



# Lifting Technologies, LLC

## EXCERPTS THAT APPLY TO CRANE SUSPENDED PERSONNEL PLATFORMS

(From CSA Z150)

### EXCERPTS FROM CSA Z150 6.4.8 PERSONNEL LIFTING

#### 6.4.8.1 General

Mobile cranes are typically designed and intended for hoisting materials rather than lifting personnel. Measures taken to adequately safeguard personnel who are lifted by a crane shall include, but are not limited to, the following:

- a) the person specifically responsible for the overall work function to be performed shall determine that there is no practical alternative way to perform the needed work or gain access to the area, and shall authorize the personnel lift;
- b) a prelift meeting shall be conducted to ensure that every worker involved with the lifting operation receives adequate instructions about the requirements, restrictions, and hazards associated with the hoisting operation;
- c) the crane manufacturer's applicable instructions shall be followed;
- d) the crane shall not travel while personnel are on the platform;
- e) the crane shall not be used for other purposes while personnel are on the platform;
- f) personnel lifting shall not take place when wind speeds exceed 25 km/h (16 mph) or when electrical storms, snow, ice, sleet, or other adverse weather conditions could affect the safety of personnel;
- g) an adequate means of reliable communication between the worker on the platform and the crane operator, in accordance with Clause 6.5, shall be established, maintained, and used;
- h) sufficient lighting for the job shall be provided; and
- i) adequate means of evacuation or rescue procedures, including procedures for work in remote locations, shall be established and communicated in writing to all workers involved with the lifting operation.

Single-part line or two-part line should be used.

**Note:** *The requirements for procedures and equipment that apply to personnel lifting can vary according to the authority having jurisdiction.*

#### 6.4.8.2 Platform requirements

##### 6.4.8.2.1 General

A suspended or pinned platform that carries personnel shall

- a) be capable of supporting, without failure, its own weight and at least five times the rated load of the platform;
- b) have a minimum rated load of 136 kg (300 lb);
- c) be designed and approved by an engineer, in accordance with good engineering practice;
- d) have design drawings that set out the size and specifications of all components of the platform, including the type and grade of materials used for it, the rated load of the platform, and instructions for the proper maintenance and inspection of the platform;
- e) be constructed and maintained in accordance with the design drawings;
- f) have all weldments conforming to CSA W59 or AWS D14.3/D14.3M. Similar standards or procedures may be used, provided that the welding process meets or exceeds the criteria of CSA W59 or AWS D14.3/D14.3M;
- g) have its weight and rated load conspicuously posted on a plate or by other means of permanent marking;
- h) be modified or repaired in accordance with the manufacturer's specifications or as directed by an engineer;
- i) have guardrail protection, consisting of a top rail, intermediate rail, and toe board. The top rail shall be not less than 990 mm (39 in) or more than 1140 mm (45 in) in height with respect to the platform floor. The intermediate rail shall be positioned at an equal distance between the toe board and the top rail. The toe board shall be around the periphery of the platform and shall be a minimum of 90 mm (3.5 in) in height. A solid barrier from the top rail to the floor may be used, provided the top rail height and the barrier structural competence meet the requirements of this Item. Each top rail, intermediate rail, and lower barrier shall be capable of withstanding a concentrated load of 1340 N (300 lbf) applied at any point in any direction without exceeding the allowable load of the material;

**Note:** *The user should be aware of the requirements of the authority having jurisdiction.*



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- j) be permitted to carry tools and sufficient material to do their work, provided
  - i) adequate means such as a lower barrier shall be provided to prevent material from falling from the platform; and
  - ii) the lower barrier, where required, shall span the distance between the toe board and intermediate rail and be of solid construction or expanded metal. The materials and tools shall not present a hazard to occupants. The platform shall not be used for solely transporting bulk material; and
- k) have flooring with a slip-resistant surface, with provision to allow free drainage of liquids.

