

**KENNEDY SPACE CENTER (KSC)**

**FALL PROTECTION STANDARD**

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**INCH-POUND**

**KSC-STD-S-0033**  
**MARCH 5, 2015**

**KENNEDY SPACE CENTER (KSC)**  
**FALL PROTECTION STANDARD**

**SAFETY AND MISSION ASSURANCE DIRECTORATE**

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National Aeronautics and  
Space Administration  
**John F. Kennedy Space Center**



**KSC-STD-S-0033**  
**MARCH 5, 2015**

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**FALL PROTECTION STANDARD**

Approved by:

--- Original Signed By ----

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**JOHN F. KENNEDY SPACE CENTER, NASA**

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## **ABBREVIATIONS, ACRONYMS, AND SYMBOLS**

ANSI	American National Standards Institute
ASSE	American Society of Safety Engineers
Attn	Attention
CFR	Code of Federal Regulations
FPPA	Fall Protection Program Administrator
FPWG	Fall Protection Working Group
HVAC	Heating, Ventilation, and Air Conditioning
KDP	Kennedy Documented Process
KNPR	Kennedy NASA Procedural Requirements
KSC	Kennedy Space Center
NASA	National Aeronautics and Space Administration
NPR	NASA Procedural Requirements
OPR	Office of Primary Responsibility
OSHA	Occupational Safety and Health Administration
mph	miles per hour
PM	Preventive Maintenance
PPE	Personal Protective Equipment
Rev	Revision
SSFPP	Site Specific Fall Protection Plan
STD	Standard
S&MA	Safety and Mission Assurance

## **KSC FALL PROTECTION STANDARD**

### **1. SCOPE**

- a. The provisions of this standard apply to all NASA civil servants and NASA contractors (including subcontractors, service providers, and construction contractors) at KSC, as specified in their contracts. These provisions are also applicable at offsite facility areas where KSC has operational responsibility. The provisions of this standard only apply to other organizations (e.g., commercial partners, other federal agencies, international parties, service providers, and tenants) as specified and described in written agreements.
- b. In the event of a conflict between the requirements set forth in this document and:
  - 1) Program or Agency requirements, the program or Agency requirements shall take precedence.
  - 2) Existing contract provisions, the contract provisions shall take precedence.
  - 3) Sub-tier documents, the provisions of this document shall take precedence.
  - 4) Other documents at an equivalent level (e.g., other Kennedy NASA Procedural Requirements (KNPR) documents), the respective document Office of Primary Responsibility (OPR) shall resolve the conflict on a case-by-case basis and provide appropriate guidance.
- c. In the event of a conflict between the requirements set forth in this document and other applicable documents/contract provisions, the KSC Director of Safety and Mission Assurance (S&MA) shall make the final determination.
- d. In this standard "shall" denotes a mandatory requirement, "may" or "can" denotes a discretionary privilege or permission, "should" denotes a good practice, and "will" denotes an expected outcome.

### **2. APPLICABLE DOCUMENTS**

The following documents form a part of this document to the extent specified herein. When this document is used for procurement, including solicitations, or is added to an existing contract, the specific revision levels, amendments, and approval dates of said documents shall be specified in an attachment to the Solicitation/Statement of Work/Contract.

## 2.1 Governmental

### Source Organization

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction
NPR 8715.3	NASA General Safety Program Requirements
KNPR 8715.3-1	KSC Safety Procedural Requirements, Volume 1, Safety Procedural Requirements for Civil Servants/NASA Contractors
KNPR 8715.7	KSC Construction Contractor Safety and Health Practices Procedural Requirements

(Copies of specifications, standards, drawings, and publications required by suppliers, in connection with specified procurement functions, should be obtained from the procuring activity or as directed by the Contracting Officer.)

## 2.2 Non-Governmental

### Source Organization

ANSI/ASSE Z359	Fall Protection Code
ANSI/ASSE A10.8	Scaffolding Safety Requirements

Applications for copies should be addressed to:

ANSI Attn: Customer Service Department  
25 W 43<sup>rd</sup> Street, 4<sup>th</sup> Floor, New York, NY, 10036

## 2.3 Standards Traceability

The following numerical references (e.g., <sup>1,2,3,4,5,6</sup>) were used to denote from what sources this document's requirements/definitions came. Because requirement/definition language can differ between denoted sources, the language chosen in this document may not be verbatim with the text of each document source referenced and may be a composite from several sources.



Numerical Reference	Requirement/Definition Origin
(1)	29 CFR 1910, OSHA General Industry
(2)	29 CFR 1926, OSHA Construction
(3)	NPR 8715.3, NASA General Safety Program Requirements
(4)	ANSI/ASSE Z359 Series - Fall Protection Codes
(5)	KSC Fall Protection Working Group (FPWG)
(6)	ANSI/ASSE A10.8, Scaffolding Safety Requirements

### 3. DEFINITIONS

For the purpose of this document, the following definitions shall apply.

