

**AMERICAN NATIONAL STANDARDS
ACCREDITED STANDARDS COMMITTEE**

ASC A92 – AERIAL WORK PLATFORMS

INTERPRETATIONS

1986 - 2013



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Foreword

This publication provides summaries of pertinent interpretations to ASC A92 Aerial Work Platform Standards.

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The primary objective of these interpretations is to prevent accidents associated with the use of Aerial Work Platforms through clarification of the language used to address the issues of design, manufacture, maintenance, performance, use and training contained in the standards.

Only formal requests for interpretation received in writing will receive a response. All such inquiries should be directed to the Secretariat, A92 Committee, Scaffold & Access Industry Association, 400 Admiral Boulevard, Kansas City, Missouri 64106. The A92 Committee shall approve the interpretation before the submission to the inquirer. No one but the A92 Committee is authorized to provide any interpretation of the standards.

The standards will be revised from time to time where necessary or desirable, as demonstrated by the experience gained from the application of the standards. The A92 Committee solicits comments and criticism regarding the content and wording of the standard as it relates to all issues and entities addressed. Proposals for improvement of these standards are welcome. Proposals should be as specific as possible: citing the standard, paragraph number(s), proposed wording and a detailed rationale including any pertinent documentation.

The Scaffold & Access Industry Association does not “approve”, “rate” or “endorse” any item, construction, proprietary device or activity.

ASC A92.2 Vehicle-Mounted Elevating and Rotating Devices

A92.2-1979

Question

1. Should an inspector checking for “proper markings of ... instructions” under Section 6.3.1.3(13) point out the manufacturer has not provided “band of arrow” decals?

Response

1. *Section 4.10, Markings does not specifically state that an insulation aerial device must have a “band of arrows” decal, and in fact many of these devices are not so equipped. Note that paragraph 4.10.6 does list some specific electrical markings which must be provided, and “band of arrows” is not included as a requirement. This paragraph also recognizes that users may wish to designate specific markings for their devices. If a purchaser designates the “band of arrows” be furnished on his machines and includes it on his company’s inspection check list, then an inspector would be responsible to note if it was missing.*

A92.2-1990

Question

1. May I modify the bottom of the fiberglass platforms on our insulated aerial lifts by installing a ¼” hole in the bottom, closed with a nylon hex head bolt to drain the water on rainy days?
2. What responsibility does a dealer or installer have (if any) to obtain written approval of the manufacturer prior to making a modification?
3. Why was this provision placed under the Owners responsibilities?
4. What constitutes “hydraulic integrity”? What are the factors involved in “hydraulic integrity”? What are examples of actions which would violate hydraulic integrity”? **(8.5 Modifications.** No modifications or additions which affect the stability, mechanical, hydraulic, or electrical integrity or the safe operation of the aerial device shall be made without the written approval of the manufacturer. If such modifications or changes are made, the capacity, operation and maintenance instruction markings shall be changed accordingly. In no case shall the safety factors be reduced below those specified in this standard or below

the manufacturer's design safety factors, whichever are greater. Should the original manufacturer no longer exist, an equivalent entity may approve required modification.)

Response

1. *Section 4.9.7 does not address how a manufacturer may close a hole or passage in fiberglass platforms on insulated aerial devices. Section 8.5 requires that no modifications which affect electrical integrity or the safe operation of the aerial device shall be made without the written approval of the manufacturer.*
2. *Despite the fact that this provision appears in the owners and users section, it includes all sections of this standard.*
3. *The provision appears in the owners and users section because modifications are typically requested by this group. Dealers and installers usually are not the final owners and as such major changes should not be made by an intermediate party without the consent of the owner. Dealers and installers may approve modifications in the absence of the manufacturer only if they qualify as an equivalent entity.*
4. *Hydraulic integrity used in Section 8.5 refers only to those systems and components that directly affect the safety of personnel and protect the equipment from extensive damage. Among the items that would fall under this are (1) the system of holding valves that prevent the booms from dropping should there be a power or line failure; (2) the dielectric characteristics of oil and insulating hose; (3) the ability to control the various functions to position the platform; (4) the resistance to bursting of critical components under pressure; and (5) the provision for the lower controls to override the upper controls.*

Question

1. ...It is my understanding that the meaning of the work line is hose, tubing, or any other conduit for hydraulic fluid. In other words, this requirement for appropriate devices to be present within the hydraulic system to prevent unrestricted motion of the aerial device is intended to address the possible failure of specific hydraulic system components. An alternative interpretation, which I believe is incorrect, has been offered that suggests that the word line is intended to have a more comprehensive meaning, namely, that it means the entire hydraulic system. This interpretation would require that appropriate devices be installed to guard against the failure of any and all components that comprise the entire hydraulic system...(4.8 **System Protection**. Where the operation of the aerial device is accomplished by hydraulic means, the system shall be equipped with appropriate devices to prevent motion of the platform(s) or material lifting device, or both in the event of hydraulic line failure.)

