 15.3	14X 48	14X 30	9X 13.4
38	---	15X 42.9	8X 11.5	12X 50	14X 30	9X 13.4
40	---	15X 42.9	8X 11.5	24X 76	14X 30	9X 13.4
42	---	15X 42.9	8X 11.5	---	16X 36	10X 15.3
44	---	15X 42.9	9X 13.4	---	16X 36	10X 15.3
46	---	15X 42.9	10X 15.3	---	16X 36	10X 15.3
48	---	---	---	---	16X 36	12X 20.7
50	---	---	---	---	18X 50	10X 15.3
52	---	---	---	---	18X 50	10X 15.3
54	---	---	---	---	18X 50	12X 20.7
56	---	---	---	---	18X 50	12X 20.7
58	---	---	---	---	21X 62	12X 20.7
60	---	---	---	---	21X 62	12X 20.7

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>3 TONNE RATED LOAD</b>						
10	12X 40.8	12X 40.8	7X 9.8	12X 35	10X 39	12X 20.7
12	12X 40.8	12X 40.8	7X 9.8	18X 40	10X 39	12X 20.7
14	18X 54.7	12X 40.8	7X 9.8	10X 45	12X 40	12X 20.7
16	18X 54.7	12X 40.8	7X 9.8	10X 45	14X 43	12X 20.7
18	18X 54.7	12X 40.8	8X 11.5	14X 48	14X 43	12X 20.7
20	20X 66.0	12X 40.8	10X 15.3	14X 48	18X 50	10X 15.3
22	20X 75.0	18X 54.7	9X 13.4	12X 50	18X 50	10X 15.3
24	24X 80.0	18X 54.7	9X 13.4	14X 53	18X 50	10X 15.3
26	20X 86.0	18X 54.7	9X 13.4	14X 53	18X 50	10X 15.3
28	20X 86.0	18X 54.7	9X 13.4	14X 61	18X 50	10X 15.3
30	---	18X 54.7	10X 15.3	14X 61	16X 50	12X 20.7
32	---	18X 54.7	12X 20.7	16X 67	16X 50	12X 20.7
34	---	18X 54.7	12X 20.7	14X 68	16X 50	12X 20.7
36	---	20X 66.0	9X 13.4	14X 74	16X 57	12X 20.7
38	---	20X 66.0	10X 15.3	14X 82	16X 57	12X 20.7
40	---	20X 66.0	12X 20.7	16X 89	16X 57	12X 20.7
42	---	20X 66.0	12X 20.7	16X 89	18X 60	12X 20.7
44	---	20X 66.0	12X 20.7	---	18X 60	12X 20.7
46	---	20X 66.0	15X 33.9	---	18X 65	12X 20.7
48	---	20X 66.0	15X 33.9	---	21X 68	12X 20.7
50	---	20X 66.0	15X 33.9	---	21X 68	15X 33.9
52	---	24X 80.0	15X 33.9	---	21X 68	15X 33.9
54	---	24X 80.0	15X 33.9	---	21X 68	15X 33.9
56	---	24X 80.0	15X 33.9	---	21X 73	15X 33.9
58	---	24X 80.0	15X 33.9	---	24X 76	15X 33.9
60	---	24X 80.0	15X 33.9	---	24X 76	15X 33.9