<b>Administrative Controls</b>	Employer mandated safe work practices or procedures that are designed to prevent exposure to a fall by signaling or warning an authorized person to avoid approaching a fall hazard. <sup>(4)</sup>
<b>Anchorage (Certified)</b>	An anchorage for fall arrest, positioning, restraint or rescue systems that a qualified person certifies, by auditable record(s), to meet the ANSI Z359 criteria for a certified anchorage. <sup>(4,5)</sup>
<b>Anchorage (Engineered)</b>	A secure point of attachment for a personal fall arrest or restraint system that is capable of supporting 5000 pounds per person (exception is a fall restraint system which requires an anchorage of 1000 pounds) or designed under the supervision of a qualified person with a safety factor of at least two (2). Engineered anchorages may also be “certified anchorages” if they meet the above definition for an “Anchorage (Certified)”. <sup>(5)</sup>
<b>Anchorage (Non-Engineered)</b>	A secure point of attachment for a personal fall arrest or restraint system that is assumed to be capable of supporting 5000 pounds per person (exception is a fall restraint system which requires an anchorage of 1000 pounds) for which no engineering calculations have been performed. <sup>(5)</sup>
<b>Authorized Person (User)</b>	Employee trained & certified to use fall protection (fall restraint and arrest equipment, administrative controls) in performance of their work and trained and certified to use fall protection personal protective equipment (PPE) and systems. <sup>(2, 4, 5)</sup>

<b>Certified</b>	An act or process resulting in documentation that determines and attests to criteria that meet the requirement of an American National Standard. Such act or process may be carried out by testing or applying proven analytical methods, or both, under the supervision of a qualified person or entity. <sup>(4)</sup>
<b>Certification</b>	The process to determine that criteria established by a designated standard have been met and the documentation that records that the criteria were met. The process includes testing and/or analysis and is performed under the supervision of a qualified trainer or entity. <sup>(5)</sup>
<b>Competent Person</b>	Employee trained and certified in fall protection who is capable of identifying hazards, has the authority to take corrective actions, is knowledgeable of applicable regulations, standards, equipment, and systems. <sup>(1, 2, 4, 5)</sup>
<b>Competent Person Trainer</b>	A person in possession of a recognized formal training certificate from an industry recognized trainer, training center, or an equivalent OSHA training program, who has successfully demonstrated their extensive knowledge and experience to perform competent person training. <sup>(4, 5)</sup>
<b>Competent Safety Monitor</b>	Person trained in duties and responsibilities of performing in the position of Safety Monitor. <sup>(2, 5)</sup>
<b>Engineered Fall Protection System</b>	A fall protection system that has been designed and approved by a qualified person. <sup>(5)</sup>
<b>Fall Arrest System</b>	A system designed to stop one or more persons from striking a lower level or obstructions if a fall occurs. Fall Arrest Systems include the use of a full body harness, a connecting means, a suitable anchorage, planned rescue procedures, and proper training of all users. <sup>(2, 4, 5)</sup>
<b>Fall Protection Program</b>	Policy and guidelines established by an organization to protect all employees engaged in work activities exposing them to potential falls from elevation. The program covers all company facilities, jobsites, and employees of that company. The Fall Protection Program is used to develop the site-specific fall protection plan. <sup>(5)</sup>
<b>Fall Protection Program Administrator</b>	A person or team designated in writing to manage the Fall Protection Program. <sup>(4, 5)</sup>

<b>Fall Restraint System</b>	A fall protection system that prevents employees from reaching an unprotected edge. The system is comprised of a full body harness along with an anchor, connectors, and other necessary equipment. <sup>(4, 5)</sup>
<b>Infeasible</b>	It is impossible or more hazardous to perform the work using a conventional fall protection system, (i.e., guardrail system, or fall arrest/restraint system) or technologically or physically impossible to use any one of these systems to provide fall protection. <sup>(2, 4, 5)</sup>
<b>Leading Edge</b>	The edge of a floor, roof, or formwork for a floor or other walking/working surface (such as a deck) which changes location as additional floor, roof decking, or formwork sections are placed, formed, or constructed. A leading edge is considered to be an unprotected side and edge during periods when it is not actively and continuously under construction. <sup>(2, 5)</sup>
<b>Lifeline</b>	A component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage. <sup>(2, 4, 5)</sup>
<b>Low Slope Roof</b>	Low Slope Roof means a roof having a slope less than or equal to 4 feet in 12 feet (vertical to horizontal). <sup>(2)</sup>
<b>Metal Roof</b>	A roof with metal surface that engineering has determined is load bearing or is a structural support surface. <sup>(5)</sup>
<b>Non-Roof Work</b>	Preventive maintenance (PM), repair of equipment on roofs such as heating, ventilation, and air conditioning, (HVAC), lightning protection systems, rigging of fall protection systems, etc. <sup>(2, 5)</sup>
<b>Passive Fall Protection</b>	A system used to control fall hazards by means other than wearing personal protective equipment (PPE) and do not involve the actions of employees . Examples may include such items as guardrails, walls, covers, fences. <sup>(4, 5)</sup>
<b>Positive Fall Protection</b>	Fall protection by the use of a guardrail system or personal fall protection to include harness with a fall arrest/restraint system or the use of other means such as vehicle mounted platforms and/or scaffolding. <sup>(5)</sup>