Response

1. Based on general usage by users and manufacturers of utility vehicle equipment, lines specifically refer to fluid conduits such as hoses and tubing used to transport hydraulic fluid, within a hydraulic system and not the entire system itself. Consider the following definitions from publications that are widely accepted in the industry:

Line - A tube, pipe or hose which acts as a conductor of hydraulic fluid

-Vickers Mobile Hydraulics Manual, 1979

Line — A tube, pipe, or hose which acts as a conductor of fluid

-Fluid Power Controls, Pippenger and Koff

Further definition is provided from early standards established by United States of America Standards Institute, now call ANSI. They symbolically identify the components or building blocks of all hydraulic systems as either: Pumps, motors (rotary or linear), valves or lines. From these components any complex system can be constructed. Viewed as a system there is no question that a line is a component, albeit an important one, and does not include any other component(s) of the system.

Question

1. Is the design of an upper boom without an insulated cover over the jib boom cylinder and bracket an “other hazard” to be inspected for under Section 6.3.1.3(14)?

(8.2.4(15) of ANSI/SIA A92.2-1990. If the aerial device is rated and used as an insulated device, the electrical insulating components and system(s), after a thorough inspection for lack of cleanliness and other hazards, shall be tested for compliance with the rating of the aerial device in accordance with one of the applicable methods and procedures as outlined in section 5.4.3 of this standard.

Response

1. Item (14) lists the accepted methods for checking the insulating integrity of a rated aerial device. The introductory portion simply instructs the inspector to properly prepare the aerial device for an insulation inspection by removing or correcting those things that could adversely affect the test, such as dirt (which is likely to be conductive), defective hoses, insulation cracks or damage and the likes.

The tests described in (14) would not be influenced by the presence or non-presence of the insulated cover referenced. The phrase “other hazards” was not a good choice of words. A better description would have been “and other conditions that compromise insulation.”

Question

1. In my opinion the ANSI standard regarding vehicle mounted elevating and rotating aerial devices are deficient since there are no requirements for non-conductivity between dual buckets on this type of equipment. In addition, the requirement for the over-ride control should be more stringent. The lower override control should be capable of lowering the buckets even if the upper control is destroyed.

Response

1. Insulated aerial devices manufactured in accordance with A92.2-1979 are designed and tested to provide electrical protection from phase to ground along the length of the boom. At the platform end of the aerial device, the operator should consider the platform, its controls and all attachments to be electrically connected together. Paragraph 4.10.6 in A92.2-1979 states that "Instructional marking shall be provided for: (1) Electrical hazards involved in the operation of the machine to warn that an aerial device does not provide protection to the operator from contact with or in proximity to an electrically charged conductor when he is in proximity to another conductor." Protection of the operator against these electrical hazards required the use of established industry work practices.

Paragraph 4.5.1 of A92.2-1979 states the "Lower controls shall be easily accessible and shall provide for overriding the upper controls." This requirement implies that the control system must be intact. To require that the lower controls override the upper controls even if the upper controls are destroyed would prohibit the use of open center hydraulic systems which are and have been used by a large number of manufacturers for many years without problem.

Question

1. What does the term "bridging" mean as that term is used in Section 3.3.4? (3.3.4 **Insulated Systems.** All components bridging the insulated portions of the aerial device shall have electrical insulating values consistent with the design voltage rating of the upper boom, and, when provided, of the lower insulator.)

Response

1. *Bridging is defined in part by Webster's New Collegiate dictionary as "a means of connection." Specifically applied to 3.3.4 it is the connecting of one non-insulated portion of an aerial device to another non-insulated portion across an insulating section which electrically isolates the two non-insulated portions.*
Any object that crosses or "bridges" the insulated section must of necessity have an insulating at least equal to the insulated section itself in order to maintain insulating integrity of the

insulated section. If the insulation level of the bridge is not realized, then an alternative electrical path around the insulated section will be provided.

Typical systems that bridge and insulating section in a boom(s) are: operating controls, platform leveling systems, hydraulic tools circuits and hydraulic hoses.

A92.2-1990

Question

1. Regarding ANSI/SIA A92.2-1990:

- a) How can a company determine if aerial devices presently owned should be considered insulated or non-insulated?
- b) Is it possible to have an aerial device with some components that have dielectric characteristics, but yet use and label it as a non-insulated device and consider it as such?
- c) What authority and responsibility does the manufacturer have in determining whether an aerial device is insulated or non-insulated?
- d) Is there a need to acoustically test a non-insulated unit? (Note that ASTM Standard F914-85 did not give consideration for AE testing of non-insulated units)
- e) What types of testing would be recommended for non-insulated units only?
- f) What type of certification would be required for an individual or company claiming to be qualified to test aerial devices?
- g) Is there an approved list of independent testing companies that are known to be qualified and recommended?
- h) In an effort to interpret and clarify standard and regulations as they apply to aerial work platforms, we would appreciate a definition of the term, "Self-Leveling Platform".
- i) What should be the proper procedure for testing a truck labeled Category B manufactured in January 1004 that does not have a lower test electrode system?
- j) Why is the meter receptacle illustrated in Figure 2 on page 29 and Figure 2A on page 30 not specified?

