

AERIAL LIFT TRUCK

SERVI-LIFT

DESCRIPTION AND OPERATION

CONTENTS	PAGE	CONTENTS	PAGE
1. GENERAL	1	11. Upper and Lower Boom Cylinders Showing Holding Valves	11
2. DESCRIPTION	2	12. Emergency Method of Lowering Booms—Upper Boom Past Top Center	12
3. PRECAUTIONS	3	13. Emergency Method of Lowering Booms—Lower Boom Vertical—Upper Boom Past Top Center	12
4. OPERATION	8	14. Location of Brake Release Studs	12
5. EMERGENCY PROCEDURE	10		
6. MAINTENANCE AND INSPECTION ROUTINE	10		

1. GENERAL

1.01 This section covers the description and operation of the Servi-Lift, Model S-31-MT, aerial lift which is used to raise and support a workman and authorized tools and equipment to a working position aloft.

1.02 This section is reissued to revise and update safety precautions and maintenance procedures, update illustrations, provide a listing of supplemental information, and include features of later models. Since this issue is a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 The Servi-Lift, Model S-31-MT, aerial lift is adequate for placing cable, strand, and self-supporting cable if the load limits given in Section 627-700-201 on placing self-supporting cable are not exceeded. The aerial lift is not designed to withstand loads imposed on work operations that normally require the use of a pole derrick or similar equipment.

FIGURES

1. Servi-Lift, Model S-31-MT, Aerial Lift	3
2. Controls in Platform	4
3. Controls on Turret	4
4. Winch Controls on Truck Body	4
5. Intercom Speaker Unit and Controls in Truck Cab	5
6. Reel Loader and Reel Carrier	6
7. Controls for Reel Loader and Reel Carrier	7
8. Lift in Stowed Position	8
9. Platform Position for Loading, Entering, and Leaving	9
10. Auxiliary Engine Controls	9

NOTICE

Not for use or disclosure outside the
Bell System except under written agreement

1.04 The safety precautions, methods of operation, and load limits given in this section apply to all models of the Servi-Lift aerial lift.

1.05 The following General Letters and Bell System Practices are considered as supplements to this section:

Section 627-700-201, Self-Supporting Cable, Placing Methods

Section 620-135-010, Guarding Work Areas

Section 620-100-011, Minimum Approach Distances to Exposed Energized Power Conductors

GL 75-05-003, Power Conductors

GL 73-02-060, Ground Fault Interrupter Installation on Motor Vehicles

2. DESCRIPTION

2.01 The Servi-Lift, Model S-31-MT, aerial lift (Fig. 1) is a truck-mounted unit with a heavy duty base and turret, an all metal lower boom and turret arm, a fiberglass upper boom, and a fiberglass platform. There are two releaseable hydraulic lock valves on each boom cylinder, a failsafe brake on rotation with release, and a provision for manual rotation. The unit is designed for continuous rotation and has a rotation slip-clutch to protect the boom in case of overload.

2.02 The lift may be operated from either of two control positions. One control head is mounted in the platform. The other is located on the turret. The controls on the turret override the controls in the platform, thereby making it possible to lower an injured employee to the ground even if the control in the platform is actuated. Each control head includes controls for the upper boom (FOLD-UNFOLD), rotation (CW-CCW), and lower boom (FOLD-UNFOLD). Winch control toggle switches (IN-OFF-OUT) are located in the platform and on the outside of the left forward portion of the truck body. A winch speed control, OFF-1 (low speed) -2 (high speed), and the winch ENGAGE-DISENGAGE lever are also located on the outside of the left forward portion of the truck body. The controls in the platform, the control panel on the turret, and the winch controls on the truck body are shown in Fig. 2, 3, and 4.

2.03 Each of the upper and lower booms has separate hydraulic systems. The lower boom can travel from horizontal to vertical (90 degrees), and the upper boom can fold and unfold through an arc of 270 degrees relative to the lower boom. With the booms extended vertically, the platform height is 31 feet above the ground. With the booms extended horizontally (9 feet, 2 inches above ground), the maximum side working distance (from side of truck) is 21 feet, 7 inches.

2.04 Electric power to operate the lift, power tools, and lights is provided by an ac generator driven by an auxiliary engine. The generator is a 6500-watt (later models have 8000 or 9000 watts), Y-connected 60-hertz, 133-volt single-phase, 230-volt 3-phase unit. The 133-volt convenience outlets are wired through a ground fault interrupter circuit to prevent potentially hazardous conditions when working with power tools. (See General Letter 73-02-060.) (**Note:** Later models have taps to provide 115 volts for all outlets.) The engine is a 2-cylinder 4-hertz gasoline engine with an electric starter and magneto ignition.

2.05 Intercom speaker units are mounted in the platform, in the truck cab (Fig. 5), and on the right rear of the truck body to allow the operator and the truck driver to converse. The speaker at the rear of the truck has an ON-OFF toggle switch and is turned on only when communication between the cab and the rear of the truck is necessary. The platform unit is designed for 2-way hands-free operation, and the cab unit has a push-to-talk switch.

