

## FESHM 10190: CRANE PERSONNEL LIFTING PLATFORMS (MAN-BASKETS)

### Revision History

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## 1.0 INTRODUCTION

This chapter specifies the design, inspection, use and maintenance requirements of personnel lift platforms suspended from cranes at Fermilab. The use of a crane to hoist employees on a personnel platform is prohibited, except when the erection, use and dismantling of conventional means of reaching the work area (e.g. personnel hoist, ladder, stairway, aerial lift, elevating work platform, or scaffold) would be more hazardous, or is not possible because of industrial design or worksite conditions.

## 2.0 DEFINITIONS

**Ground Crew** – those individuals who are involved in the personnel lift, other than the hoisting equipment operator and platform occupants. These individuals include riggers, signal persons, and supervision.

**Lift Director** – a person who directly oversees the work being performed by the hoisting equipment and the associated ground crew.

**Lifting, personnel** – raising, lowering or transporting personnel using hoisting equipment covered by the ASME B30 Standard.

**Live Load Line** – a load line whose lowering is controlled by a brake without the aid of other lowering retarding devices (free-fall capable).

**Load, rated** – capacity or rating established by the manufacturer or a qualified person for a stipulated hoisting equipment configuration.

**Load, working** – the external load applied to the hoisting equipment, including the personnel lifting platform, its contents, and the load-attaching equipment, such as lower load block, shackles, and slings.

**Occupant, platform** – a person who is within the guardrail barrier while the personnel platform is in a hoisted position.

**Personnel Lift Authorizer** – a person who verifies compliance with the provisions of 29 CFR 1926 and ASME B30 standards.

**Platform, personnel - suspended** – platform attached to hoisting equipment using wire rope, chair, or jointed attachment and that has no installed motion controls for the platform itself.

**Platform, rating** – the maximum capacity of a personnel lifting platform, established by the platform manufacturer, in terms of weight and number of occupants allowable.

**Qualified Person** - a person who, by possession of a recognized degree in an applicable field or certificate of professional standing or by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.

**Two-Blocking** – the condition in which the lower load block or hook assembly comes in contact with the upper load block or boom point sheave assembly.

## 3.0 RESPONSIBILITIES

### 3.1 Division/Section Head

The Division/Section Head, or designee, is responsible for implementing this program. Specifically, he/she is responsible for:

- Designating a “lift director” for each personnel lift operation that will occur in their area.

### 3.2 ESH&Q Section

The ESH&Q Section is responsible for:

- Providing consultation services to division/section heads regarding safety of operations and training opportunities.
- Maintaining training records of operators in the TRAIN database.
- Designating a qualified person as the crane operator evaluator.

### 3.3 Division Safety Officer(DSO)/Personnel Lift Authorizer

The Division Safety Officer is responsible for:

- Verifying that there are no less hazardous alternatives to performing the work or providing access to the area. The personnel lift shall not be authorized when less hazardous means are feasible.
- Verifying the equipment to be used for the personnel lift meets the requirements of this chapter.
- Authorizing the personnel lift operation in writing by approving the *Personnel Platform Lift Planning and Authorization Form* (Form F1).

### 3.4 Facilities Engineering Services Section (FESS)

The Facilities Engineering Services (FESS) Section is responsible for:

- Maintaining manuals and manufacturer information and records related to testing, inspection, and repair of personnel lifting systems. This includes the distribution of related reports to the landlord division/section head or his/her designee.
- Arranging for an initial inspection of all new, repaired or modified baskets.
- Arranging contracts with qualified subcontractors to perform annual inspections, testing and maintenance of personnel lifting systems. FESS/FM Crane Office will provide oversight of the subcontractor.