Response

1. Regarding ANSI/SIA 92.2.1990:

- a) Paragraph 6.5.2 requires that the manufacturer provide a marking to indicate whether the unit is "Insulated or Non-Insulated". Examine the nameplates on the

- aerial devices you presently own to determine how they should be considered.*
- b) A common example of this are buckets which are made of plastic with dielectric characteristics yet are considered non-insulating. The A92.2 standard does not specify the materials to be used in the manufacture of an aerial device. If the device is to be considered insulated, certain electrical tests on the completed unit are specified in the standard.*
 - c) Paragraph 6.5.2 requires that the manufacturer provide a marking to indicate whether the unit is “Insulated or Non-Insulated”.*
 - d) Paragraph 8.2.4 of A92.2-1990 details the minimum inspections and tests that shall be performed during intervals ranging from 1 to 12 months. Acoustic testing is not specifically mentioned in this paragraph.*
 - e) Paragraphs 8.2.3 and 8.2.4 state the minimum requirements for inspection and test.*
 - f) The definition of a “qualified person” in A92.2-1990 does not mention any type of required certification. Your company will have to make the determination whether the individual or company is qualified using the definition as a guide and your own judgment.*
 - g) It is outside the scope of this committee to make such a list or recommend specific companies. We suggest that you contact the manufacturers of the aerial devices you own and other users for this information.*
 - h) The term “self leveling” is ambiguous. The term means different things to different people. Platforms may be gravity leveled, positive leveled, power leveled, hydraulically leveled or mechanically leveled.
We recommend that you not use the term “self leveling”. If the term “self leveling” has been used by someone else, we suggest that you contact them to get the term clarified.*
 - i) An aerial device manufactured in 1994 labeled as Category B that does not have a lower test electrode system does not meet the A92.2 criteria for a Category B machine. It is not within the charter of the A92 committee to direct you on how to proceed.*
 - j) Figure 2A is labeled as illustrative only. Standards such as A92.2 can refer to commercially available products only in a generic sense. Some companies utilize a seven pin socket which allows the operator to perform continuity checks of the test circuits before use. The illustration indicates that the cable from the lower test electrode system can be single “Insulated conductor or multiple conductor cable”.*

Question

1. Does paragraph 4.3.4 mandate a mechanical device that would by-pass all hydraulic fluid before it enters the directional control valves?
2. Is this intended to be part of the start/stop system or a function to stop the flow of hydraulic oil?

(4.3.4 Emergency Stop. A control shall be provided at the platform to effect an emergency stop of platform movement. This control shall not require continuous actuation for a stop condition.)

Response

1. *ANSI/SIA A92.2-1990 is not a design standard, but is instead a performance standard. The intent of paragraph 4.3.4 is to give the operator the ability to stop the aerial device from moving in an emergency situation due to malfunction in the operating mechanisms whether they may be hydraulic, electric, pneumatic, fiber-optic, etc. The method to obtain the final objective is left to the designer of the unit.*
2. *ANSI/SIA A92.2-1990 is not a design standard, but is instead a performance standard. The intent of paragraph 4.3.4 is to give the operator the ability to stop the aerial device from moving in an emergency situation due to malfunction in the operating mechanisms whether they may be hydraulic, electric, pneumatic, fiber-optic, etc. The method to obtain the final objective is left to the designer of the unit.*

Question

1. [Regarding 4.3.5 Outrigger Controls] Does this necessarily imply the duplication of outrigger controls – i.e. one panel mounted on each side of the vehicle – or is a rear mounted location considered acceptable?
2. Does an outrigger control meet the intent of this standard, if the outrigger can be seen by a person operating the control when he positions himself in one position, even though the operator may choose to position himself in a place where he cannot see the outrigger as he operates the control?

(4.3.5 Outrigger Controls. When an aerial device is equipped with outrigger controls, these controls shall be guarded to protect against inadvertent operation and shall return to neutral when released by the operator. These controls shall be located so that the operator can see the outriggers being operated.)

Response

1. *The standard intends that the movement of all outriggers be visible from the location that controls the movement of the specific outriggers. If the requirements can be met at one control location, then all controls can be placed at the one location and satisfy the intent of the standard.*
2. *The position of the outrigger control meets paragraph 4.3.5 of ANSI/SIA A92.2-1990, provided the operator need not assume an unreasonable position in order to observe the operation of the outrigger.*

Question

1. Is a lower winch control also required for a removable material handling winch inside the platform designed for use only by platform personnel to lift light tools and equipment without lowering the boom (capacity: 330 lb.)?

(4.3.6 **Winch Control.** If the aerial device is equipped with a material handling system winch at the upper boom, it shall have both upper and lower controls to operate the winch.)