**METRIC MEASURE (TONNES) - MOTOR DRIVEN BRIDGE**

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>5 TONNE RATED LOAD</b>						
10	18X 54.7	12X 40.8	8X 11.5	16X 50	12X 50	12X 20.7
12	20X 66.0	18X 54.7	9X 13.4	16X 57	12X 50	12X 20.7
14	20X 66.0	18X 54.7	9X 13.4	16X 57	16X 50	12X 20.7
16	20X 66.0	18X 54.7	9X 13.4	18X 60	16X 57	12X 20.7
18	24X 80.0	18X 54.7	12X 20.7	18X 65	16X 57	12X 20.7
20	24X 80.0	20X 66.0	9X 13.4	18X 65	16X 57	12X 20.7
22	20X 86.0	20X 66.0	9X 13.4	18X 71	16X 57	12X 20.7
24	20X 96.0	20X 66.0	9X 13.4	14X 74	18X 60	12X 20.7
26	24X 106.0	20X 66.0	9X 13.4	14X 82	18X 65	12X 20.7
28	24X 106.0	20X 66.0	10X 15.3	14X 82	18X 65	12X 20.7
30	24X 121.0	20X 66.0	12X20.7	16X 89	18X 71	12X 20.7
32	---	24X 80.0	10X 15.3	16X 89	18X 71	12X 20.7
34	---	24X 80.0	10X 15.3	16X 89	18X 71	12X 20.7
36	---	24X 80.0	12X 20.7	16X 100	21X 83	12X 20.7
38	---	24X 80.0	12X 20.7	16X 100	21X 83	12X 20.7
40	---	24X 80.0	15X 33.9	---	21X 83	12X 20.7
42	---	24X 80.0	15X 33.9	---	21X 83	12X 20.7
44	---	24X 80.0	15X 33.9	---	21X 93	12X 20.7
46	---	24X 80.0	15X 33.9	---	21X 93	12X 20.7
48	---	24X 80.0	15X 40.0	---	21X 83	18X 42.7
50	---	24X 90.0	15X 40.0	---	21X 93	15X 33.9
52	---	24X 106.0	15X 33.9	---	21X 93	15X 33.9
54	---	24X 106.0	15X 33.9	---	24X 94	15X 33.9
56	---	24X 106.0	15X 33.9	---	24X 94	15X 33.9
58	---	24X 106.0	15X 40.0	---	24X 94	18X 42.7
60	---	24X 106.0	15X 40.0	---	27X 102	18X 42.7

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>10 TONNE RATED LOAD</b>						
10	20X 86.0	20X 66.0	12X 20.7	21X 93	21X 83	12X 20.7
12	24X 106.0	24X 80.0	10X 15.3	21X 93	21X 93	12X 20.7
14	24X 106.0	24X 80.0	10X 15.3	18X 119	21X 93	12X 20.7
16	24X 106.0	24X 80.0	12X 20.7	18X 119	21X 93	12X 20.7
18	24X 106.0	24X 80.0	15X 33.9	18X 119	21X 93	15X 33.9
20	---	24X 106.0	12X 20.7	18X 119	21X 93	15X 33.9
22	---	24X 106.0	12X 20.7	18X 119	21X 93	18X 51.9
24	---	24X 106.0	12X 20.7	21X 132	27X 114	15X 33.9
26	---	24X 106.0	12X 20.7	24X 146	27X 114	15X 33.9
28	---	24X 106.0	12X 20.7	24X 146	27X 114	18X 42.7
30	---	24X 106.0	15X 33.9	24X 146	30X 132	15X 33.9
32	---	24X 106.0	15X 33.9	24X 146	30X 132	15X 33.9
34	---	24X 106.0	15X 40.0	24X 162	30X 132	15X 33.9
36	---	24X 121.0	18X 42.7	24X 162	30X 132	15X 33.9
38	---	24X 121.0	18X 45.8	24X 162	30X 132	18X 42.7
40	---	---	---	24X 162	24X 146	18X 42.7
42	---	---	---	24X 162	24X 146	18X 51.9
44	---	---	---	---	24X 162	18X 42.7
46	---	---	---	---	24X 162	18X 42.7
48	---	---	---	---	24X 162	18X 42.7
50	---	---	---	---	24X 162	18X 42.7
52	---	---	---	---	36X 170	18X 42.7
54	---	---	---	---	36X 170	18X 42.7
56	---	---	---	---	36X 170	18X 42.7
58	---	---	---	---	36X 170	18X 51.9
60	---	---	---	---	36X 182	18X 51.9

