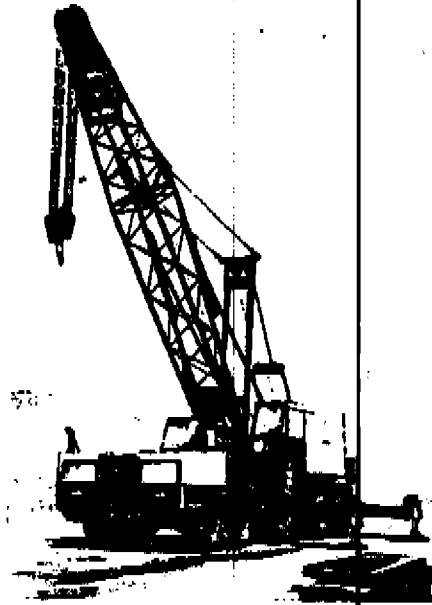


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OPERATOR'S MANUAL

MC 670A MOTO-CRANE



Koehring
Crane and Excavator Group
Lorain Products

DESCRIPTION

The MC-670A Moto-Crane (figure 1) is a carrier mounted 70 ton machine.

The superstructure has an all-welded turntable with integral side frames and A-frame. It is equipped with double-drum boom hoist assembly, removable counterweight and shear-ball connection. The hoist friction clutches are controlled by a full air system. The swing clutches are air assist controlled. A balanced two shoe type, spring set, air released swing brake is provided.

The MC-670A Carrier is an 8 x 4 chassis of all-welded design. A big engine, heavy duty transmission and through-drive connection between the tandem rear axles gives travel speeds up to 40.2 M.P.H. The rear axle assemblies are double-reduction gear driven, the first reduction through hypoid gears and the final reduction through planetary wheel hubs.

Hydraulic Outriggers with floats are standard. They are controlled from the carrier cab or through the cab rear window. The outrigger boxes are removable for additional weight reduction if required.

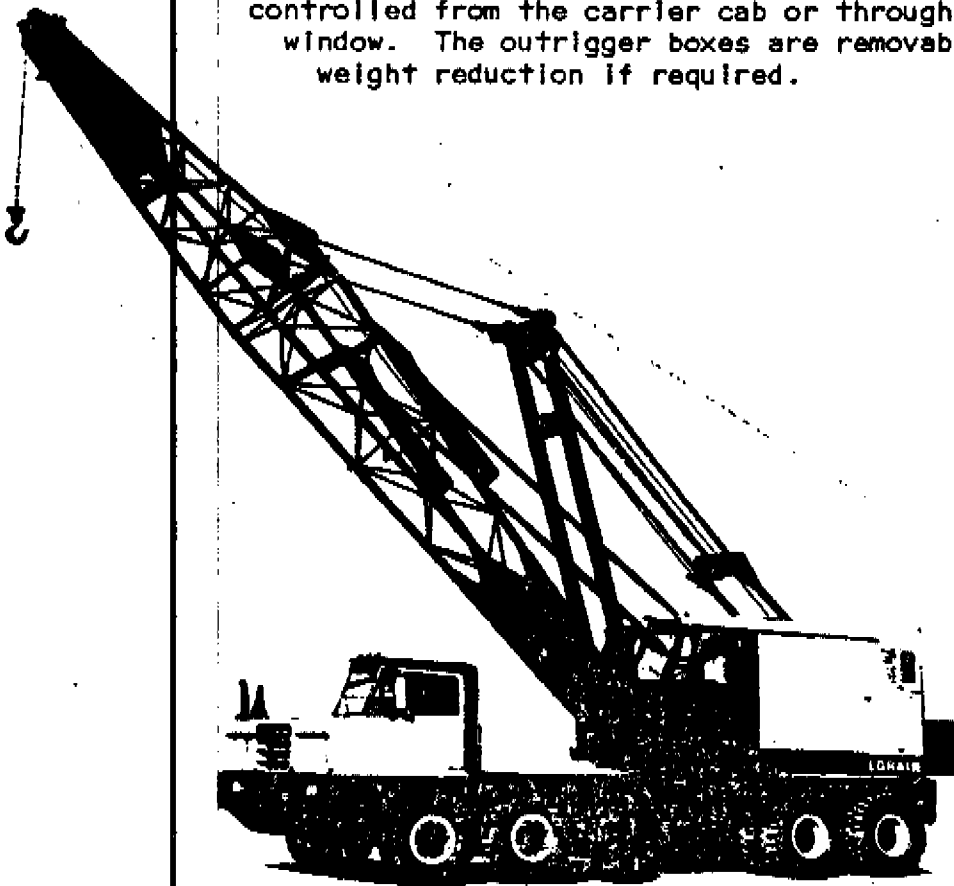


Figure 1. MC-670A Moto-Crane.

ENGINE SPECIFICATIONS AND DATA

Engine	Std. (Diesel) Cummins MHC-250	Opt. (Diesel) GMC 6-71N	Opt. (Diesel) NTC-290	(Early Machines) MHCT-270 (Diesel)
Number of Cylinders	6	6	6	6
Bore and Stroke	5-1/2" x 6"	4-1/4" x 5"	5-1/2" x 6"	5-1/2" x 6"
Displacement Cu. in.	855	425.6	855	855
H.P. Rated Without Accessories At Idle Governed Speed	250 @ 2100 R.P.M.	238 @ 2100 R.P.M.	290 @ 2100 R.P.M.	270 @ 2100 R.P.M.
H.P. Rated With Access- ories At Full Load Governed Speed	230 @ 2100 R.P.M.	221 @ 2100 R.P.M.	272 @ 2100 R.P.M.	250 @ 2100 R.P.M.
Horsepower, Taxable	72.6	43	72.6	72.6
Torque, Maximum (pounds feet)	685 @ 1500 R.P.M.	649 @ 1400 R.P.M.	837 @ 1500 R.P.M.	740 @ 150 R.P.M.
Battery - Starter	12 Volts	12 Volts	12 Volts	12 Volts
Alternator	53 Amps		53 Amps	53 Amps
Generator		50 Amps		
Fuel Tank Capacity	75 gal.	75 gal.	75 gal.	75 gal.
Cooling System Capacity	11 ga.	13 gal.	12 gal.	11. gal.

