NASA

QinetiQ
North America

AGENDA:

- Introduction
- Course Objectives
- Common Mobile Aerial Platform Terminology
- NASA-STD-8719.9
- GPR8834.1B
- GPR 8719.1A
- OSHA
  - 29CFR 1910.67
  - 29CFR 1926.451
  - 29CFR 1926.452(W)
  - 29CFR 1926.453
  - 29CFR 1926.454
- ANSI/ASME
  - A92.2 (Vehicle Mounted Elevating and Rotating Aerial Lift)
  - A92.3 (Manually Propelled Elevating Aerial Platform)
  - A92.5 (Boom Supported Elevated Work Platform)
  - A92.6 (Self Propelled Elevating Work Platform)

AGENDA:

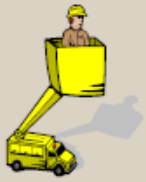
- Pre-operational Inspection
- Review

- Fall Protection Requirements
- Review
-

- Accidents and Fatalities

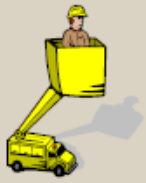
- Video
- Written Test
- Hands-on Training

Introductions



Who Are You?

Why are you attending this Training?



What type of Mobile Aerial Platform will you be operating?

Do you have any prior experience operating Mobile Aerial Platforms?

Course Objectives

Course Objectives

- Given any selected Mobile Aerial Platform(MAP), you will be able to perform an operational check of the Unit without error.

Course Objectives

- Given the basic requirements for an Aerial Lift operation, you will be able to plan the Aerial lift operation, such that it can be accomplished efficiently, safely, and in complete accordance with
- OSHA 29CFR
  - 29CFR 1910.29
  - 29CFR 1910.67
  - 29CFR 1926.451
  - 29CFR 1926.452(W)
  - 29CFR 1926.453
  - 29CFR 1926.454
- ANSI/SIA A92.2-2009
- ANSI/SIA A92.3-2009
- ANSI/SIA A92.5-2006
- ANSI/SIA A92.6-1999
- NASA-STD-8719.9
- GPR8834.1B
- GPR8719.1A

Course Objectives

Upon completion of the course participants will be able to:

- **Understand the general purpose of manuals for Mobile Aerial Platforms (MAP)**
- **Perform a Pre-start Inspection**
- **Understand the responsibilities associated with problems or malfunctions affecting the operation of a Mobile Aerial Platforms (MAP)**
- **Recognize factors that effect the stability of a Mobile Aerial Platforms (MAP)**

Course Objectives

Upon completion of the course participants will be able to: ***(continued)***

- **Understand the purpose and the content of placards and decals associated with the safe operation of a Mobile Aerial Platform (MAP).**
- **Understand and perform a workplace inspection for potential hazards .**
- **Understand the applicable safety rules and regulations pertinent to NASA Goddard Space Flight Center.**

Course Objectives

Upon completion of the course participants will be able to: ***(continued)***

- 
  Operate an Aerial Lift in a safe manner and develop safe working habits in regard to Aerial Lift operations.

- 
  Achieve authorization to operate Aerial lifts through training and licensing program

- 
  Understand the importance and proper use of Fall Protection equipment
  (Fall protection systems criteria and practices are covered in OSHA 29 CFR 1926.502)


Common Aerial Lift
Terminology
and
Facts
COMMANDER

Common Mobile Aerial Platform Terminology And Facts

A **Mobile Aerial Platform (MAP),** also referred to as an "**Aerial Lift**" or "**Elevating Work Platform**" is a mechanical device used to provide temporary access for people or equipment to inaccessible areas, usually at substantial heights. The two most distinct types of mobile aerial platforms are also referred to as a **"Cherry Picker"** or a **"Scissor Lift"**.

They are generally used for temporary, flexible access purposes such as maintenance and construction work .

They are designed to lift limited weights , and they are primarily for lifting personnel.

They are usually capable of being fully operated (including setup) by a single person.

Articulated lift being demonstrated

Common
Mobile Aerial Platform
Terminology
And
Facts

Regardless of the task they are used for, aerial work platforms may provide additional features beyond transport and access, including being equipped with electrical outlets or compressed air connectors for power tools. They may also be equipped with specialist equipment, such as carrying frames for window glass or attachments for bending electrical conduit ect....

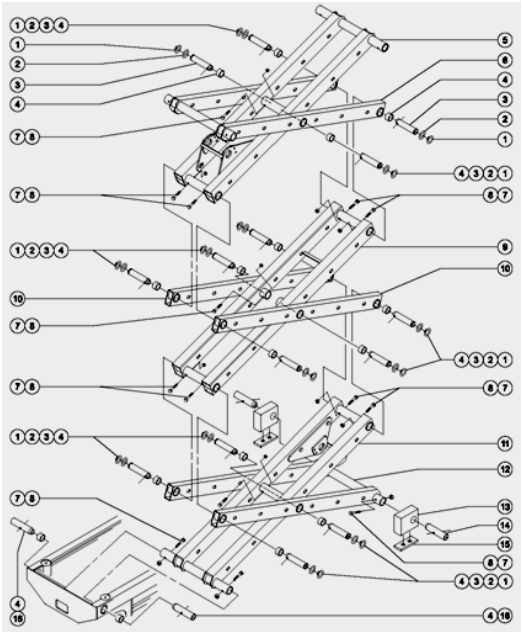
Common
Mobile Aerial Platform
Terminology
And
Facts

Scissor Lift

A scissor lift is a type of platform which can usually only move vertically. The mechanism to achieve this is the use of linked, folding supports in a crisscross 'X' pattern. The upward motion is achieved by the application of pressure to the outside of the lowest set of supports, elongating the crossing pattern, and propelling the work platform vertically. The Platform may also have an extending 'bridge' to allow closer access to the work area (because of the inherent limits of vertical only movement).

Common Mobile Aerial Platform Terminology And Facts

The contraction of the scissor action can be hydraulic, pneumatic or mechanical (via a lead screw or rack and pinion system). Depending on the power system employed on the lift, it may require no power to enter 'descent' mode, but rather a simple release of hydraulic or pneumatic pressure. This is the main reason that these methods of powering the lifts are preferred, as it allows a Fail Safe option of returning the platform to the ground by release of a manual valve.



Common Mobile Aerial Platform Terminology And Facts

Because there are so many Manufacturers and configurations of Scissor lifts, the operator must always consult the operators manual which is required to be on the lift at all times.

Common
Mobile Aerial Platform
Terminology
And
Facts

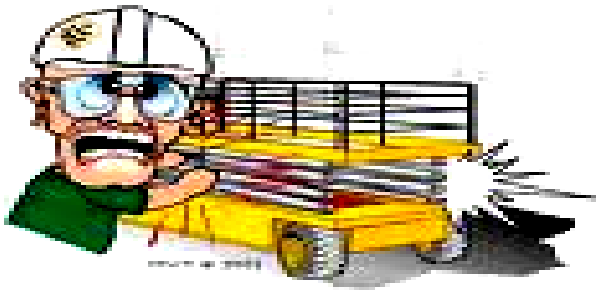
Using a Scissor Lifts for any purpose other than what the Lift was designed and approved is strictly prohibited.

AND EXTREMELY DANGEROUS

Common
Mobile Aerial Platform
Terminology
And
Facts

General inspection, application, and operation of aerial lifts:

• Recognizing and avoiding hazards associated with their operation is key to safe operation and inspection.



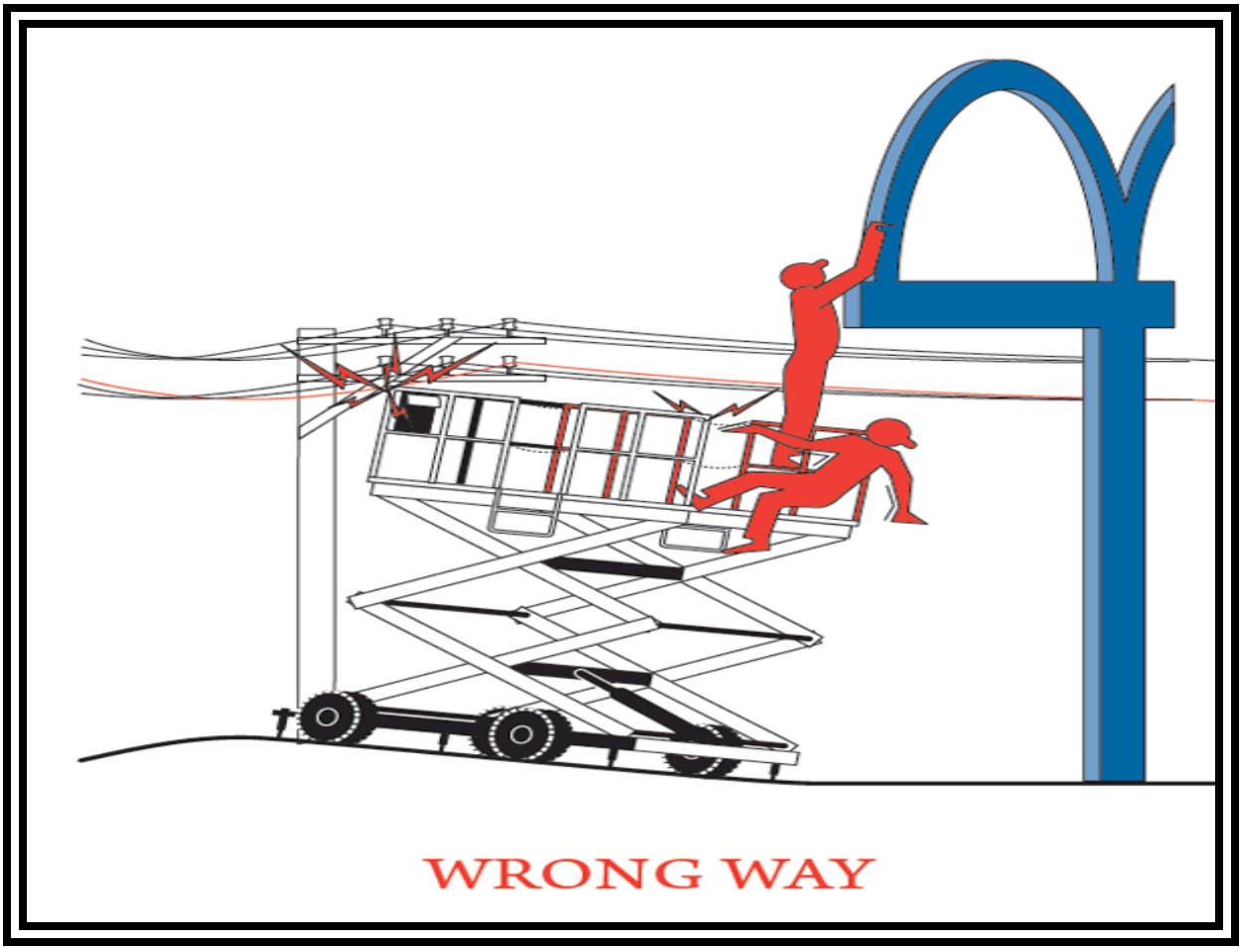
Common Mobile Aerial Platform Terminology And Facts

About 26 construction workers die each year while operating or using aerial lifts.

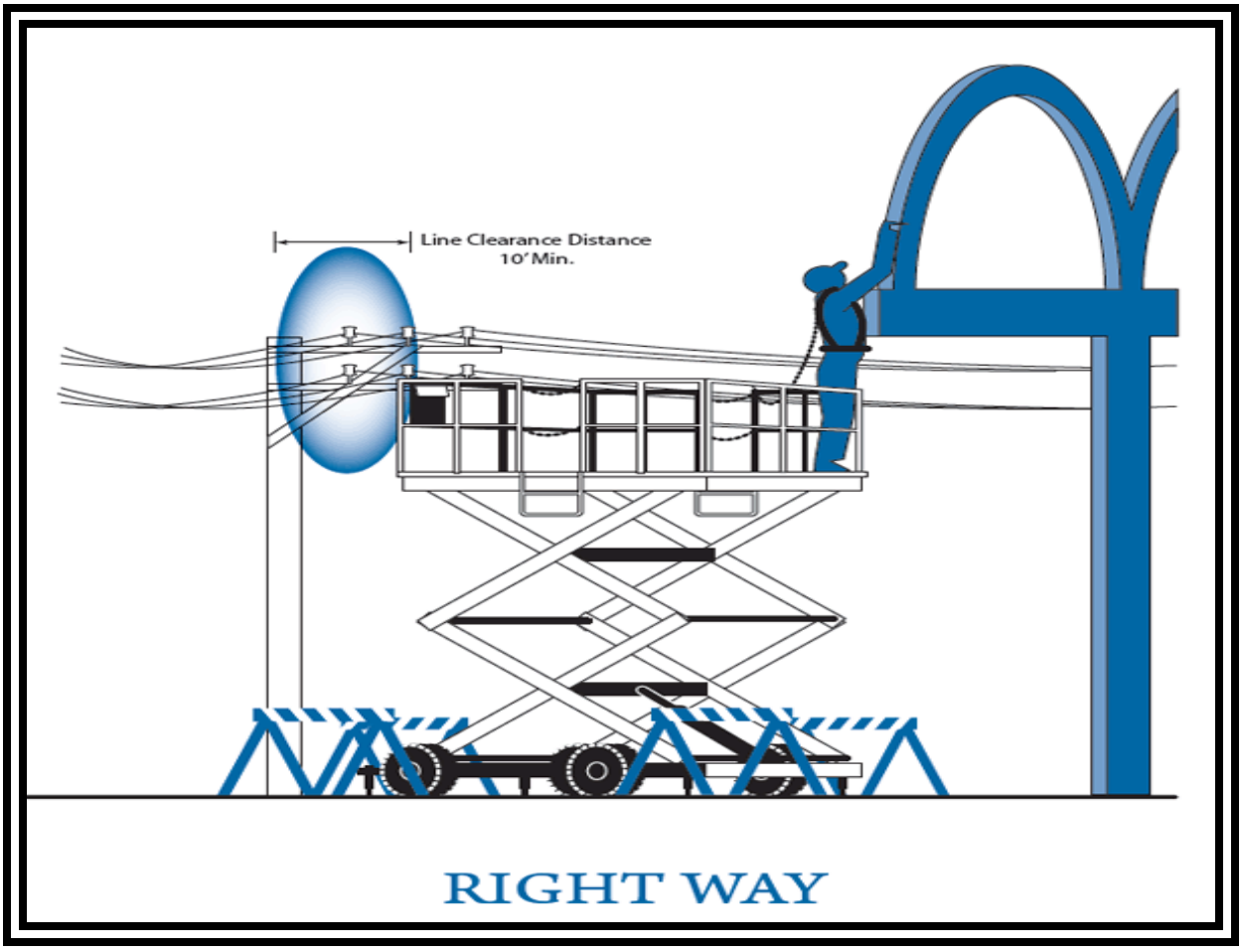
More than half of the deaths involve boom-supported lifts, such as bucket trucks and cherry pickers; most of the other deaths involve scissor lifts.

Common Mobile Aerial Platform Terminology And Facts

Electrocutions, falls, and tip over cause most of the deaths. Other causes include being caught between the lift bucket or guardrail and a stationary object (such as steel beams or joists) and being struck by falling objects.
A worker can also be catapulted out of a bucket, if the boom or bucket is struck by something.
Most of the workers killed are electrical workers, laborers, painters, ironworkers, or carpenters.



WRONG WAY



RIGHT WAY

Common
Mobile Aerial Platform
Terminology
And
Facts

Before Operating an Aerial Lift

Check operating and emergency controls, safety devices (such as, outriggers and guardrails), personal fall protection gear, wheels and tires, and other items specified by the manufacturer. Look for possible leaks (air, hydraulic fluid, and fuel-system) and loose or missing parts.

Common
Mobile Aerial Platform
Terminology
And
Facts

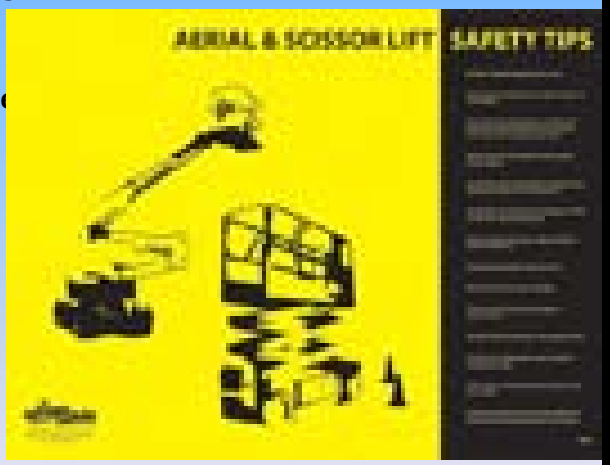
Check where the lift will be used. Look for a level surface that won't shift. Check the slope of the ground or floor; do not work on steep slopes that exceed slope limits listed by the manufacturer.

Look for hazards, such as, holes, drop-offs, bumps, and debris, and overhead power lines and other obstructions.

Common Mobile Aerial Platform Terminology And Facts

Your employer should:

- **Provide required manuals to operators and maintenance mechanics.**
- **Be sure operators and mechanics are trained by a qualified person experienc with the model of aerial Lift (s) being used.***



***OSHA says a *qualified person…by extensive knowledge, training, and experience can…solve…problems related to the subject* matter….**

A *competent person is…capable of identifying existing and predictable hazards…and has authorization to take prompt* measures to eliminate them.

Common
Mobile Aerial Platform
Terminology
And
Facts

Using An Aerial Lift:

- Always close lift platform chains or doors.

Common
Mobile Aerial Platform
Terminology
And
Facts

Using An Aerial Lift:

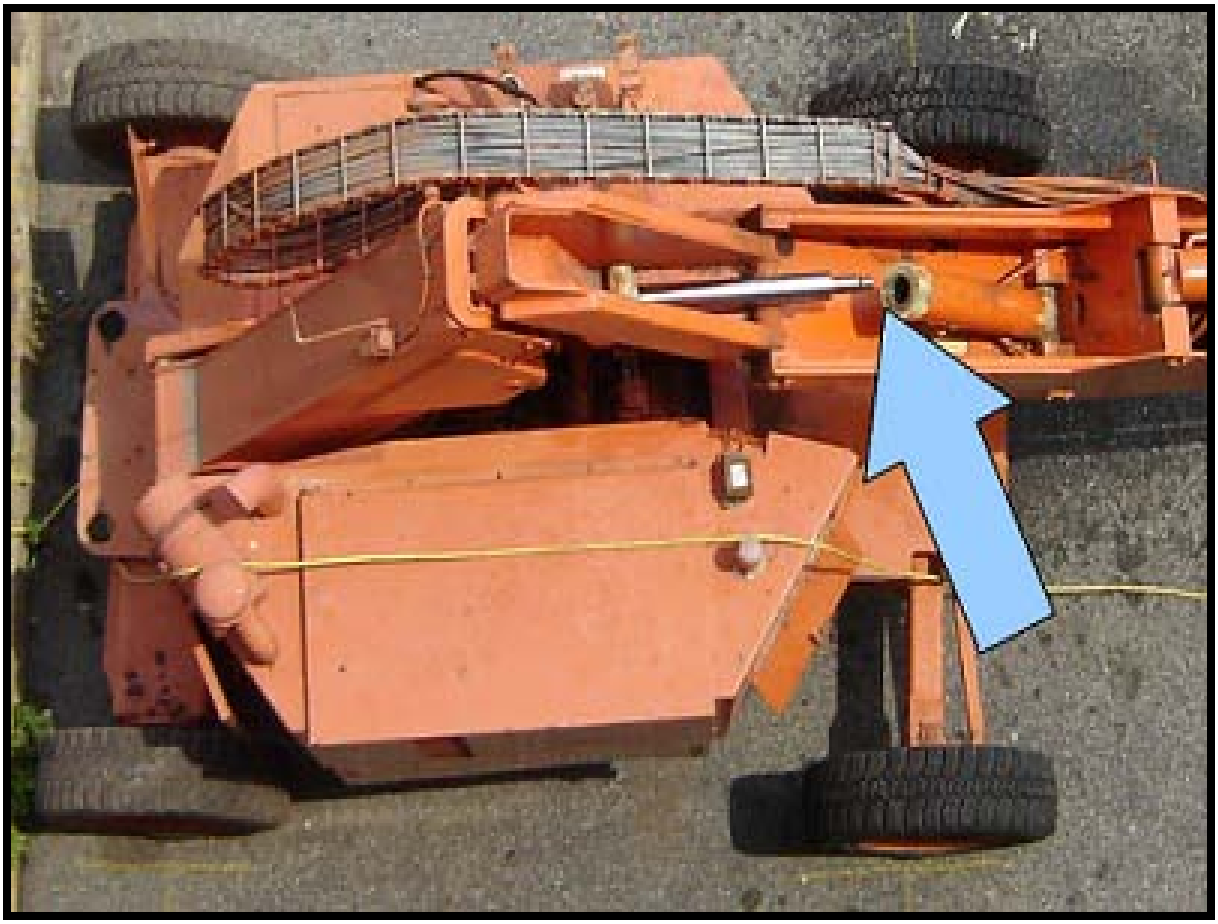
- Stand on the floor of the bucket or lift platform.

Do not climb on or lean over guardrails.

What else is wrong with this picture ????

Common
Mobile Aerial Platform
Terminology
And
Facts

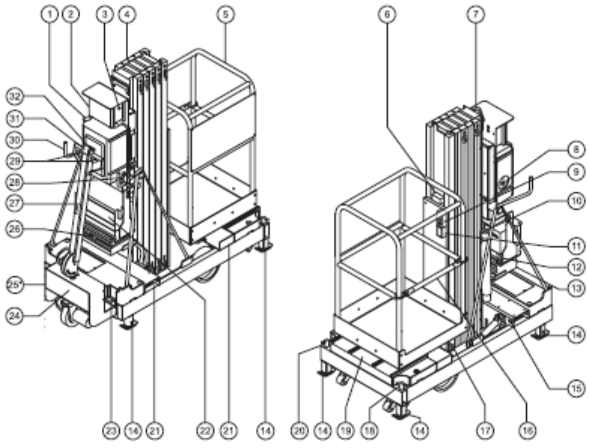
• Do not exceed manufacturer's load-capacity limits (including the weight of such things as bucket liners and tools)



Common Mobile Aerial Platform Terminology And Facts

- **If working near traffic or pedestrians, always set up work-zone warnings, like cones and signs.**

Legend



1 AC models: AC power supply line for machine
DC models: power to platform
2 Ground controls (Interlock display)
3 Circuit breaker
4 Mast
5 Platform
6 Operator's manual storage container
7 Lifting eye
8 Breather cap
9 Platform controls
10 Bubble level/level sensor
11 AC outlet
12 DC models: Battery quick disconnect
13 DC models: Battery pack
14 Footpad
15 Transport tie down
16 Platform entry mid-rail or gate
17 Forklift ring
18 Left side leveling jack
19 Counterweight
20 Right side leveling jack
21 Forklift pocket
22 DC models: Battery charger
23 Foot pedal
24 Power wheel assist option
25 Manual lowering valve (*located at the bottom of the hydraulic cylinder)
26 Battery strap
27 Steer handle - power wheel assist option
28 Base lowering handle
29 Function enable lever - power wheel assist option
30 Steering handle
31 Direction-reversing safety switch - power wheel assist option
32 Thumb rocker switch - power wheel assist option

Common Mobile Aerial Platform Terminology And Facts

- Referencing the operators manual is crucial to safe operations
- Identification of lift components that are subject to pre-use inspection is always covered in the manufacturers manual.

NASA STANDARD 8719.9

NASA Standard 8719.9

1. SCOPE

1.1 Scope. This standard applies to overhead and gantry cranes (including top running monorail, underhung, and jib cranes) mobile cranes, derricks, hoists, winches, special hoist supported personnel lifting devices, hydra-sets, load measuring devices, hooks, slings and rigging, **Mobile Aerial Platforms,** powered industrial trucks, and jacks. This document does not include coverage for front-end loaders and elevators.

NASA Standard 8719.9

1.2 Purpose.
This standard establishes NASA's minimum requirements for the design, testing, inspection, maintenance, personnel certification, and operation of lifting devices and equipment (LDE) described in paragraph 1.1

NASA Standard 8719.9

1.3 Applicability.
Compliance with this standard is mandatory for all NASA-owned and NASA contractor-supplied equipment used in support of NASA operations at NASA installations and NASA operations in host countries. The individual installation Lifting Devices and Equipment Manager (LDEM) and safety organizations are responsible for implementation and enforcement.

NASA Standard 8719.9

1.4 Relation to Occupational and Safety Health Administration (OSHA) Requirements.
This document is not a substitute for OSHA requirements. OSHA requirements apply to all NASA operations. This document meets or exceeds Federal OSHA requirements. Some States have their own OSHA programs that must comply with Federal OSHA and may be stricter. All NASA installations are responsible for keeping up to date with the Federal and State OSHA requirements that apply to their operations.

NASA Standard 8719.9

1.5 Critical and Noncritical Lifting Operations.
There are two categories of lifting operations for the purposes of this standard, critical and noncritical.

1.5.1 **Critical lifts** are lifts where failure/loss of control could result in loss of life, loss of or damage to flight hardware, or a lift involving special high dollar items, such as spacecraft, one-of-a-kind articles, or major facility components, whose loss would have serious programmatic or institutional impact.

1.5.2 **Noncritical lifts** typically involve routine lifting operations and are governed by standard industry rules and practices except as supplemented with unique NASA testing, operations, maintenance, inspection, and personnel licensing requirements contained in this standard.

NASA-STD-8719.9

- 2.0 **Applicable Documents**

- 2.1 The applicable documents cited in this standard are listed for reference only. The specified technical requirements listed in the body of this document must be met whether or not the source document is listed in this section.

- 2.2 Government Documents
  - Department of Labor (OSHA)
  - OSHA Standard 29CFR 1910 subpart I

NASA-STD-8719.9

- **2.2 Government Documents**

Department of Labor

Occupational Safety and Health Administration(OSHA)

OSHA Standard 29CFR 1910 subpart I

(Personal Protective Equipment) ←

OSHA Standard 29CFR 1910.29

(Manually Propelled Mobile Ladder Stands and Scaffolds)

OSHA Standard 29CFR 1910.67

(Vehicle-Mounted Elevating and Rotating Work Platforms)

OSHA Standard 29CFR 1910.178 (Powered Industrial Trucks)

OSHA Standard 29CFR 1910.180(Crawler, Locomotive, and Truck Cranes)

OSHA Standard 29CFR 1910.181(Derricks)

OSHA Standard 29CFR 1910.184(Slings)

OSHA Standard 29CFR 1926.550 (Cranes and Derricks)

NASA Specifications (SPECSINTACT) (Standard Construction Specification System)

NASA-STD-8719.9

2.3 Non-Government Publications

- AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME),
- AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
- ANSI A10.22, Safety Requirements for Rope Guided and Non-guided Worker's Hoists.
- **ANSI/SIA A92.2, Vehicle Mounted Elevating and Rotating Aerial Devices.**
- **ANSI/SIA A92.3, Manually Propelled Elevating Aerial Platforms.**
- **ANSI/SIA A92.5, Boom Supported Elevating Work Platforms.**
- **ANSI/SIA A92.6, Self Propelled Elevating Work Platforms.**
- ANSI/ISA S84.01, Electrical, Electronic, Programmable Electronic Systems in Safety Applications.

NASA-STD-8719.9

- 2.4 Order of Precedence
  - Where the document is adopted or imposed by contract on a program or project, the technical guidelines of this document take precedence in the case of conflict, over the technical guidelines cited in other referenced documents.

Section 11
Mobile Aerial Platforms

NASA Standard 8719.9

11.1 General.
This section establishes minimum standards for the design, testing, maintenance, inspection, personnel certification, and operation of mobile aerial platforms. This section applies to those platforms covered by ANSI/SIA A92.2 (Vehicle Mounted Elevating and Rotating Aerial Devices), A92.3 (Manually Propelled Elevating Aerial Platforms), A92.5 (Boom Supported Elevating Work Platforms), and A92.6 (Self-Propelled Elevating Work Platforms).

NASA Standard 8719.9

11.2 Safety and Design Aspects. High quality off-the-shelf OEM type equipment is acceptable if it is designed, maintained, and operated according to this standard.

NASA Standard 8719.9

11.2.1 Design criteria/general design requirements that should be emphasized for mobile aerial platforms are contained in **ANSI/SIA A92.2, A92.3, A92.5, and A92.6.** It is the responsibility of the applicable engineering, operations/maintenance, and safety organizations to ensure the design, testing, maintenance, inspection, and operation of this equipment complies with this standard, the manufacturers' recommendations, and ANSI/SIA.

ANSI
American National Standards Institute

NASA Standard 8719.9

11.2.2 Labeling/Tagging of Mobile Aerial Platforms.

a. The rated load/applicable capacity ratings shall be clearly marked on the mobile aerial platform.

b. A standard system of labeling shall be established and used throughout the installation.

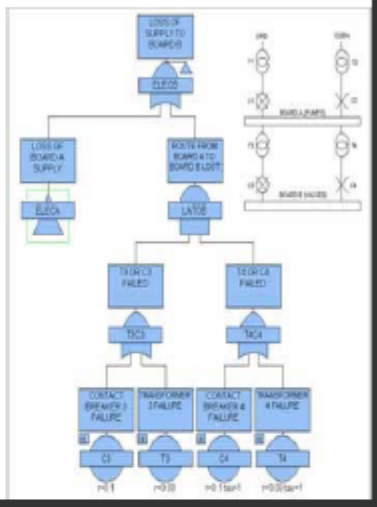
c. A standard lockout/tag-out system shall be established and used throughout the installation to indicate equipment that is not to be used due to inspection discrepancies, ongoing maintenance, or other reasons.

d. Certification/recertification tags are required as described in paragraph11.3.4.