2.06 A hydraulically operated reel loader, located on the rear of the truck, will lift reels that measure up to 84 inches in diameter and weigh a maximum of 6000 pounds. However, truck stability must be considered when transporting heavy reels on the loader.

2.07 Spindle bars available with the reel loader are:

(a) A 2-inch spindle bar with bronze bearings, centering cones, a mechanical or hydraulic brake, and a reel clamp. Use for paying out strand, wire, and cable.

(b) A 2-inch spindle bar with locating collars on each end. Use for loading and storing reels

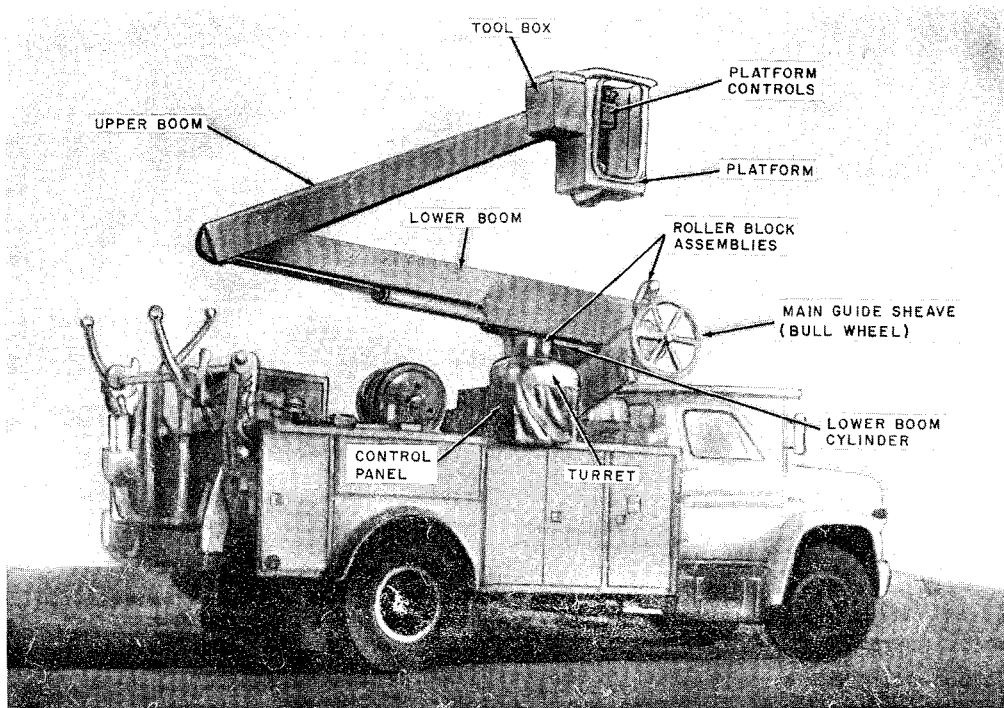


Fig. 1—Servo-Lift, Model S-31-MT, Aerial Lift

on the truck. **Do not use this loading bar for paying out strand, wire, or cable.**

Note: Later models with wide loaders (58-inch center-to-center arms) have 2-1/2 inch spindle and loading bars.

2.08 A hydraulically operated reel carrier, located in the forward portion of the truck body, is used with the loading bar for transporting reels in the truck or with the brake-equipped spindle bar for paying out strand. The reel loader and reel carrier are shown in Fig. 6.

2.09 Controls for the reel loader and reel carrier are located on the outside of the left rear panel of the truck. The controls are shown in Fig. 7.

3. PRECAUTIONS

3.01 Before starting work operations, the lift and safety systems shall be inspected as outlined in Part 6.

3.02 Before moving the truck at normal road speeds, be sure the lift is in the stowed position with the lower boom resting firmly on its support and the upper boom completely folded as shown in Fig. 8. If the booms are not properly stowed, damage to the lift can result from road shock.

3.03 The load in the platform shall be limited to one man and authorized tools and equipment. However, in no case shall the load be allowed to exceed 350 pounds.