SECTION II
Page 9**OPERATION AS A CLAMSHELL**

GENERAL The clamshell is generally used for digging footers, trenches and pier holes, stock piling of loose materials, loading hauling units and charging bins. The clamshell is capable of handling materials both above and below ground level and can spot dump at any level of operation.

The clamshell requires the use of both hoist drums to provide a closing and holding line. The closing line is used for closing, hoisting and dumping the bucket. The holding line is used to hold the bucket suspended when the closing line is released to dump.

OPERATION (FIGURE 9)

FILLING AND HOISTING THE CLAMSHELL BUCKET Starting with open bucket for digging or filling, engage closing line clutch by pulling closing line lever and releasing closing line brake.

Control depth by use of holding line brake. As bucket closes, engage holding line clutch by pulling back on holding line lever so that both holding and closing lines spool equally.

Depending on obstructions, machine can be swung to bucket dumping position while continuing to hoist. When bucket is to desired height, press both the holding line and closing line brakes as both holding line and closing line levers are pushed forward releasing their respective clutches.

NOTE: IT IS NECESSARY TO BOOM UP SLIGHTLY TO RELEASE THE BOOM SAFETY LOCK PAWL BEFORE BOOMING DOWN. MAKE THIS A STANDARD PRACTICE.

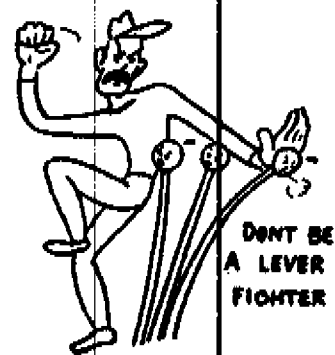
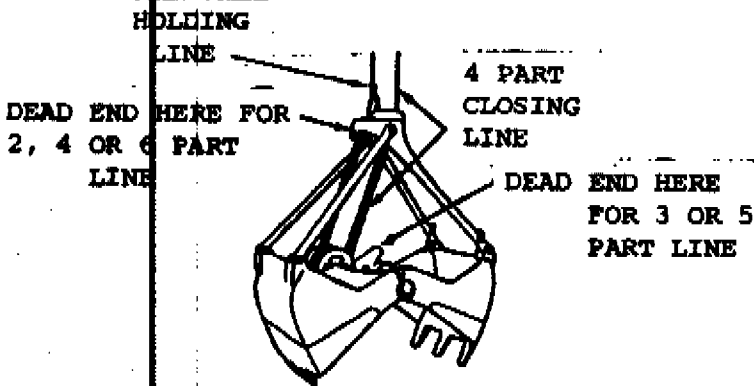
To empty bucket, continue the holding line brake application and release the closing line brake just enough to allow the bucket to open.

Synchronize both brakes as machine is being swung back to the digging position to give smooth lowering condition.

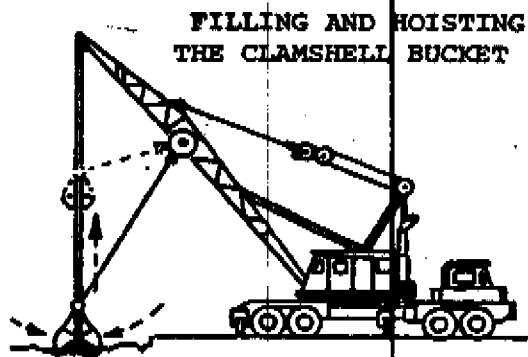
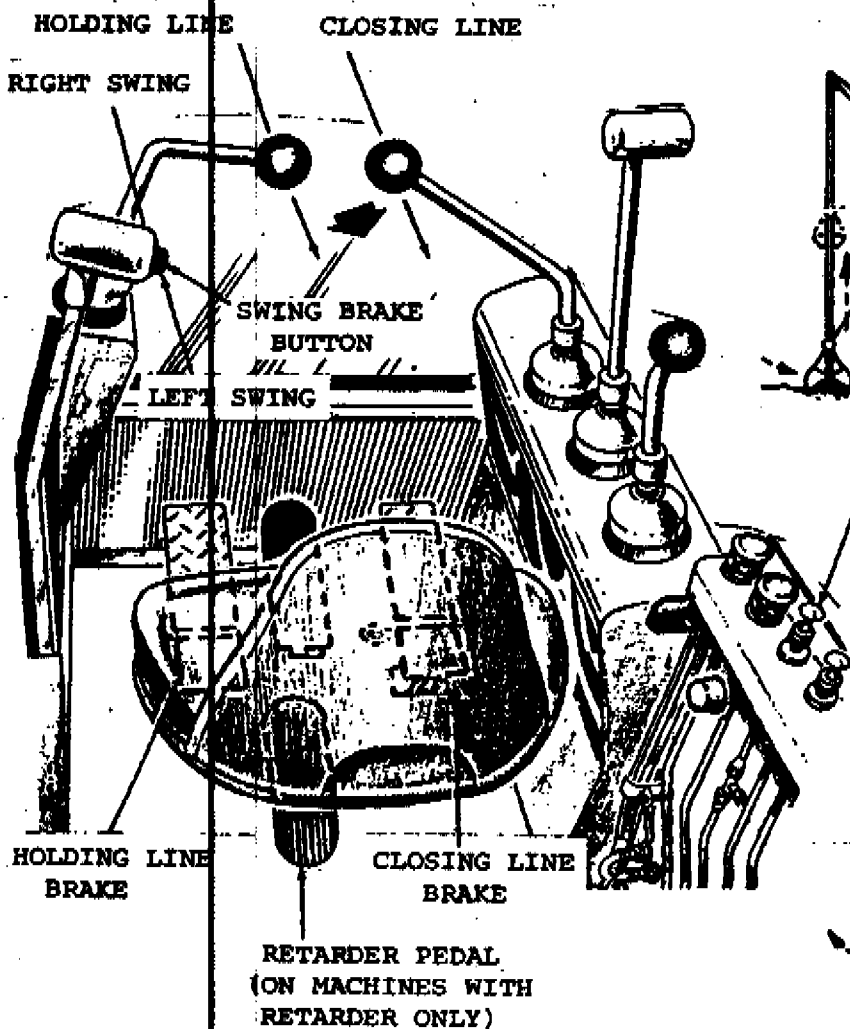
SWINGING Engage the swing lever in the desired direction (push to swing right, pull to swing left) and swing the bucket to the dumping position. Reverse the swing lever to stop the swing.