NASA Standard 8719.9

11.2.3 Safety Analysis and Documentation of Mobile Aerial Platforms.

A recognized safety hazard analysis such as fault tree analysis, FMEA, O&SHA shall be performed on all mobile aerial platforms used for lifts where failure/loss of control could result in loss of or damage to flight hardware. The analysis shall, as a minimum, determine potential sources of danger, identify failure modes, and recommend resolutions and a system of risk acceptance for those conditions found in the hardware-facility-environment-human relationship that could cause loss of life, personal injury, and loss of or damage to the mobile aerial platform, facility, or load.



The analysis shall be done as part of the initial activation process, included in the equipment documentation, and updated as required to reflect any changes in operation and/or configuration.

NASA Standard 8719.9

11.3 Testing.

Testing of mobile aerial platforms shall be performed according to this section, the manufacturers' recommendations, and the applicable ANSI/SIA standard. Three types of tests are required for mobile aerial platforms: proof load tests, periodic load tests, and operational tests.

Proof load tests and operational tests shall be performed prior to first use for new or extensively repaired or altered components directly in the mobile aerial platform load path.

NASA Standard 8719.9

11.3 Testing

Repairs or alterations to non-lifting or non-holding components do not require a load test, although a functional check should be performed to determine if the repairs or alterations are acceptable

NASA Standard 8719.9

11.4.1 Inspections, as described below, shall be performed on all mobile aerial platforms. Inspections shall be performed according to this section, the manufacturers' recommendations, and the applicable ANSI/SIA standard. Inadequacies discovered during an inspection shall be documented and, if determined to be a hazard, tagged out and corrected prior to further use. Inspections shall be performed by qualified personnel according to approved technical operating procedures.

NASA Standard 8719.9

11.4.2

All new, extensively repaired, or modified mobile aerial platforms shall be inspected to the requirements of both daily and periodic inspections prior to first use. For component repair on mobile aerial platforms, only the inspections that apply to the repaired portion need to be performed prior to first use unless a periodic inspection interval expires during the downtime (see paragraph 11.4.5).

NASA Standard 8719.9

11.4.3

Mobile aerial platforms in regular service (used at least once a month) shall be inspected as required in paragraphs 11.4.4 and 11.4.5. Idle and standby platforms shall be inspected according to paragraph 11.4.6.

NASA Standard 8719.9

11.4.4 Daily Inspections.

These inspections shall be performed each day the mobile aerial platform is used and shall include the following:

a. Check safety devices for malfunction.

NASA Standard 8719.9

b. Check operating and control mechanisms for proper function.

NASA Standard 8719.9

c. Inspect for defects such as cracked welds, damaged control cables, and loose cable/wire connections.

NASA Standard 8719.9

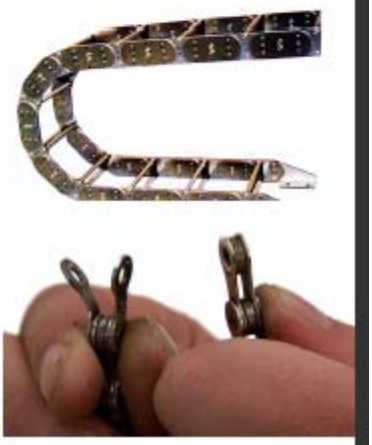
d. Inspect hydraulic or pneumatic systems for observable deterioration or leakage and check hydraulic system for proper oil level if suspect.

NASA Standard 8719.9

e. Inspect electrical equipment for signs of malfunction, signs of deterioration, and dust and moisture accumulation.

NASA Standard 8719.9

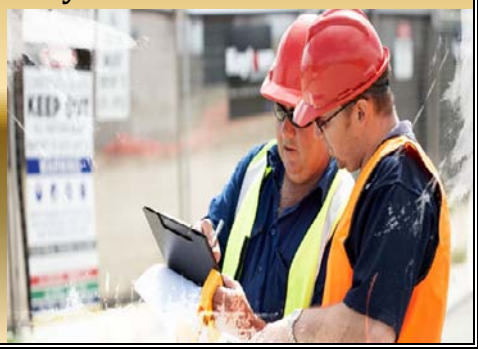
f. Inspect chains or wire rope for wear or distortion.



NASA Standard 8719.9

11.4.5 Periodic Inspections.

These inspections shall be performed at varying intervals depending on activity, severity of service, and environment. The following inspections shall be performed at least once per year or more frequently if required by the manufacturer or the applicable ANSI/SIA standard.



NASA Standard 8719.9

11.4.5 Periodic Inspections.

a.) Requirements for daily inspections described in paragraph 11.4.4.

b.) Deformed, cracked, or corroded members and loose bolts or rivets in the aerial platform structure. Various methods of NDT such as ultrasonic's, radiographic, magnetic particle, and liquid penetrant shall be utilized as needed.

c.)Worn, cracked, or distorted parts, such as pins, bearings, shafts, gears, couplings, rollers, and locking devices.

d.) Wear in chain drive sprockets and stretch in the chain.

e.) Hydraulic and pneumatic relief valve settings as required by the manufacturer.

f.) Hydraulic system for proper oil level.

NASA Standard 8719.9

11.4.5 Periodic Inspections.

g.) Hydraulic and pneumatic fittings, hoses, and tubing for evidence of leakage, abnormal deformation, or abrasion.

h.) Compressors, pumps, motors, and generators for loose fasteners, leaks, unusual noises or vibrations, loss of operating speed, and heating.

i) Hydraulic and pneumatic valves for cracks in the valve housing, leaks, and sticking spools.

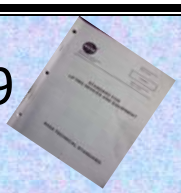
j.) Hydraulic and pneumatic cylinders and holding valves for malfunction and visible damage.

k.) Hydraulic and pneumatic filters for cleanliness and the presence of foreign material in the system indicating other component deterioration.

l.) Condition and tightness of bolts and other fasteners.

m.) Legible and proper markings of controls, ratings, and instructions.

NASA Standard 8719.9



11.4.6 Idle and Standby Mobile Aerial Platforms

Idle and standby mobile aerial platforms shall be inspected prior to first use according to the requirements of paragraphs 11.4.4 and 11.4.5 unless these daily and periodic inspections were performed at required intervals and recorded during the idle/standby period.

NASA Standard 8719.9

Idle Lifting Device (LD)

This LD has been looked out by RECERT. When the need for LD use arises, please call RECERT Support /Code 640 at Extension 6-2683 at least two weeks in advance for required inspection and release.

Note:

•After the RECERT inspection, the LD will have unlimited use for a One Month Period.

•The LD will be looked out by RECERT and returned to Idle Status when the One Month Period ends, unless the owner/user's Branch Office notifies RECERT to reclassify the LD to either Regular Service or Standby Status.

Definitions:

Lifting Device (LD) – Mobile Aerial Platform, Powered Industrial Trucks , Crane, Gantry, Hoist, Mobile Crane, Monorail ECT.

Regular Service – A lifting device used one or more times per month

Standby – A Lifting Device that is not in regular service but used occasionally or intermittently as required. (Intermittent use is defined as a Lifting Device, which has not been used for a period of One Month or more, but less than Six Months.

Idle – A Lifting Device that has no projected use for the next Twelve Month Period

Standby Lifting Device (LD)

This LD has been looked out by RECERT. When the need for LD use arises, please call RECERT Support /Code 640.6 at Extension 6-2683 at least one week in advance for required inspection and release.

NOTE:

•After the RECERT inspection, the LD will have unlimited use for a One Month Period.

•The LD will be looked out by RECERT and returned to Standby Status when the One Month Period ends, unless the owner/user's Branch Office notifies RECERT to reclassify the LD to either Regular Service or Idle Status.

Definitions:

Lifting Device (LD) – Mobile Aerial Platform, Powered Industrial Trucks, Crane, Gantry, Hoist, Mobile Crane, Monorail ECT.

Regular Service – A lifting device used one or more times per month

Standby – A Lifting Device that is not in regular service but used occasionally or intermittently as required. (Intermittent use is defined as a Lifting Device, which has not been used for a period of One Month or more, but less than Six Months.

Idle – A Lifting Device that has no projected use for the next Twelve Month Period

NASA Standard 8719.9

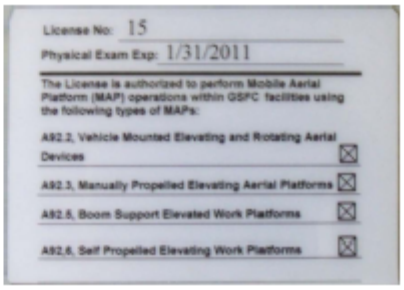
11.4.7 Inspection Reports.

After each formal periodic inspection, qualified personnel shall prepare written, dated, and signed inspection reports, including procedure reference and adequacy of components. Inadequacies shall be documented and, if determined to be a hazard, corrected prior to further use. These reports shall be filed and be made readily available by the organizational element responsible for mobile aerial platforms.

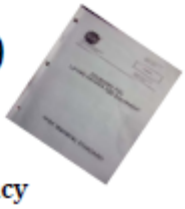
NASA Standard 8719.9

11.6 Personnel Certification.
Only certified (licensed) and trained operators shall be authorized to operate mobile aerial platforms (except for manually propelled platforms where training can be provided). A training, examination, and licensing program shall be established or made available. For those NASA installations that do not have a training program, all mobile aerial platform operators shall be trained and certified by a recognized certification organization that normally performs this function. The basic certification program will include the following:


National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, MD 20771
Mobile Aerial Platform (MAP) Operator License
Joseph Selba/540.5
Name/Code
has met all requirements of NASA-STD-8719.9, NPR 8715.3, and is certified for Mobile Aerial Platform operations using MAPs as indicated on the reverse side.
Approval:
B.J. Montgomery, Acting RECERT Manager/GSFC Date
License Expiration: January 31, 2011


License No: 15
Physical Exam Exp: 1/31/2011
The License is authorized to perform Mobile Aerial Platform (MAP) operations within GSFC facilities using the following types of MAPs:
A92.2, Vehicle Mounted Elevating and Rotating Aerial Devices ☒
A92.3, Manually Propelled Elevating Aerial Platforms ☒
A92.5, Boom Support Elevated Work Platforms ☒
A92.6, Self Propelled Elevating Work Platforms ☒

NASA Standard 8719.9



11.6.1 Training.
a. Classroom training in safety, lifting equipment emergency procedures, general performance standards, requirements, pre-operational checks, and safety-related defects and symptoms (for initial certification and as needed).

NASA Standard 8719.9

11.6.1 Training

b. Hands-on training
(for initial certification and as needed).

NASA Standard 8719.9

11.6.1 Training

c. An annual review of items listed in paragraphs 11.6.1a and 11.6.1.b above.
(This may be conducted informally by local supervisory personnel).

NASA Standard 8719.9

11.6.1 Training

d. Training for working at heights and the proper use of fall protection equipment.

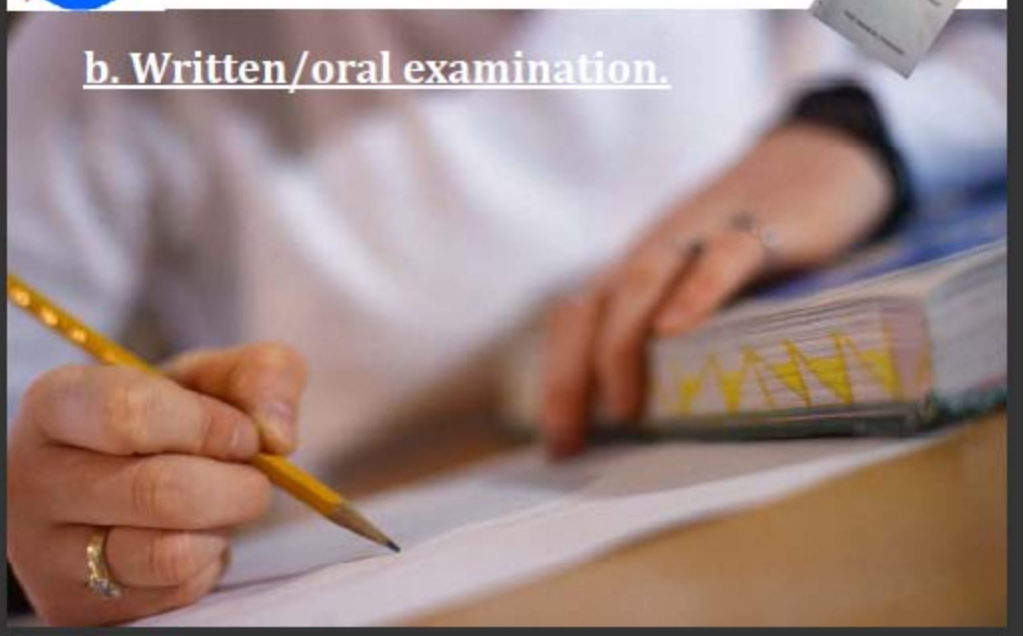
NASA Standard 8719.9

11.6.2 Examination.

a. Physical examination
(criteria to be determined by the cognizant medical official).

NASA Standard 8719.9

b. Written/oral examination.



NASA Standard 8719.9

c. Operational demonstration.

NASA Standard 8719.9

d. Proficiency examination for recertification.

NASA Standard 8719.9

11.6.3 Licensing. An organizational element shall be designated to issue operator licenses. Provisions shall be made to revoke licenses for

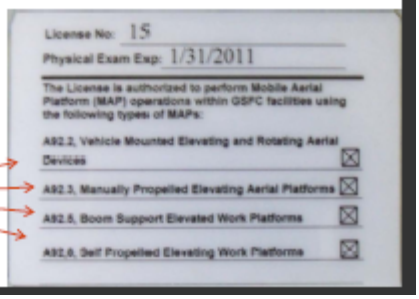
A) **negligence,**

B)**violations of safety requirements,**

C) **or failure to meet medical standards**.

Provisions shall be made for periodic checks of operators to verify they have licenses in their possession. The licenses shall indicate the type of mobile aerial platform the holder is

Qualified to operate.



NASA Standard 8719.9

11.6.4 Renewal.

Licenses or certifications will expire at least every ~~4.~~ 2 years. Renewal shall require demonstration of proficiency or approval of supervision that proficiency is adequate and current. Renewal procedures will be established by each licensing organization, but as a minimum, will include items in paragraphs 11.6.1 and 11.6.2.

NASA Standard 8719.9

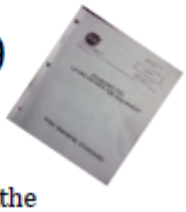
11.7 Operations.

a. Determine that the proposed mobile aerial platform operation is the desired operation after comparing hazards, productivity, and manpower requirements associated with other methods of access.

NASA Standard 8719.9

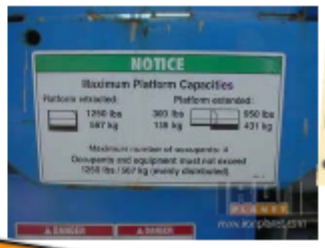
The Safest way
Is The Best Way

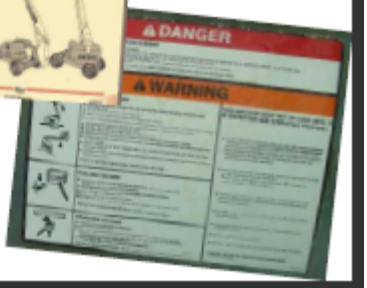
NASA Standard 8719.9

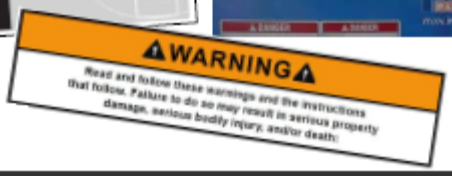


11.7 Operations.

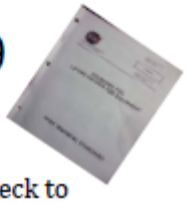
b. Before each use, the operator shall have read and understood the manufacturer's operating instructions and safety rules, have been trained and licensed according to paragraph 11.6, and have read and understood all decals and warnings on the equipment.







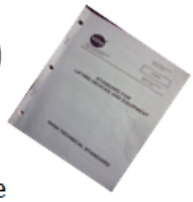
NASA Standard 8719.9



11.7 Operations.

c. Before each use, the operator shall perform a pre-operational check to demonstrate operational readiness, including all limit switches and outrigger drift switches, if applicable, but excluding the tilt alarm/shutoff. If controls do not operate properly, the operator is responsible for notifying the supervisor. Repairs and adjustments shall be made before operations begin. The operator shall adhere to all tags on the controls.

NASA Standard 8719.9



11.7 Operations.

d. Before each use, the operator shall survey the area for applicable hazards such as overhead obstructions and high-voltage conductors, debris, bumps and loose obstructions, drop-offs and holes, ditches, un-tamped earth fills, obstructed path of travel, unstable footing, and other possible hazardous conditions. The operator shall establish appropriate safety zones before initiating operations.

NASA Standard 8719.9

11.7 Operations.

d. Before each use, the operator shall survey the area for applicable hazards such as overhead obstructions and high-voltage conductors, debris, bumps and loose obstructions, drop-offs and holes, ditches, un-tamped earth fills, obstructed path of travel, unstable footing, and other possible hazardous conditions. The operator shall establish appropriate safety zones before initiating operations.

NASA Standard 8719.9

11.7 Operations.

e. The equipment shall not be loaded beyond its rated load (capacity) except for required testing.

NASA Standard 8719.9

11.7 Operations.

f. The operator shall ensure the equipment is within inspection and testing intervals by examination of the periodic recertification tags and/or documentation.

NASA Standard 8719.9

11.7 Operations.

g. Operator discipline shall be maintained at all times. There shall be no eating, drinking, or rowdiness during mobile aerial platform operations.

Personnel shall keep all parts of the body, tools, and equipment inside the work platform periphery during raising, lowering, and traveling operations.

NASA Standard 8719.9

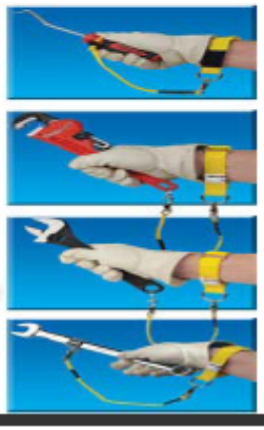
11.7 Operations.

h. Fall protection is required for personnel using mobile aerial platforms that can tilt, as covered by ANSI/SIA A92.2 and A92.5.

NASA Standard 8719.9

11.7 Operations.

i. Tools and other objects shall be carried in canvas bags or by other methods that free both hands and do not present a snagging hazard. Alternate methods of tool delivery beside mobile aerial platforms should be investigated.



NASA Standard 8719.9

11.7 Operations.

j. For work on or near electrical distribution and transmission lines, mobile aerial platforms shall be operated in accordance with paragraphs 5.7.as, 5.7.at, and 5.7.au of this standard and the applicable ANSI/SIA standard.

NASA Standard 8719.9

11.7 Operations.

k. Insulated mobile aerial platforms shall be tested and inspected in accordance with ANSI/SIA.

NASA Standard 8719.9

11.7 Operations.

Notre Dame student dies in lift accident

Only 20 years old

l. Outdoor mobile aerial platform operations should not commence if winds are above 20 knots steady state (23 mph, 37 km/hr) or if gusts exceed 25 knots (29 mph, 46 km/hr) or as recommended by the manufacturer. Consideration shall also be given to weather conditions such as lightning or snow before commencing operations.

NASA Standard 8719.9

11.7 Operations.

m. The requirements of this section apply to all uses of mobile aerial platforms; e.g., movement for storage/repositioning and use of the platform close to ground level.

GPR 8834.1B Goddard Procedural Requirements (GPR)

GPR 8834.1B

Goddard Procedural Requirements (GPR)

•PURPOSE

•The purpose of this GPR is to define the process, requirements, and responsibilities for conducting safe lifting operations at Goddard Space Flight Center (GSFC).

GPR 8834.1B

Goddard Procedural Requirements (GPR)

•APPLICABILITY

a. **This directive is applicable to all operations associated with Lifting Devices and Equipment (LDE), including rented or leased LDE and LDE provided by on-site Support Services Contractors to the extent provided in their contracts, at Greenbelt, Wallops Flight Facility (WFF), and other areas under GSFC cognizance unless specifically excluded by this directive. It also applies to institutional lifts and manual lifts.**

b. This directive does not apply to tenants and their contract personnel operating in facilities exclusively used for non-NASA operations and controlled by the tenant under a Center-level agreement provided NASA personnel are not placed at risk.

c. When invoked as a contractual requirement by the applicable project, this directive is applicable to the extent specified in the contract for off-site contractor installations supporting GSFC activities.

GPR 8834.1B

Goddard Procedural Requirements (GPR)

d. Lifting operations under privatization clauses shall be subjected to the provisions of this directive to the extent provided by the contract, and the requirements shall be clearly specified therein.

e. The responsible Contracting Officer and the Project Manager shall apply requirements of this directive to any contractor, tenant, or customer if non-NASA lifting operations place NASA personnel, facilities, or equipment at risk.

f. This directive does not apply to contractor lifting operations using contractor-provided LDE which are exclusively associated with facility construction activities where the activities take place exclusively within an area to which access by the general population of NASA employees is excluded

GPR 8834.1B

Goddard Procedural Requirements (GPR)

P3 AUTHORITY

- NASA-STD-8719.9, Standard for Lifting Devices and Equipment

P4 REFERENCES

- NPR 8715.3, NASA General Safety Program Requirements
- GPR 1400.1 Waiver Processing
- GPR 1410.2, Configuration Management
- GPR 5330.1, Product Processing, Inspection and Test
- GPR 8621.1, Reporting of Mishaps and Close Calls
- GPR 8719.1, Certification and Recertification of Lifting Device Equipment
- GSFC WM-001, Workmanship Manual for Electrostatic Discharge (ESD) Control
- GSFC Form 23-60, Task Safety Analysis Worksheet
- NASA-STD-8719.9, Standard for Lifting Devices and Equipment
- Department of Health and Human Services (DHHS)/National Institute for Occupational Safety and Health (NIOSH) Publication No. 94-110,

Applications Manual for the Revised NIOSH Lifting Equation

- OSHA 1910.135 (a)(1), Head Protection
- ASME B30.23, Personnel Lifting Systems

GPR 8834.1B

Goddard Procedural Requirements (GPR)

P5 CANCELLATION

GPR 8834.1A, Lifting Operations Requirements

P6 SAFETY

Safety requirements are described throughout this GPR.

GPR 8834.1B

Goddard Procedural Requirements (GPR)

•**TRAINING**

Supervisors shall ensure that:

a.)Personnel involved in manual lifts are trained or briefed on proper lifting techniques;

b.)All individuals designated to participate in a lifting operation are qualified to perform their role safely and effectively, based on training, prior experience, and physical ability to do the operation. This includes designated observers, safety representatives, LDE operators, communicators, and all other participants; and

c.)LDE Operators are trained and certified in accordance with GPR 8719.1 for the type of lifting operations required, and that training and certifications are current

GPR 8834.1B

Goddard Procedural Requirements (GPR)

	• **P.10 Definition**
e.) Customer –	A non-NASA, government or private sector entity or organization that owns, sponsors, or otherwise champions a project brought onto GSFC property by a current NASA contractor exercising a contractual provision permitting such an arrangement for the purposes of utilizing NASA facilities and/or test equipment on a lease or rental basis.
f.) Flight Hardware –	Hardware designed and fabricated for ultimate use in a vehicle intended to fly.
g.) Hazardous Operating Procedures (HOP)	Detailed, documented procedures listing step-by-step functions or tasks to be performed on a system or equipment to ensure safe and efficient operations. A HOP may address such topics sequences of steps, approving official(s), etc. as special precautions, start and stop times or conditions, necessary

GPR 8834.1B

Goddard Procedural Requirements (GPR)

• P.10 Definitions

j.) **LDE Operator Certification** – The documented status of LDE operators validating that they are trained and qualified in accordance with NASA-STD-8719.9 and GPR 8719.1, and certified by the RECERT Manager at Greenbelt or the Deputy RECERT Manager at Wallops.

GPR 8834.1B

Goddard Procedural Requirements (GPR)

• P.10 Definitions

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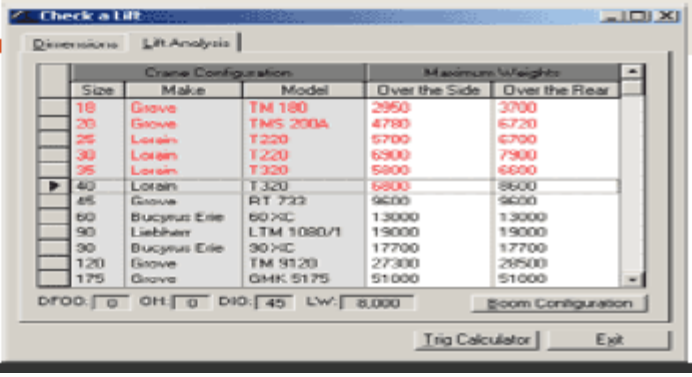
k.) **Lift Analysis** – Analysis performed to determine the maximum load the LDE is expected to experience during the worst case lift.



GPR 8834.1B

Goddard Procedural Requirements (GPR)

l.) Lift Categories –	The category of lifting operations determines the number and qualifications of personnel involved, documentation requirements, and safety requirements. The following categories of lifts are addressed:
Critical Lift –	•A lift where failure/loss of control could result in loss of life, loss of or damage to critical hardware, or other items such as spacecraft, one-of-a-kind articles, or major facility components whose loss would have serious programmatic or institutional impact. Operations involving the lifting of personnel with a crane, and lifts where personnel are required to work under a suspended load, shall always be defined as critical lifts (see NASA-STD-8719.9). Operations with special personnel and equipment safety concerns beyond normal lifting hazards shall also be designated as critical. See Appendix C for a "Process for Lifting Category Determination.
Non-Critical Lift –	•A lift involving routine lifting operations governed by standard industry rules and practices except as supplemented with unique NASA testing, operations, maintenance, inspection, and personnel licensing requirements contained in NASA-STD-8719.9 and this directive.

GPR 8834.1B

Goddard Procedural Requirements (GPR)

	• P.10 Definitions
m.) Lifting Devices and Equipment (LDE)	The collective term that includes both Lifting Devices (LD) and Lifting Equipment (LE). LDs are machines such as overhead and gantry cranes (including top running, monorail, underhung, and jib cranes), mobile cranes, derricks, gantries, hoists, winches, special hoist-supported personnel lifting devices, Hydra Sets, **mobile aerial platforms,** powered industrial trucks, and jacks. LE includes the slings and sling assemblies, strong backs, shackles, load-measuring devices, and hardware components used to attach the load(s) to the lifting device(s).
n.) Manual Lift –	A lift where a person lifts, holds, and/or moves an item.
o.) Mechanical Lift –	A lift that employs the use of equipment (e.g., crane, chain fall, fork lift, Aerial Lift etc.) to raise, lower, or move loads or personnel.

GPR 8834.1B

Goddard Procedural Requirements (GPR)

- **P.10 Definitions**

r.) Personal Protective Equipment (PPE) -

Safety equipment such as hard hats, goggles, steel-toed shoes, etc.
(And full Body Harness For Mobile Aerial Lifts)

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t.) RECERT -

An established GSFC process that provides certification and recertification expertise, management, and oversight for lifting devices and equipment at GSFC or by GSFC contractors (see P.2). The RECERT manager has overall responsibility for RECERT functions. The processes of certification/recertification of LDE and operators are described in GPR 8719.1.

GPR 8834.1B

Goddard Procedural Requirements (GPR)

- **P.10 Definitions**

X.) Waiver/Variance – Written authorization to depart from a specific requirement.

Variances and waivers can be granted for NASA requirements only, never for an OSHA requirement.

GPR 8834.1B

Goddard Procedural Requirements (GPR)

P.11 Acronyms

- **ASME** American Society of Mechanical Engineers
- **CLC** Critical Lift Coordinator
- **CG** Center of Gravity
- **CMS** Constant Micro Speed
- **DHHS** Department of Health and Human Services
- **DOT** Department of Transportation
- **EED** Electro-Explosive Device
- **ESD** Electrostatic Discharge
- **FOM** Facility Operations Manager
- **GSFC** Goddard Space Flight Center
- **HOP** Hazardous Operating Procedures
- **LD** Lifting Device
- **LDE** Lifting Devices and Equipment
- **LE** Lifting Equipment
- **LSP** Lifting Service Provider
- **NIOSH** National Institute for Occupational Safety and Health
- **OEM** Original Equipment Manufacturer
- **OLOC** Off Load Operation with Constraints
- **OSHA** Occupational Safety and Health Administration
- **PIC** Person In Charge
- **PPE** Personal Protective Equipment
- **QA** Quality Assurance
- **RECERT** Recertification Program
- **SWL** Safe Working Load
- **WFF** Wallops Flight Facility
- **WOA** Work Order Authorization

GPR 8834.1B

Goddard Procedural Requirements (GPR)

Procedures

In this document, a requirement is identified by "shall," a good practice by "should," permission by "may" or "can," expectation by "will" and descriptive material by "is."

- This directive establishes GSFC requirements for lifting operations. It complements NASA-STD-8719.9 to ensure the safety of all personnel and equipment involved in lifting operations at all levels of complexity.
- For use at a contractor's facility, the requirements of this directive may be tailored and reissued as a project document and controlled in accordance with GPR 1410.2, and invoked in the applicable contract(s).

GPR 8834.1B

Goddard Procedural Requirements (GPR)

- **RESPONSIBILITIES**
- **1.1 Lifting Service Provider (LSP)**

  - The LSP is the organization that provides a lifting service to a user, and is usually the owner/operator of the facility where the lift service is performed. The LSP may provide their own LDE and/or operators, or task supporting organizations or contractors to provide LDE and/or operators.