## 6.4.8.2.2 Additional requirements for suspended platforms

In addition to the requirements of Clause 6.4.8.2.1, a suspended platform that a worker is using shall

- a) be equipped with a secondary means of suspension or support, where the secondary means of support is secured above the hook. The secondary support shall neither impede the operation of the hoist line and travelling block nor compromise the structural competence of the travelling block or the hoist line;
- b) have all wire rope, shackles, rings, master links, and other rigging hardware capable of supporting, without failure, at least ten times the maximum intended load applied or transmitted to that component without exceeding the maximum rated load of the hardware or rigging. This safety factor shall apply to the components used, not to the efficiency of the completed assembly where end-fitting efficiencies, etc., might reduce the overall factor of safety. These requirements shall apply to both the primary and the secondary means of support as defined in Item a);
- c) have bridles and associated rigging for attachment to the hoist line that are identified and used only for the purpose of lifting or lowering workers;
- d) not have synthetic slings and slings utilizing wire rope clips used as part of the suspension system;
- e) be designed, constructed, and maintained so that the failure of one means of support or suspension will not cause the collapse of all or part of the platform;
- f) have all eyes in wire-rope slings fabricated with a Flemish eye complete with thimble and mechanical splice;
- g) have a continuous hand or grab rail inside the perimeter of the suspended platform;
- h) have means of securing loose items within the platform;
- i) if built with an access gate,
  - i) be equipped with a device to restrain the gate from accidental opening; and
  - ii) have the gate configured to swing into the platform; if the platform is too small for the gate to swing inward (to allow safe entry), then the gate may swing outward; and
- j) be equipped with anchorage(s) for personal fall protection. The anchorage(s) shall conform to the following:
  - i) the location of the anchorage(s) shall be identified and the number of anchorages shall equal or exceed the number of rated occupants of the platform;
  - ii) more than one occupant may be attached to a single anchorage if the anchorage is rated and identified for more than one person; and
  - iii) each anchorage shall be capable of withstanding a static force of 16 000 N (3600 lbf) for each person allowed by the manufacturer, without reaching ultimate strength. The strength requirement shall apply only to the anchorages and their attachment to the platform.

## 6.4.8.2.3 Additional requirements for pinned platforms

In addition to the requirements of Clause 6.4.8.2.1, a pinned platform that a worker is using shall

- a) have a design safety factor of 2 for the yield strength for ductile materials or of 5 based on ultimate strength for brittle materials. Where the platform is subjected to dynamic loading, this loading shall be included;
- b) be inspected and load tested with 100% rated load following structural repairs and modifications; and
- c) be equipped with means that maintains the platform in a level position and guard against overturning.

## 6.4.8.2.4 Requirements for pinned platforms equipped with motion control

The motion control on the platform shall

- a) be clearly identified as to its function;





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- b) be clearly marked to indicate the direction of movement and, if possible, be oriented and move in the same direction as the platform when the control is actuated;
- c) be inside the platform and readily accessible to the platform operator;
- d) be protected from inadvertent actuation;
- e) return to its neutral position and stop all motion when released; and
- f) include an emergency stop control that does not require continuous actuation for a stop condition.

## 6.4.8.3 Crane requirements

### 6.4.8.3.1 General

A crane, when used with a suspended or pinned platform to lift personnel, shall

- a) be downrated to half of its rated capacity; and
- b) have a boom that is equipped with fail-safe systems and devices to prevent the boom from freefalling or unintentional lowering or retracting.

### 6.4.8.3.2 Additional crane requirements for suspended platforms

In addition to the requirements of Clause 6.4.8.3.1, a crane when used with a suspended platform to lift personnel shall

- a) be equipped with an anti-two-blocking device as defined in Clause 4.3.5;
- b) have, on its hoist line, hooks equipped with positive-locking catches at the point where the platform is suspended or have other means of preventing the platform from accidentally detaching from the hook;
- c) have hoist lines capable of supporting at least ten times the maximum load or force to which it is likely to be subjected;
- d) when used for hoisting workers and if equipped with a secondary hoist line, have the line and its rigging removed or set in such a way that it will not tangle or endanger workers on the platform and prevent the safe operation of the crane; and
- e) use only winches with power down capabilities for suspending personnel platforms.

### 6.4.8.3.3 Additional crane requirements for pinned platforms

In addition to the requirements of Clause 6.4.8.3.1, a crane when used with a pinned platform to lift personnel shall

- a) be equipped with means to maintain the platform in a level position and protect against overturning;
- b) when hoisting workers, have the hoist line removed from the boom sheave or set in such a way that it will not endanger the workers in the platform or interfere with the operation of the crane; and
- c) each anchorage shall be capable of withstanding a static force of 16000 N (3600 lbf) for each person allowed by the manufacturer, without reaching ultimate strength. The strength requirement shall apply only to the anchorages and their attachment to the platform.

