



# Environmental Health & Safety

Oklahoma State University



# AERIAL LIFT MANUAL

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Environmental Health and Safety | University Health Services Suite 002 | Stillwater, OK 74078 | (405) 744-7241 | [www.ehs.okstate.edu](http://www.ehs.okstate.edu)

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## Status

<b>Contact(s)</b>	<b>Implementation Date</b>	<b>Comments</b>
Kim Southworth	April 2018	Created document.

# A. Introduction

This program guides all aspects of the Aerial Lift/Elevating Work Platform Safety Program for Oklahoma State University. This program requires departments that own and/or operate Aerial Lifts/Elevating Work Platforms (AL/EWP) to train personnel who operate their equipment, conduct pre-operation safety inspections and preventive maintenance of the equipment, and adhere to specific safe-work practices whenever using these types of powered industrial equipment.

# B. Administrative Roles

## **ENVIRONMENTAL HEALTH AND SAFETY**

The specific responsibility for developing and implementing Oklahoma State University (OSU) programs for health and safety resides with the Environmental Health and Safety (EHS) Department. In fulfillment of this responsibility, EHS has prepared the Oklahoma State University Aerial Lift Manual and will assist other departments in the development and implementation of Aerial Lift operations and training for their areas.

## **FACILITIES MANAGEMENT**

FM supervisors are responsible for ensuring their employees are properly trained to do the jobs they are sent to do. This includes documented training for the aerial lift for that the employee will be using. **No FM employee shall be sent on a job that involves operating an aerial lift, unless they have been properly trained in the operating procedures for the aerial they are using.**

## **DEPARTMENTS**

Each department is responsible for ensuring employees using an aerial lift have been properly trained before operating any lift. Immediately correcting deficiencies found with an aerial lift. Maintaining aerial lifts that are operated in their department per manufacturer recommendations. Maintain written records of operator training on each model of aerial lift.

## **MANAGERS AND SUPERVISORS**

Managers and supervisors play a key role in the implementation of the Aerial Lift Program. They are responsible for coordinating employee training, and ensuring that all operators receive annual training. Verify employee compliance with the principles and practices outlined in the Aerial Lift Safety Program. Observe the operation of aerial lifts, and correct unsafe practices. Provide specific operational training for each aerial lift.

## **OPERATORS**

Review the operator's manual for all lifts that they use prior to the initial lift use. Understand hazards specific to the aerial lift type. Ensure modifications are not made to aerial lifts without manufacturer's prior approval. Perform aerial lift pre-use safety check prior to each use (See Pre-Use Inspection Checklist Form) and submit the completed form to the supervisor. Immediately report damage or irregularities of lift operation to the supervisor. Immediately report worn personal fall arrest system components to the supervisor. Attend and complete aerial lift training. Operators are responsible for observing all practices and procedures contained in the Aerial Lift Manual, other general safety practices,

attending designated training sessions, and complete the Daily Pre-Use Inspection Checklist before operating any lift. Notify supervisor of any deficiencies noted during inspection of lift or to EHS.

## **PROGRAM REVIEW**

EHS will review the Aerial Lift Manual annually. If revisions are needed, the changes shall be made and all affected employees trained on the revisions. EH&S will provide training as requested by university departments. Provide the general safety training requirements for program. Monitor the effectiveness of program by receipt of copies of inspection checklists. Upon request, evaluate work areas and employee work practices.

## **APPLICABLE REGULATIONS AND STANDARDS**

- OSHA 29 CFR 1910.66 (Powered Platforms for Building Maintenance)
- OSHA 29 CFR 1910.68 (Man lifts)
- OSHA 29 CFR 1926.20 (General Safety & Health Provisions)
- OSHA 29 CFR 1926.21 (Safety Training and Education)
- OSHA 29 CFR 1926.451 (General Requirements)
- OSHA 29 CFR 1926.452 (Scaffolds)
- OSHA 29 CFR 1926.453 (Aerial Lifts)
- ANSI/SIA A92.3 - 2006 (Manually Propelled Elevation Aerial Platform)
- ANSI/SIA A92.5 - 2006 (Boom - Supported Elevating Work Platform)
- ANSI/SIA A92.6 - 2006 (Self-Propelled Elevated Work Platforms)

## C. Types of Aerial Lift

### **EXTENSIBLE BOOM PLATFORM**

An aerial device (except ladders) with an extensible boom. Telescopic booms with personnel platform attachments are considered to be extensible boom platforms.



**Fall Protection is required when operating this equipment.**

### **SCISSOR LIFT**

A device designed to elevate a platform in a substantially vertical axis. This device can be driven by an operator inside the work platform and is generally designed to carry more than one person.