Response

1. *This section addresses the controls of any winch which is part of an aerial lift device and requires both upper and lower controls. This requirement does not apply to small capacity winches which are manually operated or powered by a self-contained source.*

Question

1. [Regarding 4.4.3 Platform Security] This one is very brief and could be interpreted many ways. My recommendation would be to construct a shock absorbing support for the platform to rest on during travel.

(4.4.3 **Platform Security.** Platforms shall be designed to withstand vibration and shock loading during travel.)

Response

1. *This section states an end point requirement and leaves the decision of how to conform to the designer. There is absolutely no need to provide shock absorbing platform supports on all aerial lifts. Those with long booms may well need such “shock absorbing supports”. The method to obtain the final objective is left to the designer of the unit.*

Question

1. Assume the case of a vehicle mounted platform whose configuration includes the mandatory placement of outriggers for stability purposes. Does the stability test have to be performed after the outriggers have been placed so as to correct and level the mandated 5% test slope? In other words, is it satisfactory to prove that the outriggers are in fact capable to enable leveling on a slope of 5%, with an applied test load of 133%, or must the unit be stable on a 5% slope regardless of outrigger placement?
2. Is the machine to be placed on a 5 degree slope and then leveled as indicated in the second paragraph? Is the machine to be placed on a 5 degree slope; the outriggers extended but not used to level the lift? Does the second paragraph simply provide detailed instructions to be used in order to properly conduct the test?
3. Are the first and second paragraphs under 4.5.2 indicating two separate tests, i.e. one test on a 5 degree slope where the outriggers cannot be used and a second test on a 5 degree slope where the outriggers can be used?
4. Does paragraph 4.5.2, stability, require the vehicle to rotate 360 degrees at all angles of elevation, if capable, while on a 5 degree side slope? Specifically does the standard require the vehicle to be capable of lifting the test load towards the downward slope in the direction most likely to cause overturning?
5. If we restrict lifting to the high side of the vehicle, can we consider that to be within the definition of the specific configuration?
6. Can we restrict the use of the vehicle to level ground only and would that be considered within the definition of the specific configuration?
7. Does this require the load to be lifted in the direction of the downward slope, the direction that is most likely to cause overturning?

(4.5.2 Stability on Slopes. Each aerial device, when mounted on a vehicle meeting the manufacturer's minimum vehicle specifications without readily removable tools and material and used in a specific configuration, shall comprise a mobile unit capable of sustaining a static load one and one-third times its rated load capacity in every position in which the load can be placed within the definition of the specific configuration when the vehicle is on a slope of 5 degrees downward in the direction most likely to cause overturning. The load shall be applied at one and one-third times the platform(s) rated load at the center of the platform, simultaneously with one and one-third times the lifting device rated load at the point of load application in its position of maximum overturning moment when so equipped. If having the outriggers extended to a firm footing is part of the

definition of the configuration, they shall be extended to provide leveling for the purpose of determining whether the mobile unit meets the stability requirements. If other facilities, such as a means of turntable leveling are provided to minimize the effect of the sloping surface, then those facilities shall not be utilized for the purpose of determining whether the mobile unit meets the stability requirements. The simultaneous application of material load and platform load shall be done only on the aerial devices that are designed to be used in service with both loads applied simultaneously. Vertical towers designed specifically for operation only on a level surface shall be excluded from this requirement.)

Response

1. *If it is mandatory that the outriggers be placed during all work operations, then the stability check can and should be made with the outriggers in place.
Please note that the slope is specified at 5 degrees not 5 percent.*
2. *The answer to these questions depend upon the "Definition of Configuration" that the manufacturer will publish with the machine. If the configuration requires that the machine always be leveled prior to use, then the stability test on the 5 degree slope is performed by extending the outriggers, if so equipped for leveling. The uphill side where the outriggers do not extend fully may be the most unstable position.
If the manufacturer wishes to publish a second set of ratings with outriggers simply contacting the ground (machine not leveled), he may also do this. The important issue is that the published stability be clearly identified as to the configuration in which the machine was tested.*
3. *Paragraph 4.5.2 requires only one test on a 5 degree slope for each "Definition of Configuration".*
4. *The paragraph does not require the turret to be capable of rotating 360 degrees. It does require that the stability requirements be met for all positions into which it can be rotated.*
5. *No. The stability test cannot be restricted to the high side of the vehicle. Vehicles are often reassigned or sold to second parties, and when doing conventional work could then become unstable.*
6. *No. The stability test cannot be restricted to the high side of the vehicle. Vehicles are often reassigned or sold to second parties, and when doing conventional work could then become unstable.*
7. *Yes. The load must be applied in the position in which the vehicle is most likely to overturn. Due to unsymmetrical weight distribution of the final installation or variations in the chassis components, the stability of the vehicle may vary from one side of the chassis to the other. Thus the stability of the final installation may have to be tested by the installer on all sides of the chassis to determine which side is the least stable.*