As the operator becomes skilled in clamshell work, the above operations will become a synchronous function.

SECTION II
Page 10



TYPICAL REEVING OF CLAMSHELL CLOSING LINE FOR VARIOUS PARTS OF LINE IN BUCKET.



SWING LOCK LEVER
PULL UP TO RELEASE BRAKE,
PUSH DOWN TO LOCK BRAKE.

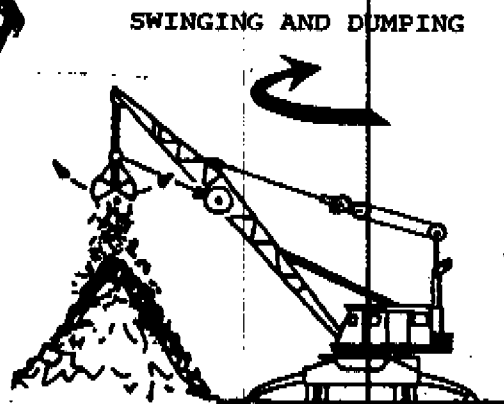


Figure 9. Clamshell Operation.

SECTION II

Page 14

THE TORQUE CONVERTER VERSUS THE PLATE CLUTCH AND THE HYDRAULIC COUPLING

The technique in operating a machine equipped with a torque converter is somewhat different than when equipped with a standard plate clutch or hydraulic coupling. Here is a brief and simple comparison of the various power take-off units, which will assist the operator in obtaining the best performance from the torque converter.

PLATE CLUTCH A plate clutch in the engaged position forms a direct coupling between the engine and the output shaft. When too great a load is placed on the engine, as when lifting excessive loads, the engine will slow down and stall if the operating clutches are not released.

HYDRAULIC COUPLING When a hydraulic coupling, commonly called a fluid drive, is used between the engine and the output shaft, the coupling acts as a cushion between the engine and load. A hydraulic coupling differs from a plate clutch in that when excessive loads are encountered, the output shaft will slip or come to a complete stop. The engine, however, will continue running at reduced speed.

TORQUE CONVERTER A torque converter also acts as a cushion between the load and engine. It differs from the hydraulic coupling in that it multiplies the engine output torque. The torque converter builds up torque gradually as the load is applied, whereas a mechanical transmission increases torque by shifting step by step. The amount of torque multiplication depends on the limit of the converter and the applied load. As the torque is increased, the operating speeds are reduced.

The main difference in the operation of a torque converter versus a hydraulic coupling is that when a load is applied to a hydraulic coupling, the engine will slow down and lose horsepower, whereas the engine with a converter will speed up, thereby increasing horsepower and building up torque in the converter.

On a fluid drive machine, when the engine slows down to machinery stall speed, the operator automatically releases the clutches to allow the engine to pick up speed so he can resume operation. This same operator, if not accustomed to a machine equipped with a converter will naturally keep on applying the load expecting the engine to slow down. Instead the engine will pick up speed even though the machinery is stalled.

To maintain a good operating speed on a converter powered machine, the operator must disregard the sound and speed of the engine and rely on the performance of the machine. The speed at which the load or bucket is moving is the deciding factor in determining if the machine is working within its capabilities. For maximum production, it is important to load the engine and converter just enough to keep the load moving or the bucket slicing through the excavated material. Just because the engine won't stall, don't think the converter lacks power. Dynamometer tests prove that considerably more line pull is attained by a converter equipped machine.

Learn to run a torque converter equipped machine by EYE, not by EAR.