### 6.4.8.3.4 Additional crane requirements for pinned platforms with motion control

Mobile cranes with pinned platforms that are equipped with motion control shall have a motion control at ground level that can override the platform control.

## 6.4.8.4 Fall arrest system requirements

Workers on the platform shall wear a fall arrest system that meets the following requirements:

- a) the fall arrest system shall allow the worker to move around the platform and provide a minimum of lanyard slack;
- b) the fall arrest system shall be connected to the anchorage as provided for the platform in accordance with the instructions of the platform;
- c) the fall arrest system shall include a full body harness and a lanyard equipped with a personal energy absorber or self-retracting lanyard;
- d) the fall arrest system shall be designed and not subject the worker to a peak force exceeding 6 Kn (1350 lbf);
- e) full body harnesses shall meet the requirements of CSA Z259.10;
- f) lanyards and energy absorbers shall meet the requirements of CSA Z259.11;
- g) self-retracting lanyards shall meet the requirements of CAN/CSA-Z259.2.2; and
- h) platforms shall be equipped with anchorage(s) located on the boom or on a fixed support attached to the boom for the fall arrest system of workers in the platform. The anchorage(s) shall conform to the following:
  - i) the location of the anchorage(s) shall be identified and the number of anchorages shall equal or exceed the number of rated occupants of the platform;





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- ii) more than one occupant may be attached to a single anchorage if the anchorage is rated for more than one person. Anchorage ratings can be lumped in accordance with CSA Z259.16;
- iii) each anchorage shall be capable of withstanding a minimum factored static force of 16000 N (3600 lbf) or lumped factor, whichever is greater, for each person allowed by the manufacturer without reaching ultimate strength. The strength requirement shall apply only to the anchorages and their attachment to the platform; and
- iv) anchorage(s) used for pinned platforms shall be located on the boom or on a fixed support attached to the boom.

## 6.4.8.5 Set-up and operation

### 6.4.8.5.1 General

The following requirements shall be met when lifting personnel in suspended or pinned platforms:

- a) the crane shall have its structural elements inspected by a competent person before each use;
- b) the crane shall be levelled as specified by the manufacturer and located on firm footing. Cranes equipped with outriggers shall have them deployed in accordance with the manufacturer's specifications;
- c) a trial lift shall be performed in accordance with Clause 6.4.8.5.2; and
- d) the crane operator shall comply with Clause 6.4.1.9. The operator shall remain at the crane controls at all times when the platform is occupied and is in an elevated position.

### 6.4.8.5.2 Trial lift

A trial lift shall be performed to verify the integrity of rigging and the personnel platform, and to ensure that all systems, controls, crane set-up, lift routes, and safety devices are activated and functioning properly. The trial lift shall ensure that no interference exists and that all configurations necessary to reach those work locations will allow the operator to remain under the 50% limit of the crane's rated load capacity. The trial lift tests described in Items a) and b) shall be performed with the platform loaded to its maximum rated load without people in the basket. See Figure H.1 for an example of a suspended platform loaded with a test weight. The trial lift consists of the following tests:

- a) The platform shall be lifted 1 m (40 in) off the ground to verify the integrity of the primary support. This test shall be performed each time the platform is attached or reattached to the crane.
- b) The platform shall be lifted to all work locations to verify the lift routes and that these work locations can be reached by the crane using a maximum of 50% of the crane's capacity. This test shall be performed at each location at which the personnel platform is to be lifted and positioned and for each lift route. If the operator's view of the lift route of the platform is obscured and the operator cannot be effectively signalled, the capacity of the crane may be verified by placing the platform in a quadrant of equal or lesser crane capacity and in a location of equal or greater distance from the crane.

### 6.4.8.5.3 Additional requirement for operation of pinned platforms equipped with motion control

Initial positioning of the personnel platform shall be performed by the crane operator. Motion control in the personnel platform shall only be used for final positioning of the personnel platform.