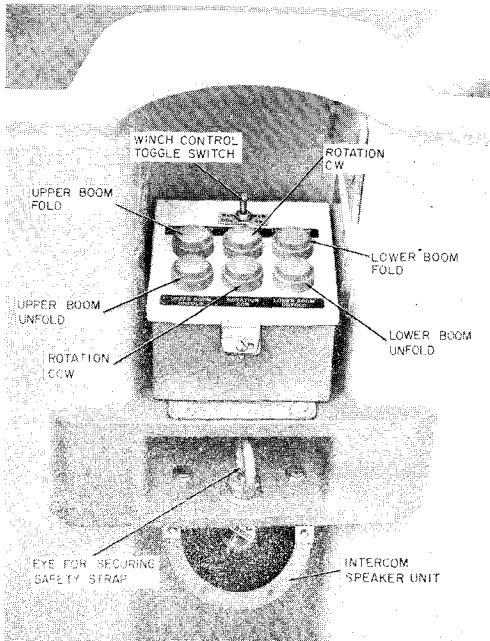


Fig. 2—Controls in Platform

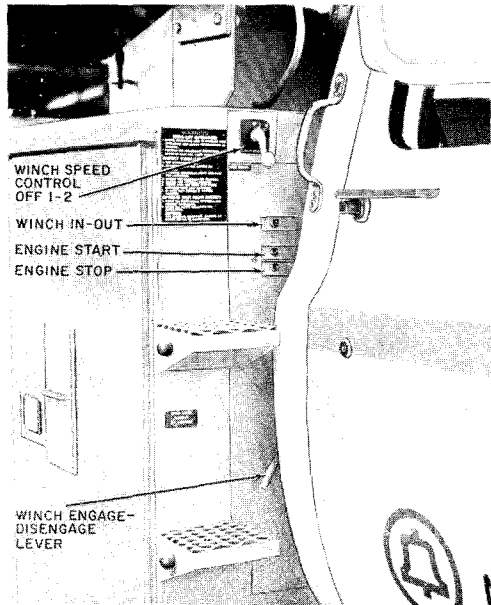


Fig. 4—Winch Controls on Truck Body

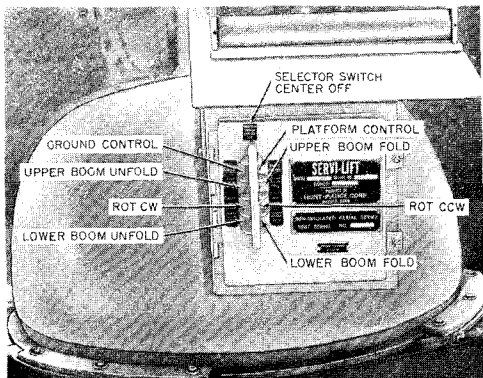


Fig. 3—Controls on Turret

3.04 The operator must be constantly alert when operating the lift to avoid contact with power wires, interference with traffic, and any obstructions that might injure the workman or damage the equipment.

3.05 The person assigned the responsibility of operating the lift must be thoroughly familiar with methods of operation. It is the responsibility of the operator to be sure that any signals that might be used will be understood by all persons concerned.

3.06 *The aerial lift does not provide electrical protection; therefore, all safety precautions pertaining to working aloft shall be observed.* Under no circumstances shall any person, platform, boom, or any conductive object exceed the minimum approach distances to energized overhead power lines as outlined in Section 620-100-011 and General Letter 75-05-003. All of the normal grounding and insulating procedures

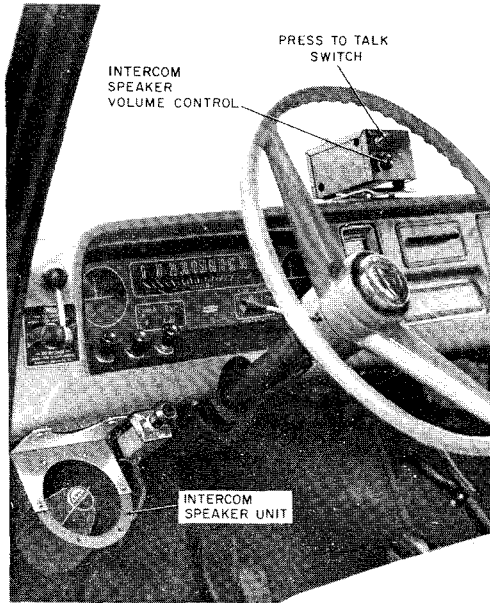


Fig. 5—Intercom Speaker Unit and Controls in Truck Cab

that are required for working around power must be followed when using the aerial lift.

3.07 Standard safety headgear shall be worn; body belt and lanyard shall be worn; and the lanyard shall be attached to the eye in the basket at all times while aloft.

3.08 All aerial lift vehicles shall be equipped with D or E insulating gloves, as appropriate for the voltage that may be encountered, and insulating blankets. Before starting work operations where electrical contact may be made, the items shall be removed from their storage compartments and placed where they are accessible without leaving the vehicle or making contact with the ground. With a 2-man operation, a pair of insulating gloves and an insulating blanket shall also be placed in the cab of the vehicle.



Where the bed of the truck body or an external mounting rack is used for the gloves and blanket, care should be taken to protect them from

inadvertent mutilation by tools or work equipment.

3.09 If the lift should come in contact with an electric power conductor, the entire truck and its contents will become electrically charged. In this event, no one should attempt to enter the truck or in any way come in contact with the truck or its contents. Anyone in the truck should remain there until the electrical contact has been broken unless an emergency arises and the following precautions are taken:

(a) Before starting work in an area where the lift will be near electric power wires, place a pair of E insulating gloves (with protectors) and a B insulating blanket in the cab of the truck where they will be accessible from the inside of the truck.

(b) If contact with electric power is made and an emergency arises that makes it necessary to leave the truck, put on the insulating gloves and throw the insulating blanket on the ground. Jump off the truck onto the insulating blanket on the ground. Do not come in contact with grounded objects such as tree limbs, shrubbery, personnel standing on the ground, etc, until free and clear of contact with the truck.

