



OPERATOR'S MANUAL

This manual has been prepared for and is considered part of -

TMS700E

Crane Model Number

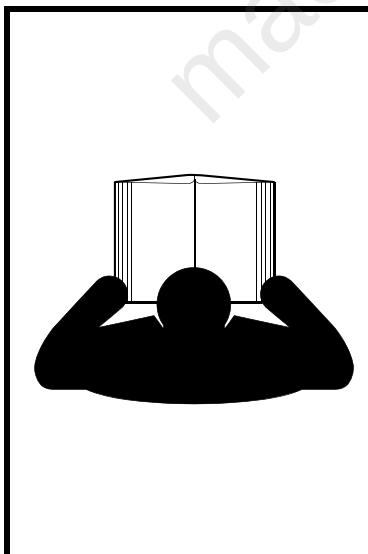
This Manual is divided into the following sections:

SECTION 1	INTRODUCTION
SECTION 2	SAFETY INFORMATION
SECTION 3	OPERATING CONTROLS AND PROCEDURES
SECTION 4	SET-UP AND INSTALLATION PROCEDURES
SECTION 5	LUBRICATION
SECTION 6	MAINTENANCE CHECKLIST

NOTICE

The crane serial number is the only method your distributor or the factory has of providing you with correct parts and service information.

The crane serial number is identified on the builder's decal attached to the operator's cab. **Always furnish crane serial number** when ordering parts or communicating service problems with your distributor or the factory.



WARNING

To prevent death or serious injury:

- Avoid unsafe operation and maintenance.
- This crane must be operated and maintained by trained and experienced personnel. Manitowoc is not responsible for qualifying these personnel.
- Do not operate or work on this crane without first reading and understanding Operator's Manual and Rating Plate supplied with crane.
- Store Operator's Manual in holder provided on crane.
- Attach laminated Capacity Charts supplied with crane to chain in operator's cab.
- If Operator's Manual or Capacity Charts are missing from cab, contact your distributor for new ones.

SECTION 1 INTRODUCTION

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Wind Force		Wind Velocity km/h (mph)	Visible Indicator Effects of wind as observed on land
Beauford Scale	Designation		
4	Moderate Breeze	21-29 (13-18)	Raises dust & loose paper: moves small branches
Reduce crane load ratings and operating parameters at 32 km/h (20 mph)			
5	Fresh Breeze	31-39 (19-24)	Small trees in leaf begin to sway: on ponds, crested wavelets form
6	Strong Breeze	40-50 (25-31)	Large branches in motion: telegraph wires whistle: umbrellas used with difficulty
Cease all craning operations at 48 km/h (30 mph); lower & retract boom			
7	Moderate Gale	52-61 (32-38)	Whole trees in motion: walking against wind is inconvenient

The crane cab is equipped with a sight level bubble that should be used to determine whether the crane is level. The load line can also be used to estimate the levelness of the crane by checking to be sure it is in-line with the center of the boom at all points on the swing circle.

Use tag lines whenever possible to help control the movement of the load.

When lifting loads, the crane will lean toward the boom and the load will swing out, increasing the load radius. Ensure the load capacity chart is not exceeded when this occurs.

Be sure the hoist line is vertical before lifting. Do not subject the crane to side loading. A side load can tip the crane or cause it to fail structurally.

Do not strike any obstruction with the boom. If the boom should accidentally contact an object, stop immediately. Inspect the boom. Remove the crane from service if the boom is damaged.

Never push or pull with the crane boom.

Avoid sudden starts and stops when moving the load. The inertia and an increased load radius could tip the crane over or cause it to fail structurally.

Load Chart capacities are based on freely suspended loads. Do not pull posts, pilings, or submerged articles. Be sure the load is not frozen or otherwise attached to the ground before lifting.

Use only one hoist at a time when lifting loads.

Always use enough parts-of-line to accommodate the load to be lifted. Lifting with too few parts-of-line can result in failure of the wire rope.

Never operate the crane with less than two wraps of wire rope on the hoist drum.

Counterweight

On cranes equipped with removable counterweights, ensure the appropriate counterweight sections are properly installed for the lift being considered.

To reduce the crushing hazard and to prevent death or serious injury, always clear all personnel from the counterweight and superstructure area before moving the counterweight or rotating the superstructure.

Do not add material to the counterweight to increase capacity.