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>7½ TONNE RATED LOAD</b>						
10	24X 80.0	20X 66.0	9X 13.4	18X 71	18X 65	12X 20.7
12	24X 80.0	20X 66.0	9X 13.4	18X 71	18X 65	12X 20.7
14	20X 86.0	20X 66.0	12X 20.7	14X 82	18X 71	12X 20.7
16	24X 106.0	24X 80.0	10X 15.3	21X 83	18X 71	12X 20.7
18	24X 106.0	24X 80.0	10X 15.3	16X 89	21X 83	12X 20.7
20	24X 106.0	24X 80.0	12X 20.7	21X 93	21X 83	12X 20.7
22	24X 106.0	24X 80.0	12X 20.7	21X 93	21X 83	12X 20.7
24	24X 106.0	24X 80.0	15X 33.9	16X 100	21X 93	12X 20.7
26	---	24X 80.0	15X 33.9	16X 100	21X 93	12X 20.7
28	---	24X 106.0	12X 20.7	27X 114	21X 93	12X 20.7
30	---	24X 106.0	12X 20.7	30X 132	21X 93	12X 20.7
32	---	24X 106.0	12X 20.7	---	21X 93	15X 33.9
34	---	24X 106.0	12X 20.7	---	21X 93	15X 33.9
36	---	24X 106.0	12X 20.7	---	21X 93	18X 42.7
38	---	24X 106.0	12X 20.7	---	27X 114	15X 33.9
40	---	24X 106.0	15X 33.9	---	27X 114	15X 33.9
42	---	24X 106.0	15X 33.9	---	27X 114	15X 33.9
44	---	24X 106.0	15X 33.9	---	27X 114	15X 33.9
46	---	24X 121.0	15X 33.9	---	27X 114	18X 42.7
48	---	24X 121.0	18X 42.7	---	30X 124	15X 33.9
50	---	24X 121.0	18X 51.9	---	30X 132	15X 33.9
52	---	---	---	---	30X 132	15X 33.9
54	---	---	---	---	30X 132	15X 33.9
56	---	---	---	---	30X 132	18X 42.7
58	---	---	---	---	30X 132	18X 42.7
60	---	---	---	---	30X 132	18X 58.0

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>15 TONNE RATED LOAD</b>						
10	---	24X 106.0	12X 20.7	12X 136	18X 119	15X 33.9
12	---	24X 106.0	12X 20.7	12X 136	18X 119	18X 42.7
14	---	24X 106.0	12X 20.7	24X 146	24X 146	18X 42.7
16	---	24X 106.0	15X 33.9	21X 147	24X 146	18X 42.7
18	---	24X 121.0	18X 42.7	24X 162	24X 146	18X 42.7
20	---	---	---	24X 162	24X 162	18X 42.7
22	---	---	---	24X 162	24X 162	18X 42.7
24	---	---	---	36X 182	24X 162	18X 42.7
26	---	---	---	36X 194	24X 162	18X 42.7
28	---	---	---	36X 194	24X 162	18X 42.7
30	---	---	---	36X 194	36X 182	18X 42.7
32	---	---	---	36X 210	36X 182	18X 42.7
34	---	---	---	36X 210	36X 182	18X 42.7
36	---	---	---	---	36X 182	18X 51.9
38	---	---	---	---	36X 194	18X 42.7
40	---	---	---	---	36X 194	18X 42.7
42	---	---	---	---	36X 194	18X 42.7
44	---	---	---	---	36X 194	18X 58.0
46	---	---	---	---	36X 210	18X 42.7
48	---	---	---	---	36X 210	18X 42.7
50	---	---	---	---	36X 210	18X 42.7
52	---	---	---	---	---	---
54	---	---	---	---	---	---
56	---	---	---	---	---	---
58	---	---	---	---	---	---
60	---	---	---	---	---	---