(c) If it is necessary to reenter the trunk, wear the insulating gloves and step from the insulating blanket to the truck, making sure there is no body contact with any grounded object.

3.10 The driver of the truck shall be sure that no contact exists between the lift and any energized object, by observation and by communication with the operator, each time he enters or leaves the truck. If there is any doubt as to whether electrical contact exists, the driver must assume the truck is energized.

3.11 When the operator is in the platform, the driver of the truck shall not leave the cab unless the engine is stopped, the brake is set, the gear shift lever is in the low or reverse position, and the Mico Brake Lock is set if the truck is so equipped. Upon leaving the cab, the driver shall place wheel chocks against the rear wheels.

(a) If the truck is on even ground, chocks shall be placed on both sides of the rear wheel that is on the same side on which boom will be working.

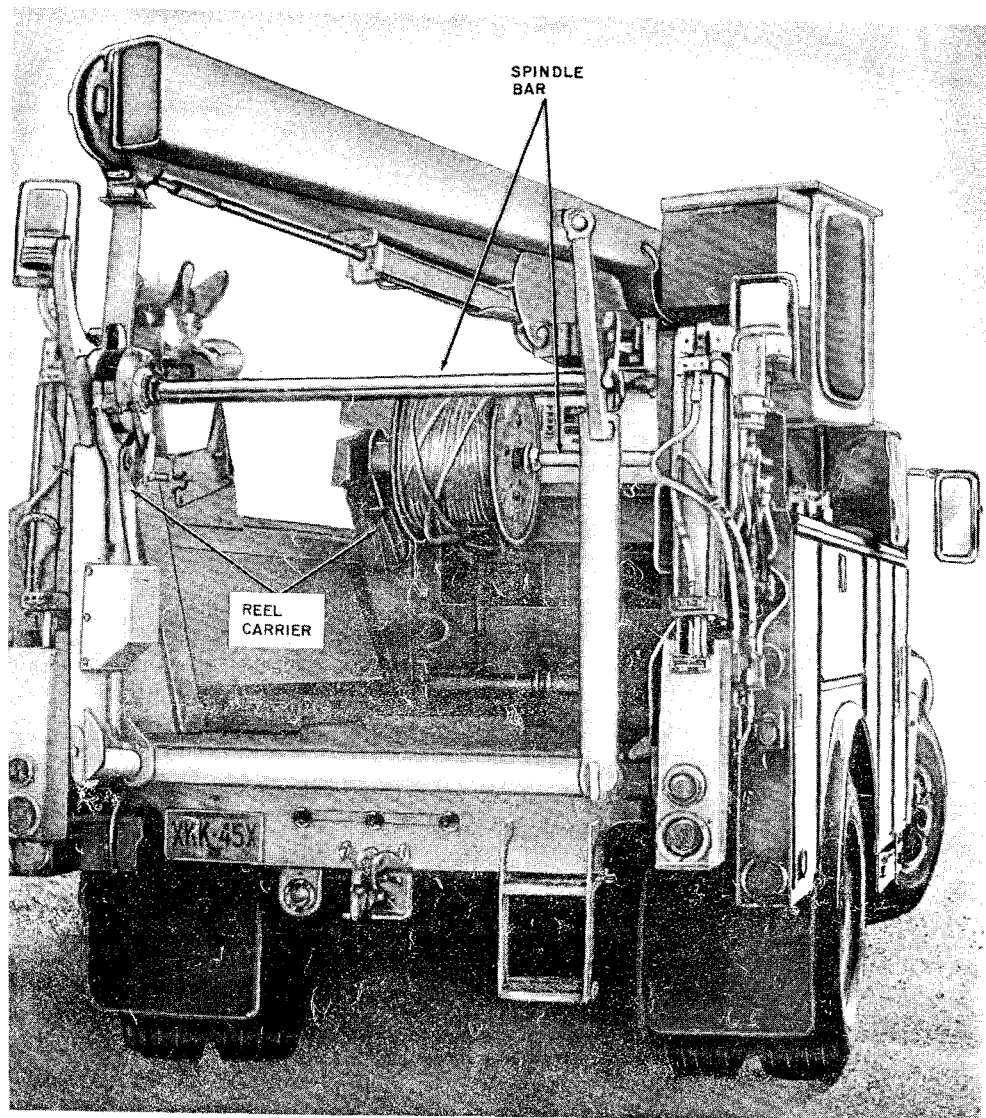


Fig. 6—Reel Loader and Reel Carrier

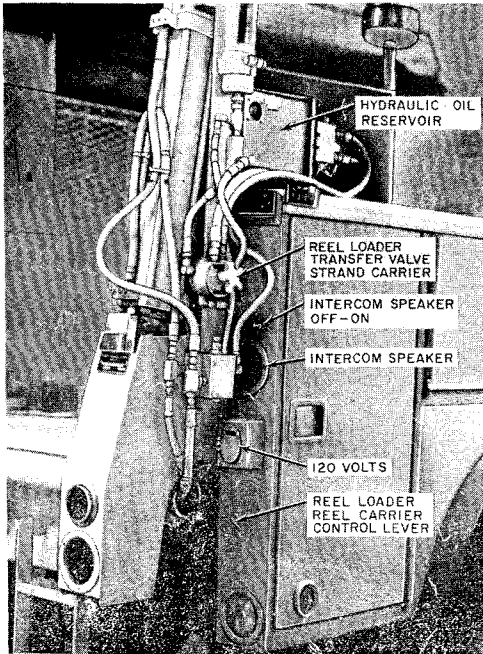


Fig. 7—Controls for Reel Loader and Reel Carrier

(b) If the truck is on an incline, the chocks shall be placed on the downgrade side of each rear wheel.

- 3.12 The operator should take care not to overreach or otherwise place himself in a position that might cause loss of balance. The operator should keep both feet on the floor of the platform while the lift is in use. Climbers shall not be worn in the platform.
- 3.13 When it is necessary to move the truck with the operator aloft, truck movements shall be made only as the lift operator directs. The speed of the truck shall not exceed a slow walking pace. The operator should look in the direction of movement. The vehicle shall not be moved with a man aloft unless driver and operator can communicate through the intercom system.
- 3.14 Placing operations should be carried out with the truck moving in the direction of traffic,

where practical. The driver should avoid depressions or holes in the road which might cause a sudden lurch or a change in the inclination of the truck. Starts and stops should be made as smoothly as possible, and the driver should be on the alert for commands from the operator.