### 3.5 Lift Director (The Person-in-Charge (PIC))

The Lift Director is responsible for:

- Preparing the personnel lift plan (see *Personnel Platform Lift Planning and Authorization Form*, Form F1), which is to be presented to the personnel lift authorizer for review/approval.
- Holding the pre-lift meeting.
- Posting the approved *Personnel Platform Lift Planning and Authorization Form* at the work site.
- Verifying qualified persons are assigned to perform the functions of the operator, signalpersons, and ground crew.
- Supervising the personnel lift operation.
- Requiring the personnel lift be accomplished in accordance with the provisions of this chapter.
- Upon completion of the work covered by the lift plan, submitting the *Personnel Platform Lift Planning and Authorization Form* (Form F1) and *Personnel Lift Platform Proof Test and Pre-Lift Inspection Form* (Form F2) to ESH&Q, MS-119, for inclusion in the centralized lift plan file.

### 3.6 Qualified Operator

The Qualified Operator is responsible for:

- Passing a fit-for duty exam, which includes a substance abuse test.
- Completing and remaining current in Crane Personnel Basket Operation Training (FN000578).
- Ensuring the hoisting equipment is capable/acceptable for lift personnel, per the requirements of this chapter.
- Understanding the operational limitations.
- Confirming that all hoisting equipment inspections have been completed and are satisfactory, prior to starting the lift (see *Personnel Lift Platform Proof Test and Pre-Lift Inspection Form*, Form F2).
- Operating the hoisting equipment in compliance with the procedures specified in this chapter.

The Qualified Operator shall not lift personnel if:

- The operator does not feel physically or mentally fit to perform the operation.
- The operator has been working for more than 10 hours prior to the start of the lift, or the lift will not be completed before the operator has been working for 12 hours.
- The operator did not have at least 8 hours off immediately prior to the work shift.
- While operating the hoisting equipment, the operator shall not engage in any practice that will divert his/her attention.
- The operator shall only respond to signals from a designated signalperson, except that the operator shall obey a stop signal at any time, no matter who gives it.
- Whenever the operator has any doubt as to the safety of the lift, the operator shall consult with the lift director before commencing or continuing the lift.

### 3.7 Platform Occupants

The platform occupants are responsible for:

- Completing and maintaining current Fall Protection Orientation training (FN000304)
- Attending the pre-lift meeting to be instructed in the recognized hazards of personnel platform lifts, such as:

- o Impacting structures outside the platform
- o Unexpected platform motion
- o Any special hazards associated with the lift
- Reviewing and signing the job hazard analysis.
- While in the platform:
  - o Maintain a stable and even loading on the platform
  - o Keep all parts of their body inside the platform during raising, lowering, and positioning, except when performing duties as a designated signalperson
  - o Not interfering with the platform operator or the designated signalperson in the platform, except to give an emergency stop signal
  - o Keeping their personnel fall protective device lanyard fastened to the provided anchorage points at all times while occupying the platform
  - o Being familiar with means of communication while in the platform. All occupants shall know how to implement an emergency stop.

## 4.0 PROGRAM DESCRIPTION

When the use of a crane-suspended personnel platform/basket is found to be the safest alternative, its use shall meet 29 CFR 1926.1431 and the requirements of this chapter. Use requires approval of the Division Safety Officer (or designee) for the area where the lift will occur. This chapter describes the requirements of using a personnel platform suspended from a building crane. Prior to using a personnel platform suspended from a mobile crane, the Mechanical Safety Subcommittee and Division Safety Officer must be consulted for additional guidance.

## 5.0 PROCEDURES

### 5.1 Training

Personnel who operate cranes with a personnel platform suspended from the crane must complete the following training:

#### 5.1.1. Crane Operator Training

Qualified operators must complete and remain current in the Crane Operator Training for Fermilab Employees and Evaluation (FN000005/CR/01 & FN000005/EV/01).

#### 5.1.2. Crane Personnel Basket Operation Training

Qualified operators must complete and remain current in the Crane Personnel Basket Operation Training (FN000578/CR/01).