<b>Prime System</b>	The first mechanism that prevents a person from falling. Typically, this is the person's balance, climbing skills, and the safety of the structure or platform that they are standing or working on. Fall Protection is a Secondary System of protection. <sup>(4, 5)</sup>
<b>Qualified Person</b>	A fall protection subject matter expert who has: 1) civil, mechanical, structural engineering degree or ready access to a person with said engineering degree, 2) a formal training certificate from an industry-recognized trainer, NASA-recognized trainer/training center, or an equivalent OSHA/ANSI compliant training program, and 3) successfully demonstrated their extensive knowledge and experience to perform structural design, evaluation, and approval of fall protection systems. <sup>(1, 2, 4, 5)</sup>
<b>Roof Work</b>	The hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, vapor barrier work, and leading edge work. <sup>(2, 5)</sup>
<b>Safety Monitoring System</b>	A system in which a competent monitor is responsible for recognizing and warning employees of fall hazards. <sup>(2, 5)</sup>
<b>Secondary System</b>	The "back-up" mechanism that protects a person if their Primary System fails. Secondary Systems include Guardrail Systems, Fall Restraint Systems, and Fall Arrest Systems. <sup>(2, 4, 5)</sup>
<b>Site Specific Fall Protection Plan (SSFPP)</b>	A plan developed specifically for the site where work at heights is performed, compliant to applicable sections of 1926.502. <sup>(2, 5)</sup>
<b>Steep Slope Roof</b>	Steep Slope Roof means a roof having a slope more than 4 feet in 12 feet (vertical to horizontal). <sup>(2, 5)</sup>
<b>Tower</b>	Free-standing or guy-supported structure that is essentially vertical, often with access via vertical ladder or ships ladder; commonly used to support antennas, boresite instruments, weather instruments, cameras, radars, lightning protection systems, or provide water storage. <sup>(5)</sup>
<b>Tower Climber</b>	Employee trained and certified as a Tower Climber and who, by possession of formal training certificate from an industry recognized trainer, training center, or an equivalent ANSI/ASSE/OSHA training program, has successfully demonstrated their extensive knowledge and experience to perform tower climbs. <sup>(5)</sup>
<b>Tower Climbing</b>	The active ascending or descending to access elevated work positions on towers, often requiring advanced free climbing skills and stamina, on structures often not specifically designed to facilitate climbing. <sup>(5)</sup>

## **4. GENERAL REQUIREMENTS**

### **4.1 Policy Statement**

- a. Persons involved in activities on any walking/working surface where a person is exposed to a fall to a lower level of four (4) feet or greater shall be provided with fall protection.<sup>(1, 3)</sup>
- b. Fall arrest and restraint components, and systems that are commercial off-the-shelf, shall be supplied with complete installation and operation instructions, and those instructions shall be followed. Only a qualified person may change the instructions, and those changes shall be documented prior to use.<sup>(5)</sup>
- c. Safety nets shall not be used for fall protection at KSC.<sup>(5)</sup>
- d. Construction contractors working at KSC shall, as required by contract, submit a Site Specific Fall Protection Plan (SSFPP) that addresses project specific fall hazards, fall protection methods, and rescue. This SSFPP will become a part of the contractor's overall Safety and Health Plan, which addresses the contractor's approach to implementing the requirements of this standard and all applicable Occupational Safety and Health Administration (OSHA) regulations. A sample SSFPP is provided in Appendix A.<sup>(5)</sup>

### **4.2 Roles, Responsibilities, and Training**

#### **4.2.1 Fall Protection Program Administrator (FPPA)**

- a. KSC NASA and contractors/subcontractors, who are required to have a fall protection program, shall appoint in writing a Fall Protection Program Administrator (FPPA) and/or team.<sup>(3)</sup>
- b. The FPPA shall have the skills, experience, and abilities to ensure effective management of the employer's fall protection program. This would include a working knowledge of current fall protection regulations, standards, fall protection equipment, and systems.<sup>(3, 4, 5)</sup>
- c. The FPPA shall ensure the development, implementation, and management of the employer's fall protection program.<sup>(3, 4, 5)</sup>
- d. The FPPA is responsible for ensuring that fall protection equipment procured is included in the training of competent, authorized, and applicable qualified persons.<sup>(4, 5)</sup>

- e. The FPPA shall ensure an annual review and audit of the fall protection program is performed to address the use of new technology, regulations, industry practices, and to ensure compliance.<sup>(3, 4)</sup>
- f. FPPA training shall include, at a minimum:<sup>(4, 5)</sup>
  - 1) Competent person training.<sup>(4, 5)</sup>
  - 2) Developing and maintaining a managed fall protection program.<sup>(4)</sup>
  - 3) Fall protection system selection.<sup>(4)</sup>
  - 4) Ensuring development of equipment purchase controls.<sup>(4)</sup>
  - 5) Understanding of written fall protection and rescue procedures and plans.<sup>(4, 5)</sup>
  - 6) Understanding of fall protection engineering system standards.<sup>(4, 5)</sup>
  - 7) Fall protection training.<sup>(4, 5)</sup>
- g. The FPPA shall remain current with changing requirements, laws, and new fall protection systems.<sup>(3, 4)</sup>
- h. The FFPA shall formally identify competent and qualified persons.<sup>(5)</sup>