Federal law prohibits modification or additions which affect the capacity or safe operation of the equipment without the manufacturer's written approval. [29CFR 1926.550]

Outrigger Lift Off

Regarding "Lifting" of an outrigger pad on Grove cranes during craning activities, please be advised that the rated loads for these cranes, as indicated on the crane's in-cab load chart, do not exceed 85% of the tipping load on outriggers as determined by SAE J765 OCT80 "Cranes Stability Test Code". An outrigger pad may lift off the ground during operation of the crane within the capacity limits of the load capacity chart, yet the crane will not have reached instability. The "balance point" for stability testing according to SAE and Grove criteria is a condition of loading wherein the load moment acting to overturn the crane is equal to the maximum moment of the crane available, to resist overturning. This balance point or point of instability for a crane does not depend on "lifting" of an outrigger but rather on comparison of the "opposing" load moments.

The occurrence of an outrigger lifting from the ground is often attributed to natural flex in the crane's frame. This may happen when lifting a load in certain configurations within the capacity limits of the load capacity chart and is not necessarily an indication of an unstable condition.

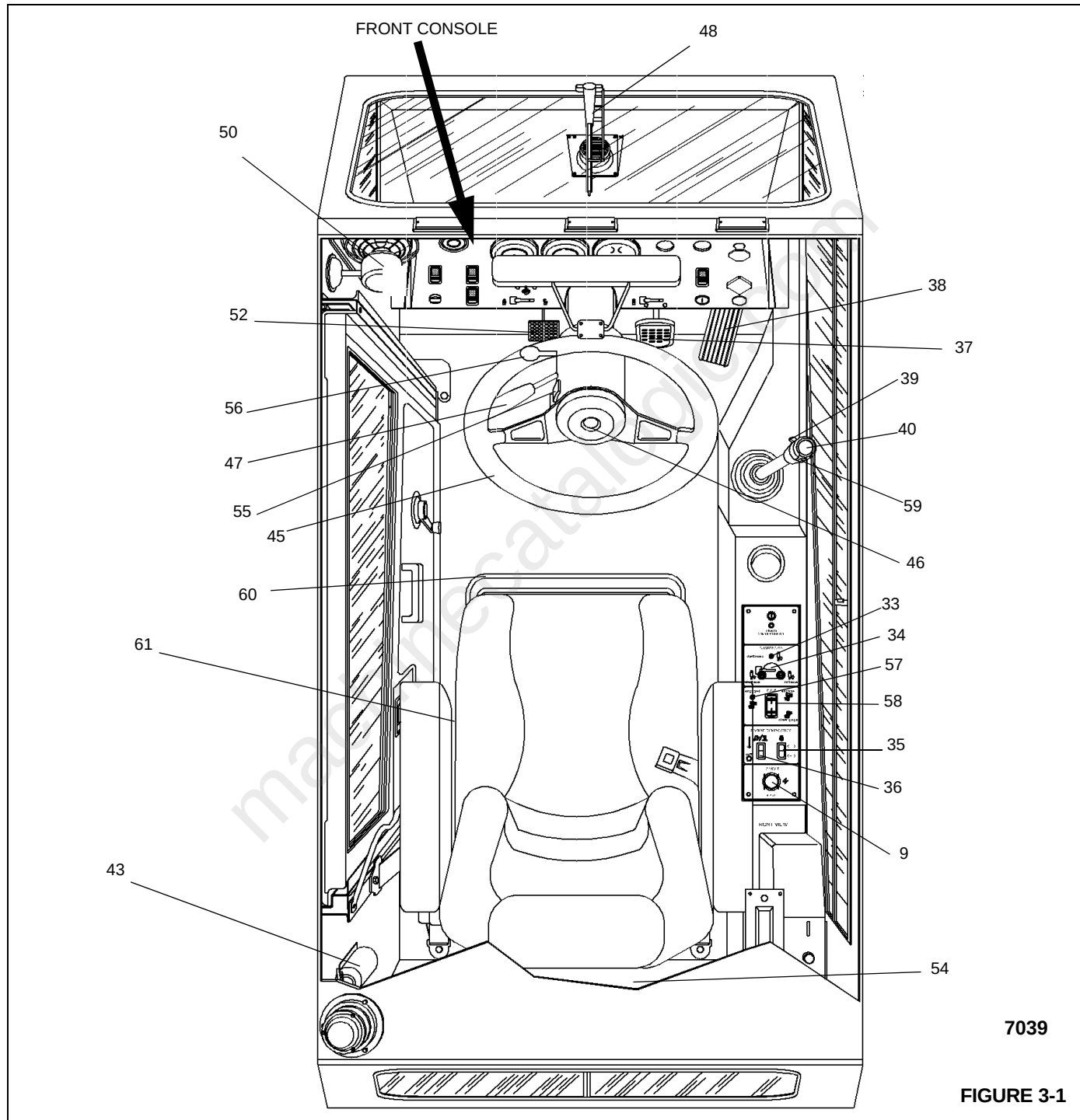
Provided the crane is properly set-up, as indicated within the accompanying documentation with the crane, is in good