**Fall Protection is not required when operating this Lift, but is highly recommended.**

### **MAN LIFT / CHERRY PICKER**

This piece of equipment lifts personnel vertically, but not horizontally.



**Fall Protection is not required when operating this Lift, but is highly recommended.**

## **EXTENDABLE / TELESCOPING AERIAL LIFT**

This aerial lift has a boom that extends horizontally and vertically.



**Fall Protection is required when operating this equipment.**

## **D. Inspection Procedures**

### **GENERAL SAFE WORK PRACTICES**

- Before machine is started, the operator must walk completely around the machine to ensure everyone and everything is clear of the machine.
- Articulating boom and extendable boom platforms, primarily designed as personnel carriers, shall have both platform (upper) and lower controls.
- Upper controls shall be in or beside the platform within easy reach of the operator. Lower controls shall provide for overriding the upper controls.
- Controls shall be plainly marked as to their function.
- Lower level controls shall not be operated unless permission has been obtained from the employee in the lift, except in case of emergency.

### **PRE-USE INSPECTION**

- Prior to the operation of any aerial lift, the Pre - Use Inspection Checklist found in Appendix A must be completed.
- This applies at the beginning of every work period, and whenever a new equipment operator takes control of the aerial lift.
- Any safety defects (hydraulic fluid leaks, defective brakes, steering, lights, or horn and/or missing fire extinguisher, lights, loose wires, cracked welds, condition of tires and wheels, seatbelt, or back-up alarm) must be reported for immediate repair.
- Safety defects shall be locked, tagged and taken out of service. Tag shall be attached to the controls on the platform.

### **INSPECTION OF WORK AREA**

- Slopes, holes, drop - offs, trenches, pits or other leading edges.
- Soft soils, particularly near creeks, streams, ponds or lagoons.

- Ground or floor obstructions such as bumps, debris, and tools. Inadequate height and width clearance for the platform and chassis of other lifts and equipment.
- Inadequate surface and support to withstand all load forces imposed by the aerial lift platform. Overhead obstructions and power lines.
- Wind and weather conditions (winds in excess of 20 mph, lightning, audible thunder, weather warnings and snow obscuring view of ground conditions).
- Presence of unauthorized people in work area.

## E. Aerial Operation Procedures

### SAFE OPERATION DURING OPERATION

- Read and understand the manufacturer's operating instructions.
- The area surrounding the elevated platform shall be cleared of personnel and equipment prior to moving, raising, lowering the elevated platform.
- Aerial lift is not to be used as a lifting device or crane.
- Follow manufactures recommendations for operating on grades, slopes, ramps.
- Speed of aerial lift devices shall be limited according to the conditions of the ground surface, congestion, visibility, slope, location of personnel.
- All personnel must always stand firmly on the floor of the basket and must not sit or climb on the edge of the basket.
- Personnel must never attempt to climb outside of the basket or over extend the upper body beyond the railing of the basket.
- Personnel may only perform work in areas that can be reached from inside the basket of the lifting device.
- Lifts may not be used in combination with other devices such as ladders, planks or scaffolding.
- The aerial work platform shall be used only in accordance with the manufacturer or owner's operating instructions and safety rules.
- Unauthorized personnel are prohibited from operating an aerial lift.
- When operating aerial work platforms or other equipment under, over, by or near energized electric power lines, the following clearances shall be maintained:
  - ~ Only aerial lifts with insulated buckets may be used for work on overhead power lines. Lifts that are not insulated must maintain at least a 15 foot distance between the boom and any energized electrical lines or source. Always treat power lines, wires, and other conductors as being energized, even if they are inactive or appear to be insulated.
  - ~ Operators that are not electrical workers must remain at least 15 feet away from power lines.

### AFTER OPERATING THE AERIAL LIFT

- Position lift in a parking area with the basket in the lowered position, and place controls in neutral while engine is idling for gradual cooling. Turn off all power. Take necessary steps to prevent unauthorized use.

- After operating aerial lift, wheels shall be chocked.

### **BATTERY CHANGING & CHARGING FACILITIES**

- A designated area for battery charging must be established with equipment for such kept there and must be free of ignition sources. These could ignite the hydrogen gas coming off a battery with insufficient electrolyte.
- There must be facilities for flushing and neutralizing spilled electrolyte, fire protection, adequate ventilation from dispersal of fumes arising from dry and gassing batteries and collision prevention/protection for the charging apparatus. Note that dry batteries get hot and can splash acidic electrolyte when being filled.
- Only trained and authorized employees may charge or change batteries. They shall be trained in proper battery inspection and handling and wear personal protective equipment (PPE) while attending to these tasks. Proper PPE includes face shield, long sleeves, rubber boots, aprons and gloves. Do not recharge, refill or replace batteries without proper protection.