GPR 8834.1B

Goddard Procedural Requirements (GPR)

1.1 LSP Responsibilities

a) Verifying that LDE operators and supporting personnel are properly designated, authorized, trained, and certified (see GPR 8719.1) at the time lifting operations are performed;

b) Verifying that lift procedures and checklists, when needed (see Section 3.1), are available and understood for lifting operations;

c) Verifying that deficient LDE or other lifting equipment that is removed from service is locked out or tagged out-of-service, and that RECERT is promptly notified;

GPR 8834.1B

Goddard Procedural Requirements (GPR)

1.1 LSP Responsibilities (continued)

d) Coordinating outages for load testing and inspections of lifting devices with RECERT to minimize conflicts with ongoing operations;

e) Providing lifting devices and/or lifting equipment, when requested by the Lifting Service User, appropriate for the lifting operation, i.e., certified for critical (and non-critical) lifts, or certified for non-critical lifts only;

f) Notifying the Facility Operations Manager (FOM) of any operations that may have unusual hazards or safety implications (see 1.11); and

g) Safe conduct of all lifting operations.

!!!Please Note: Any use of LDE must be authorized by the FOM and /or the Owner of the LDE , prior to use ,regardless of operator qualifications.

GPR 8834.1B

Goddard Procedural Requirements (GPR)

1.1 LSP Responsibilities (continued)

- **For Critical Lifts, the LSP shall also:**

h) Provide expert advice and assistance on lifting operations;

i) Support the User in developing the Critical Lift Procedure(s) for User equipment;

j) Support the User in developing variance requests, when required;

k) Verify that all required LDE and associated tools are available, in correct operating condition, and certified as required;

l) Review and verify lift and critical lift procedures with the User prior to the lift operation; and

m) Certify, to the User, that all above requirements have been met prior to the lift operation.

GPR 8834.1B

Goddard Procedural Requirements (GPR)

1.2 Lifting Service User

- The Lifting Service User **(hereinafter referred to as "User")** is the Program or Project Manager or their Representative that is the owner of the hardware being lifted or handled. The User is ultimately responsible for their hardware, and therefore has key responsibilities in the lifting operations. Users shall coordinate closely with the LSP for the conduct of lifting operations that affect their hardware.
- Many Users are flight projects that use special lifting devices or fixtures and require specialized engineering support.
- **They may provide their own lifting equipment and/or operators, or task supporting organizations or contractors to provide equipment and/or operators.**

GPR 8834.1B

Goddard Procedural Requirements (GPR)

1.3 Person In Charge (PIC)

- The PIC shall take overall responsibility for the conduct of the lifting operation. The PIC shall be from the User organization or the LSP, and may be an I&T Manager, Lead Engineer, LDE Operator, the Rigger, a Critical Lift Coordinator (CLC), supervisor, or any other individual selected and specified in the critical lift or other applicable procedure. The PIC shall:

a) Verify that all involved parties meet the lift requirements;
b) Verify that all tools and equipment are adequate for the lift requirements;
c) Fill out Appendix C "Process for Lifting Category Determination";
d) For any critical lift, or for any lift determined by the LSP or User to need a pre-lift briefing and walk-through, conduct a pre-lift briefing/walk-through with all required participants. See Section 2.3;
e) Verify that adequate communications and direction are available, particularly for the LDE operator(s); and
f) Manage the lifting operation.

GPR 8834.1B

Goddard Procedural Requirements (GPR)

1.4 Safety Representative(s)

The qualified safety representative(s) shall be responsible for the following:

a) Maintaining qualification in terms of competence, experience, training, etc.

b) Verifying that all applicable safety analyses or assessments are completed in accordance with requirements of NASA-STD-8719.9;

c) Advising all personnel involved in the lifting operations of any additional hazard(s) and appropriate methods of hazard control prior to and throughout the entire lifting operation;

d) Verifying that Incident/Mishap Reports are initiated and submitted in accordance with this document and the requirements of GPR 8621.1;

e) Providing input to the User organization to identify the lifting operations as critical or non-critical;

GPR 8834.1B

Goddard Procedural Requirements (GPR)

1.4 Safety Representative(s) (Continued)

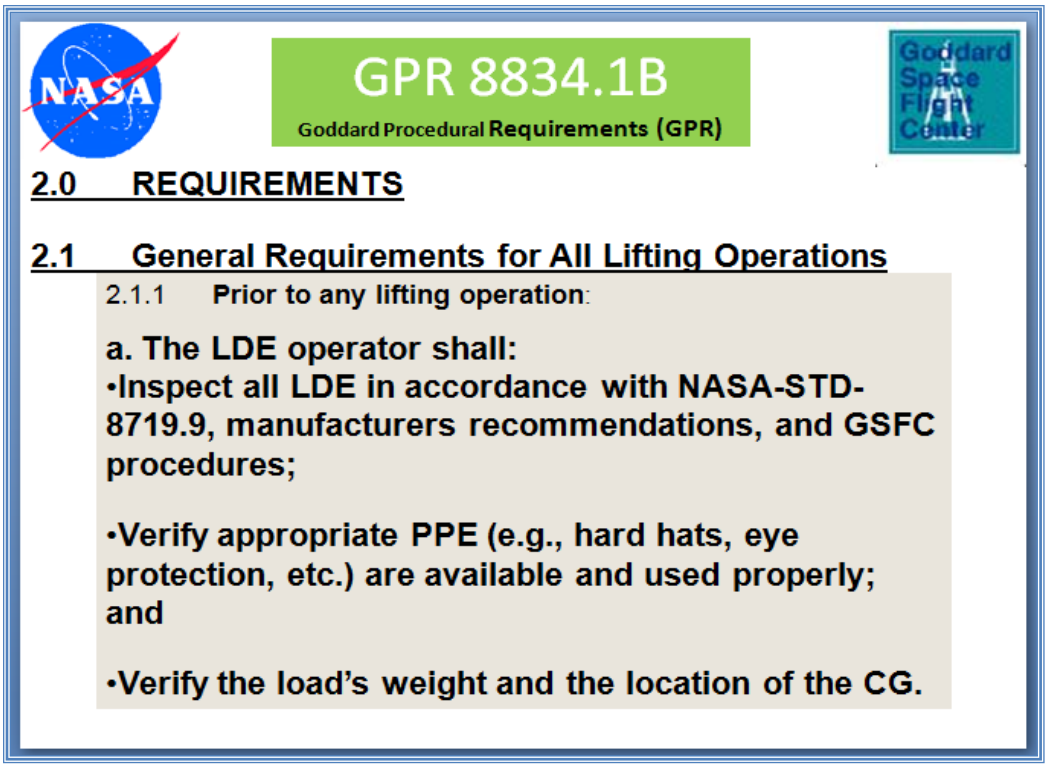
f) Reviewing and approving all critical lift procedures, HOPs, and WOAs pertaining to critical lifting operations;

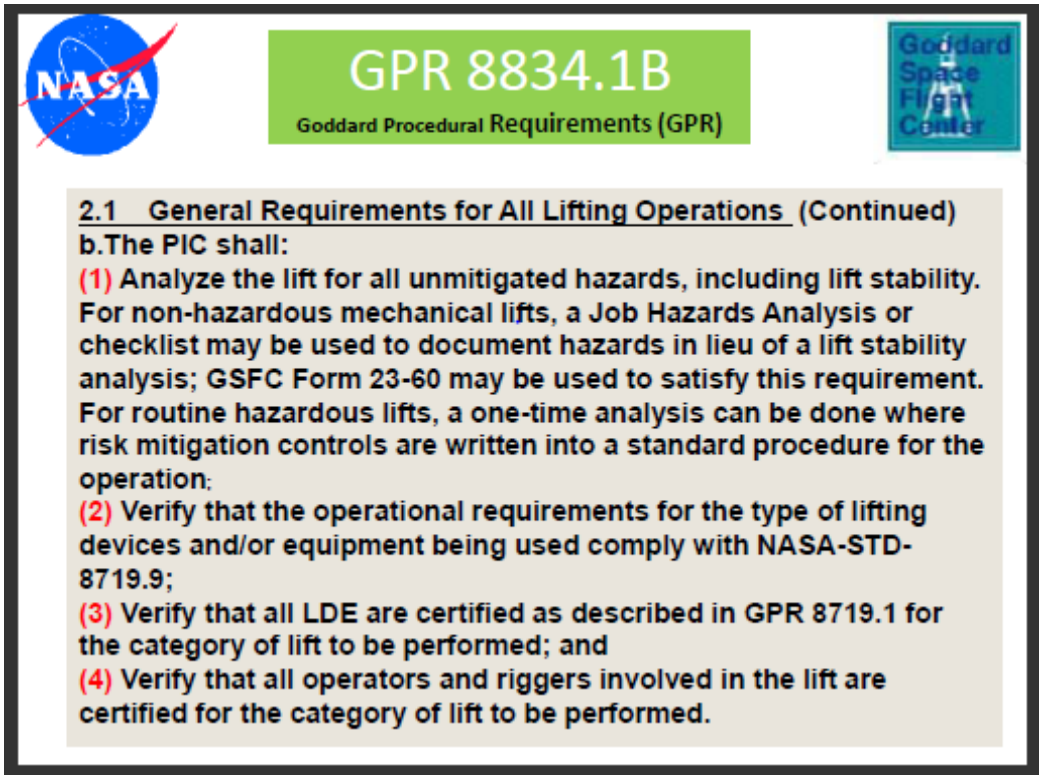
g) Ensuring appropriate hazard controls have been addressed in the HOPs and/or WOAs;

h) Ensuring that the lifting operation adheres to this directive and all applicable NASA, Occupational Safety and Health Administration (OSHA), and processing facility safety regulations (where appropriate);

i) Providing concurrence to proceed with a hazardous lifting operation and, upon completion, concurrence to open the controlled area and resume normal operations; and

j) Reviewing and concurring with/denying project-initiated safety waiver/variance requests (see NPR 8715.3 or GPR 1400.1) prior to submittal to the RECERT Manager.


GPR 8834.1B
Goddard Procedural Requirements (GPR)
2.0 REQUIREMENTS
2.1 General Requirements for All Lifting Operations
2.1.1 Prior to any lifting operation:
a. The LDE operator shall:
•Inspect all LDE in accordance with NASA-STD-8719.9, manufacturers recommendations, and GSFC procedures;
•Verify appropriate PPE (e.g., hard hats, eye protection, etc.) are available and used properly; and
•Verify the load's weight and the location of the CG.


GPR 8834.1B
Goddard Procedural Requirements (GPR)
2.1 General Requirements for All Lifting Operations (Continued)
b.The PIC shall:
(1) Analyze the lift for all unmitigated hazards, including lift stability. For non-hazardous mechanical lifts, a Job Hazards Analysis or checklist may be used to document hazards in lieu of a lift stability analysis; GSFC Form 23-60 may be used to satisfy this requirement. For routine hazardous lifts, a one-time analysis can be done where risk mitigation controls are written into a standard procedure for the operation;
(2) Verify that the operational requirements for the type of lifting devices and/or equipment being used comply with NASA-STD-8719.9;
(3) Verify that all LDE are certified as described in GPR 8719.1 for the category of lift to be performed; and
(4) Verify that all operators and riggers involved in the lift are certified for the category of lift to be performed.

GPR 8834.1B

Goddard Procedural Requirements (GPR)

2.1.3 Electrostatic Discharge (ESD) Sensitivity

User shall be responsible for ESD protection of the load

2.1.4 Explosives or Electro-Explosive Devices

Shall be designated as critical unless a risk assessment indicates otherwise, in which case it will be classified hazardous

2.1.5-6 Pressurized Containers/Hazardous Materials

Shall be designated critical unless they meet DOT or ASME requirements, are still in OEM packaging, or a risk assessment indicates otherwise, in which case it will be classified hazardous

2.1.7 Hazardous Lifting Operations

Shall be conducted in accordance with 3.8 and 7.4 of NPR 8715.3A

2.1.9 Hard Hats

Shall be worn to prevent risk of contact with falling objects, however if hard hat poses risk to load, PIC shall examine situation and determine appropriate PPE requirements

GPR 8834.1B

Goddard Procedural Requirements (GPR)

- **2.3 A Pre-Lift Briefing shall be conducted when:**
  - There is more than one person involved in the activity
  - The lift is deemed critical
  - It is requested by PIC, LSP, User, etc.
- **The briefing shall include:**
  - **Verification that team members are present and that they understand their roles and responsibilities and PPE requirements**
  - A step-by-step review of the lifting operation
  - Explanation of the hardware to be lifted, **associated Ground Support Equipment**, configuration of lifting equipment, and associated hazards
  - **A review any applicable safety requirements** or procedures
  - Emphasis that safety is the primary consideration during the lift

GPR 8834.1B

Goddard Procedural Requirements (GPR)

- **2.4 Institutional Lifts**
  - Performed frequently and repetitively
  - Normally involve activities such as construction or maintenance, handling of shop materials, and other routine activities involved in the normal operation
  - Generally the LDE are cranes, fork lifts, powered pallet jacks, and other material-handling equipment
- **2.5 Manual Lifts**
  - Supervisors shall determine and document weight limits for manual non-critical lifts
  - A walk-through shall be performed before commencing lift
  - Make sure that work area and path are cleared
  - Lift with correct posture as to avoid injury
  - When in doubt, STOP!

GPR 8834.1B

Goddard Procedural Requirements (GPR)

- **2.5.1 Manual Lifts**

The following safe lifting and handling load limits **shall** apply for each manual **CRITICAL** lift:

1) **35 lbs** of manageable shape and size for one person;
2) **75 lbs** of manageable shape and size for two people;
3) **100 lbs** of manageable shape and size for three people;
4) **No manual lift shall be performed for a load exceeding 100 lbs unless written concurrence from a qualified safety representative has been obtained; and**
5) **All lifts shall be within limits of comfortable balance and control.**

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Goddard Procedural Requirements (GPR)

Criticality	Type	Description	Lift Procedure Needed
Non-Critical	Mechanical	Simple or Routine	No
Non-Critical	Mechanical	Non-Routine or Complex	Yes
Non-Critical	Mechanical	Institutional with no risks except those inherent in any lifting operation	No
Non-Critical	Mechanical	Institutional with risks in addition to those inherent in any lifting operation	Yes
Non-Critical	Manual	Simple	No
Non-Critical	Manual	Complex	Yes
Non-Critical	Manual	High Dollar	Yes
Non-Critical	Manual	Safety Risk	Yes
Critical	All	All (See 3.1 g)	Yes

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Goddard Procedural Requirements (GPR)

- 3.2 Non-Critical Lift Procedure shall address, as a minimum:
  - Operating Instructions
  - Operator Certification and Training Requirements
  - Equipment Certification Requirements
  - Any Other Information Needed to Ensure Safety

GPR 8719.1B

Certification and Recertificaton of Lifting Devices and Equipment

Goddard Procedural Requirements (GPR)

DIRECTIVE NO. GPR 8719.1B
EFFECTIVE DATE: May 28, 2015
EXPIRATION DATE: May 28, 2020

SIGNATURE BY: Signature: Original Signed By
NAME: Dennis Andrucyk
TITLE: Director of SSED

COMPLIANCE IS MANDATORY

Responsible Office: 540/Mechanical Systems Division
Title: Certification of Lifting Device Equipment and Its Operators

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GSFC
Code 540
Recertification
Program
LDE and PVS Certification/Recertification

GPR 8719.1B

Certification and Recertificaton of Lifting Devices and Equipment

(P1) PURPOSE

This directive implements the requirements of NASA Standard 8719.9 "Standard for Lifting Devices and Equipment" for the GSFC Recertification Program (RECERT) in providing Center organizations with frequent and periodic inspection, certification, and recertification of lifting devices and equipment (LDE). Requirements are established for LDE Operators of cranes, mobile aerial platforms (MAP), and powered industrial trucks (PIT), and Critical Lift Coordinator (CLC) training and certification. This Center program improves safety, and minimizes or prevents potential personnel injury or fatality, and damage or loss of hardware and facilities.

This directive is not a substitute for applicable Occupational Safety and Health Administration (OSHA) and national consensus codes and standards (NCS) requirements. OSHA and NCS requirements apply to all GSFC LDE, LDE Operators, and their respective operations.

GPR 8719.1B

Certification and Recertification of Lifting Devices and Equipment

P2 Applicability

a. This directive is applicable to all LDE at Greenbelt, Wallops Flight Facility (WFF), and other areas under GSFC cognizance, regardless of ownership, that are operated or used by NASA employees or GSFC support services contractors, to the extent required in their respective contracts, unless specifically excluded by this directive or by the RECERT Manager.

b. When invoked as a contractual requirement by a project, this directive is applicable to the extent specified in the contract for off-site contractor installations supporting GSFC activities.

GPR 8719.1B

Certification and Recertificaton of Lifting Devices and Equipment

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GPR 8719.1B

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GPR 8719.1B

Certification and Recertification of Lifting Devices and Equipment

P2 Applicability – (Continued)

c. Lifting operations under privatization clauses shall be subjected to the provisions of this directive to the extent provided by the contract, and the requirements shall be clearly specified therein.

d. The responsible Contracting Officer and the Project Manager shall apply requirements of this directive to any contractor, tenant, or customer if non-NASA lifting operations place NASA personnel, facilities, or equipment at risk through incorporation into their respective contracts.

P.3 AUTHORITIES

- NASA-STD-8719.9, Standard for Lifting Devices and Equipment

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Certification and Recertificaton of Lifting Devices and Equipment

P.4 APPLICABLE DOCUMENTS

The references as listed within the NASA-STD 8719.9 are applicable:

a. 29 CFR 1926.1400, OSHA, Cranes & Derricks in Construction
b. 29 CFR 1910, Occupational Safety and Health Standards
c. NASA-STD 1800.1, NASA Occupational Health Program Procedures
d. NASA-STD-8709.20. Management of Safety and Mission Assurance Technical Authority (SMATAA) Requirements
e. NASA-STD 8709.22, Safety and Mission Assurance Acronyms, Abbreviations, and Definitions
f. GPR 1400.1, Waiver Processing
g. GPR 1700.5 Control of Hazardous Energy (Lockout/Tagout)
h. GPR 3410.2I, Employee Task-Specific, Required and Mandatory Training Requirements
i. GPR 8621.4, Mishap Preparedness and Contingency Plan
j. GPR 8715.3 Fall Protection Requirements for GSFC
k. GPR 8834.1, Lifting Operations Requirements
l. 540-WI-8719.1.3, Sample Lifting Device Inspection Forms
m. ASME PALD, Safety Standard for Portable Automotive Lifting Devices
n. ASME B30 Safety Standards for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings

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Certification and Recertificaton of Lifting Devices and Equipment

P.5 CANCELLATION

GPR 8719.1A, Certification and Recertification of Lifting Devices and Equipment and its Operators

P.6 SAFETY

Detailed safety requirements are contained in applicable test and inspection procedure.

P.7 TRAINING

Training requirements are specified in Section 3.

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Certification and Recertificaton of Lifting Devices and Equipment

- **P.8 RECORDS**

Record Title	Record Custodian	Retention
Test & Inspection Reports for: • LDE	RECERT Manager at Greenbelt, Deputy RECERT Manager at WFF	Permanent – pending approval of record schedule. *NRRS 8/56.5A
Operator Certifications: • LDE • CLC	RECERT Manager at Greenbelt, Deputy RECERT Manager at WFF	*NRRS 3/33G Destroy 5 years after separation of employee or when no longer needed.
Jack Operator Training	Operator Supervisor	*NRRS 3/33G Destroy 5 years after separation of employee or when no longer needed.
Completed Daily Checklists	Property Custodian	Permanent. NRRS 8/56.5D
RECERT documentation	RECERT Manager	*NRRS 3/33G
Safety Analysis	Property Custodian	Permanent. NRRS 8/56.5D
LDEC Meeting Minutes	RECERT Manager	Permanent. *NRRS 1/14B (1) (a) Retire to FRC when 2 years old. Transfer to NARA when 20 years old.
GSFC 17-112, Employee Task-Specific Training Requirement for civil servant employees	Supervisor	Permanent – Maintained in the Employee Performance File in the IDP/Training Related Information section on the right side.

**NRRS – NASA Records Retention Schedules (NPR 1441.1)*

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Certification and Recertificaton of Lifting Devices and Equipment

- **P.9 MEASUREMENT/VERIFICATION**
- The RECERT Manager shall document the percentage of scheduled test and inspections completed, and the pass/fail percentage of LDE.

- **PROCEDURES**
- In this document, a requirement is identified by “shall,” a good practice by “should,” permission by “may” or “can,” expectation by “will” and descriptive material by “is.”

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Certification and Recertificaton of Lifting Devices and Equipment

1. Responsibilities

1.1 Center Director appoints the RECERT Manager and Deputy RECERT Manager/WFF for LDE.

1.2 RECERT Manager shall

a. Maintain overall responsibility for the management, implementation, and enforcement of the Center’s LDE Program;

b. Provide direction to the Deputy RECERT Manager;

c. Tasks the RECERT Support Contractor in the maintenance of Section 1.2 of this directive;

d. Serve as the GSFC interface with NASA Headquarters (HQ) and other NASA Centers on matters pertaining to LDE;

e. Serve as the GSFC representative on the NASA LDE committee;

f. Chair the Center LDE Committee;

g. Serve as the Certifying Authority for the certification and recertification of LDE to which this directive is applicable;

h. Serve as the final authority on interpretation of, and compliance with, this directive and its references;

i. Establish and maintain a system for periodic inspection of LDE including review of logbooks, daily inspection forms, identification of deficiencies, and completion of corrective actions;

j. Ensure that certification and/or recertification tests and inspections are performed by personnel properly trained and qualified in accordance with applicable codes and standards;

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Certification and Recertificaton of Lifting Devices and Equipment

1.2 RECERT Manager shall

k. Provide consultation to the center for design, specification, testing, maintenance, operation, and modification of LDE to owners and operators;

l. Approve the re-rating of LDs;

m . Review and concur/non-concur with waiver requests per GPR 1400.1;

n. Review and concur/non-concur with specifications prior to procurement of LDs;

o. Establish and maintain a RECERT configuration management system for LDE;

p. Review, approve, and monitor the training courses for qualifying LDE Operators, and define their training and retraining requirements;

q. Certify and recertify LDE Operators;

r. Perform compliance spot checks of LDE Operators to ensure that the requirements of this GPR are being followed;

s. Provide Division Offices with an inventory of Division LDs for review and update, when requested;

t. Coordinate with affected Center safety offices on issues of mutual interest;

u. Coordinates with the Office of Human Capital Management (OHCM) to ensure all RECERT training classes are entered in SATERN at least 30 days prior to the start of each class.

v. Notify supervisors of training and certification requirements for civil servant employees to be documented on the GSFC 17-112, Employee Task-Specific Training Requirements Form

w. Maintain oversight, for safety and compliance, of all Lifting Devices, including mobile cranes brought onsite, for lifting, setting and delivering equipment to center; and

x. Review the use of lifting equipment (slings, strong-backs, etc.) brought onsite to support the lifting device operations delineated in item u, above.

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- **The Deputy RECERT Manager** shall serve as the RECERT Manager's alternate and represent the RECERT Manager at WFF for day-to-day operations by performing duties in Section 1.2.

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1.4 LDE Owners and/or Division Offices shall:

a. Ensure documented compliance to this directive by maintaining records of LDE and the Operators;

b. Submit LDE specifications to the RECERT Manager for review and concurrence prior to purchase;

c. Ensure that LDEs are certified by the RECERT Manager prior to use;

d. Provide resources for training and ensure that LDE operators are certified;

e. Ensure that LDE for which the division is responsible is appropriately certified for critical or noncritical lifts, and notify RECERT, as required by NASA-STD 8719.9;

f. Determine the appropriate LD usage category, i.e., Active, Standby, or Idle; and classification, i.e., Critical or Noncritical, based on current and projected operational requirements;

g. Maintain a current inventory of LDE (including slings, shackles, turnbuckles, D-rings, load measuring devices, and other LE) owned and operated by the division;

h. Manage and control uncertified or expired LDE to preclude inadvertent use;

i. Request that RECERT perform certification of new or transferred LDE from offsite locations prior to their use;

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Certification and Recertificaton of Lifting Devices and Equipment

1.4 LDE Owners and/or Division Offices shall: (Continued)

j. Notify the RECERT Manager immediately of all LDE deficiencies and failures, and initiate the appropriate Incident/Mishap Report in accordance with GPR 8621.4;

k. Initiate repair for LDE deficiencies found during OSHA and NASA-STD 8719.9 required tests and inspections;

l. Ensure that Original Equipment Manufacturer (OEM)-recommended maintenance is performed on LDE and that the daily checklist conforms with the OEM;

m. Submit requirements to the appropriate budget to bring Division LDE into compliance with this directive;

n. Maintain responsibility for day-to-day operations of LDE under their cognizance;

o. Coordinate outages for load testing and inspections of inventoried LDE with RECERT to minimize conflicts with ongoing operations;

p. Notify RECERT of any LDE that is removed from service or any change in use status per Section 2.3.2 of this directive;

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Certification and Recertificaton of Lifting Devices and Equipment

1.4 LDE Owners and/or Division Offices shall: (Continued)

q. Perform daily LDE inspections and document such inspections on the Daily Checklist;

r. Establish administrative controls over their LDE to preclude unauthorized operation. Such controls may include administratively controlling access to areas in which LDE are located, or administratively locking out LDE to all but authorized users by using GSFC Administrative locking procedures as defined in GPR 1700.5;

s. Require civil servant supervisors to document task-specific training requirements on the GSFC 17-112, Employee Task-Specific Training Requirements Form for civil servant employees as required by GPR 3410.2;

t. Notify RECERT Manager when rented or leased equipment is brought on center; and

u. Review and document operator training of Overhead Crane, Mobile Crane, MAP, and PIT assigned to the division on an annual basis and submit to RECERT manager for review.

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Certification and Recertificaton of Lifting Devices and Equipment

1.5 Occupational Safety and Health Division/Code 350 and Wallops Safety Office/Code 803 shall:

a. Notify RECERT Manager if construction activities are not in compliance with OSHA (as it relates to LDE) and NASA-STD 8719.9 requirements.

b. Provide comments on construction lift plans as requested by the RECERT Manager.

1.6 Medical and Environmental Management Division/Code 250

Shall provide medical expertise via the Medical Director to establish LDE operator medical examination criteria using applicable NASA and American National Standards Institute requirements.

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Certification and Recertificaton of Lifting Devices and Equipment

1.7 Facilites Management Division (FMD)

FMD shall notify, in writing, the RECERT Manager of any planned LDE acquisition, installation, upgrade, and/or removal as part of a FMD facilities project. To ensure compliance and certifiability, all LDE designs and specifications shall be supplied to the RECERT Manager for review and approval prior to contract implementation. Assure that mobile cranes coming on center for facility construction comply with OSHA 1926.1400. Notify the RECERT Manager and Safety (Code 350/803) of any construction activities requiring the use of a leased/rented LDE.

1.8 Office of Human Capital Management (OHCM)

a. Coordinate with RECERT Manager to document training offerings in SATERN;
b. Coordinate with RECERT Manager in approving participants in SATERN;
c. Provide RECERT manager official training roster for each training offered; and
d. Update SATERN to ensure civil servant participants receive training credit and it is properly recorded in their learning history

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Certification and Recertificaton of Lifting Devices and Equipment

1.9 Certified Crane Operators shall

a. Ensure that the load is properly and safely rigged;

b. Verify the GSFC RECERT certification status of the LDE is current before commencing lifting operations (using uncertified LDE is a violation of Center policy);

c. Perform crane daily inspections and tests in accordance with RECERT approved procedures;

d. Perform LE inspection before use;

e. Provide entry in the LD (including Hydra-set) log book for all inspections, tests, and operations; and

f. Perform LDE lock out procedures in accordance with GSFC Administrative locking procedures as defined in GPR 1700.5, if any deficiencies are observed and immediately enter the deficiencies into the log book, and notify the RECERT Manager; and

g. Have the final approval on the lift. If the Crane Operator is not comfortable or satisfied that all aspects are correct or complete prior to the lift, the Crane Operator does not have to perform the lift, and shall contact the RECERT manager immediately.

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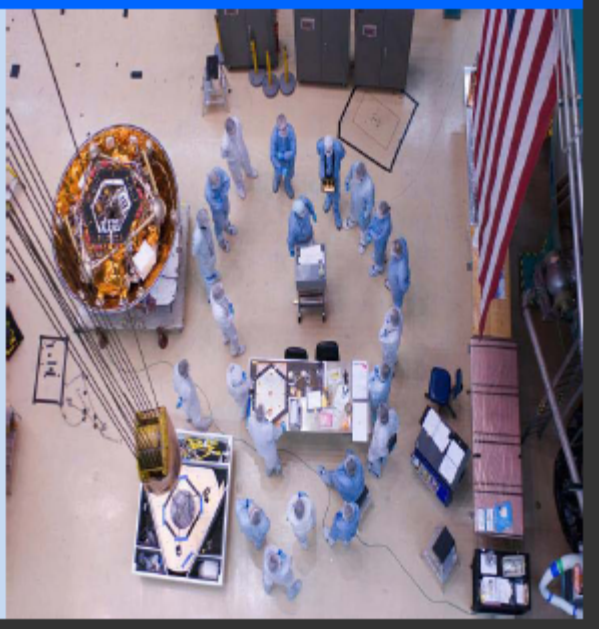
Certification and Recertificaton of Lifting Devices and Equipment

1.10 Certified Critical Lift Coordinators (CLC)

Certified CLC's may be responsible for directing and giving commands to the Crane Operator during a lifting operation if so designated in the Critical Lift Procedure. If the CLC is in charge of the lifting operation, they shall, in a pre-lift briefing, instruct personnel in the proper preparation, rigging, lifting, and final positioning of the load. Coordination for directing the lifting operation shall be delineated in the Critical Lift Procedure and re-emphasized in the pre-lift briefing. A CLC shall not perform rigging activities or hands-on operation of LDs.