3.15 *Do not attach cables, strand, wire, etc, to the platform or boom* except as outlined in sections which cover cable and strand placing methods using an aerial lift truck. Do not alter or modify the lift in any way.

3.16 When operating the aerial lift on crowned or inclined roads, the stability of the truck will be reduced. Exercise care under these conditions to prevent the truck from becoming unstable. Normally, the driver will be able to detect instability by the feel of the truck steering and should warn the operator. To increase stability, operate the lift with the platform close to the truck and the booms as near in line with the truck as practical.

3.17 Do not attempt to make any switch adjustments, replace any fuses, or open any electrical connections on the lift electrical system unless the generator has been shut down and the operator is out of the platform.

3.18 When making adjustments or performing maintenance on any part of the aerial lift where movement of the machine could cause personal injury, stop the generator and take any additional precautions necessary to prevent movement of the lift.

3.19 Keep bystanders away from the aerial lift and truck itself and clear of all work operations. Work locations must be guarded in accordance with Division 620 of the Bell System Practices.

3.20 Enter and leave the platform only when it is in the position shown in Fig. 9. Use the control head located on the turret to position the platform for entry and to place the equipment in the stowed position. To prevent damage to the leveling system from excessive down thrust or movement of the vehicle with the platform on the ground, *the platform should be maintained 12 to 18 inches above ground.*

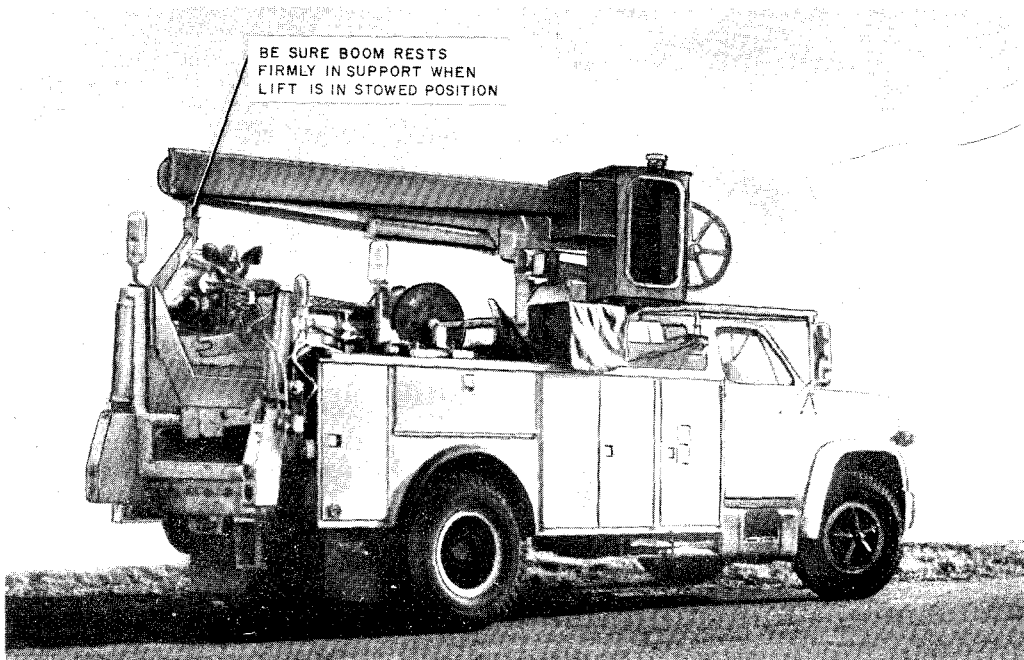


Fig. 8—Lift in Stowed Position

4. OPERATION

4.01 Before placing the lift in operation, be sure that all equipment is in proper working condition. If strand or cable is to be placed, check the main guide sheave, roller guide assemblies, and strand tension or strand reel brake. When placing self-supporting cable, check the cable reel brake.