Question

1. Do the words “open holes or passages” include a top down “U” shape exit/entry 18” wide by 20” high with safety strap?
2. Do the words “open holes or passages” include a water drain hole in the bottom of the bucket with a double trap?
3. We have had customer requests to provide cutouts in the side of fiberglass platforms to allow operators to enter and exit without climbing over the top. Will a platform built this way meet the intentions of this section?
4. The specific issue in question is whether this statement is intended to prohibit access openings in fiberglass platforms on insulated aerial lifts. Insulated aerial lifts used for streetlight maintenance have historically used fiberglass platforms with access openings.
5. At present we are supplying polyethylene liners with all basket units. There have been holes drilled in the lip of the line and the basket and a nylon bolt inserted to keep the liner from coming out of the basket during travel. Pin-on baskets on digger/derricks give us the most problems because some of these stow in the horizontal position. I have no problem with these holes, I do agree holes in any other area should not be allowed.
6. May I modify the bottom of the fiberglass platforms on our insulated aerial lifts by installing a ¼” hole in the bottom, closed with a nylon hex head bolt to drain the water on rainy days?

(4.9.7 **Fiberglass Platforms.** There shall be no open holes or passages in fiberglass platforms on insulated aerial devices.)

Response

1. *“Open holes or passages” do not include exit/entry openings which are not closed with a door or cover.*
2. *“Open holes or passages” so include water drain holes that are open and not closed with a door or plug.*
3. *The section states “There shall be no open holes or passages on fiberglass platforms on insulated aerial devices.” “Open holes or passages” do include exit/entry openings which are not covered with a door or cover.*
4. *The section states “There shall be no open holes or passages in fiberglass platforms on insulated aerial devices.” “Open holes or passages” do include exit/entry openings which are not covered with a door or cover. The prohibition of “open holes or passages” does not apply to platforms on insulated aerial devices constructed from material other than fiberglass and does not apply to fiberglass platforms on non-insulating aerial devices.*

- Aerial devices marked as “non-insulating” on the instruction plate(s) may be constructed using non-conductive materials.*
5. *The section prohibits “open” holes in the fiberglass bucket. Holes in overlapping lips of a line and basket are not open, providing they are occupied by bolts and nuts. Be aware that paragraph 8.5 Modifications, prohibits modifications such as holes which effect the electrical integrity of the aerial device without the written approval of the manufacturer. Digger derricks are covered under ANSI A10.31 and are not covered by A92.2.*
 6. *Section 4.9.7 does not address how a manufacturer may close a hole or passage in fiberglass platforms on insulated aerial devices. Section 8.5 requires that no modifications which affect electrical integrity or the safe operation of the aerial device shall be made without the written approval of the manufacturer.*

Question

1. For a Category B aerial device, at what voltage, if any, are conductive shields for lower test electrode systems and/or gradient control devices required?
2. Is the sole criteria distinguishing a category B aerial device from a category C aerial device the fact that a category B is equipped with a “lower test electrode system”?
3. If so, are aerial lifts manufactured prior to July 1991 (which have a lower test electrode system) required to meet the standard of 60 microamps or less at 60 kVAC?
4. If these older units are not required to meet the 60 microamp at 60 kVAC standard, at what voltage and what leakage are they required to meet?

(5.1.2 Insulating Aerial Device Categories. (2) Category B. Aerial devices which are designed and manufactured for work in which the boom is not considered as primary insulation, but secondary, such as that using insulating (rubber) gloves. Isolation or bonding of the conductive components at the platform is not a requirement. These shall be equipped with a lower test electrode system (Figure 2A).

Response

1. *The manufacturer of a Category B device rated 138kV or higher is likely to equip it with gradient control device(s) in order to pass the Qualification Test listed in Table 1. When any aerial device is equipped with gradient control device(s), Paragraph 5.2.4.2 states it “shall have the lower test electrode system equipped with a conductive shield or an equivalent to reduce the capacitive coupling effect and to improve indication of resistive current.” Neither paragraph 5.2.4.1, Gradient Control Devices, nor paragraph 5.2.4.2, Conductive Shield(s), list voltages or aerial device categories.*

2. *From the electrical testing point of view, the criteria distinguishing a category B aerial device from a category C aerial device is that a category B is equipped with a complete “lower test electrode system”. Neither category B nor category C use the boom insulation as primary insulation. The second criteria, which does not affect electrical testing, is that all category b devices must be equipped with a vacuum prevention system. Only category C devices with a platform height greater than 50 feet must be equipped with a vacuum prevention system.*
3. *Machines manufactured prior to July 1991 having a lower test electrode system are required to meet the test criteria in the edition of ANSI/SIA A92.2 that was current at the time of manufacture.*
The older standards did not provide a procedure or leakage criteria using a permanent lower test electrode system when it was installed on a unit rated 69 kV and below.
4. *These machines must meet whatever test criteria was applied prior to 1991.*
For aerial lifts rated 69 kV and below, the older standards provided a wide range of acceptable voltage levels for periodic testing. For example, the A92.2-1989 standard provided a minimum AC periodic test voltage of line-to-ground exposure in paragraph 6.3.1.3 (14)(c) and a maximum AC periodic test voltage of 100 kVAC with 1mA current in paragraph 5.2.2.1.