SECTION II
Page 15

SPECIFICATIONS AND DATA

Engine	Std. (Diesel) Cummins V-504C	Opt. (Diesel) GM 6V 53N
Number of Cylinders	8	6
Bore and Stroke	4-5/8" x 3-3/4"	3-7/8" x 4-1/2"
Displacement Cu. In.	504	318
H.P. Rated With Accessories at Full Load Governed Speed	150 @ 2440 R.P.M. ...	147 @ 2235 R.P.M.
Torque of Engine at Full Load Governed Speed (pounds feet)	325 @ 2440 R.P.M. ...	341 @ 2235 R.P.M.
Torque of Output Shaft at Full Load Governed Speed (pounds feet) ..	412 @ 1400 R.P.M. ...	452 @ 1400 R.P.M.
Torque, maximum, of Output Shaft at Stall of Converter (pounds feet).....	800	910
Speed of Engine, Full Load, Full Throttle (R.P.M.)	2325	2235
Speed of Engine, No Load Full Throttle (R.P.M.)	2500	2435
Speed of Engine at Stall of Converter (R.P.M.)	2300	1800
Speed of Torque Converter Output Shaft, Full Load at Full Throttle (R.P.M.)	1400*	1400*
Speed of Torque Converter Output Shaft, Full Load at Full Throttle (R.P.M.)	2300**	2200**
Speed of Torque Converter Output Shaft, No Load at Full Throttle (R.P.M.)	1600*	1600*
Speed of Torque Converter Output Shaft, No Load at Full Throttle (R.P.M.)	2600**	2435**
Cooling System Capacity	10 gal.	4 gal.
Battery - Starter - Alternator	12 volts	2 volts
Alternator	55 amps.	60 amps.
Fuel Tank Capacity	68 gal.	68 gal.

* Hand Throttle

** Foot Throttle

NOTE: Machine is equipped with foot throttle arrangement to provide overspeed of normal throttle setting. Provides for increase of line speeds when handling light loads. See Section XI for adjustment and operation.

SECTION II
Page 16

SPECIFICATIONS AND DATA

Engine	Opt. (Diesel) Cummins CT464P (C175)	*** (Diesel) Cummins C464C (C160)
Number of Cylinders	6	6
Bore and Stroke	4-7/16" x 5"	4-7/16" x 5"
Displacement Cu. In.	464	464
H.P. Rated With Accessories at Full Load Governed Speed	148 @ 2260 R.P.M. ...	141 @ 2300 R.P.M.
Torque of Engine at Full Load Governed Speed (pounds feet)	345 @ 2260 R.P.M. ...	322 @ 2300 R.P.M.
Torque of Output Shaft at Full Load Governed Speed (pounds feet) ...	452 @ 1400 R.P.M. ...	377 @ 1600 R.P.M.
Torque, Maximum, of Output Shaft at Stall of Converter (pounds feet).....	820	720
Speed of Engine, Full Load, Full Throttle (R.P.M.)	2260	2220
Speed of Engine, No Load, Full Throttle (R.P.M.)	2500	2500
Speed of Engine at Stall of Converter (R.P.M.)	2200	2100
Speed of Torque Converter Output Shaft, Full Load at Full Throttle (R.P.M.)	1400*	1600*
Speed of Torque Converter Output Shaft, Full Load at Full Throttle (R.P.M.)	2300**	2300**
Speed of Torque Converter Output Shaft, No Load at Full Throttle (R.P.M.)	1600*	1800*
Speed of Torque Converter Output Shaft, No Load at Full Throttle (R.P.M.)	2500**	2500**
Cooling System Capacity	10 gal.	10 gal.
Battery - Starter - Alternator	12 volts	12 volts
Alternator	55 amps.	55 amps.
Fuel Tank Capacity	68 gal.	68 gal.

* Hand Throttle
** Foot Throttle

NOTE: Machine is equipped with foot throttle arrangement to provide overspeed of normal throttle setting. Provides for increase of line speeds when handling light loads. See Section XI for adjustment and operation.

*** Cummins C464C used on some early machines.

SECTION III
Page 1

MACHINE CONVERSION

GENERAL

The MC-670A Crane (figure 1) can be equipped with the following front end attachments.

- a. Conventional (Open Throat Peak) Boom. The conventional (Open Throat) boom is a pin connected type with a 25 ft. base section and a 15 ft. top section. Center sections are available in 10, 20 and 30 ft. lengths to make up to a maximum of 170 ft. of boom.
- b. 35 Ft. Long Tapered Peak Section. The 35 ft. long tapered peak section is a pin connected type using common base and center sections with the conventional boom. Maximum length 170 ft.
- c. Hammer Head Boom. A two ft. hammer head top section can be pin connected to the conventional base or center sections permitting use as a hammer head crane boom from 27 ft. to 127 ft. maximum.
- d. Jib. The jib extension is a pin connected type with a 10 ft. base section and a 10 ft. top section. 10 ft. insert sections are available to make up a maximum of 50 ft. A 12 ft. jib mast is used. Jib extensions can be used with the conventional or tapered peak type booms. A special 20 ft. boom center section with jib backstay pendant anchors and (2) adapter links are required when jib extension is used with hammer head peak boom.
- e. Clamshell. A rudomatic tagline with cable is available for converting the machine to clamshell operation.