## BEAM SIZE SELECTION FOR VARIOUS SPANS

### METRIC MEASURE (TONNES) - HAND GEARED BRIDGE

- Section designation is in accordance with AISC.
- Beam sizes listed are American standard (S) beams, wide flange (W) and channel (C) sections.
- Use ASTM A 36 grade steel, first quality, free of rust and excessive mill scale.
- The bridge is designed in accordance with CMAA Specification 74, revised 1994 and is based on the following assumptions:

Rated Load	Hoist + Trolley Dead Load	* Wheel Diameter	Allowable Flange Width	Allowable Flange Thickness
1 Tonne	227kg	4"	9-1/8"	11/16"
2	227	4	11-1/4	11/16
3	363	4	11	15/16
5	499	6-1/2	11	1-5/32
7-1/2	544	6-1/2	11	1-5/32
10	1134	8	13-3/4	1-1/2
15	1451	8	13-3/4	1-1/2

\*LTI four wheel trolleys (one per hoist) with the wheels equally loaded.  
DLFB, DLFT and HLF are assumed to be 1.1, 1.1 and .15 respectively.

IFD is assumed to be 0.

Assumed additional dead load (for cross conductors and cross shaft) is 5.90 kg'.

The bridge is assumed to be an indoor bridge.

- If any of the above assumptions are exceeded contact the factory for beam selection.

6. No additional loading such as footwalks, platforms, cabs, machinery, etc., is allowed.

7. Beam substitution is allowed by going to an increased span, but **not** by going to an increased load.

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>2 TONNE RATED LOAD</b>						
10	10X 25.4	10X 25.4	7X 9.8	12X 22	12X 22	7X 9.8
12	10X 25.4	10X 25.4	7X 9.8	12X 22	12X 22	7X 9.8
14	10X 25.4	10X 25.4	7X 9.8	12X 22	12X 22	7X 9.8
16	12X 31.8	12X 31.8	8X 11.5	10X 26	12X 22	7X 9.8
18	12X 31.8	12X 31.8	8X 11.5	10X 30	16X 36	10X 15.3
20	12X 31.8	12X 31.8	8X 11.5	10X 30	16X 36	10X 15.3
22	12X 40.8	12X 31.8	8X 11.5	10X 30	16X 36	10X 15.3
24	12X 40.8	12X 31.8	8X 11.5	12X 35	16X 36	10X 15.3
26	12X 40.8	12X 40.8	7X 9.8	14X 38	16X 36	10X 15.3
28	---	12X 40.8	7X 9.8	12X 40	16X 36	10X 15.3
30	---	12X 40.8	7X 9.8	14X 43	12X 40	12X 20.7
32	---	15X 42.9	8X 11.5	14X 48	12X 40	12X 20.7
34	---	15X 42.9	8X 11.5	14X 48	14X 43	12X 20.7
36	---	15X 42.9	8X 11.5	14X 53	14X 43	12X 20.7
38	---	15X 42.9	8X 11.5	14X 61	18X 50	10X 15.3
40	---	15X 50.0	12X 20.7	16X 67	18X 50	10X 15.3
42	---	---	---	16X 67	18X 50	10X 15.3
44	---	---	---	16X 67	18X 50	10X 15.3
46	---	---	---	16X 67	18X 50	10X 15.3
48	---	---	---	18X 76	18X 50	10X 15.3
50	---	---	---	---	24X 62	10X 15.3
52	---	---	---	---	24X 62	10X 15.3
54	---	---	---	---	24X 62	10X 15.3
56	---	---	---	---	21X 62	12X 20.7
58	---	---	---	---	21X 62	12X 20.7
60	---	---	---	---	24X 62	12X 20.7