Personnel platform occupants must complete the following training prior to riding on the platform:

#### 5.1.3. Fall Protection Orientation

All occupants must have complete and current Fall Protection Orientation training (FN000304/CR/01).

## 5.2 Personnel Platform Requirements

Platforms used in the transport of personnel must be designed by a qualified person competent in structural design and familiar with national consensus standards governing personnel platform design. Design requirements include, but are not limited to, the following:

- An identification plate specifying the empty weight of the platform, and its rated load capacity or maximum intended load.
- Guardrail protection consisting of a top rail 39 - 45 inches high and a midrail approximately halfway between the top rail and the toeboard.
  - The toprail and midrail shall be capable of withstanding a concentrated load of 300 pounds applied at any point.
- A grab rail inside the platform to minimize hand exposure.
- Anchorage points within the platform for attaching personnel fall protection lanyards.
- The sides of the platform must be enclosed from the toeboard to the midrail with solid construction or expanded metal having openings no greater than ½ inch.
- Platform access gates shall have a positive acting device to restrain the gate from accidental opening. Swinging type gates shall open only to the interior of the platform.
- All welds shall be in accordance with American Welding Society or ASME guidelines.
- The platform shall have a minimum design factor of 5, based on the stated platform rating.

## 5.3 Engineering Note Procedure

An Engineering Note shall be prepared by a qualified person for all personnel platforms owned by Fermilab or collaborating institutions used at Fermilab whether purchased or fabricated at Fermilab or a collaborating institution. The minimum format for the Engineering Note is shown in the appendix of this chapter. The purpose of the Engineering Note is to allow a reviewer to check the design and to inform future users of the personnel platform's limitations.

1. Engineering Notes for personnel platforms designed at Fermilab or other non-commercial institutions such as Universities or other Laboratories shall include design compliance calculations to verify that the personnel platform meets as a minimum the requirements of ASME B30.23 and 29 CFR 1926.
2. Engineering Notes for personnel platforms purchased from a commercial source engaged in the manufacturing of personnel platforms shall include the manufacturer's Certificate of Test, copies of the Operator's Manual and Inspection and Maintenance Instructions.
3. Modifications to personnel platforms (whether designed at Fermilab or other non-commercial institutions or purchased from a commercial source) shall be documented in the Engineering Note.
4. All Engineering Notes shall include all safety precautions, operating, and maintenance procedures, recommended inspection frequency, and complete nameplate data required for the personnel platform.
5. All personnel platforms are subject to the test requirements of 29 CFR 1926.1431, the manufacturer, and this chapter. Operational and load tests shall be performed using hoisting equipment of the proper size and capacity for the personnel platform being tested. Initial load tests shall be documented in the engineering note.
6. Review of Engineering Notes: All personnel platform Engineering Notes shall be reviewed by a qualified person for compliance with the requirements of this chapter.

7. Amendment of Engineering Notes: All subsequent changes in usage that could affect the safety of personnel shall require an amendment to the original engineering note. This amendment shall be reviewed in the same manner as the original note.
8. Engineering Note for Existing Personnel Platforms: Personnel platforms currently in use at Fermilab shall be inspected and reviewed with an Engineering Note prepared. Personnel platforms without an Engineering Note shall not be used.
9. Approved engineering notes shall be filed in TeamCenter.

#### 5.4 Hoisting Equipment Requirements

All hoisting equipment used to lift personnel on platforms must be constructed in accordance with ASME B30. All hoisting equipment shall be inspected prior to being used for personnel lifting in accordance with the defined “Inspection Classification” requirements of the applicable volume of the ASME B30 Standard. All operational aids on the hoisting equipment shall be functional. All hoisting equipment must be verified as meeting the following requirements prior to being used for personnel lifting:

- Load lines shall be capable of supporting, without failure, a minimum of seven times the maximum intended load. If the crane is equipped with rotation-resistant rope, the lines must be capable of supporting, without failure, a minimum of ten times the intended load.
- Rope or chain hoisting systems shall have an anti-two block device installed.
- Hooks used for attachment of a personnel lifting platform shall be of a type that can be positively locked closed and will prevent the platform lifting bridle from being dislodged.
- Hoisting equipment shall have automatic brakes on all functions to be used during personnel handling, such that when the equipment operating controls are released, the motions are brought to rest.