4.02 To place the lift in operation, start the auxiliary engine (Fig. 10) using the following procedure:

- (1) Pull out the ON-OFF button.
- (2) Push starter button and operate choke as required.
- (3) Allow the engine to warm up before operating the lift. On units with the auxiliary engine mounted in the left front compartment, start/stop

switches are located on the front of the curbside of the body. An automatic choke is provided.

4.03 Position the platform for entry of the operator by using the control head on the turret to bring the platform to entry position. When the operator is in the platform, the controls on the turret shall not be used except in an emergency.

4.04 Check that the intercom system is on and working before raising the platform from the ground. ***Do not operate the lift with the truck in motion if the intercom system is not operating.***

4.05 When operating the lift, loads imposed on the boom must not exceed the safe operating capability of the equipment. When placing self-supporting cable using a moving aerial lift with the boom fully extended, the maximum allowable cable tension is 600 pounds. This load limit allows

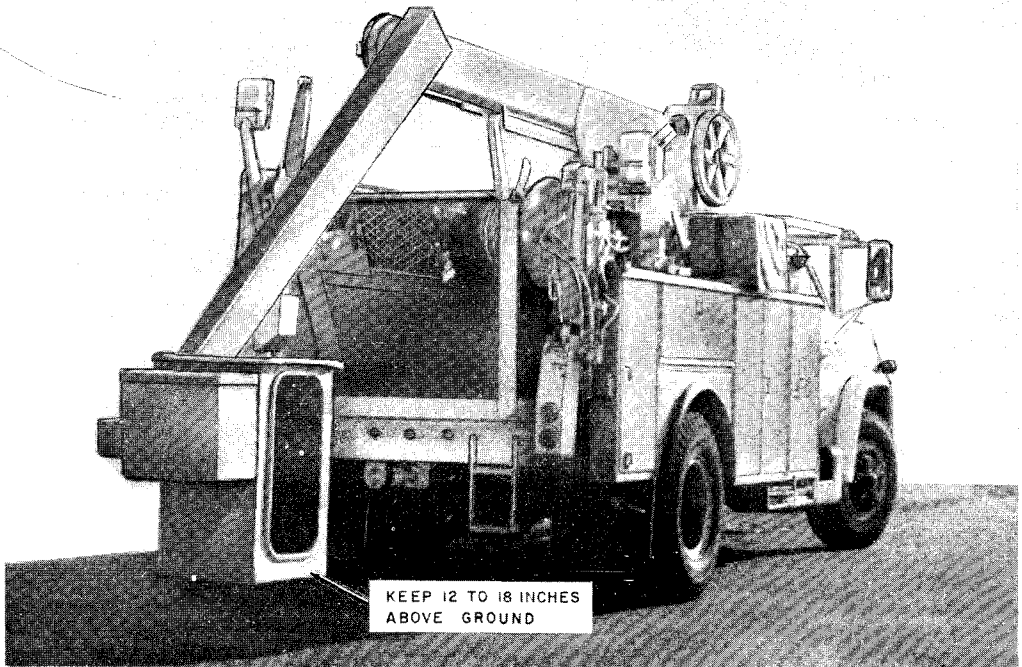


Fig. 9—Platform Position for Loading, Entering, and Leaving

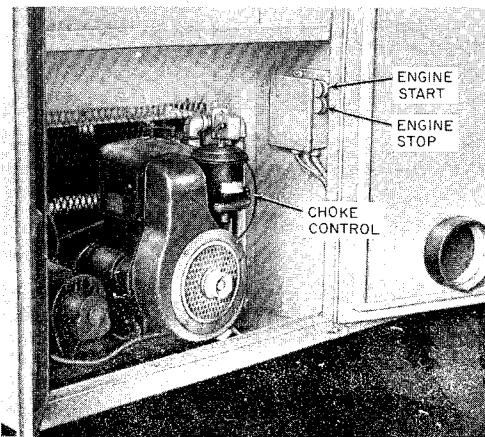


Fig. 10—Auxiliary Engine Controls

self-supporting cable to be placed in normal span lengths while maintaining minimum above-ground clearances. (See Section 627-700-201 for detailed information.) For example, when placing 50-pr 22-gauge self-supporting cable where the average pole attachment height is 19 feet and a minimum ground clearance of 15 feet must be maintained, the maximum span length is limited to 200 feet. With the same size self-supporting cable, the 19-foot pole attachment height, and a minimum allowable ground clearance of 10 feet, the maximum span length is limited to 300 feet. If lower ground clearances can be tolerated during the stringing operation, the aerial lift can be used for the stringing operation for longer spans. Prior to placing self-supporting cable with the aerial lift, the job should be surveyed to ensure safe, efficient use of the equipment.