positioned to DEFLATE, the suspension air bags are deflated.

NOTE: The suspension air bags should be inflated at all times except when on outriggers or in a pick and carry mode.

Suspension Deflated Indicator

The SUSPENSION DEFLATED indicator (33) is located on the right side console above the suspension control lever. The amber indicator lights when the air is removed from the suspension air bags. It is controlled by four pressure switches connected in series.



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FIGURE 3-1

Item	Description
1	Work Lights
2	Windshield Wiper/Washer
3	Boom Telescope Control Pedal (Optional)
4	Throttle Pedal
5	Bubble Level Indicator
6	Swing Pin Lock Control Lever
7	Seat Adjustment Lever
8	Boom Lift Control Lever
9	Main Hoist Control Lever
10	Main Hoist Speed Selector Switch
11	Hydraulic Boost Switch
12	Cab Dome Light
13	Fuse Panel
14	Beacon Light (Optional)
15	Fire Extinguisher
16	Auxiliary Hoist Speed Selector Switch (Optional)
17	Swing Brake Control Switch
18	Telescope or Auxiliary Hoist Control Lever
19	Swing Control Lever
20	Swing Horn Button
21	Skylight Wiper
22	Swing Brake Pedal
23	Cab Circulating Fan
24	Positive Swing Lock Control Pedal

Crane Controls and Indicators

Telescope or Auxiliary Hoist Control Lever

The telescope or auxiliary hoist (TELE or AUX) control lever (18) is located on the left armrest. The lever controls the telescope functions when the crane is not equipped with an auxiliary hoist. Positioning the lever forward actuates the control valve to telescope the boom out and pulling the lever back actuates the boom to telescope in. When equipped with an auxiliary hoist, the lever controls auxiliary hoist functions and telescope functions are controlled through a foot pedal (3). Positioning the lever forward actuates the control valve to let out the hoist cable and pulling the lever back reels the cable in.

Swing Control Lever

The SWING control lever (19), located on the left armrest, controls the swing function. The lever, when positioned

forward (rotates the turntable clockwise) or back (rotates the turntable counterclockwise), actuates a control valve through hydraulic pilot pressure to provide 360 degree continuous rotation in the desired direction.

Boom Lift Control Lever

The boom LIFT control lever (8) is located on the right armrest. The lever, when positioned forward (lowers the boom) or back (raises the boom), actuates the control valve through hydraulic pilot pressure to raise or lower the boom.

Main Hoist Control Lever

The MAIN HOIST control lever (9) is located on the right armrest. The lever, when positioned forward (lowers the cable) or back (raises the cable), actuates the control valve through hydraulic pilot pressure to raise or lower the main hoist cable.

Swing Horn Switch

The swing horn switch (20) is located on top of the swing controller and is used by the operator to provide a warning that the superstructure is rotating. Press down on the switch to sound the swing horn.

Telescope Control Pedal (Optional)