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>1 TONNE RATED LOAD</b>						
10	7X 15.3	7X 15.3	6X 8.2	8X 15	8X 15	7X 9.8
12	7X 15.3	7X 15.3	6X 8.2	8X 15	8X 15	7X 9.8
14	7X 15.3	7X 15.3	6X 8.2	10X 17	8X 15	7X 9.8
16	8X 18.4	7X 15.3	7X 9.8	8X 18	8X 18	8X 11.5
18	8X 23.0	8X 18.4	7X 9.8	8X 21	12X 22	7X 9.8
20	10X 25.4	8X 18.4	7X 9.8	10X 22	12X 22	7X 9.8
22	10X 25.4	10X 25.4	7X 9.8	10X 26	12X 22	7X 9.8
24	12X 31.8	10X 25.4	7X 9.8	10X 26	12X 22	7X 9.8
26	12X 31.8	10X 25.4	7X 9.8	10X 30	12X 22	7X 9.8
28	12X 40.8	10X 25.4	8X 11.5	10X 30	12X 22	7X 9.8
30	12X 40.8	12X 31.8	8X 11.5	14X 34	12X 22	7X 9.8
32	12X 40.8	12X 31.8	8X 11.5	12X 35	12X 22	8X 11.5
34	12X 50.0	12X 31.8	8X 11.5	12X 40	12X 26	9X 13.4
36	---	12X 40.8	7X 9.8	14X 43	14X 30	9X 13.4
38	---	15X 42.9	8X 11.5	14X 43	14X 30	9X 13.4
40	---	15X 42.9	8X 11.5	14X 48	14X 30	9X 13.4
42	---	15X 42.9	8X 11.5	14X 48	16X 36	10X 15.3
44	---	15X 42.9	8X 11.5	21X 62	16X 36	10X 15.3
46	---	15X 50.0	9X 13.4	21X 68	16X 36	10X 15.3
48	---	---	---	21X 68	18X 50	10X 15.3
50	---	---	---	24X 76	18X 50	10X 15.3
52	---	---	---	---	18X 50	10X 15.3
54	---	---	---	---	18X 50	10X 15.3
56	---	---	---	---	18X 50	12X 20.7
58	---	---	---	---	24X 62	10X 15.3
60	---	---	---	---	24X 62	10X 15.3

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>3 TONNE RATED LOAD</b>						
10	12X 40.8	12X 40.8	7X 9.8	10X 30	10X 39	12X 20.7
12	12X 40.8	12X 40.8	7X 9.8	12X 35	10X 39	12X 20.7
14	12X 40.8	12X 40.8	7X 9.8	12X 35	10X 39	12X 20.7
16	12X 40.8	12X 40.8	7X 9.8	14X 38	14X 43	12X 20.7
18	12X 40.8	12X 40.8	7X 9.8	16X 40	14X 43	12X 20.7
20	12X 40.8	12X 40.8	7X 9.8	18X 40	14X 43	12X 20.7
22	12X 50.0	12X 40.8	7X 9.8	10X 45	18X 50	10X 15.3
24	18X 54.7	12X 50.0	8X 11.5	16X 45	18X 50	10X 15.3
26	18X 54.7	18X 54.7	9X 13.4	14X 48	18X 50	10X 15.3
28	20X 66.0	18X 54.7	9X 13.4	14X 48	18X 50	10X 15.3
30	20X 66.0	18X 54.7	9X 13.4	14X 53	18X 50	10X 15.3
32	20X 75.0	18X 54.7	9X 13.4	18X 60	18X 50	10X 15.3
34	24X 80.0	18X 54.7	9X 13.4	18X 65	18X 50	10X 15.3
36	24X 80.0	18X 54.7	9X 13.4	16X 67	16X 50	12X 20.7
38	20X 86.0	18X 54.7	9X 13.4	16X 67	16X 50	12X 20.7
40	20X 96.0	20X 66.0	9X 13.4	16X 77	24X 62	10X 15.3
42	---	20X 66.0	9X 13.4	16X 77	24X 62	10X 15.3
44	---	20X 66.0	9X 13.4	16X 89	24X 62	10X 15.3
46	---	20X 66.0	9X 13.4	24X 94	24X 62	10X 15.3
48	---	20X 66.0	9X 13.4	27X 102	21X 62	12X 20.7
50	---	20X 80.0	10X 15.3	27X 114	21X 62	12X 20.7
52	---	24X 80.0	10X 15.3	27X 114	24X 62	12X 20.7
54	---	24X 80.0	10X 15.3	30X 124	21X 68	12X 20.7
56	---	24X 80.0	12X 20.7	---	24X 76	12X 20.7
58	---	24X 80.0	12X 20.7	---	24X 76	12X 20.7
60	---	24X 80.0	12X 20.7	---	24X 76	12X 20.7

