



National Aeronautics and  
Space Administration

**John C. Stennis Space Center**  
Stennis Space Center, MS 39529-6000

**SCWI-8715-0003 Rev. H-2**  
**March 24, 2024**

## **John C. Stennis Space Center Fall Protection Program**

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**Approved by**

*Original Signature on File*

*April 27, 2021*

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**Gary Benton**  
**Director, Safety and Mission Assurance Directorate**

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**Date**

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## Document History Log

Status/Change/ Revision	Change Date	Originator/ Phone	Description
Basic	09-01-2008	K. Volante 8-2834	Removed from SSP 8715-0001, Safety and Health Handbook and revised to include the guidance for safety Fall protection systems.
A	01-15-2010	M. Rewis 8-2663	Changed POC. Annual review and revision.
B	12-2010	M. Rewis 8-2663	Section 5.1.1 Minor terminology change was made to reflect “from” a working surface, vice “or” a working surface. Section 5.1.2 The variety of fall protection was made more specific. Section 6.4 A reference to the OSHA Construction regulation was added. General admin changes.
C	01/15/2012	A. Rice 8-2972	Section 4.2 added time frame for corrective action, Section 5.1.2 updated FOSC Crib location, changed 10 feet to 6 feet to be consistent with other SMA Documents.
D	08/03/2012	A. Rice 8-2972	Section 4.2 c. Updated prime contractors responsibility to be consistent with OSHA requirements.
D1	01/13/2014	S.Woolridge 8-2762	Administrative change
E		R. Gargiulo 8-3842, M. Rewis 8-2663	4.2.b, Description of Fall Hazard Hierarchy added; 4.2.k/4.3.c, added reference to construction specific documents, and use of equal such documents; 4.3.e, added the Fall Protection points of contact requirements; 6.1, provided clarification on use of fall protection on ladder; General change, added requirements for certified and approved anchorage points.

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F	04/20/2016	Mr. Rewis 8-2663	4.2.k, Clarification added for use of fall protection documents in a construction setting versus that of general industry; 5.1.2.c, Clarified the conditions as to when fall protection must be used when a fall to the next level presents itself for ladder staged work; 5.1.2.k, Clarified the use of reversible Self-Retracting Lifelines; 6.1.k, Removed “pipe” and “grating” from unapproved anchorages. These may be used with proper authorization; General administrative changes related to references to the FOSC contract.
G	09/05/2019	D.Dubuisson	3.0 Updated OSHA references and added ANSI standard; 4.2.k Clarified the use of construction and general industry electronic audit forms; 4.2.l Defined periodically, changed periodically to annual. 4.3.c Clarified NASA Delegate construction surveillance opportunities; Added 4.3.d Changed the word Conduct to Verify (Corrective action for internal audit finding 1891)
H	03/24/2021	D. Dubuisson	Sections 3.0 Updated references, 4.2. Added annual record of inspection, SSC Forms clarification, added internal audits annually, 4.3 updated and clarified SSC Form use, 5.1.1 added fall protection within 4 feet requirement for roof skyline and leading edge, 5.1.2 updated OSHA requirements for fixed ladders 24 feet and over, updated scaffolding requirements per OSHA CFR 1926 Subpart L Scaffolds 1926.451, 6.1 added permanent anchorage requirements, and defined certified vs approved anchorage points, 6.5

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			Added Protection From Falling Objects per OSHA requirements, 7.1 Added re-training requirements, 8.0 Added SSC Forms, 10.0 Updated definitions
H-1	06/07/2021	D. Dubuisson	Added ANSI/ASSP Z359.2-2017 and NPR 8715.1 to Reference List.
H-2	01/04/2024	D. Dubuisson	Admin Changes

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## 1.0 PURPOSE

This Stennis Common Work Instruction (SCWI) provides the general operating requirements for protecting personnel and preventing injuries/death due to the hazards of falling from heights and falling off, onto or through working levels, as well as including guidelines for protection from falling objects. This SCWI also provides guidance for determining when visitors are required to wear fall protection equipment.

## 2.0 APPLICABILITY

This SCWI applies to all National Aeronautics and Space Administration (NASA), NASA Direct Contractor personnel, NASA Direct Construction Contractors and their visitors working at John C. Stennis Space Center (SSC). It is applicable to all activities/operations, at SSC in which personnel may be exposed to the risks of falling off, onto or through working levels as well as the hazards associated with falling objects.

## 3.0 REFERENCES

All references are assumed to be the latest version unless otherwise indicated.