Question

1. Does this mean all aerial lifts without the lower test electrodes should be treated as a 46 kV lift and tested at 40 kV with a maximum leakage of 400 microamps? I ask this because I test many older lifts that have marking nameplates stating the lift is rated at 69 kV yet it does not have a lower test electrode system. My dilemma is, do I test this truck at 60 kV or 40 kV?
2. It has been suggested to me that lifts manufactured prior to July 2, 1991 have been “grandfathered in under the old standards”. If this is true, what does the term “grandfathered in” mean in this case? Does it mean that I continue testing them as under the old standard, or does it possibly mean that there is a less stringent allowable leakage?
3. If a unit is rated as a Category C aerial device, does this mean that it automatically carries a 46 kV rating? Can it be rated at some lessor voltage such as 34.5 kV? Do the design and periodic test voltages decrease per the notes under Table 1 and Table 2 or do they remain the same if the unit was a 46 kV unit?

(5.1.2 Insulating Aerial Device Categories. (3) Category C. Aerial Devices which are designed and manufactured for work in which the boom is not considered primary insulation, but secondary.

Isolation or bonding of the conductive components at the platform is not a requirement. These aerial devices are not equipped with a lower test electrode system and are designed for 46 kV and below.

Response

1. *These machines must be tested using voltage and leakage limits that meet the requirements listed in the edition of ANSI/SIA A92.2 that was current at the time of manufacture.*
2. *Grandfathered simply means that the units manufactured prior to July 1991 are not required to be tested by this 1990 revision. You may continue to test them under the old standard.*
3. *The lowest level of insulation recognized by ANSI/SIA A92.2-1990 for insulating aerial devices is 46 kV for use on rated line voltages 46 kV and below. The interpretations committee is not empowered to write new sections to the standard or to approve new voltage ratings.*

Question

1. We would like to know if the statement “conductive shields or equivalent to reduce the capacitive coupling effect and improve indication of resistive current” applies to Category A aerial lifts qualified for above and below 138 kV. More specifically, our attention is focused on the “or equivalent” statement, which appears in Section 5.2.4.2. but is not mentioned in 5.1.2(1) Category A. Based on our experience, the use of shields or equivalent devices is not linked to the need for corona rings. Basically, they serve a different function and are independent from each other. Also, an equivalent device to the shield can be used in place of the shield on all Category A aerial lift devices, regardless of the use voltage.

(5.2.4.2 **Conductive Shield(s)**. Insulating Aerial devices equipped with gradient control devices shall have the lower test electrode system equipped with a conductive shield (See Figure 2A) or an equivalent to reduce the capacitive coupling and to improve indication of resistive current.

Response

1. *Category A insulating aerial devices require a conductive shield or equivalent for all voltage ratings. The “or equivalent” as applied to the conductive shield is not affected by the voltage rating of the aerial device.*

Question

1. If bucket liners are not needed for dielectric strength purposes, do they have to be tested, or can we label each liner indicating that “this liner does not provide dielectric protection and is not being tested”?

(5.4.3.5 Test Procedures for Insulating Liners. One of the following test shall be performed: (1) Platform liners used for insulation shall be tested in a conductive liquid. The liquid level around both the inner and outer surfaces of the liner shall be within 6 inches of the top of the liner. The liner shall withstand a minimum of 35 kV 60 Hz for 1 minute or 100 kV DC for 3 minutes without flashover or break-down through the material. (2) Alternate test method for platform liners is as follows: The four sides and the bottom of liner may be tested one side at a time on a test table with wet cellulose sponge, cloth towels or metal foil used as electrodes. The electrodes shall adhere closely to the entire surface inside and outside to within 6 inches of the top of the liner. Make certain that the area on all corners is tested. The bottom may be tested with approximately 2 inches of water inside and wet cellulose sponge outside. The liner shall withstand a minimum 35 kv 60 Hz for 1 minute, or 100 kV DC for 3 minutes without flashover or puncture of liner wall.)

Response

1. *The interpretations committee could not reach a consensus response to your question. OSHA Standards should be consulted.*

Question

1. ...Most manufacturers' weight limits are 300 pounds for the bucket. Some manufacturers include the liner (single bucket approximately 43 pounds), others do not. Let's look at a manufacturer who does include the liner in the following hypothetical case:

A 45' bucket has a manufacturer's weight limit of 300 pounds with liner, no problem. But wait a minute, a 250-pound lineman now enters the bucket, and takes a normal compliment of tools, conservatively, 123 pounds. We no longer have a safe working environment, because you have 373 pounds in a bucket designed with a manufacturer's weight limit of 300 pounds. Now let's limit the amount of tools a lineman is allowed to take up in the bucket. The lineman can only carry 49 pounds of tools, so that he can stay within the limits. Let's assume we have a job to hang an 8' cross arm. As long as it weighs less than 1 pound, you're all right, but, if it weighs 2 pounds or more, you would be over the manufacturer's weight limit of 300 pounds.