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Certification and Recertificaton of Lifting Devices and Equipment

1.11 Certified MAP and PIT Operators and Authorized Jack (Critical) Operators shall

a. Verify the GSFC RECERT certification status of equipment is current before commencing operations (using uncertified LDE is a violation of Center policy);

b. Perform daily inspection in accordance with daily checklist before operation;

c. Provide entries in the equipment log book for all inspections, tests, and operations; and

d. If any deficiencies are observed, lock out the equipment using GSFC Administrative locking procedures as defined in GPR 1700.5, immediately enter the deficiencies into the log book, and notify the RECERT Manager.

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Certification and Recertificaton of Lifting Devices and Equipment

2. Equipment Requirements

2.1 Types and Traceability

2.1.1 Items Subject to RECERT. The following items are included in the RECERT Program and shall be subjected to formal certification and recertification. Other items may be included if deemed necessary by the RECERT Manager.

- Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist, and Jib Cranes)
- Mobile Cranes**
- Base Mounted Drum Hoists
- Monorails and Under hung Cranes and Hoists
- Manually Operated Level Hoists
- Special Hoist-Supported Personnel Lifting Devices
- Hydra-sets
- Crane Hooks
- Wire Rope Slings
- Alloy Steel Chain Slings
- Metal Mesh Slings
- Synthetic Slings
- Structural Slings
- Lifting assemblies
- Shackles, Turnbuckles, Swivel Joints, Connecting Links, and other lifting hardware components
- Load Measuring Devices*
- MAPs including Attachments
- PITs including Fork Extensions and Attachments
- Jacks
- Shop cranes (Portable Automotive Lifting Devices)

***Load Measuring Devices are verified by RECERT for structural integrity in the load path. Calibration of these devices shall be the owner's responsibility.**

****Mobile cranes used strictly for construction activities are exempt from meeting GSFC RECERT requirements but must meet OSHA requirements.**

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2.1.2 Traceability to Original Equipment Manufacturer (OEM).

a. All LE hardware components shall be traceable to a credible source of information, such as OEM for certifiability.

b. Fork extensions and attachments to PITs that affect capacity and/or stability shall be OEM equipment; or approved by the OEM in writing for its design and fabrication. In all cases, a tag or notice shall be affixed to the equipment clearly showing the new CG and capacity restrictions.

c. All LDE shall be used consistent with their intended purpose per OEM recommendations. The use of LDE that is contrary to OEM instructions or recommendations is not permitted, unless approved by the RECERT manager and complies with the applicable ASME/ANSI B30 series documents.

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Certification and Recertificaton of Lifting Devices and Equipment

2.2 LDE Certification and Safety Analyses

2.2.1 LDE Certification

a. LDE shall be certified, before first use, by the RECERT Manager based upon verification and acceptance of design safety factor, load testing, and nondestructive testing reports, if applicable, and by compliance with NASA-STD-8719.9 and this directive. It shall then be recertified thereafter in accordance with NASA-STD-8719.9 and this directive.

b. The RECERT Manager shall re-certify altered LDE assemblies as a system unless specifically exempted by a safety variance reviewed and approved in accordance with Section 4 of this directive. Alteration includes the extension, modification, addition, replacement, or deletion of components to the original certified configuration . All components comprising a critical LE assembly shall be uniquely identified and controlled, and should not be interchanged for use elsewhere. Replacement by identical, individually certified and tagged components of equal or greater load rating is permissible without having to recertify the LE assembly.

c. The RECERT Manger may authorize the applicable contractor organization to perform LDE test and inspections at Government Owned, Contractor Operated facilities by the applicable contractor organization provided the contractor has a test and inspection plan satisfactorily addressing GSFC requirements, including personnel qualifications, and the contractor's plan has been reviewed and approved by the RECERT Manager.

d. Owners and/or divisions responsible for LDE shall forward copies of all LDE test and inspection reports, including those for applicable off-site operations and applicable contractor installations, shall be forwarded to the RECERT Manager for annual re-certification and record keeping.

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2.2.2 LDE Safety Analyses

a. A recognized Safety Analysis, such as a Fault Tree Analysis, a Failure Modes and Effects Analysis, or an Operating and Support Hazard Analysis shall be performed by the owning organization on critical LDE's (including jacks, as defined in NASA-STD-8719.9). The critical or non-critical category determination shall be performed in accordance with Appendix C of GPR 8834.1, Lifting Operations Requirements. The analysis shall, as a minimum, determine potential sources of danger, identify failure modes, and recommend resolutions and a system of risk acceptance for those conditions that could cause loss of life, personal injury, and loss of or damage to the equipment, facility, or load.

b. Safety Analyses shall be reviewed and approved by the RECERT Manager.

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2.3 Operational Requirements

2.3.1 Criticality Determination. The owning organizations shall specify the category of operations to be performed by their LDE, i.e., critical or noncritical, so that the RECERT Manager may provide the requisite compliance requirements for the LDE. Appendix C of GPR 8834.1 must be completed, submitted, and approved by the RECERT Manager, for non-critical lifts that are non-institutional by nature.

2.3.2 LD (except MPJ) Inspection Requirements. Inspection requirements are based on the usage categories of LDs. "Daily" inspection requirements are generated by the LD owner. "Frequent" or "Periodic" inspections are defined in RECERT approved procedures.

2.3.2.1 Active LDs – These are devices that are available for unlimited daily use and:

- The Certified LDE Operator shall perform, prior to initial use, Daily Inspections and limit switch tests and record entry in the logbook in accordance with RECERT approved procedures.
- RECERT Frequent Inspections shall be performed at monthly intervals in accordance with NASA-STD 8719.9.
- RECERT Periodic Inspections for recertification shall be performed once a year in accordance with NASA-STD 8719.9.

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2.3.2.2 Standby LDs – These devices are to be secured from use by using GSFC Administrative locking procedures as defined in GPR 1700.5 and operation shall be resumed only after an inspection by RECERT that allows unlimited use for a 1-month period as an Active LD. After that the LD shall be secured again. Additionally:

- RECERT Frequent Inspections shall be performed at 6-month intervals.
- RECERT Periodic Inspections shall be performed once a year in accordance with NASA-STD 8719.9.

2.3.2.3 Idle LDs: – These devices are to be secured from use by using GSFC Administrative locking procedures as defined in GPR 1700.5 and there is no planned use of the LD for the next 12 months. When LDs are idle more than 6 months, the LD shall be recertified prior to use. Additionally:

- RECERT tests and inspections are not required during an idle period.
- RECERT shall perform required tests and inspections prior to returning the LD to service.

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2.3.3 Re-rating

Owner organizations may request that RECERT re-rate their LDs. Re-rating of LDs and the subsequent recertification shall be accomplished as follows:

a. Engineering analyses shall be performed in accordance with OSHA, NASA, and NCS requirements to validate that the LD can be used at the new re-rated load. Building structural support system(s) shall also be validated in terms of the new re-rated load. Re-rating resulting in higher equipment capacity shall require RECERT Manager's approval prior to modification.

b. Certify the LD and clearly display re-rated capacity with a tag or marking.

2.3.4 Transfer of LDE

a. LDE and associated certification documentation transferred to GSFC shall be reviewed for certification by the RECERT Manager.

b. Certification documentation shall accompany LDE permanently transferred from GSFC to other locations.

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Certification and Recertificaton of Lifting Devices and Equipment

2.3.5 LDE (Re) Certification Tagging

Tags shall indicate the (re)certification and NDT, if applicable, status of all LDE. The tagging shall be done in accordance with a Work Instruction(s) describing the tags for each application. Unless indicated, all LDE tags shall expire on the last day of the month, one year from the month in which the tag was issued.

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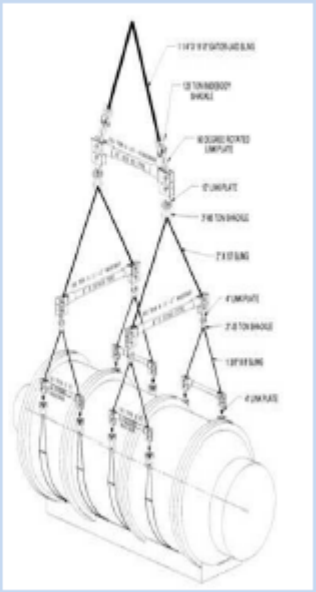
a. One load test tag (re)certification is applied to an assembly where the individual items are color-coded, tethered, or otherwise controlled as an assembly, and there are no plans to disassemble the assembly or to rearrange the configuration. The assembly is load tested as a unit with each item being individually NDT, if applicable, inspected and tagged as such.



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Certification and Recertificaton of Lifting Devices and Equipment

b. Load test (re)certification tags are applied to each component for an assembly that will be disassembled and where the individual items are not color-coded, tethered, or otherwise controlled as an assembly. The assembly may be load tested as a unit or each component load tested individually with each item being individually NDT, if applicable, inspected and tagged as such.

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c. One load test (re)certification tag per configuration is applied to an assembly where the configuration will be rearranged. The assembly is load tested in all applicable configurations with each item being individually NDT, if applicable, inspected and tagged as such. Note that there may be variations in the number of tags depending upon the similarities among the different configurations.

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d. For loose, individual components, each component is load test (re)certification tagged and NDT, if applicable, inspected and tagged.

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Certification and Recertificaton of Lifting Devices and Equipment

2.4 LDE Testing

2.4.1 Load Testing

New or modified LDs and MPJ shall be proof load tested in accordance with Table 1 and in accordance with NASA Standard 8719.9. For periodic recertification, LDs shall be tested to 100% of their rated load. New or modified LE shall be tested in accordance with NASA Standard 8719.9

Certified test weights or calibrated load cells and test equipment shall be used for all LDE load-testing activities.

2.4.2 Nondestructive Testing (NDT)

NDT shall be performed in accordance with NASA Standard 8719.9.

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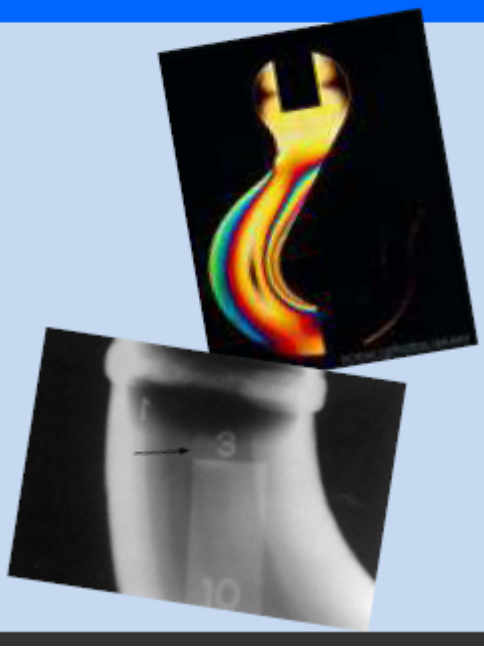
Certification and Recertificaton of Lifting Devices and Equipment

3. Personnel Qualification and Certification Requirements

3.1 Personnel Performing NDT

Personnel performing NDT shall meet the requirements of NASA Standard 8719.9.



GPR 8719.1B

Certification and Recertification of Lifting Devices and Equipment

3.2 Crane Operators

3.2.1 Crane Operator Certification Requirements

All Crane Operator candidates shall obtain formal training in LD operations and rigging as specified in NASA-STD-8719.9. Formal training may be available through the GSFC RECERT Program and other recognized sources and includes classroom instructions, written examination, and hands-on proficiency demonstration. The RECERT Manager shall evaluate and determine the acceptability of the syllabus of all training courses for which Operator candidates claim credit. In addition, all Crane Operator candidates shall pass the RECERT written examination and an applicable medical examination (in accordance with NASA-Standard 1800.1). The following training course topics shall be included as a minimum:

a. NASA-specific requirements

b. GSFC-specific requirements

c. Safe rigging procedures

d. Safe crane operations lift

e. Safety and emergency procedures

f. General performance standards

g. Pre-operational checks

h. Safety-related defects and symptoms

i. Specific hazards

j. Special procedures associated with critical lifts (critical operator training only)

k. Use of standard hand signals

l. Lessons learned

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Certification and Recertificaton of Lifting Devices and Equipment

Upon successful completion of the required training, the certification records are updated and an individual license will be issued, or in some instances a roster of Certified Crane Operators, is prepared. The licenses or the Operator roster shall be signed by the RECERT Manager and issued to the Operator, or, in the case of the Operator roster, to the appropriate supervisory personnel. It is the crane Operator's responsibility to notify the RECERT Manager prior to expiration.

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Certification and Recertificaton of Lifting Devices and Equipment

3.2.2 Categories of Crane Operator Licenses.
There are three categories of Crane Operator Permits and Licenses:

a. Apprentice Permit: Apprentice permits are typically issued with a required 40 hours of noncritical lift operation (minimum 20 hours Hands–On Crane Operation) and rigging to be attained under the direction of a licensed Crane Operator. Both the licensed operator and the candidate's supervisor shall attest to the attainment of these hours. On a case-by-case basis, for candidates with prior crane operation experience seeking GSFC Operator certification, the 40 hour apprenticeship requirement may be adjusted at the discretion of the RECERT Manager based on the recommendation of the trainer. The candidate shall complete the required hours of operation within 24 months from the Apprentice Permit issuance to prevent expiration of the Apprentice Permit. Upon completion of the required hours and attendance at a Noncritical Lift Crane Operator refresher class, the apprentice will be certified as a Noncritical Lift Crane Operator.

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Certification and Recertificaton of Lifting Devices and Equipment

3.2.2 Categories of Crane Operator Licenses.
There are three categories of Crane Operator Permits and Licenses:

b. Noncritical Lift Crane Operator License: This license authorizes the Operator to use only the types of Cranes and Hoists listed thereon, and rigging for noncritical lifts only. Noncritical operators are not permitted to use Hydra-sets, unless permitted by the RECERT manager.

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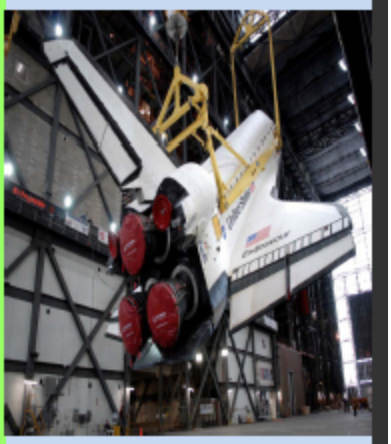
Certification and Recertificaton of Lifting Devices and Equipment

3.2.2 Categories of Crane Operator Licenses.
There are three categories of Crane Operator Permits and Licenses:

c. Critical Lift Crane Operator License: This license authorizes the operator to use Cranes and Hoists and rig for both noncritical and critical lifts, including Hydra-sets. The prerequisite for obtaining a Critical Lift Crane Operator License is that the candidate possesses a Noncritical Lift Crane Operator License and completes 40 hours of critical lift operation (minimum 20 hours Hands–On Crane Operation) and rigging under the direction of a licensed Critical Lift Crane Operator. Upon completion of the required 40 hours and attendance at a Critical Lift Crane Operator class, the Operator will be certified as a Critical Lift Crane Operator. Exceptions to the prerequisite may be reviewed and granted by the RECERT Manager on a case-by-case basis.



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Certification and Recertificaton of Lifting Devices and Equipment

3.2.3 Crane Operator Recertification
All Certified Crane Operators shall be recertified and a new license issued based on providing evidence of completion of refresher training, including written examination and hands-on training. A new license will be issued to the Operator, or the Operator roster will be updated and sent to the appropriate supervisory personnel. Critical and Noncritical Lift Crane Operators shall recertify every two years and provide evidence of successfully completing a medical examination in accordance with NASA Standard 1800.1.

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Certification and Recertification of Lifting Devices and Equipment

3.3 Requirements for MAP and PIT Operator Certification and Jack Operator Authorization

3.3.1 MAP and PIT Operator Certification Requirements.

All MAP and PIT Operator candidates shall obtain formal training as specified in NASA-STD-8719.9. Formal training may be available through the GSFC RECERT Program or the RECERT Manager may evaluate and determine the acceptability of the syllabus of all training courses for which Operator candidates claim credit. In addition, all MAP and PIT Operator candidates shall pass a written exam, hands on proficiency demonstration, and the applicable medical examination per NASA-STD 1800.1. For MAP operator certification, the candidate must provide proof of successful completion of fall protection training in accordance with GPR 8715.8. A written RECERT exam shall be given to verify the adequacy of the commercial training that the operator candidate claims credit. The following training course topics shall be included as a minimum:

a. NASA-specific requirements
b. GSFC-specific requirements
c. Safe operations
d. Safety and emergency procedures
e. General performance standards
f. Pre-operational checks
g. Safety-related defects and symptoms
h. Specific hazards
i. Lessons learned

Upon successful completion of the required training, the certification records are updated and an individual license, or in some instances a roster of Certified MAP or PIT Operators is prepared. The licenses or the Operator roster shall be signed by the RECERT Manager and issued to the Operator, or, in the case of the Operator roster, to the appropriate supervisory personnel.

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Certification and Recertificaton of Lifting Devices and Equipment

3.3.2 Jack Operator Authorization.

Operators of jacks shall be instructed in their proper use per NASA-STD-8719.9 and shall be designated and authorized to operate by their supervisor. The supervisor shall be responsible for retaining documentation of this training.

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Certification and Recertificaton of Lifting Devices and Equipment

3.3.3 MAP and PIT Operator Recertification
All Certified MAP and PIT Operators shall be recertified every two years by providing evidence of completion of refresher training, including written examination and hands-on training. Evidence of completing a satisfactory medical examination shall be provided to the RECERT Manager every two years. For MAP operator certification, the candidate must provide proof of successful fall protection refresher training in accordance with GPR 8715.8. A new license will be issued to the Operator, or, in the case of the Operator roster update, to appropriate supervisory personnel.

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Certification and Recertificaton of Lifting Devices and Equipment

3.4 Critical Lift Coordinators

3.4.1 CLC Certification Requirements

All CLC candidates shall attend a classroom training session equivalent to the training for critical lift crane operators (reference Section 3.2.1). All CLC candidates shall pass a written examination equivalent to that for critical lift operator certification but are excluded from hands-on proficiency demonstration and the medical examination requirement. Upon successful completion of CLC training and written examination requirements, the RECERT Manager shall certify CLC's by issuance of a signed license or a signed roster.

3.4.2 CLC Recertification

Recertification shall be granted upon successful completion of refresher training and applicable examinations every two years.

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Certification and Recertificaton of Lifting Devices and Equipment

3.5 Reciprocity with Licensing Authorities.
At the RECERT Manager's discretion, a temporary Crane, MAP, or PIT Operator License may be issued to personnel on temporary assignment to GSFC provided that the candidate:

a. Possesses a valid Crane, MAP, or PIT operator license or equivalent issued by another Licensing Authority in compliance with requirements contained in NASA-STD-8719.9; and

b. The candidate's license or equivalent remains valid for the duration of the candidate's assignment at GSFC.

Temporary Crane, MAP, or PIT Operator Licenses will be valid for the duration of the candidate's assignment at GSFC, but shall not exceed 90 days. Thereafter, a GSFC Crane, MAP, or PIT Operator License will be required.

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Certification and Recertificaton of Lifting Devices and Equipment

3.6 License Revocation
The RECERT Manager may revoke Crane Operator Licenses, CLC Licenses, MAP Operator Licenses, or PIT Operator Licenses for any of the following reasons:

a. Recommendations by an appointed panel of inquiry or Mishap Investigation Board.

b. Violations of, or noncompliance with, any of the safety requirements in the documented procedures.

c. Failure of supervisor providing annual documentation on reviewing of training per Section 1.4 of this document.

d. Failure to meet RECERT-required refresher training or medical examination requirements.

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Certification and Recertificaton of Lifting Devices and Equipment

Revoked Operator Licenses shall be returned to the RECERT Manager within 3 business days, and may be reinstated upon satisfactory completion of applicable refresher training or other remedial action deemed appropriate by the RECERT Manager. License extensions may be granted up to but not exceeding 30 days to allow for project demands and class scheduling flexibility. To be eligible for a license extension the operator must request the extension prior to the expiration date of the license and have a current medical examination. Extensions will not be granted if the license or medical examination has expired.

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Certification and Recertificaton of Lifting Devices and Equipment

4. Waivers

a. Waivers to the requirements of this directive shall be prepared and approved as outlined in NASA-STD 8709.20 and GPR 1400.1 prior to operation.

b. If a mandatory requirement of this directive cannot be met, a detailed waiver request package shall be prepared by the requesting organization in accordance with NASA-STD 8709.20 and GPR 1400.1. The waiver request package shall be reviewed and the risk accepted by the initiating Division Office and forwarded to the RECERT Manager for review and concurrence/non concurrence.

c. The RECERT Manager will submit the waiver request package to other authorities as stipulated in GPR 1400.1. Waiver requests approved by the Center shall be forwarded to NASA HQ within 14 days.

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Certification and Recertificaton of Lifting Devices and Equipment

5. LDE Committee

5.1 A Center LDE Committee (LDEC) shall be established by the RECERT Manager via the Goddard Safety Committee (GSC) to ensure that LDE governing standards are understood and applied across all organizational elements at GSFC. In addition, the LDEC shall resolve LDE-related issues and provide a forum to exchange information. The RECERT Manager shall serve as the Chairperson of the Committee. The Deputy RECERT Manager/WFF shall serve as the Vice Chairperson of the Committee.

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Certification and Recertificaton of Lifting Devices and Equipment

5.2 The LDEC Chairperson shall:

a. Accept appointees from the Directorates as Committee Members.

b. Include representatives from organizations conducting or having an interest in lifting operations.

c. Establish the Committee meeting schedule.

d. Conduct quarterly meetings, or more frequently as required.

e. Appoint an Executive Secretary for the Committee.

f. Report as required to the GSC regarding the activities of the Committee.

5.3 The Vice Chairperson shall:

a. Chair the Committee meeting in the absence of the Chairperson.

b. Report as required to the WFF Executive Safety Council regarding the activities of the Committee.

5.4 The Executive Secretary shall:

a. Assist the Chairperson in preparing and distributing meeting agenda, minutes, and related materials.

b. Assist the Chairperson in coordinating Committee-related activities.

c. Track action items and their status.

d. Maintain meeting minutes and make available for review by management and safety and health offices.

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Certification and Recertificaton of Lifting Devices and Equipment

5.5 The Committee Members shall:

a. At least one member from each directorate, that have LDE, shall represent his/her Directorate in the Committee's scheduled meetings. Invite other interested personnel to the meeting, including supporting contractors, as appropriate. Membership will be on a 2-year renewable term.

b. Bring Directorate issues/concerns relating to LDE and LDE operations to the Committee.

c. Serve as the information conduit between the LDEC and his/her Directorate organizations.

d. Provide input/closure of the action items assigned by the Chairperson.

e. Review and provide input to the Chairperson on LDE variance requests as required.

f. Review close call and mishaps and provide recommendations for

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Certification and Recertificaton of Lifting Devices and Equipment

TABLE 1
Load Test Requirements for New, Repaired, or Modified LDs

	Proof Load		Rated Load		Requirement
	Periodicity[1]	Percentage	Periodicity	Percentage	
Cranes					
Overhead (Non-Critical)	New, Altered	125% (+0%/-5%)	Every Four Years	100% (+5%/-0%)	NASA-STD-8719.9-4.3
Overhead (Critical)	New, Altered	125% (+0%/-5%)	Every Year	100% (+5%/-0%)	NASA-STD-8719.9-4.3
Mobile (Non-Critical)	New, Altered	110% (+0%/-5%)	Every Four Years	100% (+5%/-0%)	NASA-STD-8719.9-5.3
Mobile (Critical)	New, Altered	110% (+0%/-5%)	Every Year	100% (+5%/-0%)	NASA-STD-8719.9-5.3
MAPs (Non-Critical)	New, Altered	N/A[2]	Every Year	100% (+5%/-0%)	NASA-STD-8719.9-11.3
MAPs (Critical)	New, Altered	N/A[2]	Every Year	100% (+5%/-0%)	NASA-STD-8719.9-11.3
PITs (Non-Critical)	New, Altered	N/A[2]	Every Four Years	100% (+5%/-0%)	NASA-STD-8719.9-12.3
PITs (Critical)	New, Altered	N/A[2]	Every Year	100% (+5%/-0%)	NASA-STD-8719.9-12.3
Jacks (Flight Hardware)	New, Altered	120% (+0%/-5%)	Every Year	100% (+5%/-0%)	NASA-STD-8719.9-13.3

[1] "New, Altered" in the column entitled "Periodicity" means new, reinstalled, altered, repaired, rerated, reconditioned, and/or modified
[2] Load test shall be done in accordance with manufacturer's instructions and applicable ASME standard. In a case where both sources are silent, 100% of the rated capacity shall be used.

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Certification and Recertification of Lifting Devices and Equipment

Appendix A – Definitions

Most of the terms used in this directive are defined in NASA-STD-8719.9 or NASA-STD-8709.22. Those that are critical and or unique to this directive are listed below.

- A.1 Certification/Recertification – Written documentation that a set of requirements has been, and continues to be, met. As used in this GPR, certification and recertification is: 1) a process performed by the RECERT Manager that leads to the initial, or continuation of, certification that LDE is safe to use within specific certification parameters, and includes, but is not limited to LDE compliance and documentation reviews, tests, inspections, nondestructive testing, and analyses; 2) a license issued and renewed by the RECERT Manager for operation of LDE; and 3) a memo or license issued to perform the duties of a CLC.
- A.2 Critical Hardware – Hardware whose loss would have serious programmatic or institutional impact and that has been identified by the installation, directorate, or project as being critical.
- A.3 Critical Lift – A lift where failure/loss of control could result in loss of life, loss of or damage to critical hardware or other items such as spacecraft, one-of-a-kind articles, or major facility components whose loss or damage would have serious programmatic or institutional impact. Operations involving the lifting of personnel with a crane, and lifts where personnel are required to work under a suspended load, shall be defined as critical lifts (see NASA-STD-8719.9). Operations with special personnel and equipment safety concerns beyond normal lifting hazards shall also be designated as critical.

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Certification and Recertificaton of Lifting Devices and Equipment

Appendix A – **Definitions**

- A.4 Critical Lift Coordinator (CLC) – An individual who is assigned or demonstrates a need to direct critical lift activities due to specific project requirements and who has obtained the necessary training and is certified by the RECERT Manager. The CLC is an optional position, used only when a project desires to have its own lifting expert. The role of the CLC shall be specified in the Critical Lift Procedure.
- A.5. Daily Checklist – An inspection and/or test performed, prior to use, on a daily basis only for those days while in use.
- A.6 Division Office – For the purposes of this GPR, use of the term "Division Office" includes Project Offices, Program Offices, Supervisors, and Owner of Equipment.
- A.7 Flight Hardware – Hardware designed and fabricated for ultimate use in a vehicle intended to fly.

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Certification and Recertification of Lifting Devices and Equipment

Appendix A – Definitions

A.8 Institutional Lift – A lift performed as part of the day-to-day operations of the Center, such as lifting a section of pipe or moving a pallet of office supplies. It is not a manual lift, although a manual lift may be included as part of an institutional lift. NOTE: an Institutional Lift can also be classified as "critical," depending on the hardware involved.

A.9 Lifting Devices (LD) and Equipment (LE) collectively (LDE) – LDE comprises LD such as overhead and gantry cranes (including top running monorail, under-hung, and jib), mobile cranes, derricks, hoists, winches, special hoist supported personnel lifting devices, mobile aerial platforms (MAP), powered industrial trucks (PIT), and jacks; and LE such as Hydra-sets, load measuring devices, hooks, slings and rigging used for lifting and support of flight hardware or personnel..

A.10 LDE Operator Certification – The documented status of LDE operators (Crane Operator, MAP Operator, and PIT Operator) validating that they are trained and qualified in accordance with NASA-STD-8719.9 and certified by the RECERT Manager. For the purposes of the GSFC LDE RECERT Program, an individual certified as a Crane Operator is concurrently certified as a Rigger, and references to Crane Operators include Riggers. Jack Operators shall be designated and authorized by the equipment owning organization.

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Certification and Recertification of Lifting Devices and Equipment

Appendix A – Definitions

A.11 MPJ – For the purposes of this directive, the collective term "MPJ" refers to MAPs, PITs and Jacks as defined in NASA-STD-8719.9.

A.12 RECERT Documentation – Files that are maintained for LDE that may include, but are not limited to, manufacturer's/fabricator's documents, field test data, safety analyses, results of engineering analyses, repair history, facility descriptions, record of all safety variances, re-rating, and correspondence.

A.12 RECERT Approved Procedure – Owner generated, RECERT generated, or OEM-provided documentation that describes the specific steps needed to inspect, test, or operate LDE that is approved by the RECERT Manager.

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Certification and Recertificaton of Lifting Devices and Equipment

Appendix A – Definitions

A.14 RECERT Manager and Deputy RECERT Manager/WFF – Positions appointed by the Center Director to implement and enforce the Center's LDE Program meeting NASA-STD-8719.9 requirements.

A.15 Rigger – An individual who selects and attaches LE to an item to be lifted.

A.16 Support Services Contractors – Contract personnel who are based on-site and participate in on-going daily operations at GSFC.

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Certification and Recertification of Lifting Devices and Equipment

Appendix B – Acronyms

Most of the acronyms used in this directive are defined in NASA-STD-8719.9 or NASA-STD-8709.22. Those that are critical and or unique to this directive are listed below.