- a. ANSI-ASSP Z359-1 *The Fall Protection Code*
- b. ANSI-ASSP Z359-2 *Minimum Requirements for a Comprehensive Managed Fall Protection Program*
- c. ANSI-ASSP Z359-6 *Specifications and Design Requirements for Active Fall Protection Systems*
- d. NPR 8715.1 *NASA Safety and Health Programs*
- e. OSHA 29 CFR 1910 *Occupational Safety and Health Standards General Industry*
- f. OSHA 29 CFR 1910.28 *Duty to Have Fall Protection and falling object protection*
- g. OSHA 29 CFR 1910.29 *Fall protection systems and falling object protection-criteria and practices*
- h. OSHA 29 CFR 1910.30 *Training requirements*
- i. OSHA 29 CFR 1910.135 *Head protection*
- j. OSHA 29 CFR 1910, *Subpart D, Walking/Working Surfaces*
- k. OSHA 29 CFR 1910, *Subpart F, Powered Platforms, Manlifts, and Vehicle-Mounted Work Platforms*
- l. OSHA 29 CFR 1926 *Occupational Safety and Health Standards Construction Industry*
- m. OSHA 29 CFR 1926, *Subpart L (Scaffolds)*
- n. OSHA 29 CFR 1926, *Subpart M, Fall Protection*
- o. OSHA 29 CFR 1926.105, *Safety Nets*
- p. OSHA 29 CFR 1926.501(b) *10 Roofing work on Low-slope roofs*
- q. OSHA 29 CFR 1926.502, *Fall Protection Systems, Criteria and Practices*

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- r. OSHA 29 CFR 1926.502 (e) Positioning device systems
- s. SCWI-3410-0003, *SSC Training/Certification Plan and Scheduling Report*
- t. SCWI 8715-0008, *SSC Construction Safety and Health Program*

## 4.0 RESPONSIBILITY

### 4.1 NASA Employees

NASA employees typically do not expose themselves to situations that would require the application of a fall protection program. However, should there be a need for fall protection for NASA employees, all applicable sections of this standard will apply.

### 4.2 NASA Direct Contractors and NASA Direct Construction Contractors

NASA Direct Contractors and NASA Direct Construction contractors shall:

- a. Ensure personnel are trained to recognize fall hazards and understand the basic Occupational Safety and Health Administration (OSHA) and American National Standards Institute (ANSI) standards applicable to the area of fall protection.
- b. Initiate a Fall Protection Hierarchy which includes Elimination, Guardrails, Fall Restraint, Fall Arrest and Other Acceptable Systems, with Elimination of the Fall Hazard as the preferred method and Other Acceptable Systems as least desired.
- c. Ensure employees are trained in the Fall Protection Hierarchy, proper use, wear, inspection and maintenance of fall protection equipment.
- d. Develop and implement a written fall protection program in accordance with the requirements in this document. The program must include the necessary employee training.
- e. Develop and implement an annual comprehensive record of inspection of all fall protection equipment and rescue equipment by a competent person or a competent rescuer to include brand, model, type and identifying information.
- f. Review fall protection plans of the sub-contractors hired to ensure compliance with all applicable standards.
- g. Have and submit fall protection plans as a part of their company safety plan for review by the appropriate safety office before fall protection is to be utilized on a jobsite. Plan shall be made specific to SSC.
- h. Provide a fall protection section, unique to fall hazards they may encounter on the SSC

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jobsite and the proposed means of protecting workers from these hazards.

- i. Ensure an activity hazard analysis is conducted addressing fall hazards that employees may be exposed to and the mitigation of these hazards. The activity hazard analysis and rescue plan shall be completed prior to each job/task requiring the use of fall protection.
- j. Ensure that the training of employees on fall arrest systems cover the topics of application limits, proper anchoring and tie-off techniques, estimation of free fall distance, including determination of deceleration distance, and total fall distance to prevent striking a lower level, methods of use, inspection and storage as well as manufacturer's recommendations.
- k. Ensure that all personal fall protection equipment and personal fall arrest equipment are maintained and kept in a serviceable condition. Any fall protection equipment found to be un-serviceable shall be taken out of service and replaced.
- l. Conduct inspections/field audits of employees, sub-contractor and construction contractor fall protection work to ensure compliance with federal regulations and compliance with this document using:
  - Form SSC-879, *SSC Construction Safety Weekly Inspection*;
  - Form SSC-852, *SSC Construction Safety Job Site Audit*, (for use in a construction setting)
  - Form SSC-820, *SSC Fall Protection Field Audit Form* (for use in a general industry setting)

Forms located on the Stennis electronic forms page or equal, shall be used when inspecting/auditing fall protection work.