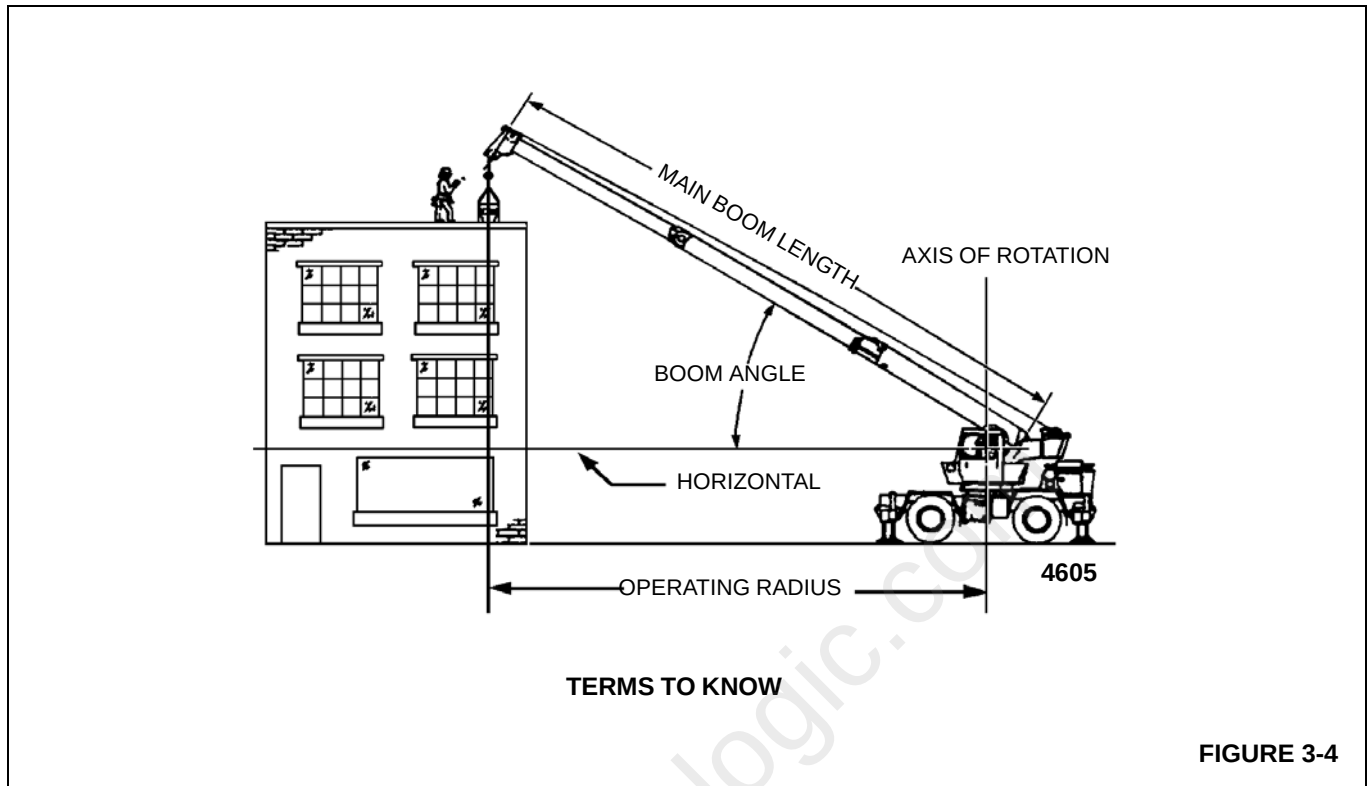
The telescope control foot pedal (3), supplied when the crane is equipped with an auxiliary hoist, is located at the center of the cab floor. Pushing forward on the top of the pedal will extend the boom and pushing down on the bottom of the pedal will retract the boom.

Main Hoist Speed Selector Switch

The MAIN HOIST SPEED selector rocker switch (10) is located on the right armrest. It is a two position switch placarded HIGH and LOW. Positioning the switch to HIGH energizes a solenoid controlled valve on the main hoist to direct the flow of hydraulic oil to the hoist motors. When the switch is in the HIGH position, the amber LED square in the switch will light.

Auxiliary Hoist Speed Selector On/Off Switch (Optional)

The AUX HOIST SPEED selector rocker switch (16) is located on the left armrest. It is a three position switch placarded HIGH-OFF-LOW. Positioning the switch to HIGH energizes a solenoid controlled valve on the auxiliary hoist to direct the flow of hydraulic oil to the hoist motors. When the switch is in either the HIGH or LOW position, the amber LED square in the switch will light. The switch must be in the HIGH or LOW position before the auxiliary hoist can be operated. Positioning the switch to OFF prevents the operator from accidentally activating the auxiliary hoist.



Another important section is the range diagram. The range diagram shows the operating radius and tip height that can be achieved at a given boom length and angle. If the operator knows the radius and tip height required for a specific lift, the angle and boom length can quickly be determined from the range diagram. Or if he knows the boom length and angle, he can quickly determine the tip height and operating radius.