CG -Center of Gravity
CLC- Critical Lift Coordinator
FMD -Facilities Management Division
GPR -Goddard Procedural Requirements
GSC -Goddard Safety Committee
GSFC -Goddard Space Flight Center
HQ- NASA Headquarters
IAW- In Accordance With
IDP -Individual Development Plan
LD- Lifting Device
LDE -Lifting Devices and Equipment
LDEC- LDE Committee
LDEM -LDE Manager
LE- Lifting Equipment
LOTO -Lockout Tag out
MAP -Mobile Aerial Platform
MPJ -Mobile Aerial Platform, Powered Industrial Truck, and Jack collectively (see Appendix A)
NDT- Nondestructive Testing
NRRS -NASA Records Retention Schedules
OEM -Original Equipment Manufacturer
OHCM- Office of Human Capital and Management
OSHA -Occupational Safety and Health Administration (29 CFR 1910, 29 CFR 1926)
PIT- Powered Industrial Truck
RECERT -Goddard Recertification Program
SATERN -System for Administration, Training and Educational Resources, for NASA
WFF- Wallops Flight Facility

Accidents and Fatalities

Accidents and Fatalities

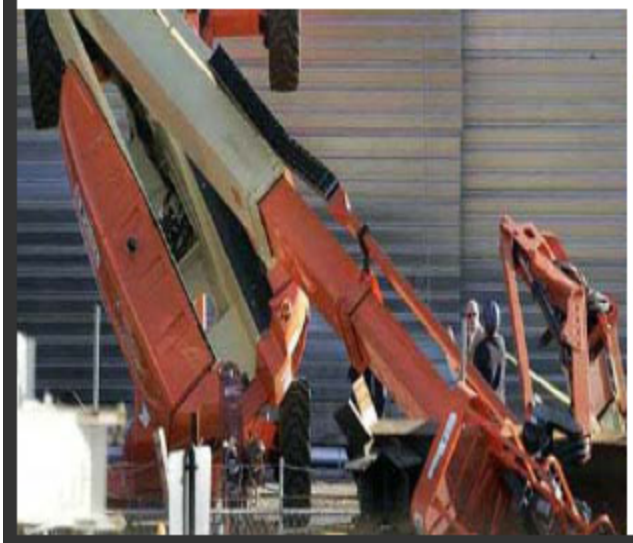
Aerial Lift Accident Results in Death

According to the Boston Globe, "Federal safety officials and city homicide detectives continued yesterday to investigate the death Saturday of a worker who was slammed into a Downtown Crossing building when the aerial lift he was working from tipped over. James Williamson and a second worker, Greg Johnson, were inspecting the roof of a Suffolk University dormitory Saturday morning when the 110-foot-tall aerial lift toppled into a condo building on West Street.

Williamson was hurled into the building and died at Massachusetts General Hospital Saturday evening. The hospital upgraded Johnson's condition from serious to fair yesterday. Fire officials said Johnson fell or jumped onto a second-floor rooftop as the lift fell.

Accidents and Fatalities

Aerial Lift Deaths from Boom Lifts



According to a report published by the CDC and the Center for Construction Research and Training, an average of 26 construction workers died annually due to aerial lift accidents.

The leading causes of these deaths are electrocution, falls, and collapses/tip over. Reports indicate that the highest number of aerial lift deaths were of electricians, followed by construction workers, electrical power installers, painters, and carpenters. Boom lifts accounted for over 70% of these fatalities.

Accidents and Fatalities

Aerial Lift Deaths from Scissor Lifts

Three-quarters of the tip over's of scissor lifts resulted in fall deaths; in the remaining accidents, workers died from being struck by the falling scissor lift. About two-fifths of the tip over's occurred when the scissor lift was extended over 15 feet, mostly while driving the lift. In one-fifth of the falls the worker was ejected from the scissor lift, mostly when an object struck the scissor lift. Other fall deaths occurred after removal of chains or guardrails, or while standing on or leaning over railings.

Accidents and Fatalities

Fatal boom tip
October 13, 2009
A man died yesterday after the boom lift he was working in toppled over after a wheel broke through a manhole cover, in Philadelphia Pennsylvania.

The lift was being used by a man to inspect the steeple of the First Presbyterian Church at 21st and Walnut Streets. The operator was driving and steering the machine, which was fully telescoped with its riser fully retracted and lowered, when one of the wheels went over an electrical cable manhole cover which gave way under its weight.

Accidents And Fatalities

Fatal boom tip
October 13, 2009 |
Witnesses say that the lift, a recent model JLG 1250AJP owned by Interstate Aerials, tilted over, recovered sending the boom the other way, tilted again and the second time went over sideways, with the boom striking a building opposite, showering the street with bricks, before striking a parked utility truck and then the ground. The 40 year old operator, James Wilson, was wearing a harness and was left suspended from his lanyard.

Accidents And Fatalities

Fatal boom tip
October 13, 2009 (Continued)

He was rushed to hospital where he later died from his injuries, a woman passer by was also injured. The falling lift also caused considerable damage to street lights and signs

Later reports say that the company had not applied for a road closure permit and was operating the machine on the sidewalk in order to avoid disruption to traffic. A co-worker who was on the ground, is also said to have "gone around the corner to check on some other work when the accident occurred"

Accidents And Fatalities

Fatal boom accident in Canaries
November 3, 2009 |
Two men died on Monday in Lanzarote - Canary Islands, after the boom lift they were working in tipped over backwards.
The men, a 41 year-old Spaniard and a 46 year-old Peruvian man were cleaning a new building alongside a highway in the island's capital, Arrecife, at a height of between 39and 46 feet, when something appears to have happened to the boom.

Accidents And Fatalities

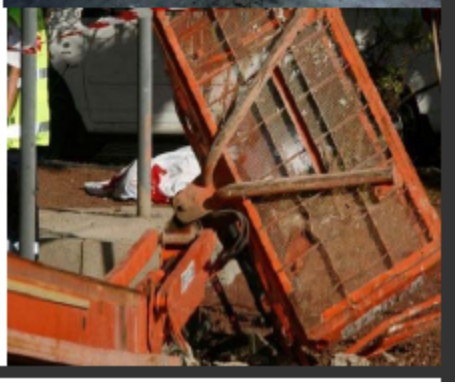
Fatal boom accident in Canaries
November 3, 2009
Local reports are sketchy but the lift, a JLG articulated boom owned by locally based rental company Maquinas Opein, was operating with its telescopic riser retracted and slightly raised with the boom was elevated and extended.

The boom of the lift fell across the highway that connects the city to the island's airport and struck a car, but the occupants of the car were not seriously injured.

Accidents And Fatalities

Fatal boom accident in Canaries
November 3, 2009
This is a very strange accident, the ground under the wheels appears to have been fine, the machine was clearly not overloaded, and unless we have misunderstood local reports it was not hit by a passing vehicle.

There seems to have been some structural issue between boom and riser, but this might have occurred on impact - Hopefully we will discover later what caused this tragic accident.



Accidents And Fatalities

SouthBendTribune.com

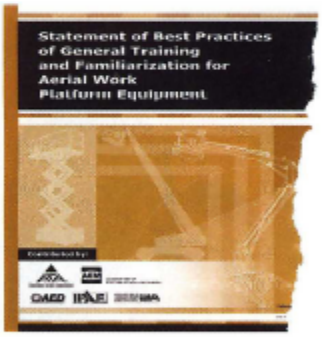
Notre Dame Declan Sullivan student sent ominous tweets before dying in football lift accident

Classmates gathered Thursday night for a special Mass to remember Sullivan a day after he died in an accident during a Fighting Irish football practice. The 20-year-old junior was videotaping the team from a tower when his hydraulic scissor lift fell over during another windy day in the Midwest.

Sullivan, a film student from the Chicago suburb of Long Grove, Ill., was taken to a hospital, but was soon pronounced dead.

In addition to his parents, Barry and Alison, Sullivan has two younger siblings, a brother in high school and a sister, who also attends Notre Dame.

Action Needed Now to Prevent Repeat of Notre Dame Tragedy, IPAF Says



Following the recent fatality at the University of Notre Dame where a student operating a scissor lift was killed when it was blown over by wind gusts, Tim Whiteman, managing director of the International Powered Access Federation (IPAF) said, "This is a horrible tragedy and our thoughts are with the family of the victim. I say victim because this was a needless death that proper training should have prevented. Aerials provide the safest way of doing temporary work at height, but everybody in the industry needs to say loudly and clearly that untrained operators should never operate aerials."

To help those who use and operate aerial devices safely and expand risk management knowledge for use of these machines, American Rental Association, Association of Equipment Manufacturers, Associated Equipment Distributors, IPAF and Scaffold Industry Association (SIA) have jointly released "Statement of Best Practices of General Training and Familiarization for Aerial Work Platform Equipment." The document clarifies what is required for general training and model-specific familiarization of aerial work platform (AWP) equipment. It aims to educate the industry on industry-recognized standards, including ANSI/SIA A92 standards and OSHA regulations; present best practices and minimum general training guidelines for AWP operators; emphasize the differences between general training and familiarization to all parties responsible; and clarify minimum trainer qualifications.

Download the free publication at **www.awpt.org**.

Visit awpt.org for Technical advice and information, through influencing and interpreting legislation and standards, safety initiatives and training programs.

www.awpt.org

AWPT

VIDEO

.00 x 7.50 in

NASA Standard 8719.9

OSHA
Occupational Safety and Health Administration

ANSI
American National Standards Institute

NASA-STD-8719.9 w/Change 1
May 9, 2002

National Aeronautics and
Space Administration

HYBRID

Expiration Date: October 1, 2012

STANDARD FOR
LIFTING DEVICES AND EQUIPMENT

NASA TECHNICAL STANDARD

FOREWORD

This standard is approved for use by NASA Headquarters and all NASA Installations and contractors as specified in their contracts. The standard establishes uniform design, testing, inspection, maintenance, operational, personnel certification, and marking requirements for lifting devices and associated equipment used in support of NASA operations. A NASA operation is defined as any activity or process that is under NASA direct control or includes major NASA involvement.

NASA's goal for achieving "best class" status as an organization poised for preventing mishaps requires perfecting our processes in four areas of excellence. These areas are: management commitment and employee involvement; system and worksite hazard analysis; hazard prevention and control; and safety and health training. This standard was developed to address hazard prevention and control as well as safety and health training and expands on NPG 8715.3, "NASA Safety Manual," policy and guidelines for safety assurance. It is a compilation of pertinent requirements from the Occupational Safety and Health Administration (OSHA), American Society of Mechanical Engineers (ASME), American National Standards Institute (ANSI), Crane Manufacturers Association of America (CMAA), and unique NASA requirements. The standard combines the knowledge of all NASA Installations and contractors including NASA operations in host countries, standardizes definitions, clarifies/documents OSHA interpretations, addresses the subject of criticality, and conveys standardized requirements. With the exception of Alternative Standard for Suspended Load Operations contained in Appendix A, this standard is not a substitute for OSHA or local government (including such host country requirements as those in Australia or Spain) requirements which apply to NASA operations in full.

Significant changes in this revision of the standard include the coverage for Mobile Aerial Platforms, Powered Industrial Trucks, and Jacks. Appendices C and D have been added concerning lifting personnel with a crane and using a crane to load test other lifting equipment, respectively. The designation of an installation Lifting Devices and Equipment Manager (LDEM) is also required with this revision.

Compliance with this standard is mandatory for all NASA-owned and NASA contractor-supplied equipment used in support of NASA operations at NASA installations. The individual installation safety organizations are responsible for assuring implementation. This document establishes minimum safety requirements; NASA installations are encouraged to assess their individual programs and develop additional requirements as needed.

Requests for information, corrections, or additions to this standard should be directed to the ~~National Aeronautics and Space Administration Headquarters, Director, Safety and Risk Management Division, Code QS, Washington, DC 20546~~. Requests for general information concerning NASA Technical Standards should be sent to NASA Technical Standards Program Office, ED41, MSFC, AL, 35812. This and other NASA Standards may be viewed and downloaded free-of-charge from our NASA Standards Homepage: http//standards.nasa.gov. This NASA Technical Standard cancels NSS/GO-1740.9, dated November 1991 as updated March 1993.

Michael A. Greenfield, Ph.D.
Acting Associate Administrator for
Safety and Mission Assurance

<u>New Address</u>:
Director, Safety and Assurance Requirements Division
Office of Safety and Mission Assurance
NASA Headquarters
Washington, DC 20546

REVISION LOG

REVISION	DESCRIPTION	DATE
Initial Issue	NASA-STD-8719.9, NASA Standard for Lifting Devices and Equipment. Significant Changes. Converts document to NASA-STD format. Adds sections on mobile aerial platforms, powered industrial trucks, and jacks. Adds appendices on lifting personnel with a crane and using a crane to load test other lifting equipment. Designation of an installation Lifting Devices and Equipment Manager (LDEM) is also required.	May 9, 2002
Change 1	Document is revalidated without changes other than updates to Cover, Foreword (address), and Revision Log.	October 1, 2007 JWL4

A note concerning the history of this document:

The original NASA Safety Standard for Lifting Devices and Equipment was issued as NSS/GO-1740.9 in July 1982. In July 1988 it was revised and Revision A was issued reflecting significant changes related to mobile cranes, hoist supported personnel platforms, personnel lifting buckets, and guidance concerning super critical lifts. In November 1991 it was revised again and Revision B was issued which deleted the guidance on super critical lifts and added the NASA Alternate Standard for Suspended Load Operations. Additional revisions were issued as change pages in March 1993 to expand operational test requirements for special hoist supported personnel lifting devices. When it came time to update the standard again, in addition to the technical changes to the document (synopsized in the Revision Log above) the format and numbering were changed to reflect current practices and conventions for NASA Standards.

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LIST OF TABLES

APPENDICES

STANDARD FOR LIFTING DEVICES AND EQUIPMENT

1. SCOPE

1.1 Scope. This standard applies to overhead and gantry cranes (including top running monorail, underhung, and jib cranes) mobile cranes, derricks, hoists, winches, special hoist supported personnel lifting devices, hydra-sets, load measuring devices, hooks, slings and rigging, mobile aerial platforms, powered industrial trucks, and jacks. This document does not include coverage for front-end loaders and elevators.

1.2 Purpose. This standard establishes NASA's minimum requirements for the design, testing, inspection, maintenance, personnel certification, and operation of lifting devices and equipment (LDE) described in paragraph 1.1.

1.3 Applicability. Compliance with this standard is mandatory for all NASA-owned and NASA contractor-supplied equipment used in support of NASA operations at NASA installations and NASA operations in host countries. The individual installation Lifting Devices and Equipment Manager (LDEM) and safety organizations are responsible for implementation and enforcement. This document establishes minimum requirements; NASA installations should assess their individual programs and develop additional requirements as needed. The need for compliance with this standard at contractor installations performing NASA work should be evaluated and made a contractual requirement where deemed necessary by the contracting officer and the responsible NASA installation/program safety office. Rented or leased LDE is exempt from this standard only by the decision of the contracting officer, the responsible NASA installation/program safety office, and the LDEM. If determined that rented or leased LDE will be used for a critical lift, this standard applies.

1.3.1 The testing, inspection, maintenance, operational, and operator and rigger certification/recertification/licensing requirements apply to new and existing lifting devices and equipment.

1.3.2 The design/hardware requirements contained in this document are applicable to new lifting devices/equipment purchased after 6 months from the issue date of this document. Existing equipment and that purchased during the first 6 months from issue of this document shall be reviewed for compliance with all design/hardware aspects of this standard within 12 months of its issue and the need to update such equipment shall be evaluated.

1.3.3 Deviations/waivers from the requirements of this document (including design/hardware requirements for both new and existing equipment) shall be approved as outlined in paragraph 1.7. The deviation/waiver documentation shall include any alternate or special criteria or procedures that will be imposed to ensure safe design and operations for those devices that do not meet the applicable requirements.

1.3.4 Portions of this standard refer to various national consensus codes/standards for equipment design/hardware requirements (e.g., ASME, CMAA, etc.). Lifting devices and equipment purchased after the initial review required in paragraph 1.3.2 shall comply with the specified codes/standards in effect at the time of manufacture. Each installation shall periodically review subsequent codes/standards and evaluate the need to update existing equipment. Based on an evaluation of NASA's overall safe lifting program and any significant changes in the consensus codes/standards, the NASA Safety and Risk Management Division

with concurrence from the field installations shall decide when the next complete review (as described in paragraph 1.3.2) is warranted.

1.4 Relation to Occupational and Safety Health Administration (OSHA) Requirements. This document is not a substitute for OSHA requirements. OSHA requirements apply to all NASA operations. This document meets or exceeds Federal OSHA requirements. Some States have their own OSHA programs that must comply with Federal OSHA and may be stricter. All NASA installations are responsible for keeping up to date with the Federal and State OSHA requirements that apply to their operations. This standard contains some OSHA requirements where deemed necessary to stress the importance of the requirement, clarify the requirement, document interpretation of the requirement, and/or define NASA's program for meeting the requirement. The NASA Safety and Risk Management Division, with assistance from the field installations, shall monitor subsequent OSHA requirements for any impact on NASA's safe lifting program.

1.5 Critical and Noncritical Lifting Operations. There are two categories of lifting operations for the purposes of this standard, critical and noncritical.

1.5.1 Critical lifts are lifts where failure/loss of control could result in loss of life, loss of or damage to flight hardware, or a lift involving special high dollar items, such as spacecraft, one-of-a-kind articles, or major facility components, whose loss would have serious programmatic or institutional impact. Critical lifts also include the lifting of personnel with a crane, lifts where personnel are required to work under a suspended load, and operations with special personnel and equipment safety concerns beyond normal lifting hazards. Personnel shall not be located under suspended or moving loads unless the operation adheres to the OSHA-approved NASA Alternate Standard for Suspended Load Operations (see Appendix A). Lifting of personnel with a crane shall be in accordance with 29 CFR 1926.550 (see Appendix C).

a. Each installation or program shall develop a process to identify critical lifting operations and lifting devices/equipment that must meet critical lift requirements. Input shall be gathered from facility, program, user, and assurance personnel. The results of the process shall be documented and approved, as a minimum, by the installation LDEM.

b. It is NASA policy that the comprehensive safeguards outlined in this standard be provided for critical lifting operations. This includes special design features, maintenance, inspection, and test intervals for the lifting devices/equipment used to make critical lifts.

c. Specific written procedures shall be prepared and followed for all critical lifts.

d. During critical lifts there shall be one person present (NASA or contractor) that is designated as responsible for the safety of the operations. That person may be a safety professional, a supervisor, an engineer, or a task leader.

1.5.2 Noncritical lifts typically involve routine lifting operations and are governed by standard industry rules and practices except as supplemented with unique NASA testing, operations, maintenance, inspection, and personnel licensing requirements contained in this standard.

1.5.3 The requirements for critical and noncritical lifts outlined in this standard shall be followed unless a specific deviation/waiver is approved as outlined in paragraph 1.7. Different levels of risks associated shall be evaluated using the risk determination criteria in NPG 8715.3.

1.6 Recordkeeping and Trend Analysis. A data collection system shall be established at each installation or location to support NASA-wide lifting device trend and data analysis. Data entered locally would typically be associated with type and manufacturer of the equipment, age, maintenance history, operational problems and their corrective actions, lifting mishaps, safety notices, inspection discrepancies, waivers, and proof and load test results.

1.7 Safety Variances.

1.7.1 If a mandatory requirement cannot be met, a safety variance shall be prepared in accordance with NPG 8715.3.

1.7.2 The NASA variance process does not apply to Federal and applicable State/local regulations (e.g., OSHA, Cal OSHA). Any variance of a Federal or State/local regulation must be approved by the appropriate Federal/State/local agency (e.g., NASA Alternate Safety Standard for Suspended Load Operations approved by OSHA). The NASA Safety and Risk Management Division shall review all proposed safety variances of Federal regulations before submittal for approval.

1.7.3 Example: A variance request to a requirement in this standard that uses the word shall would be routed through the Center Safety Director for concurrence and approved or denied by the Center Director. A copy would then be sent to the NASA Safety and Risk Management Division within 14 days along with detailed rationale for its approval and other documentation.

1.8 Lifting Devices and Equipment Committee.

1.8.1 NASA LDE Committee. Each installation Director shall designate in writing at least one person and an alternate, with appropriate background in lifting devices, lifting operations, lifting equipment industry standards and an understanding of lifting safety, as the installation LDEM, to participate as a member of the NASA LDE Committee. The committee is chaired by the Director, Safety and Risk Management Division, or designee, and is responsible for reviewing proposed changes to this standard and addressing general LDE safety issues. The LDEM is responsible for overall management of the installation LDE program, coordinating with appropriate personnel at their installation on lifting issues and providing the NASA LDE Committee with their installation's position on LDE issues.

1.8.2 Installation LDE Committee. Each installation shall establish a LDE Committee, to ensure this standard is understood and applied across other organizations at the installation and to resolve any issues and provide a forum to exchange information. The Installation LDE Committee shall be chaired by the LDEM, with representation from all organizations at the installation that are responsible for and/or involved with LDE.

1.9 Personnel Performing Nondestructive Testing. Personnel performing lifting devices and equipment nondestructive testing (NDT), including visual inspections, shall be qualified and certified in accordance with written practices meeting the requirements contained

in American Society for Nondestructive Testing (ASNT) Recommended Practice No. SNT-TC-1A, Personnel Qualification and Certification in Nondestructive Testing.

2. APPLICABLE DOCUMENTS

2.1 General. The applicable documents cited in this standard are listed in this section for reference only. The specified technical requirements listed in the body of this document must be met whether or not the source document is listed in this section.

2.2 Government Documents.

2.2.1 Specifications, Standards, and Handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issuances in effect on date of invitation for bids or request for proposal shall apply.

DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

OCCUPATIONAL SAFETY AND HEALTH STANDARD, 29 CFR 1910, Subpart I, Personal Protective Equipment.

OCCUPATIONAL SAFETY AND HEALTH STANDARD, 29 CFR 1910.29, Manually Propelled Mobile Ladder Stands and Scaffolds (Towers).

OCCUPATIONAL SAFETY AND HEALTH STANDARD, 29 CFR 1910.67, Vehicle-Mounted Elevating and Rotating Work Platforms.

OCCUPATIONAL SAFETY AND HEALTH STANDARD, 29 CFR 1910.178, Powered Industrial Trucks.

OCCUPATIONAL SAFETY AND HEALTH STANDARD, 29 CFR 1910.179, Overhead and Gantry Cranes.

OCCUPATIONAL SAFETY AND HEALTH STANDARD, 29 CFR 1910.180, Crawler, Locomotive, and Truck Cranes.

OCCUPATIONAL SAFETY AND HEALTH STANDARD, 29 CFR 1910.181, Derricks.

OCCUPATIONAL SAFETY AND HEALTH STANDARD, 29 CFR 1910.184, Slings.

OCCUPATIONAL SAFETY AND HEALTH STANDARD, 29 CFR 1926.550, Cranes and Derricks.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA Specifications Kept Intact (SPECSINTACT), Standard Construction Specification System.

Excerpts Pertaining to Mobile Aerial Platforms

From Pages 89 to 95

NASA-STD-8719.9
May 9, 2002

11. MOBILE AERIAL PLATFORMS

11.1 General. This section establishes minimum standards for the design, testing, maintenance, inspection, personnel certification, and operation of mobile aerial platforms. This section applies to those platforms covered by ANSI/SIA A92.2 (Vehicle Mounted Elevating and Rotating Aerial Devices), A92.3 (Manually Propelled Elevating Aerial Platforms), A92.5 (Boom Supported Elevating Work Platforms), and A92.6 (Self-Propelled Elevating Work Platforms).

11.2 Safety and Design Aspects. High quality off-the-shelf OEM type equipment is acceptable if it is designed, maintained, and operated according to this standard.

11.2.1 Design criteria/general design requirements that should be emphasized for mobile aerial platforms are contained in ANSI/SIA A92.2, A92.3, A92.5, and A92.6. It is the responsibility of the applicable engineering, operations/maintenance, and safety organizations to ensure the design, testing, maintenance, inspection, and operation of this equipment complies with this standard, the manufacturers' recommendations, and ANSI/SIA.

11.2.2 Labeling/Tagging of Mobile Aerial Platforms.

a. The rated load/applicable capacity ratings shall be clearly marked on the mobile aerial platform.

b. A standard system of labeling shall be established and used throughout the installation.

c. A standard lockout/tag out system shall be established and used throughout the installation to indicate equipment that is not to be used due to inspection discrepancies, ongoing maintenance, or other reasons.

d. Certification/recertification tags are required as described in paragraph11.3.4.

11.2.3 Safety Analysis and Documentation of Mobile Aerial Platforms. A recognized safety hazard analysis such as fault tree analysis, FMEA, O&SHA shall be performed on all mobile aerial platforms used for lifts where failure/loss of control could result in loss of or damage to flight hardware. The analysis shall, as a minimum, determine potential sources of danger, identify failure modes, and recommend resolutions and a system of risk acceptance for those conditions found in the hardware-facility-environment-human relationship that could cause loss of life, personal injury, and loss of or damage to the mobile aerial platform, facility, or load. The analysis shall be done as part of the initial activation process, included in the equipment documentation, and updated as required to reflect any changes in operation and/or configuration.

11.3 Testing. Testing of mobile aerial platforms shall be performed according to this section, the manufacturers' recommendations, and the applicable ANS/SIA standard. Three types of tests are required for mobile aerial platforms: proof load tests, periodic load tests, and operational tests. Proof load tests and operational tests shall be performed prior to first use for new or extensively repaired or altered components directly in the mobile aerial platform load path. Repairs or alterations to non-lifting or non-holding components do not require a load test, although a functional check should be performed to determine if the repairs or alterations are acceptable. The periodic load and operational tests shall be performed annually. The acceptable tolerance for load test accuracy is +5/-0 percent. All load and operational tests shall be performed by qualified personnel according to written (specific or general) technical operating procedures. An inspection of the mobile aerial platform and its components shall be performed after each load test and prior to the platform being released for service to ensure

there is no damage. The periodic load test requirement may be fulfilled by a concurrently performed proof load test.
11.3.1 Proof Load Test. Before first use, all new, extensively repaired, or altered mobile aerial platforms shall undergo a proof load test in accordance with the manufacturers' instructions and the applicable ANSI/SIA standard. A proof load test may also be performed when there is a question in design, previous testing, or to ensure system integrity. The load shall be lifted slowly in an area where minimal damage will occur if the platform fails.
11.3.2 Periodic Load Test. Each mobile aerial platform shall be tested at least once every year with a load equal to the rated load.
11.3.3 Operational Test. Together with proof load and periodic load tests, the following shall be performed with a dummy rated load unless otherwise specified:
a. Perform all functions in an unloaded condition, including operation of limit switches and tilt alarm/shutoff. Where possible, use ground control station.
When required to use the platform control station, operate close to ground level.
b. Perform load test at maximum boom radius over the rear, if applicable.
Hold the load for a minimum of 5 minutes and verify drift does not exceed that specified by the responsible engineering organization.
c. The operational test for a modified mobile aerial platform can be tailored to test only those portions of the equipment that were modified/repaired, only if the rated and operational test interval has not expired.
11.3.4 Test Reports and Periodic Recertification Tags. After each test, designated personnel shall prepare written, dated, and signed test reports. Inadequacies shall be documented and, if determined to be a hazard, corrected prior to further use. These reports shall be kept on file for a minimum of two test cycles and shall be made readily available.
Following the periodic load test, mobile aerial platforms shall be given a permanently affixed tag identifying the equipment and stating the next required periodic load test date or load test expiration date.
11.4 Inspection.
11.4.1 Inspections, as described below, shall be performed on all mobile aerial platforms. Inspections shall be performed according to this section, the manufacturers' recommendations, and the applicable ANSI/SIA standard. Inadequacies discovered during an inspection shall be documented and, if determined to be a hazard, tagged out and corrected prior to further use. Inspections shall be performed by qualified personnel according to approved technical operating procedures.
11.4.2 All new extensively repaired, or modified mobile aerial platforms shall be inspected to the requirements of both daily and periodic inspections prior to first use. For component repair on mobile aerial platforms, only the inspections that apply to the repaired portion need to be performed prior to first use unless a periodic inspection interval expires during the downtime (see paragraph 11.4.5).

Excerpts Pertaining to Mobile Aerial Platforms

From Pages 89 to 95

11.4.3 Mobile aerial platforms in regular service (used at least once a month) shall be inspected as required in paragraphs 11.4.4 and 11.4.5. Idle and standby platforms shall be inspected according to paragraph 11.4.6.

11.4.4 Daily Inspections. These inspections shall be performed each day the mobile aerial platform is used and shall include the following:

a. Check safety devices for malfunction.

b. Check operating and control mechanisms for proper function.

c. Inspect for defects such as cracked welds, damaged control cables, and loose cable/wire connections.

d. Inspect hydraulic or pneumatic systems for observable deterioration or leakage and check hydraulic system for proper oil level if suspect.

e. Inspect electrical equipment for signs of malfunction, signs of deterioration, and dust and moisture accumulation.

f. Inspect chains or wire rope for wear or distortion.

11.4.5 Periodic Inspections. These inspections shall be performed at varying intervals depending on activity, severity of service, and environment. The following inspections shall be performed at least once per year or more frequently if required by the manufacturer or the applicable ANSI/SIA standard. Inspect for:

a. Requirements for daily inspections described in paragraph 11.4.4.

b. Deformed, cracked, or corroded members and loose bolts or rivets in the aerial platform structure. Various methods of NDT such as ultrasonic, radiographic, magnetic particle and liquid penetrant shall be utilized as needed.

c. Worn, cracked, or distorted parts, such as pins, bearings, shafts, gears, couplings, rollers, and locking devices.

d. Wear in chain drive sprockets and stretch in the chain.

e. Hydraulic and pneumatic relief valve settings as required by the manufacturer.

f. Hydraulic system for proper oil level.

g. Hydraulic and pneumatic fittings, hoses, and tubing for evidence of leakage, abnormal deformation, or abrasion.

h. Compressors, pumps, motors, and generators for loose fasteners, leaks, unusual noises or vibrations, loss of operating speed, and heating.

i. Hydraulic and pneumatic valves for cracks in the valve housing, leaks, and sticking spools.

j. Hydraulic and pneumatic cylinders and holding valves for malfunction and visible damage.

k. Hydraulic and pneumatic filters for cleanliness and the presence of foreign material in the system indicating other component deterioration.

l. Condition and tightness of bolts and other fasteners.

m. Legible and proper markings of controls, ratings, and instructions.

11.4.6 Idle and Standby Mobile Aerial Platforms. Idle and standby mobile aerial platforms shall be inspected prior to first use according to the requirements of paragraphs 11.4.4 and 11.4.5 unless these daily and periodic inspections were performed at required intervals and recorded during the idle/standby period.