- m. Internal audits shall be performed annually to determine compliance and measure the effectiveness of the fall protection program. Findings shall be corrected within thirty (30) days of noncompliance.
- n. Results of audits shall be considered in the completion of the annual safety and health evaluations.

#### **4.3 NASA SSC Safety and Mission Assurance Directorate**

The NASA SSC Safety and Mission Assurance Directorate (SMA) shall:

- a. Be the Office of Primary Responsibility for a Fall Protection Work Instruction that is up to date, and meets NASA, SSC and OSHA requirements.
- b. Review all fall protection plans for applicable content submitted by NASA direct

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construction contractors performing work at SSC. These plans shall be submitted as part of the construction contractors Health and Safety Plan.

- c. NASA Delegates shall conduct inspections/field audits during surveillance opportunities of NASA Direct Construction contractor's fall protection work to ensure compliance with federal regulations and compliance with this document using the following SSC Forms:

- Form SSC-879, *SSC Construction Safety Weekly Inspection*
- Form SSC-852 *SSC Construction Safety Job Site Audit*

Forms are located on the Stennis electronic forms page.

- d. Verify NASA Prime Contractors and NASA Direct Construction Contractors have performed annual internal fall protection field inspections/audits in their work areas, using or equal to SSC Forms SSC-879, *SSC Construction Safety Weekly Inspection*; SSC-852, *SSC Construction Safety Job Site Audit* and SSC -820, *SSC Fall Protection Field Audit Form* (for use in a general industry setting) to ensure compliance with federal regulations and compliance with this document. If applicable, verify all internal findings were completed within 30 days.
- e. Consider the results of audits in the completion of the annual safety and health evaluations.
- f. Meet with the NASA Prime Contractors safety offices at least annually to discuss the SSC Fall Protection Program, specifically:
- Fall protection specific changes to the code of federal regulation, NASA requirements, and industry standards
  - Site implementation of fall protection requirements
  - Trending of site-specific fall protection issues

#### **4.4 All SSC Employees Utilizing Fall Protection Equipment and Systems**

All SSC employees who are exposed to fall hazards, utilize fall protection equipment and systems shall:

- a. Evaluate all work areas for fall hazards and ensure these hazards are properly controlled before work begins.
- b. Follow OSHA standards and manufacture's requirements regarding the proper use, wear, inspection and maintenance of fall protection equipment.
- c. Inspect before and after use of all fall arrest equipment for wear and possible damage and take out of service any suspect equipment.

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- d. Properly store and maintain fall protection equipment.
- e. Training will be completed initially for employees and as required thereafter as specified in SCWI-3410-0003, *SSC Training/Certification Plan and Scheduling Report*.
- f. Fulfill as directed, training requirements for fall protection and achievement of 100% attendance.

## 5.0 SSC SPECIFIC PROCEDURES

- a. The following instructions provide the fall protection requirements for many specifically identifiable situations in general industry and construction. For situations not specifically addressed, SSC has a 100% Fall Protection Program. Employees shall be provided fall protection whenever they are placed into situations outside of secured work areas protected by finished or temporary guardrails and the potential fall exposure is greater than that addressed in applicable OSHA general industry or construction standards.
- b. All provisions of 29 Code of Federal Regulations (CFR) 1910, *Occupational Safety and Health Procedures* subpart D- *Walking Working Surfaces* and 29 CFR 1926, *Safety and Health Regulations for Construction*, Subpart M – *Fall Protection* Apply.

### 5.1 General Industry and SSC Specifics

#### 5.1.1 General Industry Requirements

In general industry, fall protection is required for activities executed at heights greater than or equal to four (4) feet from fixed flooring, decking or platform structure. The four (4) foot rule applies to walking and working surfaces and requires every open-sided floor or platform four (4) feet or more above adjacent floor or ground level to be guarded. This requirement also applies to:

- a) Wall openings and holes
- b) Window wall openings at a stairway landing
- c) Floor, platform or balcony, from which there is a drop of more than four (4) feet
- d) Chute wall opening from which there is a drop of more than four (4) feet shall also be guarded
- e) Roof Skylights
- f) Leading edge

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### 5.1.2 SSC Requirements

Fall Protection conforming to OSHA 29 CFR 1910.28 *Duty to Have Fall Protection* shall be provided to the maximum extent possible. It is NASA SSC policy that whenever possible, guardrails/stairway railings will be provided and used. When guarding is not possible, alternate methods of employee protection shall be utilized to include: personal fall arrest systems, fall restraint systems, positioning device systems or safety net systems.