4.06 After work operations aloft have been completed, the operator shall leave the

platform only after it has been brought down 12 to 18 inches above the ground. Tools and equipment used by the operator should be removed from the platform and the lift placed in the stowed position by using the control head on the turret.

5. EMERGENCY PROCEDURE

5.01 Failure of the auxiliary power supply while the aerial lift is in use will make it necessary to manually lower the lift and place it in the stowed position, or lower it to a position that will allow the truck to be driven to a location where the auxiliary power supply can be repaired. Before attempting to operate the lift manually, study the situation to determine the procedure to be used for boom lowering and rotation that will keep the lift clear of wires, tree limbs, traffic, etc. Generally, the best method will be to rotate the unit to clear obstructions, lower the upper boom to within about 4 feet of the stowed position, lower the lower boom almost all the way, complete lowering of the upper boom, rotate the unit until the end of the lower boom is aligned over the stowing support, and complete the lowering of the lower boom.

5.02 To fold the booms when there is a power failure, turn out the adjusting screw on the appropriate holding valve to release oil from the upper and lower boom cylinders as required. Fig. 11 shows the locations of the holding valves for the boom cylinders.

5.03 There are three general positions from which the booms may be required to be lowered manually:

- (a) If the booms are in the positions shown in Fig. 1, turn out the adjusting screws as required on the inboard ends of the upper and lower booms to lower the booms in the manner covered in 5.01.
- (b) If the booms are in the positions shown in Fig. 12, use a rope to pull the upper boom past top center.
- (c) If the booms are in the positions shown in Fig. 13, a rope must be secured to a firm overhead support.

5.04 To rotate the unit manually, the large turret cover must be removed so the flywheel can be turned by hand. The magnetic brake must be

released before the flywheel can be turned. The location of the brake release studs is shown in Fig. 14. To rotate manually, remove the large turret cover, release the magnetic brake by turning the release studs clockwise against the stops, and turn the flywheel to rotate the unit to the desired position. ***Reengage the brake before traveling on the road.***

5.05 If the booms cannot be placed in the stowed position and the truck must be driven, place rope lashing from the booms to each side of the truck to lessen stress on the unit. Drive slowly.

6. MAINTENANCE AND INSPECTION ROUTINE

Daily, Operator

6.01 Prior to use or each 8-hour shift, the operator or other qualified person shall perform the following inspection and safety routines.

- (1) Inspect motor vehicle safety systems (brakes, lights, horn, wipers, etc).
- (2) Inspect all visible lines, hoses, fittings, cylinder heads, and packing for signs of oil leakage. Leakage of a few drops of oil per hour through a packing does not normally indicate trouble.
- (3) Inspect all hoses, lines, and wiring for signs of chafing or twisting.
- (4) Check the oil level in the auxiliary power supply engine and add oil as required.
- (5) Make an operational test of controls to ensure that they are in safe working condition.
- (6) Inspect wire rope drives for proper tension and signs of wear. With the operator in the platform and the upper boom unfolded about 180 degrees, vertical droop in the slack side of drive cable should be about 1 to 1-1/2 inches.
- (7) Report any defects or unsafe condition in accordance with local procedures so the equipment can be repaired.

Weekly, Qualified Mechanic

- (1) Change oil in auxiliary engine crankcase every 40 hours or once each week.