## **F. Fall Protection**

Fall protection equipment must be used as follows when operating aerial/scissor lifts:

### **AERIAL LIFTS:**

- Operators shall be secured to the anchor point provided by the equipment manufacturer by either a self-retracting lanyard or by a lanyard short enough to prevent the employee from being ejected.
- Operators must follow manufacturer's recommendations for fall protection system to use.

### **SCISSOR LIFTS:**

- The guardrail system provides fall protection. If the manufacturer has installed an anchorage point, a fall protection system (restrain, positioning, personal fall arrest system) as designated by the manufacturer's instructions, must be utilized.
- Tying a lanyard off to an adjacent pole, structure, or equipment while working from an aerial lift, shall not be permitted.
- Other types of personal protective equipment (PPE) such as hard hat, safety glasses and safety gloves, shall be worn according to the task specific PPE hazard assessment.

## **G. Training Requirements**

Employees who are authorized to operate aerial lifts must receive training prior to engaging in their duties. The training is to ensure that the Aerial Lift Safety Program is understood. The supervisor will also ensure that authorized aerial lift operators have acquired the necessary practical skills required for safe operation. Training is offered by Environmental Health and Safety.

The Supervisor will perform an operational training with each employee to determine if operators have the knowledge, training, and skills necessary to use the aerial lift. Operational training will consist of a



combination of general safety instruction, practical/operational training (demonstrations performed by the trainer, and practical exercises performed by the trainee), and evaluation of the operator's performance in the workplace. All operational training must be conducted under close supervision.

### **INITIAL TRAINING**

- Receive instruction on the intended purpose and function of each control.
- Prior to operating any Aerial Lift, the trainee will read and understand the manufacturer's operating instruction(s) and aerial lift procedures or receive training by a qualified person on the contents of the manufacturer's operating instruction(s) and users safety rules.
- Be informed of the Aerial Lift operating limitations and restrictions as defined by the manufacturer.
- Understand by reading or having a qualified person explain all decals, warnings, and instructions displayed on the Aerial Lift.
- During operational training, trainees may operate an aerial lift only under the direct supervision of authorized trainers where such operation does not endanger the trainee or other employees.
- All training and evaluation must be completed before an operator is permitted to use an aerial lift without continual and close supervision.

### **ANNUAL TRAINING** – must include at least the following:

- Review of the Aerial Lift Inspection & Maintenance Records
- Updated information on new equipment.
- Review of university written program.

### **TRAINING RECORDS**

Each department shall maintain a record of all individual training, including:

- Subject of training.
- Date of training.
- Name of individual trained.
- Name of supervisor or Environmental Health and Safety person providing the training.
- Training records must maintained by the department and available for review by EHS.

# H. Inspection Forms

*Oklahoma State University*  
*Environmental Health & Safety*

**Aerial Elevated Work Platform Pre-operation Inspection**



Lift MFG: \_\_\_\_\_ Model: \_\_\_\_\_ Serial Number: \_\_\_\_\_

Date: \_\_\_\_\_ Start Time: \_\_\_\_\_ AM / PM (circle one)

**WEAR FALL PROTECTION IS OPTIONAL BUT RECOMMENDED**

**Instructions:** Operator must check off each item as having been checked "OK" and safe to use during daily inspection prior to operation. See the reverse side of this page and complete the Work Site Evaluation for every new location.

	Pass	Fail	N/A
<b>KEY OFF Procedures</b>			
Check that the operator's manual, decals are in place and legible, and the operator has reviewed the manual and is aware of its limitations			
Check Hydraulic cylinders/Lifting mechanism/Fluid level			
Check welds, pins, missing nuts or bolts and other structural parts for cracks or defects			
Check outriggers, outrigger limiting switches, and locking pins			
Check platform entry mid-rail/gate, and platform or basket housekeeping			
Examine the battery & fire extinguisher			
Check fuel level to assure that the unit can operate the duration of the job			
Operator is responsible for inspecting all fall protection and insure that all fall protection is being worn and attached properly			
Tires/Rollers/Monitor tire air pressure if pneumatic (Front Right _____ psi, Front Left _____ psi, Right Rear _____ psi, Left Rear _____ psi)			
<b>KEY ON Procedures</b>			
Check all ground controls for proper operation, including emergency lowering means (remember, these could save your life)			
Check all basket controls, foot switch, horn for proper operation			
Battery discharge indicator, Hour meter			
Steering and drive system			
Check limit switches, alarms, and flashing beacon if equipped (operating the lift by raising/swing/extending booms, tilt/rotate the basket)			
Starting Hour Meter Reading: _____ Hours	Operator's Name: (Printed / Signature) _____ / _____		Operator's Employee ID: _____