11.4.7 Inspection Reports. After each formal periodic inspection, qualified personnel shall prepare written, dated, and signed inspection reports, including procedure reference and

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adequacy of components. Inadequacies shall be documented and, if determined to be a hazard, corrected prior to further use. These reports shall be filed and be made readily available by the organizational element responsible for mobile aerial platforms.

11.5 Maintenance. A maintenance program based on manufacturers' recommendations, integrating proactive, reactive, preventive and predictive maintenance shall be established to increase the probability the mobile aerial platform will function in the required manner over its design life cycle with a minimum of maintenance. The program shall include procedures and a scheduling system for normal periodic maintenance items, adjustments, replacements, and repairs. The program also shall ensure that records are kept and unsafe test and inspection discrepancies are documented and corrected. Any mobile aerial platform found in an unsafe operating condition shall be removed from service until repaired. All repairs shall be made by qualified personnel in accordance with the manufacturers' instructions.

11.6 Personnel Certification. Only certified (licensed) and trained operators shall be authorized to operate mobile aerial platforms (except for manually propelled platforms where training can be provided). Training, examination, and licensing program shall be established or made available. For those NASA installations that do not have a training program, all mobile aerial platform operators shall be trained and certified by a recognized certification organization that normally performs this function. The basic certification program will include the following:

11.6.1 Training.

a. Classroom training in safety, lifting equipment emergency procedures, general performance standards, requirements, pre-operational checks, and safety-related defects and symptoms (for initial certification and as needed).

b. Hands-on training (for initial certification and as needed).

c. An annual review of items listed in paragraphs 11.6.1a and 11.6.1.b above. (This may be conducted informally by local supervisory personnel).

d. Training for working at heights and the proper use of fall protection equipment.

11.6.2 Examination.

a. Physical examination (criteria to be determined by a cognizant medical official).

b. Written/oral examination.

c. Operational demonstration.

d. Proficiency examination for recertification.

11.6.3 Licensing. An organizational element shall be designated to issue operator licenses. Provisions shall be made to revoke licenses for negligence, violations of safety requirements, or failure to meet medical standards. Provisions shall be made for periodic checks of operators to verify they have licenses in their possession. The licenses shall indicate the type of mobile aerial platform the holder is qualified to operate. Alternately, the organizational element may elect to maintain a master list of licensed operators instead of issuing individual licenses, providing copies of the list are readily available to assurance and supervisory personnel at the work site.

11.6.4 Renewal. Licenses or certifications will expire at least every 4 years. Renewal shall require demonstration of proficiency or approval of supervision that proficiency is adequate and current. Renewal procedures will be established by each licensing organization, but as a minimum, will include items in paragraphs 11.6.1 and 11.6.2.

Excerpts Pertaining to Mobile Aerial Platforms

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NASA-STD-8719.9
May 9, 2002

11.7 Operations. Mobile aerial platforms shall be operated according to this section, the manufacturers' recommendations, and the applicable ANSI/SIA standard. The following practices shall be followed for mobile aerial platform operations:

a. Determine that the proposed mobile aerial platform operation is the desired operation after comparing hazards, productivity, and manpower requirements associated with other methods of access.

b. Before each use, the operator shall have read and understood the manufacturer's operating instructions and safety rules, have been trained and licensed according to paragraph 11.6, and have read and understood all decals and warnings on the equipment.

c. Before each use, the operator shall perform a pre-operational check to demonstrate operational readiness, including all limit switches and outrigger drift switches, if applicable, but excluding the tilt alarm/shutoff. If controls do not operate properly, the operator is responsible for notifying the supervisor. Repairs and adjustments shall be made before operations begin. The operator shall adhere to all tags on the controls.

d. Before each use, the operator shall survey the area for applicable hazards such as overhead obstructions and high-voltage conductors, debris, bumps and loose obstructions, drop-offs and holes, ditches, un-tamped earth fills, obstructed path of travel, unstable footing, and other possible hazardous conditions. The operator shall establish appropriate safety zones before initiating operations.

e. The equipment shall not be loaded beyond its rated load (capacity) except for required testing.

f. The operator shall ensure the equipment is within inspection and testing intervals by examination of the periodic recertification tags and/or documentation.

g. Operator discipline shall be maintained at all times. There shall be no eating, drinking, or rowdiness during mobile aerial platform operations.
Personnel shall keep all parts of the body, tools, and equipment inside the work platform periphery during raising, lowering, and traveling operations.

h. Fall protection is required for personnel using mobile aerial platforms that can tilt, as covered by ANSI/SIA A92.2 and A92.5.

i. Tools and other objects shall be carried in canvas bags or by other methods that free both hands and do not present a snagging hazard. Alternate methods of tool delivery beside mobile aerial platforms should be investigated.

j. For work on or near electrical distribution and transmission lines, mobile aerial platforms shall be operated in accordance with paragraphs 5.7.as, 5.7.at, and 5.7.au of this standard and the applicable ANSI/SIA standard.

k. Insulated mobile aerial platforms shall be tested and inspected in accordance with ANSI/SIA.

l. Outdoor mobile aerial platform operations should not commence if winds are above 20 knots steady state (23 mph, 37 km/hr) or if gusts exceed 25 knots (29 mph, 46 km/hr) or as recommended by the manufacturer. Consideration shall also be given to weather conditions such as lightning or snow before commencing operations.

m. The requirements of this section apply to all uses of mobile aerial platforms; e.g., movement for storage/repositioning and use of the platform close
to ground level.

Goddard Procedural Requirement

GPR 8834.1B

Lifting Operations Requirements

Goddard Procedural Requirements (GPR)

DIRECTIVE NO.	GPR 8834.1B	**APPROVED BY Signature:**	*Original signed by Arthur F. Obenschain for*
EFFECTIVE DATE:	September 29, 2009	**NAME:**	Robert Strain
EXPIRATION DATE:	September 29, 2014	**TITLE:**	Director

COMPLIANCE IS MANDATORY

Responsible Office: 540/Mechanical Systems Division

Title: Lifting Operations Requirements

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PREFACE

P.1 PURPOSE

The purpose of this GPR is to define the process, requirements, and responsibilities for conducting safe lifting operations at Goddard Space Flight Center (GSFC).

P.2 APPLICABILITY

a. This directive is applicable to all operations associated with Lifting Devices and Equipment (LDE), including rented or leased LDE and LDE provided by on-site Support Services Contractors to the extent provided in their contracts, at Greenbelt, Wallops Flight Facility (WFF), and other areas under GSFC cognizance unless specifically excluded by this directive. It also applies to institutional lifts and manual lifts.

b. This directive does not apply to tenants and their contract personnel operating in facilities exclusively used for non-NASA operations and controlled by the tenant under a Center-level agreement provided NASA personnel are not placed at risk.

c. When invoked as a contractual requirement by the applicable project, this directive is applicable to the extent specified in the contract for off-site contractor installations supporting GSFC activities.

d. Lifting operations under privatization clauses shall be subjected to the provisions of this directive to the extent provided by the contract, and the requirements shall be clearly specified therein.

e. The responsible Contracting Officer and the Project Manager shall apply requirements of this directive to any contractor, tenant, or customer if non-NASA lifting operations place NASA personnel, facilities, or equipment at risk.

f. This directive does not apply to contractor lifting operations using contractor-provided LDE which are exclusively associated with facility construction activities where the activities take place exclusively within an area to which access by the general population of NASA employees is excluded.

P.3 AUTHORITY

NASA-STD-8719.9, Standard for Lifting Devices and Equipment

P.4 REFERENCES

a. NPR 8715.3, NASA General Safety Program Requirements
b. GPR 1400.1 Waiver Processing
c. GPR 1410.2, Configuration Management
d. GPR 5330.1, Product Processing, Inspection and Test
e. GPR 8621.1, Reporting of Mishaps and Close Calls
f. GPR 8719.1, Certification and Recertification of Lifting Devices and Equipment
g. GSFC WM-001, Workmanship Manual for Electrostatic Discharge (ESD) Control
h. GSFC Form 23-60, Task Safety Analysis Worksheet
i. NASA-STD-8719.9, Standard for Lifting Devices and Equipment
j. Department of Health and Human Services (DHHS)/National Institute for Occupational Safety and Health (NIOSH) Publication No. 94-110, Applications Manual for the Revised NIOSH Lifting Equation
k. OSHA 1910.135 (a)(1), Head Protection
l. ASME B30.23, Personnel Lifting Systems

P.5 CANCELLATION

GPR 8834.1A, Lifting Operations Requirements

P.6 SAFETY

Safety requirements are described throughout this GPR.

P.7 TRAINING

Supervisors shall ensure that:

a. Personnel involved in manual lifts are trained or briefed on proper lifting techniques;
b. All individuals designated to participate in a lifting operation are qualified to perform their role safely and effectively, based on training, prior experience, and physical ability to do the operation. This includes designated observers, safety representatives, LDE operators, communicators, and all other participants; and

c. LDE Operators are trained and certified in accordance with GPR 8719.1 for the type of lifting operations required, and that training and certifications are current.

P.8 RECORDS

Record Title	Record Custodian	Retention
Critical Lift Procedure(s)	Project Office	* NRRS 8/103: Temporary. Destroy/delete between 5 and 30 years after program/project termination.
Completed checklists	Project Office	* NRRS 8/103
Stress/Stability Analyses	Project Office	* NRRS 8/103
Variances/Waivers	Project Office	* NRRS 8/103
User documents (e.g., technical interface information, analyses, problem records, and other relevant lift-specific information	Project Office	* NRRS 8/103
Audit results (see P.9 Metrics) and corrective actions	Applicable Safety Office	* NRRS 8/103
RECERT follow-up actions to metrics	RECERT	* NRRS 8/103

**NRRS – NASA Records Retention Schedules (NPR 1441.1)*

Contractors generating records as required by this procedure shall retain the records and turn them over to NASA as specified in the contract.

P.9 METRICS

Safety organizations shall, on an annual basis, audit an appropriate number of executed lift procedures (and associated documentation) of different projects and activities under their cognizance for compliance with this Directive. Each applicable safety office shall determine which procedures to audit, such that the audit results will, in their judgment, give good representation of typical lift activities. Audit results shall be analyzed by the safety organization for continual improvement. Corrective actions shall be implemented by the affected project/organization, and tracked to closure by the safety organization. Audit results shall be submitted to the Recertification Program (RECERT) Manager for appropriate follow up actions, such as trend analysis, lessons learned dissemination, and directive revision.

P.10 DEFINITIONS

Most of the terms used in this directive are defined in NPR 8715.3, NASA-STD-8719.9, and GPR 8719.1. Those that are unique or essential to this directive are listed below.

a. Certified – An individual who has documented evidence that he/she has completed required training, and has specific knowledge or proficiency in a skill that has been demonstrated, documented, and approved by an accepted authority. Certification expires after a specified time period and must be renewed to remain current. Certification, in the context of this GPR, requires approval by the RECERT Manager.

b. Critical Hardware – Hardware whose loss would have serious programmatic or institutional impact, and has been identified by the directorate, or project as being critical.

c. Critical Lift Coordinator (CLC) – An individual who is assigned to direct and give instructions to the crane operator during critical crane operations due to specific project requirements, and who has obtained the necessary training and is certified by the RECERT Manager. The CLC is an optional position, used only when a project desires to have its own lifting expert. The role of the CLC shall be specified in the Critical Lift Procedure.

d. Critical Lift Procedure – A specific step-by-step procedure to be followed by the lift team to perform a Critical Lift operation. The procedure also defines the roles and responsibilities of all lift team members, and pertinent items to be verified prior to the lift. See Section 3.3.

e. Customer – A non-NASA, government or private sector entity or organization that owns, sponsors, or otherwise champions a project brought onto GSFC property by a current NASA contractor exercising a contractual provision permitting such an arrangement for the purposes of utilizing NASA facilities and/or test equipment on a lease or rental basis.

f. Flight Hardware – Hardware designed and fabricated for ultimate use in a vehicle intended to fly.

g. Hazardous Operating Procedures (HOP) – Detailed, documented procedures listing step-by-step functions or tasks to be performed on a system or equipment to ensure safe and efficient operations. A HOP may address such topics as special precautions, start and stop times or conditions, necessary sequences of steps, approving official(s), etc.

h. Institutional Lift – A lift performed as part of the day-to-day operations of the Center, such as lifting a section of pipe or moving a pallet of office supplies. It is not a manual lift, although a manual lift may be included as part of an institutional lift. NOTE: an Institutional Lift can also be classified as "critical," depending on the hardware involved.

i. LDE Certification – The documented status of LDE that a set of requirements have been and continues to be met. As used in this GPR, certification and recertification is a process performed by the RECERT Manager that leads to the initial, or continuation of, certification that LDE is safe to use within specific certification parameters, and includes, but is not limited to, LDE compliance and documentation reviews, tests, inspections, nondestructive testing, and analyses.

j. LDE Operator Certification – The documented status of LDE operators validating that they are trained and qualified in accordance with NASA-STD-8719.9 and GPR 8719.1, and certified by the RECERT Manager at Greenbelt or the Deputy RECERT Manager at Wallops.

k. Lift Analysis – Analysis performed to determine the maximum load the LDE is expected to experience during the worst case lift.

l. Lift Categories – The category of lifting operations determines the number and qualifications of personnel involved, documentation requirements, and safety requirements. The following categories of lifts are addressed:

(1) Critical Lift – A lift where failure/loss of control could result in loss of life, loss of or damage to critical hardware, or other items such as spacecraft, one-of-a-kind articles, or major facility components whose loss would have serious programmatic or institutional impact. Operations involving the lifting of personnel with a crane, and lifts where personnel are required to work under a suspended load, shall always be defined as critical lifts (see NASA-STD-8719.9). Operations with special personnel and equipment safety concerns beyond normal lifting hazards shall also be designated as critical. See Appendix C for a "Process for Lifting Category Determination."

(2) Non-Critical Lift – A lift involving routine lifting operations governed by standard industry rules and practices except as supplemented with unique NASA testing, operations, maintenance, inspection, and personnel licensing requirements contained in NASA-STD-8719.9 and this directive.

m. Lifting Devices and Equipment (LDE) – The collective term that includes both Lifting Devices (LD) and Lifting Equipment (LE). LDs are machines such as overhead and gantry cranes (including top running, monorail, underhung, and jib cranes), mobile cranes, derricks, gantries, hoists, winches, special hoist-supported personnel lifting devices, Hydra Sets, mobile aerial platforms, powered industrial trucks, and jacks. LE includes the slings and sling assemblies, strongbacks, shackles, load-measuring devices, and hardware components used to attach the load(s) to the lifting device(s).

n. Manual Lift – A lift where a person lifts, holds, and/or moves an item.

o. Mechanical Lift – A lift that employs the use of equipment (e.g., crane, chain fall, fork lift, etc.) to raise, lower, or move loads.

p. Off Load Operation with Constraints (OLOC) – A handling operation where LDE is used to relieve a portion of the weight of a constrained load, i.e., a piece of hardware or an item to be lifted, due to the impossibility of safe blocking or support of the load from the ground or floor. An example would be off-loading the weight of a piece of hardware attached to a handling/holding fixture (i.e., constrained) prior to releasing the attachment fasteners. See Section 2.6, Special Requirements for OLOC.

q. Person in Charge (PIC) – The individual designated by the Lifting Service User to be in charge of the operation. .

r. Personal Protective Equipment PPE) – Safety equipment such as hard hats, goggles, steel-toed shoes, etc.

s. Pre-lift Briefing – A briefing of involved personnel held prior to the commencement of a critical lift or other designated lift.

t. RECERT – An established GSFC process that provides certification and recertification expertise, management, and oversight for lifting devices and equipment at GSFC or by GSFC contractors (see P.2). The RECERT manager has overall responsibility for RECERT functions. The processes of certification/recertification of LDE and operators are described in GPR 8719.1.

u. Rigger – An individual who selects and attaches lifting equipment to an item to be lifted. At GSFC, a rigger is a certified LDE operator.

v. Safety Representative – An individual who is selected to make judgments concerning personnel, equipment, or systems safety. The safety representative shall be qualified on the basis of a certificate, professional standing, and/or demonstrated competence in the types of lifts they take part in. The Safety Representative shall be selected by mutual agreement of the Lifting Service Provider (LSP) and User, who together determine the necessary qualifications for the assigned task. The applicable safety organization (Safety and Environmental Division, Systems Reliability and Safety Office, or the Wallops Safety Office) shall concur with or deny the selected Safety Representative.

w. Tenant – A non-NASA entity or organization that has obtained GSFC's permission to reside on Center. The entity or organization has total control of, and responsibility for, its own operations and activities within the agreed-upon boundaries, as long as NASA personnel or property are not put at risk.

x. Waiver/Variance – Written authorization to depart from a specific requirement.

P.11 ACRONYMS

ASME	American Society of Mechanical Engineers
CLC	Critical Lift Coordinator
CG	Center of Gravity
CMS	Constant Micro Speed
DHHS	Department of Health and Human Services
DOT	Department of Transportation
EED	Electro-Explosive Device
ESD	Electrostatic Discharge
FOM	Facility Operations Manager

GSFC	Goddard Space Flight Center
HOP	Hazardous Operating Procedures
LD	Lifting Device
LDE	Lifting Devices and Equipment
LE	Lifting Equipment
LSP	Lifting Service Provider
NIOSH	National Institute for Occupational Safety and Health
OEM	Original Equipment Manufacturer
OLOC	Off Load Operation with Constraints
OSHA	Occupational Safety and Health Administration
PIC	Person In Charge
PPE	Personal Protective Equipment
QA	Quality Assurance
RECERT	Recertification Program
SWL	Safe Working Load
WFF	Wallops Flight Facility
WOA	Work Order Authorization

PROCEDURES

In this document, a requirement is identified by "shall," a good practice by "should," permission by "may" or "can," expectation by "will" and descriptive material by "is."

This directive establishes GSFC requirements for lifting operations. It complements NASA-STD-8719.9 to ensure the safety of all personnel and equipment involved in lifting operations at all levels of complexity.

For use at a contractor's facility, the requirements of this directive may be tailored and reissued as a project document and controlled in accordance with GPR 1410.2, and invoked in the applicable contract(s).

1.0 RESPONSIBILITIES

1.1 Lifting Service Provider (LSP)

The LSP is the organization that provides a lifting service to a user, and is usually the owner/operator of the facility where the lift service is performed. The LSP may provide their own LDE and/or operators, or task supporting organizations or contractors to provide LDE and/or operators. The LSP shall be responsible for the following:

a. Verifying that LDE operators and supporting personnel are properly designated, authorized, trained, and certified (see GPR 8719.1) at the time lifting operations are performed;
b. Verifying that lift procedures and checklists, when needed (see Section 3.1), are available and understood for lifting operations;

c. Verifying that deficient LDE or other lifting equipment that is removed from service is locked out or tagged out-of-service, and that RECERT is promptly notified;
d. Coordinating outages for load testing and inspections of lifting devices with RECERT to minimize conflicts with ongoing operations;
e. Providing lifting devices and/or lifting equipment, when requested by the Lifting Service User, appropriate for the lifting operation, i.e., certified for critical (and non-critical) lifts, or certified for non-critical lifts only;
f. Notifying the Facility Operations Manager (FOM) of any operations that may have unusual hazards or safety implications (see 1.11); and
g. Safe conduct of all lifting operations.

For **Critical Lifts**, the LSP shall also:

h. Provide expert advice and assistance on lifting operations;
i. Support the User in developing the Critical Lift Procedure(s) for User equipment;
j. Support the User in developing variance requests, when required;
k. Verify that all required LDE and associated tools are available, in correct operating condition, and certified as required;
l. Review and verify lift and critical lift procedures with the User prior to the lift operation; and
m. Certify, to the User, that all above requirements have been met prior to the lift operation.

1.2 Lifting Service User

The Lifting Service User (hereinafter referred to as "User") is the Program or Project Manager or their Representative that is the owner of the hardware being lifted or handled. The User is ultimately responsible for their hardware, and therefore has key responsibilities in the lifting operations. Users shall coordinate closely with the LSP for the conduct of lifting operations that affect their hardware.

Many Users are flight projects that use special lifting devices or fixtures and require specialized engineering support. They may provide their own lifting equipment and/or operators, or task supporting organizations or contractors to provide equipment and/or operators.

Users shall be responsible for the following for all lifting operations of their hardware:

a. Providing input to the RECERT Manager to identify the category of lifts for their hardware, i.e., critical or non-critical, so that compliance requirements for lifting operations can be established. Appendix C "Process for Lifting Category Determination" shall be used for this determination and input shall be obtained from the LSP, the applicable safety organization(s), and facility personnel (if appropriate);
b. Selecting LDE for a lift based upon the maximum load it would experience in the worst case scenario during the lift;
c. Developing or verifying availability of lifting procedures and HOPs that address the safety of their personnel and hardware (see Section 3.1). For lifting or handling equipment not covered by NASA-

STD-8719.9, consult and follow the equipment manufacturers' recommendations with documented concurrence from the applicable safety representative;
d. Designating a Person In Charge with the responsibilities described in 1.4 below;
e. Developing and approving Critical Lift Procedure(s) prior to beginning lift operations, and concurring with changes during the lift;
f. Verifying that the LSP's LDE and operators have current certifications as required by GPR 8719.1 for the type of lifting operations required;
g. Verifying that all applicable safety analyses (e.g., stability analysis, lift analysis, etc.) or assessments are completed and are sufficient per the requirements of NASA-STD-8719.9, and that lift points are above the established Center of Gravity (CG);
h. Initiating a Waiver/Variance request if any NASA or GSFC safety requirements are not met, in accordance with NPR 8715.3 or GPR 1400.1 as applicable;
i. Providing engineering support as needed by the LSP for User hardware;
j. Providing for appropriate Safety Representative support as described in Section 1.5;
k. Providing Work Order Authorization(s) (WOAs) as required by GPR 5330.1;
l. Notifying the FOM of any operations that may have unusual hazards or safety implications (see 1.11);
m. Stopping lifting operations in the event of an actual or reported failure or unsafe condition;
n. Providing concurrence to resume operations once failures or unsafe conditions are corrected;
o. Determining the applicability of NASA-STD-8719.9 and this procedure to off-site contractors, and ensure that sufficient requirements are invoked in the contracts; and
p. The safe conduct of all lifting operations.

1.3 Person In Charge (PIC)

The PIC shall take overall responsibility for the conduct of the lifting operation. The PIC shall be from the User organization or the LSP, and may be an I&T Manager, Lead Engineer, LDE Operator, the Rigger, a Critical Lift Coordinator (CLC), supervisor, or any other individual selected and specified in the critical lift or other applicable procedure. The PIC shall:

a. Verify that all involved parties meet the lift requirements;
b. Verify that all tools and equipment are adequate for the lift requirements;
c. Fill out Appendix C "Process for Lifting Category Determination";
d. For any critical lift, or for any lift determined by the LSP or User to need a pre-lift briefing and walk-through, conduct a pre-lift briefing/walk-through with all required participants. See Section 2.3;
e. Verify that adequate communications and direction are available, particularly for the LDE operator(s); and
f. Manage the lifting operation.

1.4 Safety Representative(s)

The qualified safety representative(s) shall be responsible for the following:

a. Maintaining qualification in terms of competence, experience, training, etc.;

b. Verifying that all applicable safety analyses or assessments are completed in accordance with requirements of NASA-STD-8719.9;
c. Advising all personnel involved in the lifting operations of any additional hazard(s) and appropriate methods of hazard control prior to and throughout the entire lifting operation;
d. Verifying that Incident/Mishap Reports are initiated and submitted in accordance with this document and the requirements of GPR 8621.1;
e. Providing input to the User organization to identify the lifting operations as critical or non-critical;
f. Reviewing and approving all critical lift procedures, HOPs, and WOAs pertaining to critical lifting operations;
g. Ensuring appropriate hazard controls have been addressed in the HOPs and/or WOAs;
h. Ensuring that the lifting operation adheres to this directive and all applicable NASA, Occupational Safety and Health Administration (OSHA), and processing facility safety regulations (where appropriate);
i. Providing concurrence to proceed with a hazardous lifting operation and, upon completion, concurrence to open the controlled area and resume normal operations; and
j. Reviewing and concurring with/denying project-initiated safety waiver/variance requests (see NPR 8715.3 or GPR 1400.1) prior to submittal to the RECERT Manager.

1.5 Lift Team Members

Lift team members shall:

a. Participate in Pre-Lift Briefings as described in Section 2.3;
b. Understand their roles and the roles of other lift team members for a given operation;
c. Ensure that they fully understand all applicable procedures and safety requirements; and
d. Wear the appropriate Personal Protective Equipment (PPE).

1.6 Office of System Safety and Mission Assurance at Greenbelt and the Safety Office at Wallops

The Office of System Safety and Mission Assurance at Greenbelt and the Safety Office at Wallops shall:

a. Audit executed lift procedures and associated documentation as specified in Section P.9;
b. Concur with/deny Waiver/Variance requests submitted; and
c. Concur with/deny selected Safety Representative.

1.7 Safety and Environmental Division at Greenbelt and the Safety Office at Wallops

The Safety and Environmental Division at Greenbelt and the Safety Office at Wallops shall:

a. Provide oversight for Center industrial or institutional lifting operations for compliance with GSFC, NASA, and OSHA requirements;
b. Monitor compliance of institutional lifting operations and operators to the requirements herein;
c. Monitor compliance to institutional safety requirements;

d. Audit executed lift procedures and associated documentation as specified in Section P.9;
e. Concur with/deny Waiver/Variance requests submitted; and
f. Concur with/deny selected Safety Representative.

1.8 RECERT Manager

The RECERT Manager shall, in addition to the responsibilities described in GPR 8719.1, be responsible for:

a. All RECERT functions described herein;
b. Reviewing results of executed lift procedure audits by the safety offices, and implementing appropriate follow-up actions as required by Section P.9;
c. Reviewing and concurring or denying safety waiver/variance requests prior to the originator's submittal to other appropriate authorities and Center Director for approval; and
d. Receiving input from facility, program, user, and safety assurance personnel regarding the lifting operation to identify the category of a lift as either critical or non-critical.

1.9 Deputy RECERT Manager.

The Deputy RECERT Manager shall serve as the RECERT Manager's alternate and represent the RECERT Manager at WFF for day-to-day operations by performing the duties in Section 1.9.

1.10 Building Facility Operations Manager (FOM).

FOMs are responsible for notifying building occupants of potential safety hazards in and around facilities under their cognizance. When notified by the LSP or User of a lifting operation with unusual hazards or safety implications (i.e., potential to affect occupants beyond the immediate lift area), he/she shall review the proposed lifting operation(s) and concur prior to commencing the lifting operation(s).

1.11 Certified Critical Lift Coordinator (CLC).

CLCs shall be responsible for:

a. Maintaining a current certification as required by GPR 8719.1;
b. Coordinating the preparation and execution of the lift(s) with the PIC; and
c. When indicated in the Critical Lift Procedure, directing and commanding the lifting operation for their organization's hardware.

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2.0 REQUIREMENTS

2.1 General Requirements for All Lifting Operations

2.1.1 Prior to any lifting operation:

a. The LDE operator shall:

(1) Inspect all LDE in accordance with NASA-STD-8719.9, manufacturers recommendations, and GSFC procedures;
(2) Verify appropriate PPE (e.g., hard hats, eye protection, etc.) are available and used properly; and
(3) Verify the load's weight and the location of the CG.

b. The PIC shall:

(1) Analyze the lift for all unmitigated hazards, including lift stability. For non-hazardous mechanical lifts, a Job Hazards Analysis or checklist may be used to document hazards in lieu of a lift stability analysis; GSFC Form 23-60 may be used to satisfy this requirement. For routine hazardous lifts, a one-time analysis can be done where risk mitigation controls are written into a standard procedure for the operation;
(2) Verify that the operational requirements for the type of lifting devices and/or equipment being used comply with NASA-STD-8719.9;
(3) Verify that all LDE are certified as described in GPR 8719.1 for the category of lift to be performed; and
(4) Verify that all operators and riggers involved in the lift are certified for the category of lift to be performed.

2.1.2 Suspended load operations

Suspended load operations, as defined in NASA-STD-8719.9, are discouraged at GSFC. However, if a suspended load operation cannot be avoided, the operation shall comply with NASA-STD-8719.9, Appendix A, "NASA Alternate Standard for Suspended Load Operations." Prior to any suspended load operation, the User shall prepare analysis documentation of the operation (see NASA-STD-8719.9) and submit it to the RECERT Manager for concurrence. The RECERT Manager shall, in turn, consult with the NASA HQ Office of Safety and Mission Assurance per HQ requirements.

2.1.3 Loads Containing Components Sensitive to Electrostatic Discharge (ESD)

The User shall be responsible for ESD protection of the load. The User shall address and coordinate ESD protection with the LSP to ensure that the ESD requirements of the load are fully understood and protective measures are taken. If special handling requirements are needed to ensure ESD protection, they shall be addressed in documented procedures (see Section 3.1). Procedures shall address and comply with the requirements of NASA-STD-8719.9 and GSFC WM-001.

2.1.4 Loads Containing Explosives or Electro-Explosive Devices (EEDs)

The User shall be responsible for all lifting operations involving loads containing explosives or EEDs. Such lifts shall be classified as critical unless a documented risk assessment is performed that indicates otherwise and is concurred by responsible user management and the applicable safety representative. If it is indicated as non-critical, it shall be classified as hazardous.

2.1.5 Loads Containing Pressurized Containers

The User shall be responsible for all lifting operations involving loads containing pressurized containers which do not conform to the Department of Transportation (DOT) or the American Society of Mechanical Engineers (ASME) requirements. Such lifts shall be classified as critical unless a documented risk assessment is performed that indicates otherwise and is concurred to by responsible user management and the applicable safety representative. If it is indicated as non-critical and the pressure containers do not conform to DOT or ASME requirements, it shall be classified as hazardous.