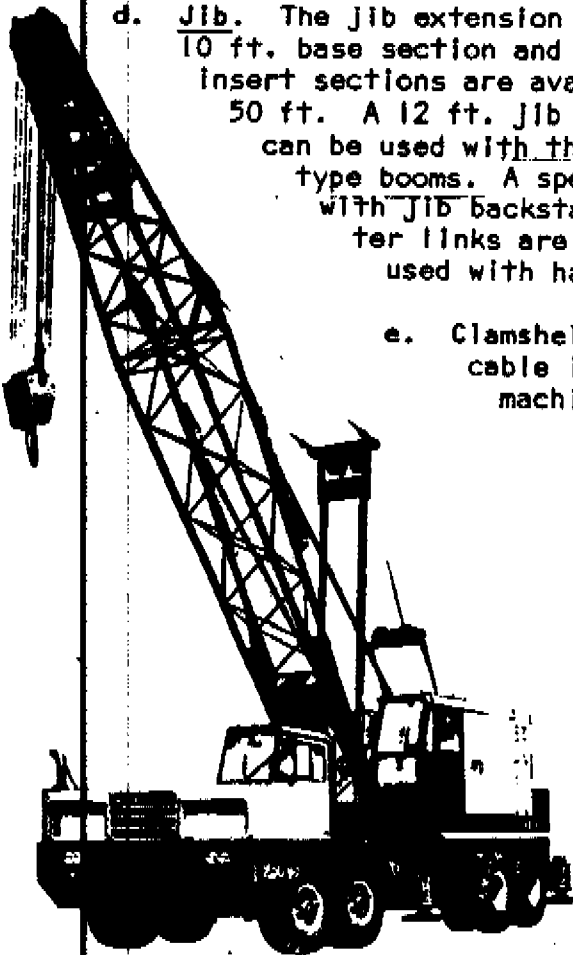


Figure 1. MC-670A Moto-Crane Equipped With 40 Ft. Open Throat Boom.

SECTION IV
Page 1

MOVEMENT TO A NEW WORK SITE

GENERAL

The MC-670A MOTO-CRANE is equipped with a pin connected boom, removable counterweight and removable outrigger boxes for quick and easy weight reduction. The removal of these components can be handled by the machine and requires no additional lifting equipment.

DIMENSIONS AND WEIGHT

Table on page 2 gives the dimensions, overall weights and load distribution on each tandem with components installed or removed.

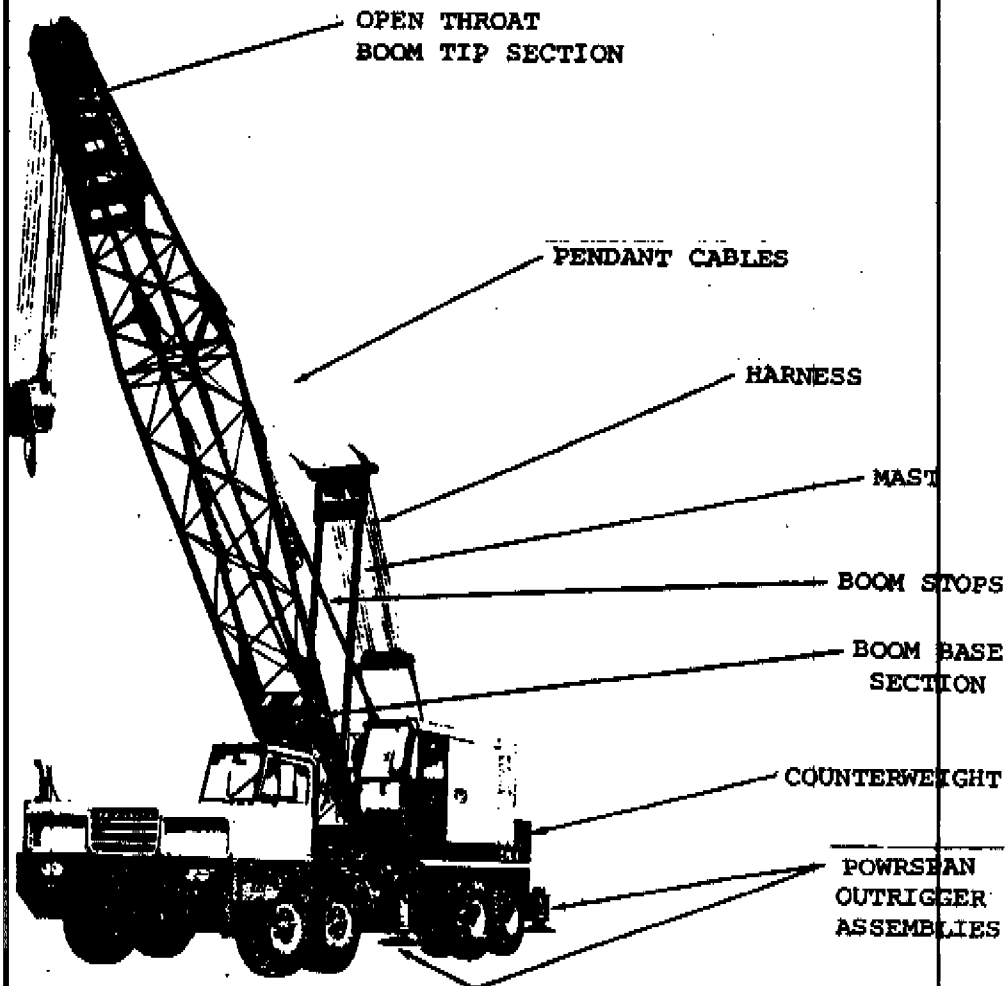


Figure 1. MC-670A Moto-Crane.