**METRIC MEASURE (TONNES) - HAND GEARED BRIDGE**

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>5 TONNE RATED LOAD</b>						
10	12X 40.8	12X 40.8	7X 9.8	18X 46	18X 50	10X 15.3
12	12X 50.0	12X 40.8	7X 9.8	18X 46	12X 50	12X 20.7
14	18X 54.7	18X 54.7	9X 13.4	18X 46	16X 50	12X 20.7
16	18X 54.7	18X 54.7	9X 13.4	16X 50	16X 50	12X 20.7
18	18X 54.7	18X 54.7	9X 13.4	18X 55	14X 53	12X 20.7
20	18X 54.7	18X 54.7	9X 13.4	16X 57	24X 62	10X 15.3
22	20X 66.0	18X 54.7	9X 13.4	16X 57	16X 57	12X 20.7
24	20X 66.0	20X 66.0	9X 13.4	16X 57	16X 57	12X 20.7
26	20X 75.0	20X 66.0	9X 13.4	18X 60	16X 57	12X 20.7
28	24X 80.0	20X 66.0	9X 13.4	18X 65	18X 60	12X 20.7
30	24X 80.0	20X 66.0	9X 13.4	18X 71	18X 65	12X 20.7
32	20X 86.0	20X 66.0	9X 13.4	16X 77	18X 65	12X 20.7
34	24X 106.0	20X 66.0	9X 13.4	16X 77	18X 65	12X 20.7
36	24X 106.0	20X 66.0	9X 13.4	16X 89	18X 71	12X 20.7
38	24X 106.0	24X 80.0	10X 15.3	24X 94	18X 71	12X 20.7
40	24X 106.0	24X 80.0	10X 15.3	16X 100	18X 71	12X 20.7
42	24X 121.0	24X 80.0	10X 15.3	27X 114	21X 83	12X 20.7
44	---	24X 80.0	10X 15.3	27X 114	21X 83	12X 20.7
46	---	24X 80.0	10X 15.3	30X 124	21X 83	12X 20.7
48	---	24X 80.0	12X 20.7	30X 132	21X 83	12X 20.7
50	---	24X 80.0	12X 20.7	---	24X 84	12X 20.7
52	---	24X 80.0	12X 20.7	---	24X 84	12X 20.7
54	---	24X 80.0	15X 33.9	---	24X 94	12X 20.7
56	---	24X 106.0	12X 20.7	---	24X 94	12X 20.7
58	---	24X 106.0	12X 20.7	---	24X 94	15X 33.9
60	---	24X 106.0	15X 33.9	---	27X 102	15X 33.9