Although the scenario presented above may stretch the factors to the limit, there is a distinct possibility it could happen.

The bottom line is, we are not safety engineers, and we are not about to sit here and second guess the procedures and parameters used in developing standards. However, we do need a clarification on the figures cited in terms of “HOW ARE THEY TO BE INTERPRETED?”

(6.2.2.2 **CAPACITY.** Rated load is of two distinct types: (1) The Platform load consisting of the weight of personnel and all items carried on or in the platform, such as the platform liner. (2) Supplemental loads which may be fixed directly to the boom(s), or to load carrying attachments on the aerial device. The capacity rating in either case shall be designated with boom or booms and load carrying attachments extended to the position of maximum overturning moment attainable throughout full rotation. Capacities of the aerial device in other positions shall be specified separately. The manufacturer shall state all applicable ratings in the manual and on placards affixed to the aerial device. It shall indicate if these capacity ratings are based on some fixed conditions of the load carrying attachments.)

Response

1. Paragraph 6.2.2.2 requires the aerial device manufacturer to state in the manual and on the aerial device the “Rated Load Capacity”. Paragraph 6.2.2.2 states that one type of rated load capacity is “The platform load consisting of the weight of personnel and all items carried on or in the platform, such as the platform liner.”
The user should consider the weight of personnel and all items carried on or in the platform to ensure that the total weight is in accordance with the manufacturer’s rated load capacity.

Question

1. We sold 36 trucks and we have a purveyor of cranes FEHSA group, certainly we do not sell cranes, but we have to give full service to the customer in all their equipment. Those 36 units were sold with Category “C” ANSI 92.2-1990. Our customer (LYFC) told us that the cranes don’t pass the test of the Aerial Devices for 46 kv Category “C”/ANSI Norm, they done the test to the two booms (up boom and down boom) but we have a copy of the ANSI Norm and have not founding specifically in where is established that we have4 to proof the Down Boom? So should we have to apply the test in the down boom or only in the up boom?

Response

1. Various sections of A92.2-1990 (see 5.3.1, 5.3.2, 5.3.3, 5.3.4, 5.3.5) and in ANSI A92.2-2001 (see the same numbered sections as in A92.2-1990) call for dielectric testing of the insulating upper boom of insulating aerial devices. There also requirements in A92.2-1990 (5.4.2.4) and A92.2-2001 (5.4.2.4) that call for dielectric testing of chassis insulating systems if they are present. Neither the A92.2-1990 nor A92.2-2001 requires that insulating aerial devices have chassis insulating systems. [See Section 5.2.5 in both the 1990 and 2001 editions to gain this understanding; we quote 'aerial devices **with** (emphasis added) a chassis insulating system...']

We note that the drawing attached to the email communication was a facsimile of Figure 3A in the A92.2-1990 standard (and similarly in A92.2-2001) that is an optional test configuration for Category C aerial devices. We assume this illustration was for purposed of explanation of what the questioner was calling the 'Up' and 'Down' boom. It should be noted that Figure 3 and Figure 3A either can be used for testing of the upper boom of the aerial device and Figure 4 is illustrative of the test positions for testing of units with the chassis insulating systems that are in most cases a part of the 'lower' boom.

Question

1. I am concerned with the visual and/or audible safety warning devices which would tell an operator/user that one of the outriggers had been taken up and would preclude the hydraulic/electrical system from allowing the boom to be lifted into the air. I believe this type of system can either be accomplished through a hydraulic bypass, flashing lights or an audible sounding system device that would either preclude movement or warn of unstable condition.

(6.3.1.2 **Frequent Inspection and Test.** Items such as, but not limited to, the following shall be inspected for defects at intervals as defined in 6.3.1.1(2)(a) or as specifically indicated, including observation during operation, for any defects which might appear between regular inspections. These tests and inspections may be performed by the operator; any suspected items shall be carefully examined and determination made by a qualified person as to whether they constitute a safety hazard. All unsafe items shall be corrected before further use. (3) Visual and audible safety devices for malfunction.)

Response

1. Paragraph 6.3.1.2(3) which you referenced in a part of the maintenance section. Its purpose is to remind maintenance forces that audible alarms and shutdown devices can and do fail, and as such, must be checked on an ongoing, scheduled basis.

You are correct that any number of visual or audible “safety” warning devices can be placed on an aerial lift, with or without associated system shutdown devices. Design and installation of such systems are readily accomplished, and in fact, when considered as a part of the entire machine, are inexpensive from an initial cost point of view. Obviously then, there are concerns other than cost that account for the relatively few machines equipped with extensive numbers of warning devices of the type you described.