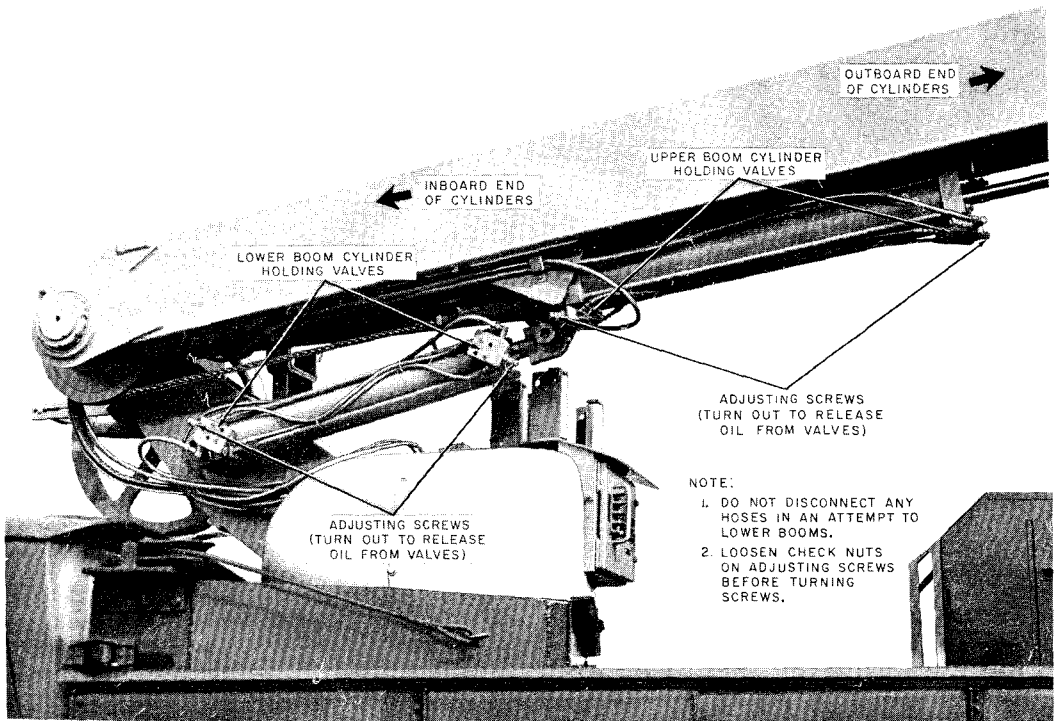


Fig. 11—Upper and Lower Boom Cylinders Showing Holding Valves

- (2) Check the oil level in the hydraulic reservoir. There is a reservoir under the turret hood for each boom and one for the reel loader on the top rear of the right hand compartment.
- (3) Perform periodic maintenance and lubrication as recommended in the maintenance manual supplied by the equipment manufacturer.

Periodic, Qualified Mechanic

6.02 Failure of the upper boom drive cable could cause a serious accident. It is recommended this cable be replaced every fourth year.

- (1) Inspect the upper boom cable for broken wires or wear by removing the covers from the ends of the lower boom and checking the cable as the upper boom is folded and unfolded.

The cable must be replaced if **any** broken wires are found.

- (2) If the platform swings too far from the vertical (maximum of 3 inches) when in the working position, or becomes loose, or if the booms settle or fail to operate properly, report the condition in accordance with local routine so the equipment can be repaired.
- (3) Inspect all welds for cracks; the most critical locations are:
 - (a) Welds attaching end fittings to lower boom cylinder.
 - (b) Weld joint between upper boom torque arm and plate bolted to upper boom.

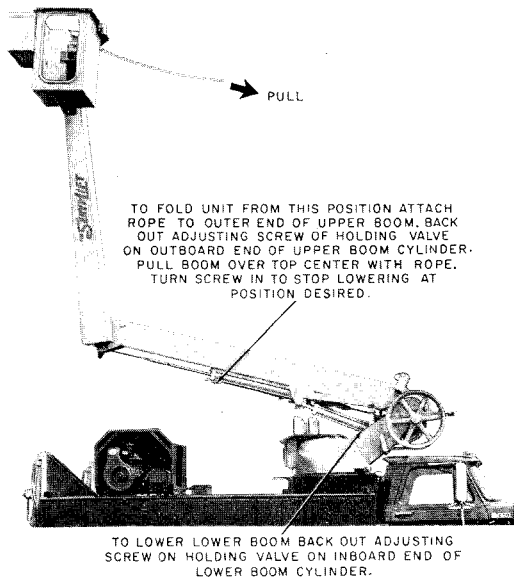


Fig. 12—Emergency Method of Lowering Booms—Upper Boom Past Top Center

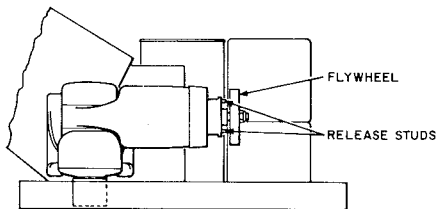


Fig. 14—Location of Brake Release Studs

- (c) Weld joints under turret structure attaching inner turret tube to base structure.
- (d) Weld joints between stabilizer torque shaft and arms.
- (e) Weld joint attaching the lug to the plate attached to the bottom of the truck springs.

- (4) Check rotation gear adjustment, hydraulic system, electrical system, switch adjustment, connecting shafts, pins, and bolts as recommended in the manual supplied by the manufacturer.

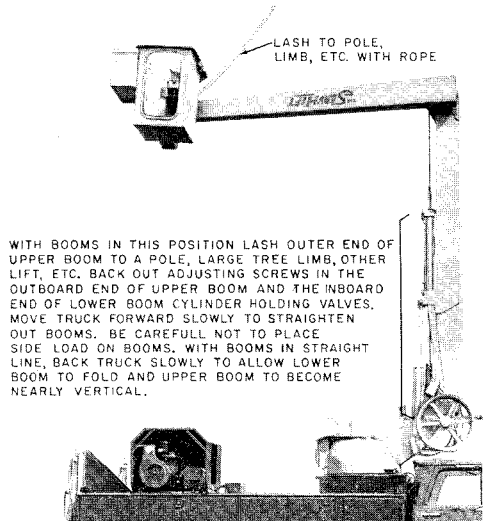


Fig. 13—Emergency Method of Lowering Booms—Lower Boom Vertical—Upper Boom Past Top Center

6.04 A thorough inspection shall be made by a qualified mechanic at intervals set by the manufacturer but not less than once a year. This inspection should cover all items as recommended by the manufacturer. In addition, a record must be maintained for each aerial lift showing the date of the inspection and the corrective action taken.