SECTION IV
Page 2

LOAD DISTRIBUTION AND WEIGHTS FOR MC-670A (8 x 4)

POWRSPAN OUTRIGGERS

	GROSS WEIGHT	TURNTABLE		TURNTABLE	
		FACING FRONT		FACING REAR	
		FRONT	REAR	FRONT	REAR
1. Basic Crane	62935	19796	43139	27736	35199
Less:					
a. Counterweight					
b. Front and Rear Outrigger Boxes and Beams.					
c. Complete 40' D-15B Offset Boom, Mast, Floating Harness, Boom Hoist Cable and Boom Stops.					
d. Hoist Cables					
2. Add: Rear Outrigger Box and Beams ... (POWRSPAN)	+6100	-1883	+7983	-1883	+7983
3. Add: Front Outrigger Box and Beams .. (POWRSPAN)	+6100	+4057	+2043	+4057	+2043
4. Add: Counterweight	+22000	-6700	+28700	+16600	+5400
5. Add: Load Hoist Cable, Front Drum ...	+690	+120	+570	+200	+490
6. Add: D-15B Boom Base, Mast, Floating Harness, Boom Hoist Cable and Boom Stops	+5675	+4855	+820	-2845	+8520
7. Add: D-15B 15' Offset Boom Peak	+1940	+4145	-2205	-3205	+5145
8. Add: D-15B 35' Long Tapered Boom Peak	+2540	+7580	-5040	-6410	+8950
9. Add: P.L.L. Front Drum	+625	+155	+470	+130	+495
10. Add: P.L.L. Drum	+420	+50	+370	+140	+280
11. Add: 3rd. Drum	+1450	+505	+945	+160	+1290
12. Add: Cummins QT-464-P Engine With Torque Converter	+100	-20	+120	+65	+35
13. Add: GM 6V-53N Engine With Torque Converter	-150	+25	-175	-85	-65
14. Add: GM 6-7IN Engine To Carrier	-615	-775	+160	-775	+160
15. Add: Cummins NHT-270 Engine To Carrier	+100	+120	-20	+120	-20
16. Add: 70 Ton, 5 Sheave Hook Block To Boom Peak	+1500	+3840	-2340	-3155	+4655
17. Add: 25 Ton, 1 Sheave Hook Block To Boom Peak	+1000	+2560	-1560	-2100	+3100

MC-670A
TRAVELING WEIGHTS
(POWRSPAN)

TURNTABLE FACING FRONT		CTWT	REAR	FRONT	BOOM	BOOM*	TURNTABLE		GROSS WEIGHTS
FRONT	REAR		OUTRIGGERS	OUTRIGGERS	PEAK	BASE	FACING FRONT	REAR	
19796	43139	0	0	0	0	0	27736	35199	62935
24651	43959	0	0	0	0	X	24891	43719	68610
28796	41754	0	0	0	X	X	21641	48909	70550
32853	43797	0	0	X	X	X	25698	50952	76650
30970	51780	0	X	X	X	X	23815	58935	82750
24270	80480	X	X	X	X	X	40415	64335	104750
20125	82685	X	X	X	0	X	43820	59190	102810
26825	53485	0	X	X	0	X	27020	53790	80810
28708	45502	0	0	X	0	X	28903	45807	74710

* Boom Base includes all components listed in item 6.
 X Installed on machine.
 0 Removed from machine