#### **4.2.2 Qualified Person**

- a. Qualified person(s) shall be formally identified by the Fall Protection Program Administrator. A qualified person shall support the Fall Protection Program Administrator, competent, and authorized persons, and the fall protection program, by supplying technical information and serving as a subject matter expert.<sup>(4, 5)</sup>
- b. Qualified person(s) shall be consulted and make the final determination when the Authorized and/or competent person cannot select an appropriate non-engineered anchorage for a fall arrest or fall restraint system.<sup>(4, 5)</sup>
- c. Qualified person(s), with structural analysis expertise or support, shall design any permanent, engineered anchorage, fall arrest system, fall restraint system, or lifeline (vertical and/or horizontal); the design shall be documented and maintained.<sup>(1, 2, 4, 5)</sup>
- d. Qualified person(s) shall be familiar with fall protection practices, equipment, regulations, engineering principles, and the effects that permanent fall protection systems have on the surrounding structure.<sup>(4, 5)</sup>

- e. Qualified person(s) shall be trained by an industry recognized trainer, training center, or locally developed training program equivalent to ANSI/ASSE and OSHA compliant training program requirements. Qualified person education and training shall include at least:<sup>(3, 5)</sup>
- 1) Engineering degree, i.e., civil, mechanical, structural or ready access to such engineering support.<sup>(5)</sup>
  - 2) Fall hazard identification, elimination, and control methods.<sup>(4)</sup>
  - 3) Applicable fall protection regulations.<sup>(4)</sup>
  - 4) Responsibilities and requirements in accordance with ANSI /ASSE standards and OSHA regulations.<sup>(4, 5)</sup>
  - 5) Inspection of equipment components and systems.<sup>(4)</sup>
  - 6) Selecting fall protection systems.<sup>(4)</sup>
  - 7) Developing engineering system standards.<sup>(4)</sup>
  - 8) Determining system clearance requirements.<sup>(4)</sup>
  - 9) Designing and selecting anchorages.<sup>(4)</sup>
  - 10) Determining when fall protection systems are infeasible.<sup>(4)</sup>
  - 11) Designing new and evaluating existing horizontal lifelines.<sup>(4)</sup>
  - 12) Assessing system component compatibility.<sup>(4)</sup>
  - 13) Fall protection system assessments and determining when a system is unsafe.<sup>(4)</sup>
  - 14) Analyzing various anchorages.<sup>(4)</sup>
  - 15) Developing written fall protection procedures and rescue procedures.<sup>(4)</sup>
  - 16) Determining swing fall arresting forces.<sup>(4)</sup>
  - 17) Determining potential arresting forces.<sup>(4)</sup>
  - 18) Investigating fall protection related accidents/incidents/near misses.<sup>(4, 5)</sup>

### 4.2.3 Competent Person

- a. Competent person(s) shall be formally identified by the Fall Protection Program Administrator, and are responsible for the immediate application of fall protection work where fall protection is required.<sup>(3, 4)</sup>
- b. Competent person(s) shall have work experience related to the application where fall protection is required.<sup>(4)</sup>
- c. Competent person(s) shall have the ability to identify unsafe conditions or practices as they relate to fall protection during the course of the work and have the authority to take prompt corrective action.<sup>(4)</sup>
- d. Competent person(s) shall be available to authorized persons when fall protection situations arise.<sup>(4)</sup>
- e. Competent person(s) shall assist authorized persons, when requested, to ensure that non-engineered anchorages selected are acceptable, fall protection system(s) will work as intended, fall protection equipment is inspected prior to use, fall protection systems are used in accordance with manufacturer recommendations, and that OSHA requirements, qualified person designs, local policy, and rescue plans are in effect.<sup>(4)</sup>
- f. Competent person education and training shall be administered by an industry recognized trainer, training center, or locally developed training program equivalent to ANSI/ASSE and OSHA compliant training, and shall include the following as a minimum:<sup>(3, 5)</sup>
  - 1) Use of all types of equipment and systems in locations where the authorized persons work, including inspecting systems prior to use.<sup>(4)</sup>
  - 2) Installation, component compatibility, estimating free fall distances, total required clearance, dismantling, storage, and the common hazards associated with each system.<sup>(4)</sup>
  - 3) Fall hazard elimination and controls methods.<sup>(4)</sup>
  - 4) Applicable fall protection regulations.<sup>(4)</sup>
  - 5) Development of written fall protection procedures and plans.<sup>(4)</sup>
  - 6) Understanding of fall protection engineering system standards.<sup>(4)</sup>
  - 7) The responsibilities under the ANSI/ASSE Standards and OSHA regulations.<sup>(1, 2, 4)</sup>
  - 8) Detailed inspection of equipment components and systems.<sup>(4)</sup>