**Oklahoma State University**  
**Environmental Health & Safety**

**Extensible Boom Platform Pre-operation Inspection**



Lift MFG: \_\_\_\_\_ Model: \_\_\_\_\_ Serial Number: \_\_\_\_\_

Date: \_\_\_\_\_ Start Time: \_\_\_\_\_ AM / PM (circle one)

**WEAR FALL PROTECTION WHEN USING THIS LIFT**

**Instructions:** Operator must check off each item as having been checked "OK" and safe to use during daily inspection prior to operation. See the reverse side of this page and complete the Work Site Evaluation for every new location.

	Pass	Fail	N/A
<b>KEY OFF Procedures</b>			
Check that the operator's manual, decals are in place and legible, and the operator has reviewed the manual and is aware of its limitations			
Check Hydraulic cylinders/Lifting mechanism/Fluid level			
Check welds, pins, missing nuts or bolts and other structural parts for cracks or defects			
Check drive hubs, engine for oil leaks			
Check platform entry mid-rail/gate, and platform or basket housekeeping			
Examine the battery & fire extinguisher			
Check fuel level to assure that the unit can operate the duration of the job			
Operator is responsible for inspecting all fall protection and insure that all fall protection is being worn and attached properly			
Tires/Rollers/Monitor tire air pressure if pneumatic (Front Right _____ psi, Front Left _____ psi, Right Rear _____ psi, Left Rear _____ psi)			
<b>KEY ON Procedures</b>			
Check all ground controls for proper operation, including emergency lowering means (remember, these could save your life)			
Check all basket controls, foot switch, horn for proper operation			
Battery discharge indicator, Hour meter			
Steering and drive system			
Check limit switches, alarms, and flashing beacon if equipped (operating the lift by raising/swing/extending booms, tilt/rotate the basket)			
Check outriggers for proper operation if equipped			
Starting Hour Meter Reading: _____ Hours	Operator's Name: (Printed / Signature) _____ / _____		Operator's Employee ID: _____

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**Aerial Scissor Lift Pre-operation Inspection**

Lift MFG: \_\_\_\_\_ Model: \_\_\_\_\_ Serial Number: \_\_\_\_\_

Date: \_\_\_\_\_ Start Time: \_\_\_\_\_ AM / PM (circle one)

**WEAR FALL PROTECTION IS OPTIONAL BUT RECOMMENDED**

**Instructions:** Operator must check off each item as having been checked "OK" and safe to use during daily inspection prior to operation. See the reverse side of this page and complete the Work Site Evaluation for every new location.

	Pass	Fail	N/A
<b>KEY OFF Procedures</b>			
Check that the operator's manual, decals are in place and legible, and the operator has reviewed the manual and is aware of its limitations			
Check Hydraulic cylinders/Lifting mechanism/Fluid level			
Check welds, pins, missing nuts or bolts and other structural parts for cracks or defects			
Check outriggers, outrigger limiting switches, and locking pins			
Check platform entry mid-rail/gate, and platform or basket housekeeping			
Examine the battery & fire extinguisher			
Check fuel level to assure that the unit can operate the duration of the job			
Operator is responsible for inspecting all fall protection and insure that all fall protection is being worn and attached properly			
Tires/Rollers/Monitor tire air pressure if pneumatic (Front Right _____ psi, Front Left _____ psi, Right Rear _____ psi, Left Rear _____ psi)			
<b>KEY ON Procedures</b>			
Check all ground controls for proper operation, including emergency lowering means (remember, these could save your life)			
Check all basket controls, foot switch, horn for proper operation			
Battery discharge indicator, Hour meter			
Steering and drive system			
Check limit switches, alarms, and flashing beacon if equipped (operating the lift by raising/swing/extending booms, tilt/rotate the basket)			
Starting Hour Meter Reading: _____ Hours	Operator's Name: (Printed / Signature) _____ / _____		Operator's Employee ID: _____

**Oklahoma State University**  
**Environmental Health & Safety**

**Articulating Boom Lift Pre-operation Inspection**



Lift MFG: \_\_\_\_\_ Model: \_\_\_\_\_ Serial Number: \_\_\_\_\_

Date: \_\_\_\_\_ Start Time: \_\_\_\_\_ AM / PM (circle one)

**WEAR FALL PROTECTION WHEN USING THIS LIFT**

**Instructions:** Operator must check off each item as having been checked "OK" and safe to use during daily inspection prior to operation. See the reverse side of this page and complete the Work Site Evaluation for every new location.