SECTION IV
Page 4

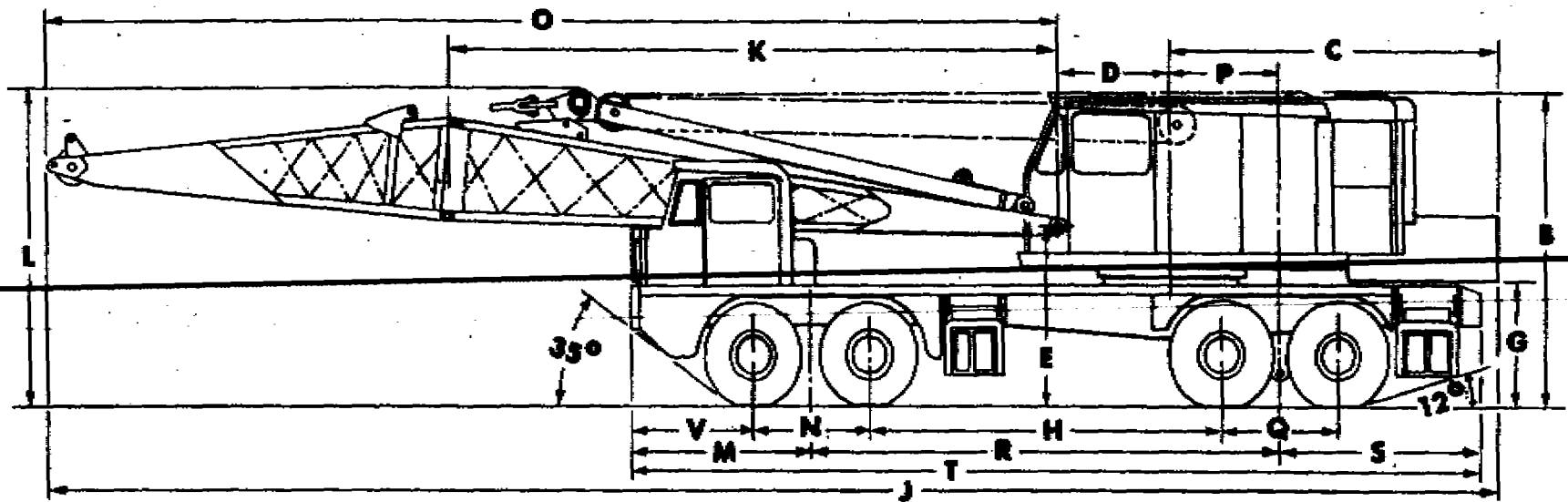
LOAD DISTRIBUTION AND WEIGHTS FOR MC-670A (8 x 4)
VERTI-POWER-SET OUTRIGGERS

	GROSS WEIGHT	TURNTABLE		TURNTABLE	
		FACING FRONT		FACING REAR	
		FRONT	REAR	FRONT	REAR
1. Basic Crane	63125	19830	43295	27770	35355
Less:					
a. Counterweight					
b. Front and Rear Outrigger Boxes and Beams.					
c. Complete 40' D-15B Offset Boom, Mast, Floating Harness, Boom Hoist Cable and Boom Stops.					
d. Hoist Cables					
2. Add: Rear Outrigger Box and Beams (VERTI+POWER-SET)	+5870	-1815	+7685	-1815	+7685
3. Add: Front Outrigger Box and Beams ... (VERTI+POWER-SET)	+5870	+3905	+1965	+3905	+1965
4. Add: Counterweight	+22000	-6700	+28700	+16600	+5400
5. Add: Load Hoist Cable, Front Drum	+690	+120	+570	+200	+490
6. Add: D-15B Boom Base, Mast, Floating Harness, Boom Hoist Cable and Boom Stops	+5675	+4855	+820	-2845	+8520
7. Add: D-15B 15' Offset Boom Peak	+1940	+4145	-2205	-3205	+5145
8. Add: D-15B 35' Long Tapered Boom Peak	+2540	+7580	-5040	-640	+8950
9. Add: P.L.L. Front Drum	+625	+155	+470	+130	+495
10. Add: P.L.L. Rear Drum	+420	+50	+370	+140	+280
11. Add: 3rd. Drum	+1450	+505	+945	+160	+1290
12. Add: Cummins CT-464-P Engine With Torque Converter	+100	-20	+120	+65	+35
13. Add: GM 6V-53N Engine With Torque Converter	-150	+25	-175	-85	-65
14. Add: GM 6-71N Engine To Carrier	-615	-775	+160	-775	+160
15. Add: Cummins NHCT-270 Engine To Carrier	+100	+120	-20	+120	-20
16. Add: 70 Ton, 5 Sheave Hook Block To Boom Peak	+1500	+3840	-2340	-3155	+4655
17. Add: 25 Ton, 1 Sheave Hook Block To Boom Peak	+1000	+2560	-1560	-2100	+3100

MC-670A
TRAVELING WEIGHTS
(VERTI-POWER-SET)

TURNTABLE		CTWT	REAR OUTRIGGERS	FRONT OUTRIGGERS	BOOM PEAK	BOOM# BASE	TURNTABLE		GROSS WEIGHT
FACING FRONT							FACING REAR		
FRONT	REAR						FRONT	REAR	
19830	43295	0	0	0	0	0	27770	35355	63125
24685	44115	0	0	0	0	X	24925	43875	68800
28830	41910	0	0	0	X	X	21675	49065	70740
32835	43775	0	0	X	X	X	25719	50891	76610
30748	51732	0	X	X	X	X	23662	58818	82480
24169	80311	X	X	X	X	X	40193	64287	104480
20058	82482	X	X	X	0	X	43365	59175	102540
26638	53902	0	X	X	0	X	26833	53707	80540
28707	45963	0	0	X	0	X	28902	45768	74670

* Boom Base includes all components listed in item 6.
X Installed on machine.
0 Removed from machine.

SECTION IV
Page 6

B- 12'-2"	E- 6' 9-1/4"	J- 57'-7"	M- 7'-3"	P- 4'-4"	S- 7' 2-1/2"
C- 12'-6"	G- 4' 9-1/8"	K- 25' 2-1/2"	N- 4'-8"	Q- 4'-8"	T- 33'-4"
D- 4'-7"	H- 14' 2-1/2"	L- 12'-2"	O- 40'-6"	R- 18'-10"	V- 4'-11"

Figure 2. Boom Carry Over Front Of Carrier.

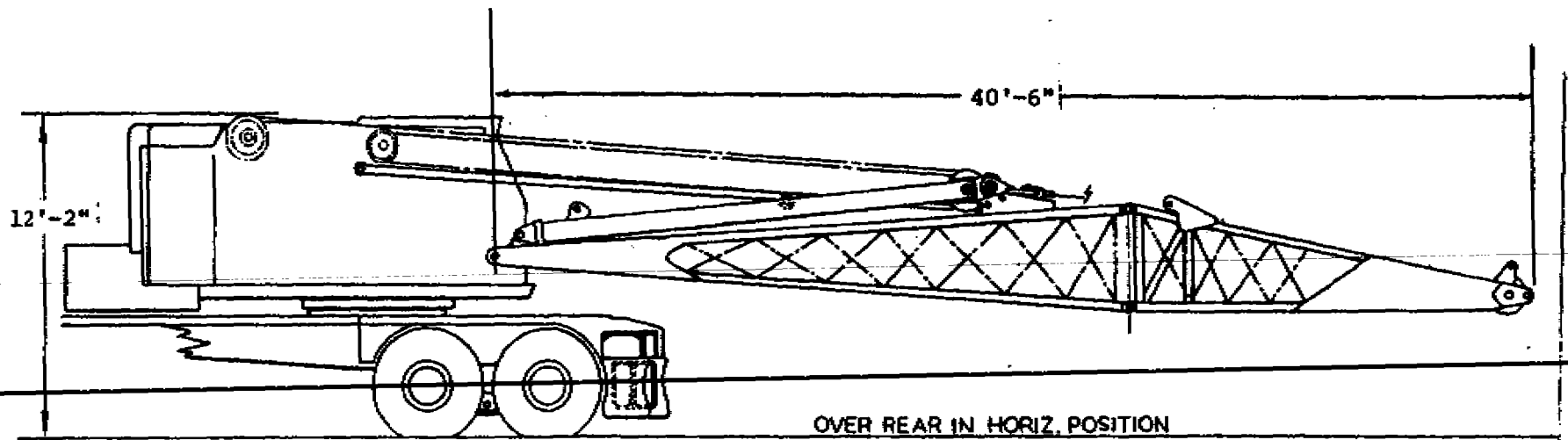


Figure 3. Boom Carry Over Rear Of Carrier.