- 9) Fall protection system assessments and determining when a system is unsafe.<sup>(4)</sup>
  - 10) Fall protection rescue procedures.<sup>(4)</sup>
  - 11) The selection and use of non-engineered anchorages.<sup>(4)</sup>
  - 12) The arresting force and the total required clearance of the system.<sup>(4, 5)</sup>
- g. Competent person(s) shall be retrained a minimum of once every two (2) years in fall protection.<sup>(4)</sup>
- h. Non-engineered anchorages can be selected by a competent person, provided the competent person can predict the arresting force (<900 pounds), support of at least 5,000 pounds per employee attached, swing hazards, and the total required clearance of the system.<sup>(5)</sup>

#### **4.2.4 Authorized Person (User)**

- a. Authorized persons shall protect themselves by applying fall protection practices during the course of the work. When the nature of the work, the workplace, or the methods of control change to an extent that prior training is not adequate, the authorized person shall be retrained. Retraining is also required when it becomes apparent to supervision, a competent person, and/or qualified person that the authorized person does not have the required level of skill and knowledge or is not following the required means and methods.<sup>(4, 5)</sup>
- b. The authorized person shall not conduct any work where required fall protection is not in place or the performance of the fall protection system is unpredictable. In these situations, the competent person for that work or area shall be notified in order to determine the appropriate action to be taken.<sup>(5)</sup>
- c. Every authorized person shall receive formal classroom training in fall protection from a competent person trainer or qualified person trainer before they use fall restraint systems, fall arrest systems, or administrative controls or are exposed to a fall hazard. Training for authorized persons shall include:<sup>(2, 4, 5)</sup>
  - 1) How to select a non-engineered anchorage that will support 5,000 pounds.<sup>(2, 4, 5)</sup>
  - 2) How to inspect, anchor, assemble, and use the fall protection equipment commonly used in locations where they work.<sup>(1, 2, 4)</sup>
  - 3) Fall hazard recognition.<sup>(2, 4)</sup>

- 4) Fall hazard elimination and control methods.<sup>(2, 4)</sup>
  - 5) Applicable fall protection regulations.<sup>(1, 2, 4)</sup>
  - 6) Their responsibilities under OSHA regulations.<sup>(1, 2, 4)</sup>
  - 7) How to use written fall protection procedures.<sup>(2, 4)</sup>
  - 8) Inspection of equipment components and systems before use.<sup>(1, 2, 4)</sup>
  - 9) Fall protection rescue procedures.<sup>(2, 4)</sup>
  - 10) Limits of authority relevant to fall protection.<sup>(2, 4)</sup>
  - 11) The use of applicable fall protection equipment, ensuring equipment meets OSHA and ANSI/ASSE Fall Protection Standards, local fall hazards, and the employers' local equipment and systems.<sup>(1, 2, 4)</sup>
  - 12) The arresting force and the total required clearance of the system.<sup>(1, 2, 5)</sup>
- d. The authorized person shall remain current with changing requirements and shall be retrained a minimum of once every two (2) years.<sup>(4)</sup>

## **5. DETAILED REQUIREMENTS**

### **5.1 Fall Hazard Controls**

The following controls, in order of preference, shall be used:

- a. Elimination and Substitution: The specific work that created the fall hazard should be evaluated to determine if a change in process, area, technology, or equipment would eliminate the fall hazard.<sup>(4, 5)</sup>
- b. Passive Fall Protection: Physical barriers between the worker and the fall hazard can be established so the barrier prevents the worker from falling (e.g., guardrails, vertical netting, covers, etc.).<sup>(4, 5)</sup>
- c. Fall Restraint: Fall protection personal protective equipment can be used to assemble a system (permanent or temporary) that will prevent a worker from reaching the fall hazard.<sup>(4, 5)</sup>

- d. Fall Arrest: Fall protection personal protective equipment can be used to assemble a system (permanent or temporary) that allows a worker to fall, but arrests the fall safely before the worker strikes the ground or surrounding structure.<sup>(4, 5)</sup>
- e. Administrative Controls: Administrative controls are reserved for situations where all other fall protection methods are deemed infeasible. <sup>(4, 5)</sup>

## 5.2 Fall Protection System Design and Performance

### 5.2.1 Fall Restraint Systems

- a. In addition to OSHA requirements, Fall Restraint Systems shall be designed according to ANSI/ASSE; anchorage points shall be able to hold a static load of 1,000 pounds.<sup>(2, 4, 5)</sup>
- b. Waist belts shall not be used for fall restraint.<sup>(5)</sup>