	Pass	Fail	N/A
<b>KEY OFF Procedures</b>			
Check that the operator's manual, decals are in place and legible, and the operator has reviewed the manual and is aware of its limitations			
Check Hydraulic cylinders/Lifting mechanism/Fluid level			
Check welds, pins, missing nuts or bolts and other structural parts for cracks or defects			
Check drive hubs, engine for oil leaks			
Check platform entry mid-rail/gate, and platform or basket housekeeping			
Examine the battery & fire extinguisher			
Check fuel level to assure that the unit can operate the duration of the job			
Operator is responsible for inspecting all fall protection and insure that all fall protection is being worn and attached properly			
Tires/Rollers/Monitor tire air pressure if pneumatic (Front Right _____ psi, Front Left _____ psi, Right Rear _____ psi, Left Rear _____ psi)			
<b>KEY ON Procedures</b>			
Check all ground controls for proper operation, including emergency lowering means (remember, these could save your life)			
Check all basket controls, foot switch, horn for proper operation			
Battery discharge indicator, Hour meter			
Steering and drive system			
Check limit switches, alarms, and flashing beacon if equipped (operating the lift by raising/swing/extending booms, tilt/rotate the basket)			
Starting Hour Meter Reading: _____ Hours	Operator's Name: (Printed / Signature) _____ / _____		Operator's Employee ID: _____

# I. Directory of Service and Emergency Providers

## **Environmental Health and Safety**

University Health Services Suite 002 / (405) 744-7241

## **University Health Services**

1202 West Farm Road / (405) 744-7665

## **Facilities Management**

402 North Willis / (405) 744-7154

## **Stillwater, Oklahoma**

Emergency - Ambulance, Fire, Police (911)



# Appendix A: Definitions

## LIST OF TERMS

**Aerial Lifts:** Any powered, mobile, vehicle mounted device that may elevate, telescopically extend, articulate and may (or may not) rotate around a substantial axis in order to raise and support personnel to elevated job sites. Aerial lifts include extendible boom platforms; articulating, rotating boom platforms; vertical self - elevating towers; cherry pickers; and any other equipment built in accordance with either ANSI-A92.2 (1990), Boom Supported Elevating Work Platforms.

**Aerial Work Platform (AWP):** is defined as a mobile or manually propelled device that has an adjustable position platform, supported from ground level by a structure.

**Anchorage:** The secure point of attachment to be used with personal fall protection equipment.

**Articulating Boom:** means an aerial device that has 2 or more hinged boom sections.

**Counter Weight:** The rear section or area of the lift that is usually made of solid steel, and/or combination of steel and the weight of the battery on electric lifts, which counter balances the boom leverage and basket load.

**Data Plate:** Manufacturer's equipment specification and information data, which includes basket load rating/lift capacity, lift heights, vehicle weight, and vehicle attachments. This plate is required to be affixed to all Aerial Lift Equipment by regulatory code.

**Extensible Boom:** means an aerial device, except for the aerial ladder - type, which has a telescopic boom.

**Fall Protection:** An approved full-body safety harness with lanyard is to be worn at all times and attached to a secure anchor point when drivers or personnel are using a boom - type lift or vehicle mounted lift. Fall protection must also be worn when using scissor lifts on uneven surfaces or near locations with tip-over hazards.

**Guard Rails:** Railing around the perimeter of the work platform. This railing consists of a top rail between 39" – 45" with a mid - rail. Units with the top rail less than 39" must have fall protection in use to operate.

**Lower Controls:** Operating controls located on the base of the unit that can be switched to override the basket or platform control during an emergency.

**Mast:** Part of the lifting mechanism, which the hydraulic lift cylinder or worm drive is attached that supports the basket as it is lifted up and down.

**Platform:** means the portion of an aerial work platform, such as a bucket, basket, stand, cage , or the equivalent, which is designed to be occupied by personnel.

**Upper Controls:** Operating controls located on the basket or work platform of the unit. These controls can only be over ridden with the operator's permission or in case of an emergency.

**Wheel Chocks:** Wheel chocks provide additional protection against accidental vehicle movement. Chocks prevent accidental movement or slippage of vehicles by bracing the wheel on both sides. This is important during boom and basket movement when shifting weight that can affect wheel placement. Chocks must be utilized before operating an aerial lift that is positioned on an incline.