2.1.6 Loads Containing Hazardous Materials

The User shall be responsible for all lifting operations involving loads containing hazardous materials which are contained in containers which do not conform to DOT or ASME requirements or the hazardous material has been removed from the Original Equipment Manufacturer's (OEM) packaging. Such lifts shall be classified as critical unless a documented risk assessment is performed that indicates otherwise and is concurred to by responsible user management and the applicable safety representative. If it is indicated as non-critical and the containers do not conform to DOT or ASME requirements, or if the hazardous material has been removed from the OEM packaging, it shall be classified as hazardous.

2.1.7 Hazardous Lifting Operations

The User shall be responsible for all hazardous lifting operations. Hazardous lifting operations shall be conducted in accordance with the requirements of sections 3.8 and 7.4 of NPR 8715.3A.

2.1.9 Use of Hard Hats

In accordance with OSHA 1910.135 (a)(1), hard hats shall be worn when working in areas where there is a potential for injury to the head from falling objects. However, the use of hard hats may introduce risk of damage to the load from contact with a hard hat. The PIC shall examine each situation and ensure steps (e.g., chin straps or tethering) are taken to mitigate the risk.

2.2 Special Requirements for Critical Lifts

The requirements for critical lifts detailed in NASA-STD 8719.9 shall be followed in their entirety and Appendix C "Process for Lifting Category Determination" shall have been completed. The following specific requirements apply, whether the critical lift is project equipment or otherwise:

a. Prior to any critical lifting operations, the PIC shall:
   1) Verify that the LE is certified per GPR 8719.1 for critical lifts.
   2) Verify the weight and CG location to ensure that the payload maintains stability during the lift.
   3) Verify that the Critical Lift Procedures, including any required waivers/variances, are complete and approved as described in Section 3 herein.

4) Perform a pre-lift briefing (see Section 2.3 of the lift team) including the User's designated representatives, Safety Representatives, and others as appropriate to review the planned lifting operation.

b. The lifting procedure shall contain a tabulation of LDE, including slings, hoist rings, shackles, turnbuckles, spreader bars, lifting assemblies, Hydra Set, load-measuring devices, and any other hardware components used in the lifting operation. The following information shall be provided for each item attached in the load line: safe working load (SWL), expiration date, and RECERT control number;

c. Videotaping of the Critical Lift shall be the User's responsibility. Videotaping is encouraged but not mandatory;

d. A single person (NASA or contractor) shall be designated as responsible for the safety of the operation. This shall be the Safety Representative described in Section 1.5;

e. A Critical Lift shall not commence unless all team members required by the Critical Lift Procedure are present, on station, and have received the pre-lift briefing;

f. When so designated in the Critical Lift Procedure, CLCs shall be responsible for directing and giving commands to the LDE Operator during a lifting operation and;

(1) The CLC shall instruct all personnel involved in the proper preparation, lifting, and final positioning to be achieved, as a part of the pre-lift briefing.
(2) Coordination for directing the lifting operation shall be delineated in the Critical Lift Procedure and emphasized in the pre-lift briefing.
(3) Any transfer of responsibility for directing the lifting operation (e.g., from CLC to the rigger/crane operator or vice versa) shall be identified in the Critical Lift Procedure and emphasized in the pre-lift briefing.
(4) A CLC shall not perform rigging activities or hands-on operation of lifting devices.

Appendix A of this directive is a sample checklist for critical lifts.

2.3 Requirements for a Pre-Lift Briefing

A pre-lift briefing shall be performed whenever more than one person is involved in the activity, whenever a lift is considered critical, or whenever the PIC, a Safety Representative, or a supervisor in the LSP or User organization requests one. In these cases, the briefing shall be conducted, regardless of familiarization or experience of those performing the task or operation. The pre-lift briefing is generally useful for all but the most routine operations, and is primarily aimed at ensuring the safety and coordination of the personnel and equipment involved.

2.3.1 The PIC normally conducts the pre-lift briefing, although they may delegate this responsibility.

2.3.2 The pre-lift briefing shall be conducted prior to beginning lifting operations, and shall involve all personnel having a role in the operation. When Lift Team members arrive after the lift has begun, such as when a shift change occurs, the incoming personnel shall be sufficiently briefed to ensure that they fully understand their roles, the task(s) to be performed, and all relevant elements of the pre-lift briefing.

2.3.3 Prior to the Pre-Lift Briefing, the briefer shall:

a. Check weather forecast and/or storm code panel for adverse conditions that could potentially affect the lift;
b. Check LDE for proper criticality category and certification;
c. Check LDE log book(s) to verify that there are no outstanding deficiencies;
d. Verify that required lift procedures and WOAs have been approved and signed off with all required signatures;
e. Verify that any required lift stability analyses, HOPs, stress analyses, etc., are completed and available;
f. Verify that the CG and total weight of the load to be lifted are known and documented; and
g. Verify that all 2-way radios to be used during lifting operations are fully charged, functioning properly, and do not produce radio interference with other equipment in the vicinity.

2.3.4 At the Pre-Lift Briefing, the briefer shall:

a. Verify that all Lift Team members are present;
b. Verify that all Lift Team members understand their roles and responsibilities;
c. Perform a step-by-step review of the lifting operation;
d. Explain the hardware to be lifted, associated Ground Support Equipment, configuration of lifting equipment, and associated hazards;
e. Verify that all Lift Team members understand the PPE requirements and are prepared to meet them;
f. Review any applicable safety requirements or procedures; and
g. Emphasize that safety is the primary consideration during the lift.

2.4 Institutional Lifts

Institutional lifts are those lifts performed frequently and repetitively, often on a daily basis, and normally involve activities such as construction or maintenance, handling of shop materials, and other routine activities involved in the normal operation of the Center. In general, the LDE consists of cranes, forklifts, powered pallet jacks, and other material-handling equipment.

Supervisors shall require that LDE operators that perform institutional lifts are trained in the safe operation of the LDE in use, and certified or otherwise qualified as defined in GPR 8719.1. Supervisors shall also confirm that any special procedures necessary to protect personnel or high-value equipment are available and understood by operators.

If an institutional lift is determined to be a Critical Lift, Section 2.2 shall apply.

2.5 Manual Lifts

This section applies to those cases where one or more individuals manually supports or moves an object, with or without LDE. Manual lifts of small, lightweight critical items, such as circuit board panels, do not require all the safeguards described below. Other requirements may be determined by the supervisor

or project manager. In such cases, supervisors or project managers shall be responsible to ensure that there is no compromise of safety to the personnel or equipment.

Manual lifts may range in complexity from handling a lightweight item of equipment to supporting an item of space flight hardware while LDE is repositioned. Operations as simple as helping someone move an item of office equipment are considered manual lifts.

2.5.1 The following safe lifting and handling load limits shall apply for each manual **critical** lift:

a. 35 lbs of manageable shape and size for one person;
b. 75 lbs of manageable shape and size for two people;
c. 100 lbs of manageable shape and size for three people;
d. No manual lift shall be performed for a load exceeding 100 lbs unless written concurrence from a qualified safety representative has been obtained; and
e. All lifts shall be within limits of comfortable balance and control.

Supervisors shall determine and document weight limits for manual **non-critical** lifts. In making this determination, supervisors shall consider the guidelines of DHHS (NIOSH) Publication No. 94-110, Applications Manual for the Revised NIOSH Lifting Equation.

2.5.2 The following rules shall apply whenever performing a manual lift. These rules may be tailored based on the situation, but shall not compromise personnel or equipment safety or permit undue risk.

a. Plan and walk through the entire lift prior to commencing the lifting operation;
b. Visually inspect the area to identify any tripping hazards and remove them, if possible, prior to starting. If a trip hazard cannot be moved prior to starting, a spotter shall be used to guide the individual(s) performing the lift when approaching the hazard;
c. Clear work area and translation path of personnel not involved in the lifting operation;
d. Pick up the load correctly to avoid injury. Minimize unnecessary bending, twisting, and lifting above the shoulders;
e. Make use of mechanical devices such as portable carts or dollies whenever possible. Inspect carts and dollies for any damage before use, and verify the device has a suitable load rating for the item to be moved;
f. Ensure that the item being lifted can be handled manually without injury to personnel or damage to the hardware and/or facility;
g. Ensure that a firm grip can be maintained from the beginning to the end of the lift;
h. Ensure that the load destination is clear of obstacles and provides a stable base to support the load;
i. When in doubt, STOP! Contact the appropriate safety representative or safety organization.

2.5.3 If a manual lift is considered complex, and high-value equipment and/or safety are at risk, a procedure and/or WOA shall be written and followed as required in Section 3. If the manual lift is considered a Critical Lift, Quality Assurance (QA) witnessing is required, but Safety witnessing is not. Manual lifts of small, lightweight critical items, such as circuit board panels, do not require QA or Safety witnessing.

2.6 Special Requirements for Off Load Operations with Constraints (OLOCs)

OLOCs (see Definitions P.10.p) present additional hazards to personnel and hardware and shall only be conducted when it is not possible to perform the same activity in a conventional, unconstrained manner. OLOCs shall be treated as critical lifts and shall comply with Section 2.2.

Since an OLOC is an unusual lift operation and poses additional risks to the hardware or item being handled, the Project Manager must assess, acknowledge and accept these risks before the operation is performed. A copy of this risk assessment shall be sent to the RECERT Manager for information purposes prior to performance of the OLOC.

An example of an OLOC (see Definitions P.10.p) would be off-loading the weight of a piece of hardware attached to a handling/holding fixture (i.e., constrained) prior to releasing the attachment fasteners. An OLOC must be treated as a critical lift and the total combined weight of the hardware handling/holding fixture, the hardware lifting equipment, and the hardware must be within the SWL of the LD (i.e., the crane or other facility equipment).

The following are additional requirements that shall apply to OLOCs to minimize the potential of hardware damage and/or exceeding the SWL of any LE or hardware component in the load path during the operation.

2.6.1 Two independent devices are required to measure the load and shall be monitored at all times by a member of the lift team other than the crane operator.

2.6.2 Crane hoist speed is absolutely critical for safe execution of the OLOC and must be able to be limited to .75 inches/minute. Thus cranes used for OLOC operations shall be equipped with a momentary ON button that controls the Constant Micro Speed (CMS) to this limit.

2.6.3 If proper CMS control is not available a Hydra Set shall be used for hoist operations. The User must be aware of potential Hydra Set issues such as hook height limitations, the lack of load release incremental control, and hydraulic fluid leaks.

2.6.4 If proper CMS control is not available and a Hydra Set cannot be used, the OLOC shall be engineered to provide another path to success – such as highly compliant LDE – and approached with extreme caution. Otherwise the OLOC must be abandoned.

2.6.5 Load measurement instrumentation configuration shall be documented in the procedure, including settings and a diagram of connections.

2.6.6 All equipment shall be used within the manufacture’s specifications.

2.6.7 Personnel setting up, using, and monitoring the load measuring devices and Hydra Set shall be trained in the operation, use, and limitations of the equipment and shall be present during the operation.

2.6.8 Pre-Operation Checks

a. Perform an accuracy verification check on the load measuring devices within 24 hours of the lift by lifting a known weight.

b. Verify all settings and equipment configurations comply with the procedure.

c. Perform a load test verification check on the Hydra Set within 24 hours of the lift by lifting a known weight.

3. DOCUMENTATION REQUIREMENTS

3.1 Required Procedures

Documented procedures shall be prepared, when required, for lifting operations as defined below. Procedures shall not rely on personnel to stabilize or support any portion of a load that exceeds the manual lift limits in 2.5.1, even in conjunction with LDE.

a. Work Order Authorizations shall be processed and approved for project lifts as defined in GPR 5330.1.

b. Procedures for routine, non-critical lifts shall be available and may be generic and not lift-specific. The requirement may be satisfied by adherence to overall standards, generic lifting procedures, standard operating procedures, and/or original equipment manufacturer's operating instructions, augmented by operator training and certification.

c. Procedures for non-routine, non-critical lifts, such as a lift involving an unusually configured load with an off-center CG, shall require a stress/stability analysis and lift procedure prior to commencement of the lifting operation(s). The PIC shall determine the degree of detail and approvals required. Normally, these procedures may be similar to those described in 3.1.b, with additional detail added for non-routine situations.

d. HOPs shall be required for all operations involving unusual hazards. HOPs may be stand-alone or incorporated in the body of other procedures. HOPs shall comply with the requirements of NPR 8715.3.

e. Checklists are very effective, and their use is encouraged to supplement required procedures. Checklists for key items of LDE can reduce the work involved in producing procedures. A sample checklist for a critical lifting operation is given in Appendix A. A sample checklist for a non-critical lifting operation is given in Appendix B. Other checklists should list detailed steps in the operation. Appendix C "Process for Lifting Category Determination" is required when a decision concerning whether or not a lift is critical is to be made.

f. Institutional lift procedures are usually as described in 3.1.b and 3.1.c. Supervisors shall ensure that adequate procedures are available, and shall produce a lifting procedure and perform a pre-lift briefing for lifts having an unusual level of risk.

g. Critical Lift Procedures shall be developed for each critical lifting operation, except as provided in 2.5.

h. Waiver/variance Documentation shall be prepared and approved in accordance with GPR 1400.1 and NPR 8715.3.

The following table serves as a guideline for determining the need for lift procedures.

Criticality	Type	Description	Lift Procedure Needed?
Non-Critical	LDE	Simple or routine	No
Non-Critical	LDE	Non-routine or complex	Yes
Non-Critical	LDE	Institutional with no risks except those inherent in any lifting operation	No
Non-Critical	LDE	Institutional with risks in addition to those inherent in any lifting operation	Yes
Non-Critical	Manual	Simple	No
Non-Critical	Manual	Complex	Yes
Non-Critical	Manual	High dollar	Yes
Non-Critical	Manual	Safety risk	Yes
Critical	All	All (see 3.1.g)	Yes

3.2 Non-Critical Lift Procedures

Procedures, when required (see Section 3.1), shall be available for all LDE citing general operating instructions, operator certification or training requirements, equipment certification requirements, and other information needed to ensure safe performance of lifting operations. Procedures may be generic, and may apply to multiple types of lifts for a given facility or LDE. These procedures need not be lift-specific. They should be sufficient to ensure safe handling of lifted and lifting equipment, ensure operator safety, and minimize or eliminate risk (Ref: NASA-STD-8719.9).

3.3 Critical Lift Procedures

Critical Lift Procedures are the responsibility of the User. As a minimum, the Critical Lift Procedure shall be reviewed and approved by the LSP, User, Safety Representative, and the PIC before the lifting operation. The procedures shall address the following:

a. Description of the lift operation, location, and LDE to be used, including defining the safety keep-out zone for the operation;
b. Identification of lift team members, their roles, and responsibilities;
c. Degree and makeup of safety and mission assurance coverage;
d. Sequential operational requirements;
e. HOPs;
f. Checklists and other required documents;

g. Emergency and contingency procedures (e.g., fire, power outage, lifting during an electrical storm, outdoor lifts under windy conditions, etc.);
h. Special requirements for ESD, EEDs, and explosives;
i. PPE;
j. Contamination control requirements;
k. Stability analyses, stress analyses, variance(s) (if required), and any other analyses determined by the LSP or User to be needed before the lift;
l. Procedures for making and approving changes to the procedure after it has been approved;
m. Description of the means of communications to be used; and
n. Photo or videotape requirements.

3.4 Waiver/Variance Documentation

Safety waiver/variance Documentation, if needed, shall be prepared and approved in accordance with GPR 1400.1 and NPR 8715.3.

APPENDIX A
SAMPLE CHECKLIST
FOR CRITICAL LIFTING OPERATIONS

- ☐ 1. All Lift Team members are present.
- ☐ 2. The Lift Stability Analysis, Stress Analysis, and other required documentation are completed.
- ☐ 3. The Lift Procedure has been approved and has all required signatures.
- ☐ 4. The CG and total weight of load to be lifted are known and documented.
- ☐ 5. If 2-way radios are to be used, all units are fully charged, functioning properly, and do not produce radio interference with other equipment in the vicinity.
- ☐ 6. All team members are wearing appropriate PPE.
- ☐ 7. Weather forecast and/or storm code panel (if applicable) are checked for adverse conditions that could potentially affect the Lift.
- ☐ 8. LDE is certified for critical lifts.
- ☐ 9. The LDE Operator is certified for Critical Lifting.
- ☐ 10. The LDE Log Book indicates no outstanding deficiencies.
- ☐ 11. Conduct a Pre-Lift Briefing

_____ _____

Signed by: Date

NOTE:

This is an example only. Developing custom checklists for lifts is encouraged because checklists aid in the planning process, they document that individual steps are taken, and they eliminate the possibility of omitting steps by mistake.

APPENDIX B
SAMPLE CHECKLIST
FOR NON-CRITICAL LIFTING OPERATIONS

☐ Determine whether the lift is simple or complex.

a. If the lift is simple and routine, the lift may be performed following industrial standards and practices, general guidelines, and operator training.

b. If the lift is complex and/or involves an unusual load configuration with an off-center CG, the PIC shall require that a stress/stability analysis and a lift procedure be developed and approved prior to the lifting operations. Also confirm the following, as appropriate:

- ☐ All Lift Team members are present.
- ☐ The Lift Procedure has been approved and signed off for all signature blocks.
- ☐ The required stress/stability analysis is completed.
- ☐ The CG and total weight of load are known and documented
- ☐ If 2-way radios are to be used, all units are fully charged, functioning properly, and do not produce radio interference with other equipment in the vicinity.
- ☐ Ensure that all Team members are wearing appropriate PPE.
- ☐ Check weather forecast and/or storm code panel (if applicable) for adverse conditions that could potentially affect the Lift.

☐ Check LDE for valid certification.
☐ Check LDE Log Book to ensure that there are no outstanding deficiencies.
☐ Verify that the LDE operator's certification is valid.

_____ _____

Signed by: Date

NOTE:

This is an example only. Developing custom checklists for lifts is encouraged because checklists aid in the planning process, they document that individual steps are taken, and they eliminate the possibility of omitting steps by mistake.

APPENDIX C

PROCESS
FOR LIFTING CATEGORY DETERMINATION (See Note 1)

PIC:
Date:
Project:
Organization:
Description of Lift:

For the Lift in Question	YES**
1. Will LDE failure/loss of control result in serious personnel injury or loss of life?	
2. Will LDE failure/loss of control result in damage or loss of program-critical flight hardware?	
3. Will LDE failure/loss of control result in damage or loss of one-of-a-kind articles?	
4. Will LDE failure/loss of control result in damage or loss of major facility components which will have serious institutional or programmatic impact?	
5. Will LDE failure/loss of control result in damage or loss of any article that could have serious programmatic or institutional impact?	
6. Are personnel being lifted with a crane? (see NASA-STD-8719.9, App. C & ASME B30.23)	
7. Are personnel required to work under a suspended load? (see NASA-STD-8719.9, App. A)	
8. Does the load contain explosives or EEDs ? (see 2.1.4 for exceptions)	
9. Does the load contain pressurized containers? (see 2.1.5 for exceptions)	
10. Does the load contain hazardous materials? (see 2.1.6 for exceptions)	
11. Is the lift an OLOC? (see 2.6 for explanation) – See Note 2.	
12. Are there any other personnel or equipment safety concerns that could be considered out of the ordinary?	

** If the answer to any of the questions listed above is “YES”, the Lifting Operation must be declared a Critical Lift.

Concurrence: Program/Project Manager

Safety/Facilities Manager

Notes:
1. A signed copy of Appendix C shall be sent to the RECERT Manager.
2. A signed copy of the OLOC Risk Assessment shall be sent to the RECERT Manager.

CHANGE HISTORY LOG

Revision	Effective Date	Description of Changes
Baseline	8/8/2006	Initial Release
A	2/4/2008	Added new requirements for off-load operations with constraints, NASA document designation updates, variance processing, and other changes throughout for clarification. In P.2, clarified Applicability for contractors.
B	9/29/2009	Added Appendix C – Process for Lifting Category Determination, modified OLOC definition (P.10) and requirements (2.6), and other changes throughout for clarification.

Goddard Procedural Requirement
GPR 8719.1B
Certification and Recertification of Lifting Devices and Equipment and Its Operators

Goddard Procedural Requirements (GPR)

DIRECTIVE NO.	GPR 8719.1B	**APPROVED BY Signature:**	*Original Signed By*
EFFECTIVE DATE:	May 29, 2012	**NAME:**	Dennis Andrucyk
EXPIRATION DATE:	May 29, 2017	**TITLE:**	Director of AETD

COMPLIANCE IS MANDATORY

Responsible Office: 540/Mechanical Systems Division

Title: Certification of Lifting Device Equipment and Its Operators

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PREFACE

P.1 PURPOSE

This directive implements the requirements of NASA Standard 8719.9 "Standard for Lifting Devices and Equipment" for the GSFC Recertification Program (RECERT) in providing Center organizations with frequent and periodic inspection, certification, and recertification of lifting devices and equipment (LDE). Requirements are established for LDE Operators of cranes, mobile aerial platforms (MAP), and powered industrial trucks (PIT), and Critical Lift Coordinator (CLC) training and certification. This Center program improves safety, and minimizes or prevents potential personnel injury or fatality, and damage or loss of hardware and facilities.

This directive is not a substitute for applicable Occupational Safety and Health Administration (OSHA) and national consensus codes and standards (NCS) requirements. OSHA and NCS requirements apply to all GSFC LDE, LDE Operators, and their respective operations.

P.2 APPLICABILITY

a. This directive is applicable to all LDE at Greenbelt, Wallops Flight Facility (WFF), and other areas under GSFC cognizance, regardless of ownership, that are operated or used by NASA employees or GSFC support services contractors, to the extent required in their respective contracts, unless specifically excluded by this directive or by the RECERT Manager.

b. When invoked as a contractual requirement by a project, this directive is applicable to the extent specified in the contract for off-site contractor installations supporting GSFC activities.

c. Lifting operations under privatization clauses shall be subjected to the provisions of this directive to the extent provided by the contract, and the requirements shall be clearly specified therein.

d. The responsible Contracting Officer and the Project Manager shall apply requirements of this directive to any contractor, tenant, or customer if non-NASA lifting operations place NASA personnel, facilities, or equipment at risk through incorporation into their respective contracts.

P.3 AUTHORITIES

NASA-STD-8719.9, Standard for Lifting Devices and Equipment

P.4 APPLICABLE DOCUMENTS

The references as listed within the NASA-STD 8719.9 are applicable:
a. 29 CFR 1926.1400, OSHA, Cranes & Derricks in Construction
b. 29 CFR 1910, Occupational Safety and Health Standards
c. NASA-STD 1800.1, NASA Occupational Health Program Procedures

d. NASA-STD-8709.20. Management of Safety and Mission Assurance Technical Authority (SMATAA) Requirements
e. NASA-STD 8709.22, Safety and Mission Assurance Acronyms, Abbreviations, and Definitions
f. GPR 1400.1, Waiver Processing
g. GPR 1700.5 Control of Hazardous Energy (Lockout/Tagout)
h. GPR 3410.2I, Employee Task-Specific, Required and Mandatory Training Requirements
i. GPR 8621.4, Mishap Preparedness and Contingency Plan
j. GPR 8715.3 Fall Protection Requirements for GSFC
k. GPR 8834.1, Lifting Operations Requirements
l. 540-WI-8719.1.3, Sample Lifting Device Inspection Forms
m. ASME PALD, Safety Standard for Portable Automotive Lifting Devices
n. ASME B30 Safety Standards for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings

P.5 CANCELLATION

GPR 8719.1A, Certification and Recertification of Lifting Devices and Equipment and its Operators

P.6 SAFETY

Detailed safety requirements are contained in applicable test and inspection procedure.

P.7 TRAINING

Training requirements are specified in Section 3.

P.8 RECORDS

Record Title	Record Custodian	Retention
Test & Inspection Reports for: ▪ LDE	RECERT Manager at Greenbelt, Deputy RECERT Manager at WFF	Permanent – pending approval of record schedule. *NRRS 8/56.5A
Operator Certifications: ▪ LDE ▪ CLC	RECERT Manager at Greenbelt, Deputy RECERT Manager at WFF	*NRRS 3/33G Destroy 5 years after separation of employee or when no longer needed.
Jack Operator Training	Operator Supervisor	*NRRS 3/33G Destroy 5 years after separation of employee or when no longer needed.
Completed Daily Checklists	Property Custodian	Permanent. NRRS 8/56.5D
RECERT documentation	RECERT Manager	*NRRS 3/33G
Safety Analysis	Property Custodian	Permanent. NRRS 8/56.5D
LDEC Meeting Minutes	RECERT Manager	Permanent. *NRRS 1/14B (1) (a)

		Retire to FRC when 2 years old. Transfer to NARA when 20 years old.
GSFC 17-112, Employee Task-Specific Training Requirement for civil servant employees	Supervisor	Permanent – Maintained in the Employee Performance File in the IDP/Training Related Information section on the right side.

**NRRS – NASA Records Retention Schedules (NPR 1441.1)*

P.9 MEASUREMENT/VERIFICATION

The RECERT Manager shall document the percentage of scheduled test and inspections completed, and the pass/fail percentage of LDE.

PROCEDURES

In this document, a requirement is identified by "shall," a good practice by "should," permission by "may" or "can," expectation by "will" and descriptive material by "is."

1. Responsibilities

1.1 Center Director appoints the RECERT Manager and Deputy RECERT Manager/WFF for LDE.

1.2 RECERT Manager shall

a. Maintain overall responsibility for the management, implementation, and enforcement of the Center's LDE Program;
b. Provide direction to the Deputy RECERT Manager;
c. Tasks the RECERT Support Contractor in the maintenance of Section 1.2 of this directive;
d. Serve as the GSFC interface with NASA Headquarters (HQ) and other NASA Centers on matters pertaining to LDE;
e. Serve as the GSFC representative on the NASA LDE committee;
f. Chair the Center LDE Committee;
g. Serve as the Certifying Authority for the certification and recertification of LDE to which this directive is applicable;
h. Serve as the final authority on interpretation of, and compliance with, this directive and its references;
i. Establish and maintain a system for periodic inspection of LDE including review of logbooks, daily inspection forms, identification of deficiencies, and completion of corrective actions;
j. Ensure that certification and/or recertification tests and inspections are performed by personnel properly trained and qualified in accordance with applicable codes and standards;

k. Provide consultation to the center for design, specification, testing, maintenance, operation, and modification of LDE to owners and operators;
l. Approve the re-rating of LDs;
m. Review and concur/non-concur with waiver requests per GPR 1400.1;
n. Review and concur/non-concur with specifications prior to procurement of LDs;
o. Establish and maintain a RECERT configuration management system for LDE;
p. Review, approve, and monitor the training courses for qualifying LDE Operators, and define their training and retraining requirements;
q. Certify and recertify LDE Operators;
r. Perform compliance spot checks of LDE Operators to ensure that the requirements of this GPR are being followed;
s. Provide Division Offices with an inventory of Division LDs for review and update, when requested;
t. Coordinate with affected Center safety offices on issues of mutual interest;
u. Coordinates with the Office of Human Capital Management (OHCM) to ensure all RECERT training classes are entered in SATERN at least 30 days prior to the start of each class.
v. Notify supervisors of training and certification requirements for civil servant employees to be documented on the GSFC 17-112, Employee Task-Specific Training Requirements Form
w. Maintain oversight, for safety and compliance, of all Lifting Devices, including mobile cranes brought onsite, for lifting, setting and delivering equipment to center; and
x. Review the use of lifting equipment (slings, strong-backs, etc.) brought onsite to support the lifting device operations delineated in item u, above.

1.3 Deputy RECERT Manager/WFF

The Deputy RECERT Manager shall serve as the RECERT Manager's alternate and represent the RECERT Manager at WFF for day-to-day operations by performing duties in Section 1.2.

1.4 LDE Owners and/or Division Offices shall

a. Ensure documented compliance to this directive by maintaining records of LDE and the Operators;
b. Submit LDE specifications to the RECERT Manager for review and concurrence prior to purchase;
c. Ensure that LDEs are certified by the RECERT Manager prior to use;
d. Provide resources for training and ensure that LDE operators are certified;
e. Ensure that LDE for which the division is responsible is appropriately certified for critical or noncritical lifts, and notify RECERT, as required by NASA-STD 8719.9;
f. Determine the appropriate LD usage category, i.e., Active, Standby, or Idle; and classification, i.e., Critical or Noncritical, based on current and projected operational requirements;
g. Maintain a current inventory of LDE (including slings, shackles, turnbuckles, D-rings, load measuring devices, and other LE) owned and operated by the division;
h. Manage and control uncertified or expired LDE to preclude inadvertent use;
i. Request that RECERT perform certification of new or transferred LDE from offsite locations prior to their use;

j. Notify the RECERT Manager immediately of all LDE deficiencies and failures, and initiate the appropriate Incident/Mishap Report in accordance with GPR 8621.4;
k. Initiate repair for LDE deficiencies found during OSHA and NASA-STD 8719.9 required tests and inspections;
l. Ensure that Original Equipment Manufacturer (OEM)-recommended maintenance is performed on LDE and that the daily checklist conforms with the OEM;
m. Submit requirements to the appropriate budget to bring Division LDE into compliance with this directive;
n. Maintain responsibility for day-to-day operations of LDE under their cognizance;
o. Coordinate outages for load testing and inspections of inventoried LDE with RECERT to minimize conflicts with ongoing operations;
p. Notify RECERT of any LDE that is removed from service or any change in use status per Section 2.3.2 of this directive;
q. Perform daily LDE inspections and document such inspections on the Daily Checklist;
r. Establish administrative controls over their LDE to preclude unauthorized operation. Such controls may include administratively controlling access to areas in which LDE are located, or administratively locking out LDE to all but authorized users by using GSFC Administrative locking procedures as defined in GPR 1700.5;
s. Require civil servant supervisors to document task-specific training requirements on the GSFC 17-112, Employee Task-Specific Training Requirements Form for civil servant employees as required by GPR 3410.2;
t. Notify RECERT Manager when rented or leased equipment is brought on center; and
u. Review and document operator training of Overhead Crane, Mobile Crane, MAP, and PIT assigned to the division on an annual basis and submit to RECERT manager for review.