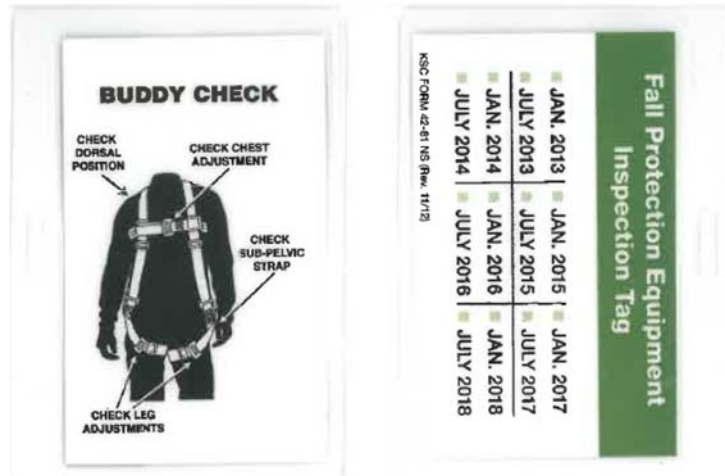
### 5.2.2 Fall Arrest Systems

Fall Arrest Systems shall be designed to meet the requirements set forth in the applicable OSHA subpart(s). ANSI/ASSE Fall Protection Standards shall be followed, except where deemed inappropriate with rationale by a qualified person. Fall arrest systems shall be used and installed to reduce the free fall distance.<sup>(1, 2, 4, 5)</sup>

- a. When using fall arrest systems, the free fall distance of the system shall not: 1) exceed six (6) feet, 2) allow the employee to contact an obstruction or lower level, or 3) exceed 900 pounds maximum arresting force, except when designed by a qualified person. In a situation where limiting the free fall to 6 feet is infeasible, free fall shall be limited to the extent possible and an arresting force of 1,800 pounds shall not be exceeded. In no case shall the manufacturer instructions be violated without the approval and documentation of a qualified person.<sup>(1, 2, 4, 5)</sup>
- b. If the system is being installed for workers other than the installer, a procedure shall be provided to ensure that the authorized user can determine that the system is approved for use.<sup>(2, 5)</sup>
- c. Acceptable anchorage structure shall be capable of supporting 5,000 pounds per person or designed by a qualified person with a safety factor of two (2). If the anchorage is questionable, the system shall not be used unless approved by a competent or qualified person.<sup>(1, 2, 4, 5)</sup>

### 5.3 Fall Protection Equipment

- a. All new fall protection equipment shall meet the applicable ANSI/ASSE Z359 code current at the time of purchase.<sup>(5)</sup>
- b. Fall protection equipment shall be used according to manufacturer instructions unless the changes are made by a qualified person, documented prior to use, and maintained until the equipment is removed.<sup>(4, 5)</sup>
- c. Equipment not designed for fall protection use shall not be used without prior approval of a qualified person, documented, and be labeled “For Fall Protection Use Only.”<sup>(5)</sup>
- d. Fall protection equipment shall meet all OSHA, applicable ANSI/ASSE, and manufacturer requirements for use and storage.<sup>(1, 2, 4, 5)</sup>
- e. All personal fall protection equipment shall be inspected by the user before each use and detailed inspected by a competent person (fall protection) annually in accordance with applicable regulatory standards or per manufacturer recommendations, whichever is more stringent.<sup>(1, 2, 4)</sup>
- f. Detailed inspections of fall protection equipment shall be documented and meet the following criteria:<sup>(4)</sup>
  - 1) All fall protective equipment, including safety harnesses, drop lines, lifelines, fall arrest, self-retracting lanyards, as well as positioning lanyards, ladder safety climb, rigid rail sleeves (e.g., skates, rope grabs), and engineered anchorages, shall be inspected to the manufacturer’s or approved engineering specifications. For engineered anchorages, qualified persons shall consider the design, type, location, size of structural members, the type of anchorage connector, the environment, and weather conditions to determine how often anchorage systems shall be detailed inspected and recertified.<sup>(4, 5)</sup>
  - 2) All equipment shall have a manufacturer’s serial number on it (e.g., tag, webbing) or it shall be serialized by using a method not destructive to the equipment.<sup>(5)</sup>
  - 3) A documented equipment tracking system that uses the method identified from 5.3.f 2) above shall be used.<sup>(5)</sup>
  - 4) Maintenance servicing shall only be completed by the manufacturer’s approved service technician, trained to repair and service their equipment.<sup>(5)</sup>
- g. Any fall protection equipment that does not have an inspection tag or equivalent inspection tracking placard, or is past due for detailed inspection, shall be immediately removed from service. See figure 1 for an example of a typical inspection tag.<sup>(5)</sup>



**FIGURE 1 – A TYPICAL INSPECTION TAG (KSC FORM 42-81 NS)**

## **5.4 Fall Hazards and Assessments**

### **5.4.1 Fall Protection for Walking/Working Surfaces with Unprotected Edge/Opening or other Fall Potential of Four (4) Feet or Greater to Surface Below**