At the present time, there are no rules in A92.2 that mandate such devices on either boom or outriggers. To date, the committee has received no strong signals to alter the posture of the A92.2 regarding alarms of the type you describe in your letter. The committee is following a more fundamental approach to assuring personnel safety by being more explicit and stringent in outlining the duties of the operators and maintenance forces. It is felt by most that concentrating on these two areas will provide more effective long term safety for the operator than reliance upon electromechanical devices which often act as crutches and generate a sense of security which, in reality, does not exist. The safest environment appears to be the well-trained operator using a well-maintained machine that is unencumbered by redundant alarms.

Question

1. What qualifications are required of the person training trainees? What records must owners and users keep of such training?

(8.12 Training of Operators. Each trainee shall be instructed in the safe and proper operation of the aerial device utilizing the manufacturer’s operator’s manual, the user’s work instructions and the appropriate standards referenced in Section 2. Such training shall include “hands-on” use to successfully demonstrate the trainee’s proficiency to the satisfaction of the qualified person designated to administrate the user’s training program.)

Response

1. A92.2-1990 does not address the qualifications of the trainer or the maintenance of records. OSHA Standards should be consulted for all such requirements. For electric utilities see OSHA 1910.269 ELECTRICAL POWER GENERATION, TRANSMISSION AND DISTRIBUTION.

Question

1. **Section 4.8 System Protection.** Where the operation of the aerial device is accomplished by hydraulic means, the system shall be equipped with appropriate devices to prevent motion of the platform(s) or material lifting device, or both, in

the event of hydraulic line failure. This requirement does not apply to properly guarded metallic tubing installed between a holding device and the cylinder.

My interpretation would be that some device is required to prevent the platform from moving even a small amount upon rupture of a hydraulic line. It further seems to indicate this is generally accomplished with a valve, attached to the cylinder with guarded metallic lines, which establishes a hydraulic lock on the cylinder if a rupture occurs. The Section 4.8 requirement does not seem to be met by a mechanical stop, which limits the drop of the platform to a distance of two ladder rungs (approximately 28 inches) or less.

Response

1. We do not normally issue interpretations on older versions of the Standard when a newer version is in existence. However, as your letter predates the publication of A92.2 2009 we will respond to your request.

Your request contained two questions related to section 4.8 System Protection.

You asked whether “some device is required to prevent the platform from moving even a small amount upon rupture of a hydraulic line.”

For a hydraulic powered device, Section 4.8 requires the system shall be equipped with appropriate devices to prevent motion of the platform.

As you mentioned in your letter, a cylinder mounted hydraulic holding valve is one type of appropriate device envisioned by the standard. Such systems may allow a small amount of platform motion that was not meant to be prohibited.

You also asked if this requirement can “be met by a mechanical stop, which limits the drop of the platform to a distance of (approximately 28 inches) or less.”

This requirement can be met with a mechanical stop. Given the limited amount of information available we can not provide an interpretation of the distance “28 inches or less”

A92.2-2001

Question

1. In the A92.2-2001 standard, paragraph 4.3.4 states that an additional control shall be provided at the platform and the lower controls to effect an emergency stop of the powered upper control functions.

We have several aerial devices that are covered by this standard that do not have the emergency stop feature on the platform. These trucks were also manufactured prior to the standards release date. In the A92.2-2001 standard the second page states that “The design and manufacturing requirements of this standard apply to all aerial platforms manufactured on or after the effective date. All other provisions of this standard apply to both and new existing units delivered by sale, lease, rental or for any form of beneficial use on or after the effective date”.

Since the requirements in question are in the design section, should we apply them to older aerial platforms. Were the design requirements of paragraph 4.3.4 in previous revisions? Some of the aerial platforms we inspect that are covered by A92.2-2001 were manufactured in the late 1970’s.

Response

1. *As stated in Section 1.4, the 2001 revision was intended to apply only to aerial devices manufactured after the effective date of that revision. In any case, the design requirements which include Section 4.3.4 “apply only to aerial devices manufactured after the effective date of this revision.” Consequently, the requirement for an additional control at the platform and lower controls to effect an emergency stop of the powered upper control function exists only for aerial devices manufactured after the effective date of the 2001 revision of A92.2. The 1990 revision of the standard required a control at the platform to effect an emergency stop of platform movement. Prior revisions had no requirement for an emergency stop control.*

A statement inadvertently placed in the “boilerplate” inside cover of the A92.2-2001 conflicted with Section 1.4 in the normative portion of the Standard. Application was, and remains addressed in Section 14. For information, later A92 standards have removed this point of confusion as will the next revision of A92.2.

Question

1. ANSI A92.2 Section 8.2.3 (Frequent Inspection and Test) “Items determined by the owner in accordance with the manufacturer’s recommendations for each specific aerial device shall be inspected for defects.