1.5 Occupational Safety and Health Division/Code 350 and Wallops Safety Office/Code 803 shall:

a. Notify RECERT Manager if construction activities are not in compliance with OSHA (as it relates to LDE) and NASA-STD 8719.9 requirements.
b. Provide comments on construction lift plans as requested by the RECERT Manager.

1.6 Medical and Environmental Management Division/Code 250

Shall provide medical expertise via the Medical Director to establish LDE operator medical examination criteria using applicable NASA and American National Standards Institute requirements.

1.7 Facilities Management Division (FMD)

FMD shall notify, in writing, the RECERT Manager of any planned LDE acquisition, installation, upgrade, and/or removal as part of a FMD facilities project. To ensure compliance and certifiability, all LDE designs and specifications shall be supplied to the RECERT Manager for review and approval prior to contract implementation. Assure that mobile cranes coming on center for facility construction

comply with OSHA 1926.1400. Notify the RECERT Manager and Safety (Code 350/803) of any construction activities requiring the use of a leased/rented LDE.

1.8 Office of Human Capital Management (OHCM)

a. Coordinate with RECERT Manager to document training offerings in SATERN;
b. Coordinate with RECERT Manager in approving participants in SATERN;
c. Provide RECERT manager official training roster for each training offered; and
d. Update SATERN to ensure civil servant participants receive training credit and it is properly recorded in their learning history

1.9 Certified Crane Operators shall

a. Ensure that the load is properly and safely rigged;
b. Verify the GSFC RECERT certification status of the LDE is current before commencing lifting operations (using uncertified LDE is a violation of Center policy);
c. Perform crane daily inspections and tests in accordance with RECERT approved procedures;
d. Perform LE inspection before use;
e. Provide entry in the LD (including Hydra-set) log book for all inspections, tests, and operations; and
f. Perform LDE lock out procedures in accordance with GSFC Administrative locking procedures as defined in GPR 1700.5, if any deficiencies are observed and immediately enter the deficiencies into the log book, and notify the RECERT Manager; and
g. Have the final approval on the lift. If the Crane Operator is not comfortable or satisfied that all aspects are correct or complete prior to the lift, the Crane Operator does not have to perform the lift, and shall contact the RECERT manager immediately.

1.10 Certified Critical Lift Coordinators (CLC)

Certified CLC's may be responsible for directing and giving commands to the Crane Operator during a lifting operation if so designated in the Critical Lift Procedure. If the CLC is in charge of the lifting operation, they shall, in a pre-lift briefing, instruct personnel in the proper preparation, rigging, lifting, and final positioning of the load. Coordination for directing the lifting operation shall be delineated in the Critical Lift Procedure and re-emphasized in the pre-lift briefing. A CLC shall not perform rigging activities or hands-on operation of LDs.

1.11 Certified MAP and PIT Operators and Authorized Jack (Critical) Operators shall

a. Verify the GSFC RECERT certification status of equipment is current before commencing operations (using uncertified LDE is a violation of Center policy);
b. Perform daily inspection in accordance with daily checklist before operation;
c. Provide entries in the equipment log book for all inspections, tests, and operations; and
d. If any deficiencies are observed, lock out the equipment using GSFC Administrative locking procedures as defined in GPR 1700.5, immediately enter the deficiencies into the log book, and notify the RECERT Manager.

2. Equipment Requirements

2.1 Types and Traceability

2.1.1 Items Subject to RECERT. The following items are included in the RECERT Program and shall be subjected to formal certification and recertification. Other items may be included if deemed necessary by the RECERT Manager.

- Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist, and Jib Cranes)
- Mobile Cranes**
- Base Mounted Drum Hoists
- Monorails and Under hung Cranes and Hoists
- Manually Operated Level Hoists
- Special Hoist-Supported Personnel Lifting Devices
- Hydra-sets
- Crane Hooks
- Wire Rope Slings
- Alloy Steel Chain Slings
- Metal Mesh Slings
- Synthetic Slings
- Structural Slings
- Lifting assemblies
- Shackles, Turnbuckles, Swivel Joints, Connecting Links, and other lifting hardware components
- Load Measuring Devices*
- MAPs including Attachments
- PITs including Fork Extensions and Attachments
- Jacks
- Shop cranes (Portable Automotive Lifting Devices)

***Load Measuring Devices are verified by RECERT for structural integrity in the load path. Calibration of these devices shall be the owner's responsibility.**

****** Mobile cranes used strictly for construction activities are exempt from meeting GSFC RECERT requirements but must meet OSHA requirements**.

2.1.2 Traceability to Original Equipment Manufacturer (OEM).

a. All LE hardware components shall be traceable to a credible source of information, such as OEM for certifiability.

b. Fork extensions and attachments to PITs that affect capacity and/or stability shall be OEM equipment; or approved by the OEM in writing for its design and fabrication. In all cases, a tag or notice shall be affixed to the equipment clearly showing the new CG and capacity restrictions.

c. All LDE shall be used consistent with their intended purpose per OEM recommendations. The use of LDE that is contrary to OEM instructions or recommendations is not permitted, unless approved by the RECERT manager and complies with the applicable ASME/ANSI B30 series documents.

2.2 LDE Certification and Safety Analyses

2.2.1 LDE Certification

a. LDE shall be certified, before first use, by the RECERT Manager based upon verification and acceptance of design safety factor, load testing, and nondestructive testing reports, if applicable, and by compliance with NASA-STD-8719.9 and this directive. It shall then be recertified thereafter in accordance with NASA-STD-8719.9 and this directive.

b. The RECERT Manager shall re-certify altered LDE assemblies as a system unless specifically exempted by a safety variance reviewed and approved in accordance with Section 4 of this directive. Alteration includes the extension, modification, addition, replacement, or deletion of components to the original certified configuration . All components comprising a critical LE assembly shall be uniquely identified and controlled, and should not be interchanged for use elsewhere. Replacement by identical, individually certified and tagged components of equal or greater load rating is permissible without having to recertify the LE assembly.

c. The RECERT Manger may authorize the applicable contractor organization to perform LDE test and inspections at Government Owned, Contractor Operated facilities by the applicable contractor organization provided the contractor has a test and inspection plan satisfactorily addressing GSFC requirements, including personnel qualifications, and the contractor's plan has been reviewed and approved by the RECERT Manager.

d. Owners and/or divisions responsible for LDE shall forward copies of all LDE test and inspection reports, including those for applicable off-site operations and applicable contractor installations, shall be forwarded to the RECERT Manager for annual re-certification and record keeping.

2.2.2 LDE Safety Analyses

a. A recognized Safety Analysis, such as a Fault Tree Analysis, a Failure Modes and Effects Analysis, or an Operating and Support Hazard Analysis shall be performed by the owning organization on critical LDE's (including jacks, as defined in NASA-STD-8719.9). The critical or non-critical category determination shall be performed in accordance with Appendix C of GPR 8834.1, Lifting Operations Requirements. The analysis shall, as a minimum, determine potential sources of danger, identify failure modes, and recommend resolutions and a system of risk acceptance for those conditions that could cause loss of life, personal injury, and loss of or damage to the equipment, facility, or load.

b. Safety Analyses shall be reviewed and approved by the RECERT Manager.

2.3 Operational Requirements

2.3.1 Criticality Determination. The owning organizations shall specify the category of operations to be performed by their LDE, i.e., critical or noncritical, so that the RECERT Manager may provide the requisite compliance requirements for the LDE. Appendix C of GPR 8834.1 must be completed, submitted, and approved by the RECERT Manager, for non-critical lifts that are non-institutional by nature.

2.3.2 LD (except MPJ) Inspection Requirements. Inspection requirements are based on the usage categories of LDs. "Daily" inspection requirements are generated by the LD owner. "Frequent" or "Periodic" inspections are defined in RECERT approved procedures.

2.3.2.1 Active LDs – These are devices that are available for unlimited daily use and:

- The Certified LDE Operator shall perform, prior to initial use, Daily Inspections and limit switch tests and record entry in the logbook in accordance with RECERT approved procedures.
- RECERT Frequent Inspections shall be performed at monthly intervals in accordance with NASA-STD 8719.9.
- RECERT Periodic Inspections for recertification shall be performed once a year in accordance with NASA-STD 8719.9.

2.3.2.2 Standby LDs – These devices are to be secured from use by using GSFC Administrative locking procedures as defined in GPR 1700.5 and operation shall be resumed only after an inspection by RECERT that allows unlimited use for a 1-month period as an Active LD. After that the LD shall be secured again. Additionally:

- RECERT Frequent Inspections shall be performed at 6-month intervals.
- RECERT Periodic Inspections shall be performed once a year in accordance with NASA-STD 8719.9.

2.3.2.3 Idle LDs: – These devices are to be secured from use by using GSFC Administrative locking procedures as defined in GPR 1700.5 and there is no planned use of the LD for the next 12 months. When LDs are idle more than 6 months, the LD shall be recertified prior to use. Additionally:

- RECERT tests and inspections are not required during an idle period.
- RECERT shall perform required tests and inspections prior to returning the LD to service.

2.3.3 Re-rating

Owner organizations may request that RECERT re-rate their LDs. Re-rating of LDs and the subsequent recertification shall be accomplished as follows:

a. Engineering analyses shall be performed in accordance with OSHA, NASA, and NCS requirements to validate that the LD can be used at the new re-rated load. Building structural support system(s)

shall also be validated in terms of the new re-rated load. Re-rating resulting in higher equipment capacity shall require RECERT Manager's approval prior to modification.

b. Certify the LD and clearly display re-rated capacity with a tag or marking.

2.3.4 Transfer of LDE

a. LDE and associated certification documentation transferred to GSFC shall be reviewed for certification by the RECERT Manager.

b. Certification documentation shall accompany LDE permanently transferred from GSFC to other locations.

2.3.5 LDE (Re) Certification Tagging

Tags shall indicate the (re)certification and NDT, if applicable, status of all LDE. The tagging shall be done in accordance with a Work Instruction(s) describing the tags for each application. Unless indicated, all LDE tags shall expire on the last day of the month, one year from the month in which the tag was issued.

a. One load test tag (re)certification is applied to an assembly where the individual items are color-coded, tethered, or otherwise controlled as an assembly, and there are no plans to disassemble the assembly or to rearrange the configuration. The assembly is load tested as a unit with each item being individually NDT, if applicable, inspected and tagged as such.

b. Load test (re)certification tags are applied to each component for an assembly that will be disassembled and where the individual items are not color-coded, tethered, or otherwise controlled as an assembly. The assembly may be load tested as a unit or each component load tested individually with each item being individually NDT, if applicable, inspected and tagged as such.

c. One load test (re)certification tag per configuration is applied to an assembly where the configuration will be rearranged. The assembly is load tested in all applicable configurations with each item being individually NDT, if applicable, inspected and tagged as such. Note that there may be variations in the number of tags depending upon the similarities among the different configurations.

d. For loose, individual components, each component is load test (re)certification tagged and NDT, if applicable, inspected and tagged.

2.4 LDE Testing

2.4.1 Load Testing

New or modified LDs and MPJ shall be proof load tested in accordance with Table 1 and in accordance with NASA Standard 8719.9. For periodic recertification, LDs shall be tested to 100% of their rated load. New or modified LE shall be tested in accordance with NASA Standard 8719.9

Certified test weights or calibrated load cells and test equipment shall be used for all LDE load-testing activities.

2.4.2 Nondestructive Testing (NDT)

NDT shall be performed in accordance with NASA Standard 8719.9.

3. Personnel Qualification and Certification Requirements

3.1 Personnel Performing NDT

Personnel performing NDT shall meet the requirements of NASA Standard 8719.9.

3.2 Crane Operators

3.2.1 Crane Operator Certification Requirements

All Crane Operator candidates shall obtain formal training in LD operations and rigging as specified in NASA-STD-8719.9. Formal training may be available through the GSFC RECERT Program and other recognized sources and includes classroom instructions, written examination, and hands-on proficiency demonstration. The RECERT Manager shall evaluate and determine the acceptability of the syllabus of all training courses for which Operator candidates claim credit. In addition, all Crane Operator candidates shall pass the RECERT written examination and an applicable medical examination (in accordance with NASA-Standard 1800.1). The following training course topics shall be included as a minimum:

a. NASA-specific requirements
b. GSFC-specific requirements
c. Safe rigging procedures
d. Safe crane operations
e. Safety and emergency procedures
f. General performance standards
g. Pre-operational checks
h. Safety-related defects and symptoms
i. Specific hazards
j. Special procedures associated with critical lifts (critical lift operator training only)
k. Use of standard hand signals
l. Lessons learned

Upon successful completion of the required training, the certification records are updated and an individual license will be issued, or in some instances a roster of Certified Crane Operators, is prepared. The licenses or the Operator roster shall be signed by the RECERT Manager and issued to the Operator, or, in the case of the Operator roster, to the appropriate supervisory personnel. It is the crane Operator's responsibility to notify the RECERT Manager prior to expiration.

3.2.2 Categories of Crane Operator Licenses.

There are three categories of Crane Operator Permits and Licenses:

a. Apprentice Permit: Apprentice permits are typically issued with a required 40 hours of noncritical lift operation (minimum 20 hours Hands–On Crane Operation) and rigging to be attained under the direction of a licensed Crane Operator. Both the licensed operator and the candidate's supervisor shall attest to the attainment of these hours. On a case-by-case basis, for candidates with prior crane operation experience seeking GSFC Operator certification, the 40 hour apprenticeship requirement may be adjusted at the discretion of the RECERT Manager based on the recommendation of the trainer. The candidate shall complete the required hours of operation within 24 months from the Apprentice Permit issuance to prevent expiration of the Apprentice Permit. Upon completion of the required hours and attendance at a Noncritical Lift Crane Operator refresher class, the apprentice will be certified as a Noncritical Lift Crane Operator.

b. Noncritical Lift Crane Operator License: This license authorizes the Operator to use only the types of Cranes and Hoists listed thereon, and rigging for noncritical lifts only. Noncritical operators are not permitted to use Hydra-sets, unless permitted by the RECERT manager.

c. Critical Lift Crane Operator License: This license authorizes the operator to use Cranes and Hoists and rig for both noncritical and critical lifts, including Hydra-sets. The prerequisite for obtaining a Critical Lift Crane Operator License is that the candidate possesses a Noncritical Lift Crane Operator License and completes 40 hours of critical lift operation (minimum 20 hours Hands–On Crane Operation) and rigging under the direction of a licensed Critical Lift Crane Operator. Upon completion of the required 40 hours and attendance at a Critical Lift Crane Operator class, the Operator will be certified as a Critical Lift Crane Operator. Exceptions to the prerequisite may be reviewed and granted by the RECERT Manager on a case-by-case basis.

3.2.3 Crane Operator Recertification

All Certified Crane Operators shall be recertified and a new license issued based on providing evidence of completion of refresher training, including written examination and hands-on training. A new license will be issued to the Operator, or the Operator roster will be updated and sent to the appropriate supervisory personnel.

Critical and Noncritical Lift Crane Operators shall recertify every two years and provide evidence of successfully completing a medical examination in accordance with NASA Standard 1800.1.

3.3 Requirements for MAP and PIT Operator Certification and Jack Operator Authorization

3.3.1 MAP and PIT Operator Certification Requirements.

All MAP and PIT Operator candidates shall obtain formal training as specified in NASA-STD-8719.9. Formal training may be available through the GSFC RECERT Program or the RECERT Manager may evaluate and determine the acceptability of the syllabus of all training courses for which Operator candidates claim credit. In addition, all MAP and PIT Operator candidates shall pass a written exam, hands on proficiency demonstration, and the applicable medical examination per NASA-STD 1800.1. For MAP operator certification, the candidate must provide proof of successful completion of fall protection training in accordance with GPR 8715.8. A written RECERT exam shall be given to verify the adequacy of the commercial training that the operator candidate claims credit. The following training course topics shall be included as a minimum:

a. NASA-specific requirements
b. GSFC-specific requirements
c. Safe operations
d. Safety and emergency procedures
e. General performance standards
f. Pre-operational checks
g. Safety-related defects and symptoms
h. Specific hazards
i. Lessons learned

Upon successful completion of the required training, the certification records are updated and an individual license, or in some instances a roster of Certified MAP or PIT Operators is prepared. The licenses or the Operator roster shall be signed by the RECERT Manager and issued to the Operator, or, in the case of the Operator roster, to the appropriate supervisory personnel.

3.3.2 Jack Operator Authorization.

Operators of jacks shall be instructed in their proper use per NASA-STD-8719.9 and shall be designated and authorized to operate by their supervisor. The supervisor shall be responsible for retaining documentation of this training.

3.3.3 MAP and PIT Operator Recertification

All Certified MAP and PIT Operators shall be recertified every two years by providing evidence of completion of refresher training, including written examination and hands-on training. Evidence of completing a satisfactory medical examination shall be provided to the RECERT Manager every two years. For MAP operator certification, the candidate must provide proof of successful fall protection refresher training in accordance with GPR 8715.8. A new license will be issued to the Operator, or, in the case of the Operator roster update, to appropriate supervisory personnel.

3.4 Critical Lift Coordinators

3.4.1 CLC Certification Requirements

All CLC candidates shall attend a classroom training session equivalent to the training for critical lift crane operators (reference Section 3.2.1). All CLC candidates shall pass a written examination equivalent to that for critical lift operator certification but are excluded from hands-on proficiency demonstration and the medical examination requirement. Upon successful completion of CLC training and written examination requirements, the RECERT Manager shall certify CLC's by issuance of a signed license or a signed roster.

3.4.2 CLC Recertification

Recertification shall be granted upon successful completion of refresher training and applicable examinations every two years.

3.5 Reciprocity with Licensing Authorities.

At the RECERT Manager's discretion, a temporary Crane, MAP, or PIT Operator License may be issued to personnel on temporary assignment to GSFC provided that the candidate:

a. Possesses a valid Crane, MAP, or PIT operator license or equivalent issued by another Licensing Authority in compliance with requirements contained in NASA-STD-8719.9; and

b. The candidate's license or equivalent remains valid for the duration of the candidate's assignment at GSFC.

Temporary Crane, MAP, or PIT Operator Licenses will be valid for the duration of the candidate's assignment at GSFC, but shall not exceed 90 days. Thereafter, a GSFC Crane, MAP, or PIT Operator License will be required.

3.6 License Revocation

The RECERT Manager may revoke Crane Operator Licenses, CLC Licenses, MAP Operator Licenses, or PIT Operator Licenses for any of the following reasons:

a. Recommendations by an appointed panel of inquiry or Mishap Investigation Board.
b. Violations of, or noncompliance with, any of the safety requirements in the documented procedures.
c. Failure of supervisor providing annual documentation on reviewing of training per Section 1.4 of this document.
d. Failure to meet RECERT-required refresher training or medical examination requirements.

Revoked Operator Licenses shall be returned to the RECERT Manager within 3 business days, and may be reinstated upon satisfactory completion of applicable refresher training or other remedial action

deemed appropriate by the RECERT Manager. License extensions may be granted up to but not exceeding 30 days to allow for project demands and class scheduling flexibility. To be eligible for a license extension the operator must request the extension prior to the expiration date of the license and have a current medical examination. Extensions will not be granted if the license or medical examination has expired.

4. Waivers

a. Waivers to the requirements of this directive shall be prepared and approved as outlined in NASA-STD 8709.20 and GPR 1400.1 prior to operation.

b. If a mandatory requirement of this directive cannot be met, a detailed waiver request package shall be prepared by the requesting organization in accordance with NASA-STD 8709.20 and GPR 1400.1. The waiver request package shall be reviewed and the risk accepted by the initiating Division Office and forwarded to the RECERT Manager for review and concurrence/non concurrence.

c. The RECERT Manager will submit the waiver request package to other authorities as stipulated in GPR 1400.1. Waiver requests approved by the Center shall be forwarded to NASA HQ within 14 days.

5. LDE Committee

5.1 A Center LDE Committee (LDEC) shall be established by the RECERT Manager via the Goddard Safety Committee (GSC) to ensure that LDE governing standards are understood and applied across all organizational elements at GSFC. In addition, the LDEC shall resolve LDE-related issues and provide a forum to exchange information. The RECERT Manager shall serve as the Chairperson of the Committee. The Deputy RECERT Manager/WFF shall serve as the Vice Chairperson of the Committee.

5.2 The LDEC Chairperson shall:
a. Accept appointees from the Directorates as Committee Members.
b. Include representatives from organizations conducting or having an interest in lifting operations.
c. Establish the Committee meeting schedule.
d. Conduct quarterly meetings, or more frequently as required.
e. Appoint an Executive Secretary for the Committee.
f. Report as required to the GSC regarding the activities of the Committee.

5.3 The Vice Chairperson shall:
a. Chair the Committee meeting in the absence of the Chairperson.
b. Report as required to the WFF Executive Safety Council regarding the activities of the Committee.

5.4 The Executive Secretary shall:
a. Assist the Chairperson in preparing and distributing meeting agenda, minutes, and related materials.
b. Assist the Chairperson in coordinating Committee-related activities.

c. Track action items and their status.
d. Maintain meeting minutes and make available for review by management and safety and health offices.

5.5 The Committee Members shall:

a. At least one member from each directorate, that have LDE, shall represent his/her Directorate in the Committee's scheduled meetings. Invite other interested personnel to the meeting, including supporting contractors, as appropriate. Membership will be on a 2-year renewable term.
b. Bring Directorate issues/concerns relating to LDE and LDE operations to the Committee.
c. Serve as the information conduit between the LDEC and his/her Directorate organizations.
d. Provide input/closure of the action items assigned by the Chairperson.
e. Review and provide input to the Chairperson on LDE variance requests as required.
f. Review close call and mishaps and provide recommendations for preventive measures.

TABLE 1
Load Test Requirements for New, Repaired, or Modified LDs

	Proof Load		Rated Load		Requirement
	Periodicity[1]	Percentage	Periodicity	Percentage	
Cranes					
Overhead (Non-Critical)	New, Altered	125% (+0%/-5%)	Every Four Years	100% (+5%/-0%)	NASA-STD-8719.9-4.3
Overhead (Critical)	New, Altered	125% (+0%/-5%)	Every Year	100% (+5%/-0%)	NASA-STD-8719.9-4.3
Mobile (Non-Critical)	New, Altered	110% (+0%/-5%)	Every Four Years	100% (+5%/-0%)	NASA-STD-8719.9-5.3
Mobile (Critical)	New, Altered	110% (+0%/-5%)	Every Year	100% (+5%/-0%)	NASA-STD-8719.9-5.3
MAPs (Non-Critical)	New, Altered	N/A[2]	Every Year	100% (+5%/-0%)	NASA-STD-8719.9-11.3
MAPs (Critical)	New, Altered	N/A[2]	Every Year	100% (+5%/-0%)	NASA-STD-8719.9-11.3
PITs (Non-Critical)	New, Altered	N/A[2]	Every Four Years	100% (+5%/-0%)	NASA-STD-8719.9-12.3
PITs (Critical)	New, Altered	N/A[2]	Every Year	100% (+5%/-0%)	NASA-STD-8719.9-12.3
Jacks (Flight Hardware)	New, Altered	120% (+0%/-5%)	Every Year	100% (+5%/-0%)	NASA-STD-8719.9-13.3

[1] "New, Altered" in the column entitled "Periodicity" means new, reinstalled, altered, repaired, rerated, reconditioned, and/or modified
[2] Load test shall be done in accordance with manufacturer's instructions and applicable ASME standard. In a case where both sources are silent, 100% of the rated capacity shall be used.

Appendix A – Definitions

Most of the terms used in this directive are defined in NASA-STD-8719.9 or NASA-STD-8709.22. Those that are critical and or unique to this directive are listed below.

A.1 Certification/Recertification – Written documentation that a set of requirements has been, and continues to be, met. As used in this GPR, certification and recertification is: 1) a process performed by the RECERT Manager that leads to the initial, or continuation of, certification that LDE is safe to use within specific certification parameters, and includes, but is not limited to LDE compliance and documentation reviews, tests, inspections, nondestructive testing, and analyses; 2) a license issued and renewed by the RECERT Manager for operation of LDE; and 3) a memo or license issued to perform the duties of a CLC.

A.2 Critical Hardware – Hardware whose loss would have serious programmatic or institutional impact and that has been identified by the installation, directorate, or project as being critical.

A.3 Critical Lift – A lift where failure/loss of control could result in loss of life, loss of or damage to critical hardware or other items such as spacecraft, one-of-a-kind articles, or major facility components whose loss or damage would have serious programmatic or institutional impact. Operations involving the lifting of personnel with a crane, and lifts where personnel are required to work under a suspended load, shall be defined as critical lifts (see NASA-STD-8719.9). Operations with special personnel and equipment safety concerns beyond normal lifting hazards shall also be designated as critical.

A.4 Critical Lift Coordinator (CLC) – An individual who is assigned or demonstrates a need to direct critical lift activities due to specific project requirements and who has obtained the necessary training and is certified by the RECERT Manager. The CLC is an optional position, used only when a project desires to have its own lifting expert. The role of the CLC shall be specified in the Critical Lift Procedure.

A.5. Daily Checklist – An inspection and/or test performed, prior to use, on a daily basis only for those days while in use.

A.6 Division Office – For the purposes of this GPR, use of the term "Division Office" includes Project Offices, Program Offices, Supervisors, and Owner of Equipment.

A.7 Flight Hardware – Hardware designed and fabricated for ultimate use in a vehicle intended to fly.

A.8 Institutional Lift – A lift performed as part of the day-to-day operations of the Center, such as lifting a section of pipe or moving a pallet of office supplies. It is not a manual lift, although a manual lift may be included as part of an institutional lift. NOTE: an Institutional Lift can also be classified as "critical," depending on the hardware involved.

A.9 Lifting Devices (LD) and Equipment (LE) collectively (LDE) – LDE comprises LD such as overhead and gantry cranes (including top running monorail, under-hung, and jib), mobile cranes, derricks, hoists, winches, special hoist supported personnel lifting devices, mobile aerial platforms (MAP), powered industrial trucks (PIT), and jacks; and LE such as Hydra-sets, load measuring devices, hooks, slings and rigging used for lifting and support of flight hardware or personnel..

A.10 LDE Operator Certification – The documented status of LDE operators (Crane Operator, MAP Operator, and PIT Operator) validating that they are trained and qualified in accordance with NASA-STD-8719.9 and certified by the RECERT Manager. For the purposes of the GSFC LDE RECERT Program, an individual certified as a Crane Operator is concurrently certified as a Rigger, and references to Crane Operators include Riggers. Jack Operators shall be designated and authorized by the equipment owning organization.

A.11 MPJ – For the purposes of this directive, the collective term "MPJ" refers to MAPs, PITs and Jacks as defined in NASA-STD-8719.9.

A.12 RECERT Documentation – Files that are maintained for LDE that may include, but are not limited to, manufacturer's/fabricator's documents, field test data, safety analyses, results of engineering analyses, repair history, facility descriptions, record of all safety variances, re-rating, and correspondence.

A.12 RECERT Approved Procedure – Owner generated, RECERT generated, or OEM-provided documentation that describes the specific steps needed to inspect, test, or operate LDE that is approved by the RECERT Manager.

A.14 RECERT Manager and Deputy RECERT Manager/WFF – Positions appointed by the Center Director to implement and enforce the Center's LDE Program meeting NASA-STD-8719.9 requirements.

A.15 Rigger – An individual who selects and attaches LE to an item to be lifted.

A.16 Support Services Contractors – Contract personnel who are based on-site and participate in on-going daily operations at GSFC.

Appendix B – Acronyms

Most of the acronyms used in this directive are defined in NASA-STD-8719.9 or NASA-STD-8709.22. Those that are critical and or unique to this directive are listed below.

CG	Center of Gravity
CLC	Critical Lift Coordinator
FMD	Facilities Management Division
GPR	Goddard Procedural Requirements
GSC	Goddard Safety Committee
GSFC	Goddard Space Flight Center
HQ	NASA Headquarters
IAW	In Accordance With
IDP	Individual Development Plan
LD	Lifting Device
LDE	Lifting Devices and Equipment
LDEC	LDE Committee
LDEM	LDE Manager
LE	Lifting Equipment
LOTO	Lockout Tagout
MAP	Mobile Aerial Platform
MPJ	Mobile Aerial Platform, Powered Industrial Truck, and Jack collectively (see Appendix A)
NDT	Nondestructive Testing
NRRS	NASA Records Retention Schedules
OEM	Original Equipment Manufacturer
OHCM	Office of Human Capital and Management
OSHA	Occupational Safety and Health Administration (29 CFR 1910, 29 CFR 1926)
PIT	Powered Industrial Truck
RECERT	Goddard Recertification Program
SATERN	System for Administration, Training and Educational Resources, for NASA
WFF	Wallops Flight Facility

CHANGE HISTORY LOG

Revision	Effective Date	Description of Changes
Baseline	11/23/04	Initial Release
Baseline	10/27/05	Administratively changed to reflect responsible office change from Code 540, Mechanical Systems Division, to Code 250, Safety and Environmental Division.
A	05/08/09	Responsible office was changed from Code 250, Safety and Environmental Division, to Code 540, Mechanical Systems Division. Revised nomenclature to be consistent with latest HQ requirements in Paragraph 4. Added Paragraph 5, LDE Committee. General editorial changes for consistency with GPR 8834.1.
B	5/29/12	Added GID changes; Under Section 1, changed Occupational Safety to Code 350; under P.1 reflected that this directive is implementing the NASA Standard; under P.2a added additional references; reworded Section 1.2 to reflect current contract; ; Section 1.4 added to reflect owners responsible to control LDE; Section 1.4 added to reflect NASA Standard; Section 1.8 added to give LDE operator authority; Section 2.1.2.3 wording added for ANSI requirements; Section 2.4.2 changed to optional; Section 3.2.3 period of recertification changed to reflect NASA Standard. A note was added to Section 3.6 License Revocation. All definitions and acronyms were moved to the end of the document.