A lifting diagram is included for over-side, over-rear, and over-front lifting areas. The lifting area diagram shows that the locations of the outrigger stabilizer cylinders in the full extended position are used to mark the boundaries of the lifting areas.

Another section contains notes for lifting capacities. Be sure to read and understand all notes concerning lifting capacities.

The load chart also gives weight reductions for Grove load handling devices such as hookblocks, headache balls, boom extension sections, etc, which must be considered as part of the load. The weight of any other load handling devices such as chains, slings, or spreader bars must also be added to the weight of the load.

NOTE: The information in the following paragraph is an example of how to compute a lift. The numbers

used in the example may not coincide with the load chart in the crane cab.

Problem: A concrete beam weighing 2268 kg (5000 lbs) needs to be lifted to a height of 9.1 m (30 ft) at a radius of 15.2 m (50 ft) (maximum). The range diagram indicates the boom must be extended to 18.9 m (62 ft) in order to reach a height of 9.1 m (30 ft) at a radius of 15.2 m (50 ft).

First we need to check the crane for load handling devices. In our example, the crane is equipped with a auxiliary boom nose (rooster sheave) and a five ton headache ball. The rooster sheave is 50 kg (110 lbs), and the headache ball is 78 kg (172 lbs) for a total of 128 kg (282 lbs). The lift requires slings and spreader bars weighing 159 kg (350 lbs) which makes the total weight for the load handling devices 286 kg (632 lbs).

A check of the load chart for a 15.2 m (50 ft) radius and 19.5 m (64 ft) of boom length shows a capacity of 3601 kg (7940 lbs) on outriggers over-front and 4970 lbs on outriggers 360 degrees. We subtract the load handling weight of 632 lbs from the load capacity of 3601 kg (7940 lbs) and 2254 kg (4970 lbs). The result is a weight capacity of 3315 kg (7308 lbs) over-the-front and 1968 kg (4338 lbs) for 360 degrees. We are constricted in making the lift over-front only and the boom angle will be about 29 degrees.

SECTION 4

SET-UP AND INSTALLATION PROCEDURES

GENERAL

This section provides procedures for installing the hoist cable on the hoist drum, cable reeving, and erecting and stowing the boom extension, and removal and installation of the counterweight.

INSTALLING CABLE ON THE HOIST

CAUTION

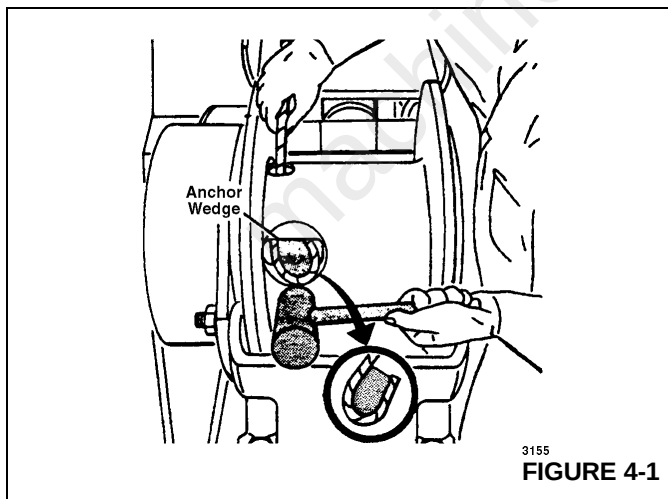
If cable is wound from the storage drum, the reel should be rotated in the same direction as the hoist.

NOTE: The cable should preferably be straightened before installation on the hoist drum.

Install cable on the hoist drum in accordance with the following procedure.

1. Position the cable over the boom nose sheave and route to the hoist drum.
2. Position the hoist drum with the cable anchor slot on top.
3. Insert the cable through the slot and position around the anchor wedge.

NOTE: The end of the cable should be even with the bottom of the anchor wedge.



4. Position the anchor wedge (Figure 4-1) in the drum slot; pull firmly on the free end of the cable to secure the wedge.

NOTE: If the wedge does not seat securely in the slot, carefully tap the top of the wedge with a mallet.