- a. If a vehicle or trailer is used as a walking/working surface other than normal operational modes such as operation, maintenance, transport, loading, off-loading, the need for fall protection shall be evaluated by a competent person and approved prior to use.<sup>(5)</sup>
- b. If work requires employees to be closer than six (6) feet from any unprotected edge or opening, positive fall protection (guardrail system or personal fall protection to include full body harness with arrest or restraint system) or the use of other means such as vehicle mounted work platforms and/or scaffolding is required.<sup>(2, 5)</sup>

**NOTE:** Users must be careful that a Secondary System DOES NOT become the Primary System. Be cautious when using guardrails, or chains, or cable systems as a secondary means of positive fall protection. Such mechanisms may be subject to failure due to wear and tear and/or faulty design, construction, installation, and testing. Personnel shall not lean on guardrails, gates, or chains.<sup>(5)</sup>

### **5.4.2 Horizontal Life Lines**

Commercially available ANSI/ASSE compliant temporary horizontal life lines shall be installed per manufacturer's written instructions. Only a qualified person may change the instructions,

and those changes shall be documented prior to use. If not commercially designed, then a qualified person shall design and supervise installation.<sup>(5)</sup>

### 5.4.3 Tower Climbing Operations

Prior to tower climbing, the following shall be considered and addressed: weather conditions, coordination with Fire Rescue, documentation of the rescue plan, safe transport of equipment/tools, tower energy sources have been safed, and at least two (2) climbers are present and trained to climb towers.<sup>(5)</sup>

### 5.4.4 Roofs - Fall Protection Requirements

- a. Non-Roof Work on Roofs (Metal and Non-Metal)
  - 1) Positive fall protection, such as personal fall arrest or restraint systems, shall be used for all work on steep roofs.<sup>(2,5)</sup>
  - 2) Work on roofs with a pitch less than 4:12, low-sloped or flat, above four (4) feet:
    - a) Positive fall protection shall be used from six (6) feet to an unprotected edge.<sup>(2,5)</sup>
    - b) A warning line shall be used from six (6) feet to 15 feet of an unprotected edge.<sup>(2,5)</sup>
    - c) A warning line is not required 15 feet or more of an unprotected edge.<sup>(5)</sup>
- b. Roof Work on Roofs
  - 1) Metal Roof: Positive fall protection shall be used at all times while performing metal roof work regardless of slope.<sup>(2,5)</sup>
  - 2) Non metal roofs:
    - a) Low-sloped or flat roofs:
      1. Positive fall protection shall be used from six (6) feet to an unprotected edge.<sup>(2,5)</sup>
      2. In lieu of positive fall protection, a warning line and Safety Monitor System may be used from six (6) feet to 15 feet of an unprotected edge.<sup>(5)</sup>
        - i. The Safety Monitor shall be on the same walking/working surface as employees being monitored; is to be within visual sighting distance of the employees being monitored; is to be

close enough to communicate orally with the employees being monitored; shall not have responsibilities which could take the monitoring attention from the monitoring function.<sup>(2)</sup>

3. In lieu of positive fall protection, a warning line may be used without a monitor from 15 feet or more to an unprotected edge.<sup>(5)</sup>

b) Positive fall protection shall be used for all work on steep roofs.<sup>(2, 5)</sup>

c. Roof Inspections and Assessments:

1) Employees needing to access roofs for the sole purpose of performing roof inspections or assessments may do so during non-construction activities, including periods prior to the actual start of construction work or after all construction work has been completed and shall follow the policy for “Non Roof Work on Roofs”.<sup>(2, 5)</sup>

2) If access is required during construction activities, the policy for “Roof Work on Roofs” applies.<sup>(2, 5)</sup>

## **5.5 Extensible / Articulating Boom Lifts or Platforms**

When using extensible/articulating boom lifts or platforms, an energy-absorbing length-adjustable lanyard and full body harness shall be used. The lanyard shall be connected to an approved anchor point in the basket and adjusted in length in such a manner that it reduces the possibility of the worker falling over the guardrails, yet permits the work to be accomplished.<sup>(1, 2, 5)</sup>

## **5.6 Scaffolds**

a. Scaffold platforms, where the potential for a fall four (4) feet or greater exists, shall be protected by the use of fall protection systems (guardrails, fall arrest, and/or fall restraint). If these cannot be accomplished, a fall protection plan shall be developed.<sup>(2, 5, 6)</sup>

b. Fall protection systems shall be used during erection, dismantlement, alteration, modification and use whenever feasible, as determined by competent persons. Such systems shall comply with appropriate standards. If fall protection systems are infeasible, a fall protection plan shall be developed.<sup>(2, 5, 6)</sup>

## **5.7 Wind Policy**

a. Organizations shall adhere to outdoor work restrictions as follows:

- 1) During steady state winds of 18 knots [20.7 miles per hour (mph)] or greater or gusts of wind 22 knots (25 mph) or greater, no erection of or work on floats, spiders, and /or scaffolding, nor lifting of personnel in buckets, crane baskets, etc. shall occur.<sup>(5)</sup>
- 2) During steady state winds of 30 knots (34.5 mph) or greater or gusts of wind 35 knots (40.3 mph) or greater, no work shall occur on:<sup>(5)</sup>
  - a. facility roofs;
  - b. structure tops;
  - c. unprotected edges;
  - d. outside guard rails

## 6. NOTES

The provisions in this standard do not supersede more stringent applicable laws or standards.