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>10 TONNE RATED LOAD</b>						
10	20X 66.0	20X 66.0	9X 13.4	21X 83	21X 83	12X 20.7
12	20X 66.0	20X 66.0	9X 13.4	21X 83	21X 83	12X 20.7
14	24X 80.0	24X 80.0	10X 15.3	21X 93	21X 83	12X 20.7
16	24X 80.0	24X 80.0	10X 15.3	21X 93	21X 93	12X 20.7
18	24X 80.0	24X 80.0	10X 15.3	21X 93	21X 93	12X 20.7
20	24X 80.0	24X 80.0	10X 15.3	21X 93	21X 93	12X 20.7
22	24X 106.0	24X 90.0	10X 15.3	21X 93	21X 93	12X 20.7
24	24X 106.0	24X 106.0	12X 20.7	27X 114	21X 93	18X 42.7
26	24X 106.0	24X 106.0	12X 20.7	27X 114	27X 114	15X 33.9
28	24X 106.0	24X 106.0	12X 20.7	27X 114	27X 114	15X 33.9
30	24X 106.0	24X 106.0	12X 20.7	27X 114	27X 114	15X 33.9
32	---	24X 106.0	12X 20.7	30X 124	27X 114	15X 33.9
34	---	24X 106.0	12X 20.7	30X 124	30X 124	15X 33.9
36	---	24X 106.0	12X 20.7	21X 132	30X 124	15X 33.9
38	---	24X 106.0	12X 20.7	33X 141	30X 124	15X 33.9
40	---	24X 106.0	15X 33.9	24X 146	30X 132	15X 33.9
42	---	24X 121.0	15X 33.9	24X 146	30X 132	15X 33.9
44	---	---	---	24X 146	30X 132	15X 33.9
46	---	---	---	24X 146	30X 132	15X 33.9
48	---	---	---	24X 162	33X 141	15X 33.9
50	---	---	---	24X 162	24X 146	18X 42.7
52	---	---	---	36X 194	24X 162	18X 42.7
54	---	---	---	36X 210	24X 162	18X 42.7
56	---	---	---	---	24X 162	18X 42.7
58	---	---	---	---	36X 170	18X 42.7
60	---	---	---	---	36X 170	18X 42.7

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>7½ TONNE RATED LOAD</b>						
10	20X 66.0	20X 66.0	9X 13.4	16X 57	16X 57	12X 20.7
12	20X 66.0	20X 66.0	9X 13.4	18X 65	18X 65	12X 20.7
14	20X 66.0	20X 66.0	9X 13.4	18X 65	18X 65	12X 20.7
16	20X 66.0	20X 66.0	9X 13.4	18X 71	18X 71	12X 20.7
18	24X 80.0	20X 66.0	9X 13.4	18X 71	18X 71	12X 20.7
20	24X 80.0	24X 80.0	10X 15.3	18X 71	18X 71	12X 20.7
22	24X 80.0	24X 80.0	10X 15.3	21X 83	21X 83	12X 20.7
24	24X 80.0	24X 80.0	10X 15.3	21X 83	21X 83	12X 20.7
26	24X 80.0	24X 80.0	10X 15.3	21X 83	21X 83	12X 20.7
28	20X 96.0	24X 80.0	10X 15.3	21X 83	21X 83	12X 20.7
30	24X 106.0	24X 90.0	10X 15.3	21X 93	21X 93	12X 20.7
32	24X 106.0	24X 106.0	12X 20.7	21X 93	21X 93	12X 20.7
34	24X 106.0	24X 106.0	12X 20.7	16X 100	21X 93	12X 20.7
36	24X 121.0	24X 106.0	12X 20.7	27X 114	21X 93	12X 20.7
38	---	24X 106.0	12X 20.7	27X 114	21X 93	12X 20.7
40	---	24X 106.0	12X 20.7	30X 124	24X 94	12X 20.7
42	---	24X 106.0	12X 20.7	30X 132	27X 114	15X 33.9
44	---	24X 106.0	12X 20.7	---	27X 114	15X 33.9
46	---	24X 106.0	12X 20.7	---	27X 114	15X 33.9
48	---	24X 106.0	12X 20.7	---	27X 114	15X 33.9
50	---	24X 106.0	12X 20.7	---	27X 114	15X 33.9
52	---	24X 106.0	15X 33.9	---	27X 114	15X 33.9
54	---	24X 121.0	15X 33.9	---	27X 114	15X 33.9
56	---	24X 121.0	15X 50.0	---	30X 124	15X 33.9
58	---	---	---	---	30X 124	15X 33.9
60	---	---	---	---	30X 124	15X 33.9