#### 5.5 Rigging Requirements

- The designated rigging for attaching the personnel platform to the hoist line shall not be used for any other purpose than hoisting personnel.
- When a wire rope bridle is used to connect the personnel platform to the load line, each bridle leg shall be connected to a master link or shackle in such a manner as to ensure that the load is evenly divided among the bridle legs.
- Wire rope, shackles, rings, master links, and other rigging hardware shall be capable of supporting, without failure, at least five times the maximum intended load applied or transmitted to that component. Where rotation-resistant rope is used, the slings shall be capable of supporting without failure at least ten times the maximum intended load.

#### 5.6 Pre-Lift Meeting

A meeting attended by the operator, the ground crew, signaler(s), person(s) to be lifted, and the designated leader shall be held each shift to plan and review procedures to be followed, including:

- Ensuring the *Personnel Platform Lift Planning and Authorization Form* (Form F1) has been completed and attached to the hazard analysis.
- Points at which persons will enter and leave the platform
- Procedures for entering and leaving the platform
- How to implement an emergency stop

- Special precautions if personnel will perform work from the suspended platform

This meeting shall be repeated for any personnel newly assigned to the operation.

### **5.7 Trial Lifts (Proof Test)**

Proof tests are required any time the basket is installed on a crane. The basket must be uniformly loaded to 125 percent of the basket rated load. The load test must be held for at least five minutes. The weighted basket must be lowered to a test position and held by the hoist brake for five minutes.

The proof test must be documented on the *Personnel Lift Platform Proof Test and Pre-Lift Inspection Form* (Form F2). The form is to be filed with ESH&Q, MS-119.

### **5.8 Platform Inspection**

The platform, suspension system, attachment points, and any platform motion controls shall be inspected at least once each day before use, following the proof test. Any conditions found that constitute a hazard shall be corrected prior to lifting personnel. The inspection must be documented on the *Personnel Lift Platform Proof Test and Pre-Lift Inspection Form* (see Form F2). The form is to be filed with ESH&Q, MS-119.

Each personnel platform will undergo a periodic inspection by a third party at least once every 12 months. Any platform that has been out of service for 12 or more consecutive months must receive a periodic inspection prior to use. (This inspection will be managed and have oversight by FESS/FM Crane Office.)

### **5.9 Platform Repairs**

Replacement parts used or repairs made shall be equal to or exceed the original equipment specification.

All welding repairs shall be done by a certified welder.

Any adjustment or repair to the platform suspension system shall be done by a qualified person.

Only modifications approved in writing by the manufacturer or a qualified person shall be accomplished.

After any structural repair or modification of the personnel lift platform, the platform's Engineering Note must be revised, reviewed and approved (see Section 5.3). The platform and rigging shall be proof-tested to 150 percent of the platform's rated capacity. Suspended platforms shall be tested by raising the loaded platform to a height, then lowering it at a speed of not less than 100 feet per minute. Once a lowering speed of 100 feet per minute or more is reached, the platform descent shall be halted, and then the platform allowed to hang for a period of not less than 5 minutes. Any damage revealed by the inspection shall be corrected and another proof test conducted. The platform shall not be used for hoisting personnel until the proof-testing requirements are satisfied.

## 6.0 REFERENCES

American Society of Mechanical Engineers (ASME) B30.23 – Personnel Lifting Systems (subpart of the Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings)

Occupational Safety and Health Administration (OSHA) 29 CFR 1926.1431 – Hoisting Personnel

Fermilab Environment, Safety and Health Manual 10100 – Overhead Cranes and Hoists