The sample Site Specific Fall Protection Plan in Appendix A is optional and is offered for ease of use. Its use is not mandatory.

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## APPENDIX A. SAMPLE SITE SPECIFIC FALL PROTECTION PLAN

### 1. General

- a. COMPANY NAME shall identify and mitigate all work-related fall hazards and has established methods to protect the employees from those fall hazards.
- b. Fall protection is required at all times within six (6) feet of an unprotected edge with a fall hazard of four (4) feet or more. Where required, full body harnesses meeting OSHA and ANSI/ASSE requirements shall be used.
- c. COMPANY NAME shall have a Fall Protection Program Administrator (FPPA) or team, name competent person(s) (fall protection), and use a qualified person(s) (fall protection), as required, by the applicable OSHA regulations and OSHA Standards. On this project, these designated persons are:
  - (1) Fall Protection Program Administrator: EMPLOYEE NAME
  - (2) Fall protection competent person(s): EMPLOYEE NAME(S)
  - (3) Fall protection qualified person(s): EMPLOYEE NAME(S)
- d. The FPPA shall identify the competent and qualified persons listed above.

### 2. Training

- a. All employees working at elevations shall receive training in recognition of fall hazards, hazard mitigation, and the proper use and inspection of fall protection equipment from a competent person (fall protection).
- b. The employee training, described above, shall be certified in writing by the employer.
- c. The latest certification documentation shall be maintained by the employer and include the name of the employee, the date of the training, areas trained in, and the signature of the training instructor and/or the employer.
- d. The designated competent person (fall protection), conducting training, shall be qualified in the following areas:
  - (1) The nature of fall hazards in the work area.
  - (2) The correct procedures for installing, inspecting, and disassembling fall protection systems.
  - (3) The use and operation of fall protection systems to be used.
  - (4) Each employee's role in the safety monitoring system, if this system is to be used.
  - (5) The limitations on the use of mechanical equipment on low-slope roofing jobs.

- (6) The correct procedures for the handling and storage of equipment and materials and installation of overhead protection.
  - (7) Each employee's role in this fall protection plan.
  - (8) The OSHA fall protection standard.
- e. If COMPANY NAME verifies and accepts training provided by another employer, the certification shall indicate the date COMPANY NAME determined the prior training was adequate rather than the date the training was performed.

### **3. Retraining of Employees**

- a. Employees suspected of not having the understanding or skills required shall be retrained.
- b. Other circumstances that require retraining include:
  - (1) Changes in the workplace that make earlier training obsolete.
  - (2) Changes in the types of fall protection systems used.
  - (3) Observed inadequacies in an employee's use or understanding of fall protection systems.

### **4. Fall Protection Equipment**

- a. All new fall protection equipment shall meet the applicable ANSI/ASSE Z359 code at the time of purchase.<sup>(5)</sup>
- b. Fall protection equipment shall be used according to manufacturer instructions. Only a qualified person may change the instructions, and those changes shall be documented prior to use and maintained until the equipment is removed.<sup>(5)</sup>
- c. Equipment not designed for fall protection use shall not be used without prior approval of a qualified person, documented, and be labeled "For Fall Protection Use Only."<sup>(5)</sup>
- d. Fall protection equipment shall meet all OSHA, applicable ANSI/ASSE, and manufacturer requirements for use, and be properly stored when not in use.
- e. All fall protection equipment shall be inspected by the user before each use and detailed inspected by a competent person (fall protection) annually in accordance with applicable regulatory standards or per manufacturer's recommendations, whichever is more stringent.
- f. Detailed inspections of fall protection equipment shall be documented and meet the following criteria:
  - (1) All fall protective equipment to include safety harnesses, drop lines, lifelines, fall arrest Self-retracting lanyards, as well as positioning lanyards, ladder safety climb, and rigid rail sleeves (e.g., skates, rope grabs) shall be inspected to the manufacturer's or approved engineering specifications.

- (2) All equipment shall have a manufacturer's serial number on it (e.g., tag, webbing) or it shall be serialized by using a method not destructive to the equipment.
- (3) Maintenance servicing shall only be completed by the manufacturer's approved service technician, trained to repair and service their equipment.
- (4) A documented equipment tracking system that uses the method identified from 4.f (2) above shall be used.
- (5) Any fall protection equipment that is missing an inspection tag or is past due for annual inspection shall be immediately removed from service.

**5. List of Attachments**

- a. List of identified fall hazards.
- b. List of all protection methods to be used to protect employees from the identified fall hazards.
- c. List of controls, limitations, constraints, and procedures to be used with the fall protection methods.
- d. Site specific fall rescue plan
- e. List of employees trained and authorized to work in areas where fall protection is required.
- f. Written certification of fall protection training for each employee.
- g. A signature page where every employee authorized to work under the plan signs to indicate that they have read and understood the plan.