Span Thru (ft)	S	Sw/C		W	Ww/C	
		S	C		W	C
<b>15 TONNE RATED LOAD</b>						
10	24X 106.0	24X 106.0	12X 20.7	18X 119	18X 119	15X 33.9
12	24X 106.0	24X 106.0	12X 20.7	18X 119	18X 119	15X 33.9
14	24X 106.0	24X 106.0	12X 20.7	30X 132	30X 132	15X 33.9
16	24X 106.0	24X 106.0	12X 20.7	12X 136	30X 132	15X 33.9
18	24X 106.0	24X 106.0	12X 20.7	24X 146	24X 146	18X 42.7
20	---	24X 106.0	12X 20.7	24X 146	24X 146	18X 42.7
22	---	24X 121.0	15X 50.0	21X 147	24X 146	18X 42.7
24	---	---	---	24X 162	24X 162	18X 42.7
26	---	---	---	24X 162	24X 162	18X 42.7
28	---	---	---	24X 162	24X 162	18X 42.7
30	---	---	---	24X 162	24X 162	18X 42.7
32	---	---	---	24X 162	24X 162	18X 42.7
34	---	---	---	36X 170	24X 162	18X 42.7
36	---	---	---	36X 182	36X 170	18X 42.7
38	---	---	---	36X 182	36X 182	18X 42.7
40	---	---	---	36X 182	36X 182	18X 42.7
42	---	---	---	36X 182	36X 182	18X 42.7
44	---	---	---	36X 194	36X 182	18X 42.7
46	---	---	---	36X 210	36X 182	18X 42.7
48	---	---	---	---	36X 194	18X 42.7
50	---	---	---	---	36X 194	18X 42.7
52	---	---	---	---	36X 194	18X 42.7
54	---	---	---	---	36X 194	18X 42.7
56	---	---	---	---	36X 194	18X 42.7
58	---	---	---	---	36X 210	18X 42.7
60	---	---	---	---	36X 210	18X 42.7











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# WARRANTY

## **WARRANTY AND LIMITATION OF REMEDY AND LIABILITY**

A. Seller warrants that its products and parts, when shipped, and its work (including installation, construction and start-up), when performed, will meet applicable specifications, will be of good quality and will be free from defects in material and workmanship. All claims for defective products or parts under this warranty must be made in writing immediately upon discovery and, in any event, within one (1) year from shipment of the applicable item unless Seller specifically assumes installation, construction or start-up responsibility. All claims for defective products or parts when Seller specifically assumes installation, construction or start-up responsibility, and all claims for defective work must be made in writing immediately upon discovery and, in any event, within one (1) year from completion of the applicable work by Seller, provided, however, all claims for defective products and parts made in writing no later than eighteen (18) months after shipment. Defective items must be held for Seller's inspection and returned to the original f.o.b. point upon request. THE FOREGOING IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES WHATSOEVER, EXPRESS, IMPLIED AND STATUTORY, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS.

B. Upon Buyer's submission of a claim as provided above and its substantiation, Seller shall at its option either (i) repair or replace its product, part or work at either the original f.o.b. point of delivery or at Seller's authorized service station nearest Buyer or (ii) refund an equitable portion of the purchase price.

C. This warranty is contingent upon Buyer's proper maintenance and care of Seller's products, and does not extend to normal wear and tear. Seller reserves the right to void warranty in event of Buyer's use of inappropriate materials in the course of repair or maintenance, or if Seller's products have been dismantled prior to submission to Seller for warranty inspection.

D. The foregoing is Seller's only obligation and Buyer's exclusive remedy for breach of warranty, and is Buyer's exclusive remedy hereunder by way of breach of contract, tort, strict liability or otherwise. In no event shall Buyer be entitled to or Seller liable for incidental or consequential damages. Any action for breach of this agreement must be commenced within one (1) year after the cause of action has accrued.