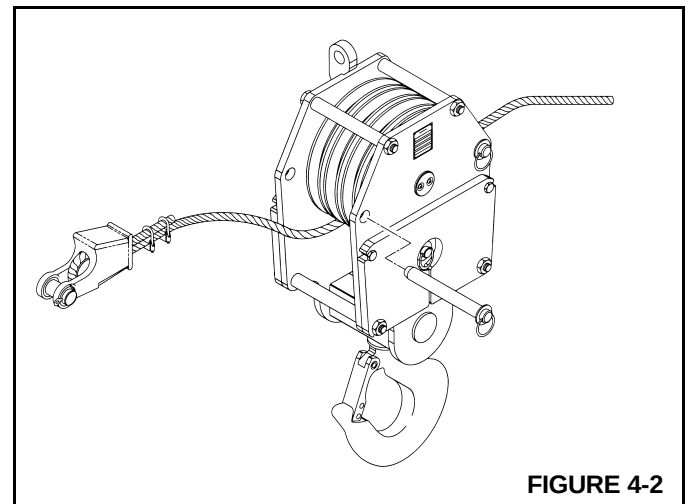
5. Slowly rotate the drum, ensuring the first layer of cable is evenly wound onto the drum.
6. Install the remainder of the cable, as applicable.

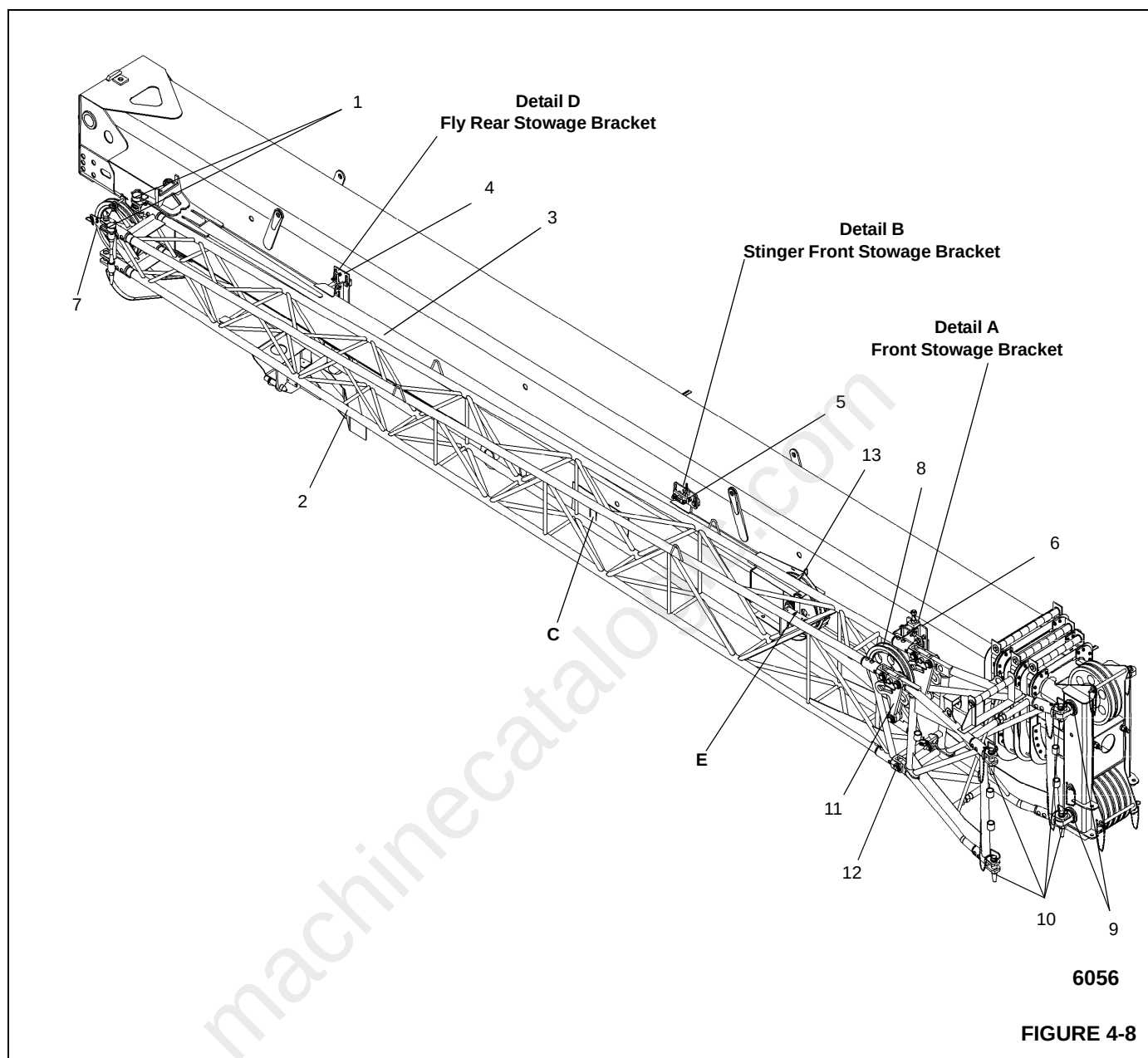
CABLE REEVEING

NOTE: There are two types of cable (wire rope) available on this crane; 6 x 37 and 35 x 7 (non-rotating).