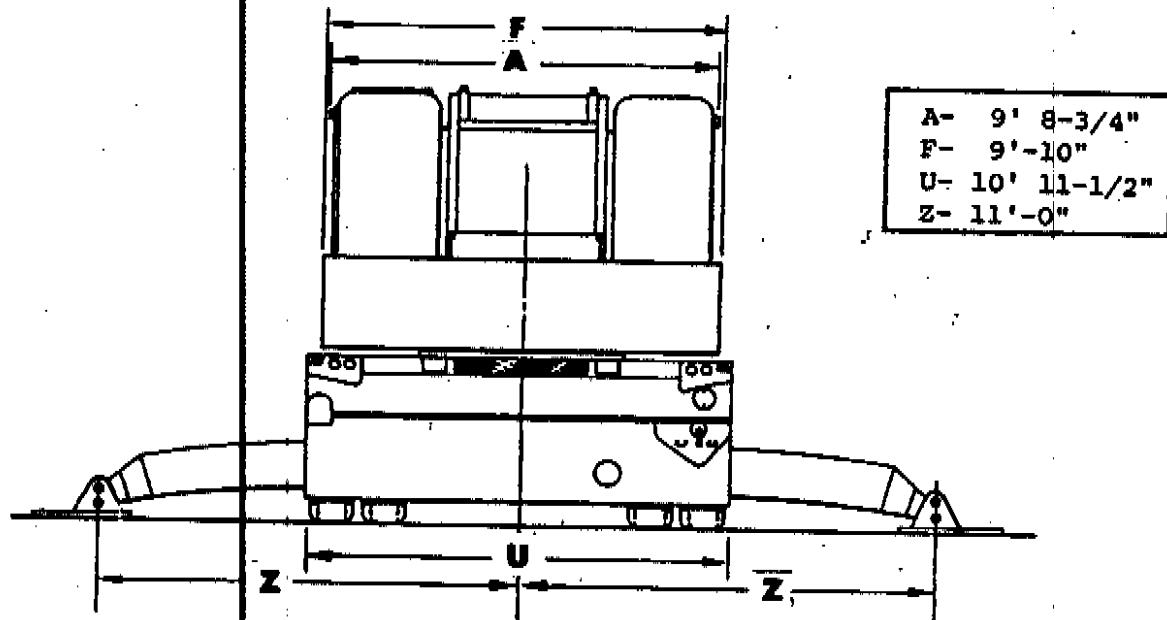
SECTION IV
Page 7

Figure 4. Rear View With Verti-Power-Set Outriggers.

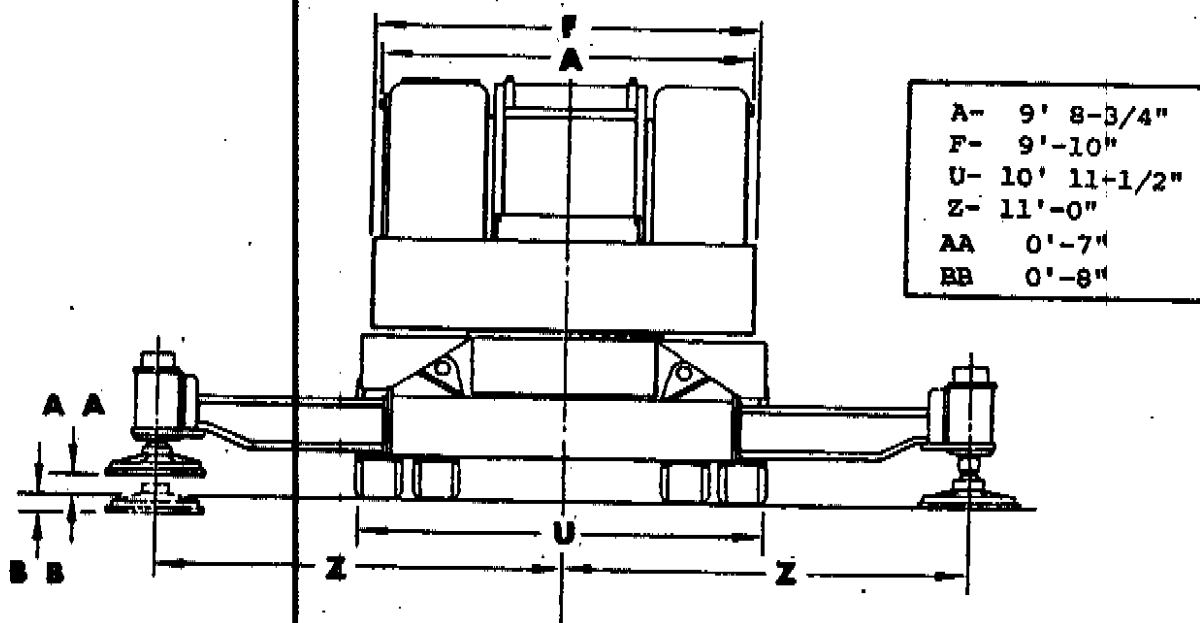


Figure 5. Rear View With Powrspan Outriggers.