Within the limits of the load and range charts and permissible line pull, multi-part lines allow the operator to raise a greater load than can be raised with a single part line. Various cable reeving (part line) is possible with the boom nose and hook block. This reeving should be accomplished by a qualified rigger using standard rigging procedures (Figure 4-3)

In order to quick reeve the hook block without removing the wedge socket on the end of the cable, (Figure 4-2).





Item	Description
1	Base To Fly Attachment Pins
2	Boom Extension Base Section
3	Boom Extension Section
4	Fly Rear Stowage Bracket
5	Stinger Section Front Stowage Bracket
6	Front Stowage Bracket
7	Swingaway Base Sheave

Item	Description
8	Mast Assembly
9	Boom Nose To Boom Extension Attachment Anchor Fittings
10	Boom Nose To Boom Extension Attachment Pins
11	Offset Links
12	Offset Pivot Point
13	Stinger Sheave

40. Telescope Cylinder Wear Pads

Lube Type - EP-MPG

Lube Interval - Every boom teardown.

Lube Amount - Thoroughly coat all areas the wear pads move on.

Application - By brush: 2 places.

NOTE: Should boom chatter or rubbing noises in the boom occur, it will be necessary to lubricate the telescope cylinder wear pads. By adding an extension adapter to a grease gun the wear pads and wear areas can be reached through the lubrication access holes in the side of the boom and through the access hole in the boom nose between the sheaves. Extend boom for access to holes as needed.

41. Inner Mid Side Wear Pads

Lube Type - EP-MPG

Lube Interval - 250 hours or 3 months, whichever interval occurs first

Lube Amount - Thoroughly coat all areas the wear pads move on.

Application - By brush: 2 places; with boom in extended position through access holes in base section.

42. Boom Section Upper Wear Pads

Lube Type - EP-MPG

Lube Interval - 50 hours or 1 week, whichever interval occurs first

Lube Amount - Until grease extrudes

Application - 6 grease fittings; with boom in extended position through access holes.

43. Boom Section Upper and Lower Wear Pads

Lube Type - EP-MPG

Lube Interval - 50 hours or 1 week, whichever occurs first

Lube Amount - Thoroughly coat all areas the wear pad moves on.

Application - By brush; 6 places; with boom in extended position.

44. Upper Boom Nose Sheave

Lube Type - EP-MPG

Lube Interval - 250 hours or 3 months, whichever occurs first

Lube Amount - Until grease extrudes

Application - 1 grease fitting per sheave (2 total)

45. Lower Boom Nose Sheave

Lube Type - EP-MPG

Lube Interval - 250 hours or 3 months, whichever occurs first

Lube Amount - Until grease extrudes

Application - 1 grease fitting per sheave (5 total)

46. Boom Extension Sheaves

Lube Type - EP-MPG

Lube Interval - 250 hours or 3 months, whichever occurs first

Lube Amount - Until grease extrudes

Application - 1 grease fitting

47. Boom Extension Mast Sheave

Lube Type - EP-MPG

Lube Interval - 500 hours or 6 months, whichever occurs first

Lube Amount - Until grease extrudes

Application - 1 grease fitting

48. Auxiliary Boom Nose Sheave

Lube Type - EP-MPG

Lube Interval - 250 hours or 3 months, whichever interval occurs first

Lube Amount - Until grease extrudes

Application - 1 grease fitting

49. Hook Block Swivel Bearing

Lube Type - EP-MPG

Lube Interval - 250 hours or 3 months, whichever interval occurs first

Lube Amount - Until grease extrudes

Application - 1 grease fitting

Full Version Available

Grove TMS700E Truck Crane Operator Manual

Grove TMS700E truck crane operator manual, covering controls, safe operation, setup and lubrication. 3 searchable PDF files. Instant PDF download.

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