The following shall apply when working off of fixed/portable ladders, scaffolding, vehicle mounted elevating and rotating work platforms, manually propelled and self-propelled mobile work platforms at SSC:

- a. Employees are required to wear a full body harness whenever climbing the SSC water tanks that have ladders with installed ladder safety devices. The correct ladder-safety climbing device will be obtained through the NASA Direct Operations and Maintenance Contractor.
- b. Employees shall be protected by an approved fall protection system (safety nets or personal fall arrest system) whenever the climbing of a ladder exposes the worker to a fall from the ladder to a surface below the level that the ladder is resting.
- c. If use of the ladder exposes a person climbing the ladder to the risk of falling to a lower level than on which the ladder starts, then fall protection will have to be provided. Employees shall use a safety harness and ladder safety device on any fixed ladder that has been equipped with a ladder safety device.
- d. Employees using fixed ladders installed or altered after November 19, 2018, and extend 24 feet or higher above a lower level shall be protected by an approved ladder safety system and trained on equipment.

**NOTE:** Ladders newly installed – or altered – after November 19, 2018, require a ladder safety system or personal fall arrest system. Any portion of an existing ladder that is replaced or repaired must be equipped with a ladder safety system or personal fall arrest system. The final deadline for installing a ladder safety system or personal fall arrest system for ALL ladders is November 18, 2036.

- e. Employees working off of portable ladders from ground level on a short temporary job and abiding by the safety requirements for use of the ladder are not specifically required to wear fall protection. The exception is ladder use when elevated above guard/handrails exposing the worker to a fall to a lower level. Alternative work methods that allow for a safer work environment or fall protection may be used if the job entails numerous ascents/descents or work over a longer period of time.

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- f. Employees erecting scaffold systems shall comply with OSHA CFR 1926 Subpart L Scaffolds 1926.451 *General Requirement*.
- g. Employees erecting or disassembling scaffold systems greater than six (6) feet in height shall be protected by either an approved guardrail system or personal fall arrest system. If not feasible, a competent person shall determine a safe means of access and fall protection only for the specific operation in question.
- h. Employees working off of tubular metal scaffolds, manually propelled rolling scaffolds, vehicle-mounted elevating and rotating work platforms, manually propelled and self-propelled mobile work platforms greater than six (6) feet shall be protected by use of standard guardrails around the work platform or a personnel fall arrest system or other similar device that meets this intent and is compliant with OSHA 29 CFR 1926, Subpart L (Scaffolds).
- i. If a scaffold's unguarded working height places the employee at risk to a fall to another level, such as over a facility guardrail, then either standard guardrails or a fall arrest system will have to be provided to protect employees from a fall.
- j. Employees who are required to work off an elevated platform used for interior or exterior building maintenance shall be protected by a personal fall arrest system consisting of a full body harness, safety lanyard and lifeline. When vertical lifelines are used, each employee shall be provided with a separate lifeline. The vertical lifeline shall extend completely to a landing platform, and shall have additional coiled rope at the landing. The lifeline must be attached to an anchorage (see definitions) that is not part of the elevated system, and is capable of supporting at least 5000 pounds.
- k. Scaffold fall protection systems such as cable handrails, wood handrails, vertical lifelines etc., shall be inspected by a competent person prior to each shift prior to use and documented.
- l. Fall protection systems such as Horizontal lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.
- m. An adjustable lanyard with full body harness shall be used as fall restraint by personnel in a boom personnel lift. The lanyard shall not extend beyond six (6) feet, and shall be adjusted to fit the demands of the work. (The anchor point of an articulating boom – when equipped, is designed for the forces imposed during fall restraint, and not designed for the forces imposed during fall arrest).

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- n. A Self-Retracting Lifeline shall not be used in reverse configuration (with the retracting mechanism positioned at the harness D-ring), unless specifically permitted by the manufacturer, and without prior written approval by the cognizant safety office.

## 5.2 Construction SSC Specific

In the construction industry fall protection is required at six (6) feet. The six (6) foot rule applies to any situation where an employee could fall or contact dangerous equipment. Walking and working surfaces with unprotected sides or edges (horizontal or vertical) where an employee is working six (6) feet or more above lower levels will be guarded or the employee otherwise protected from falling. This also applies to employees constructing a leading edge; working in a hoist area; working near an open hole in a floor; and when working at the edge of an excavation, well, pit, or shaft. Employees working less than six (6) feet from dangerous equipment must also be protected.

- a. Fall protection conforming to OSHA 29 CFR 1926 Subpart M – *Fall Protection*, shall be provided on construction sites at SSC.
- b. The use of a safety monitoring system alone to provide fall protection for roofers on low-sloped roofs shall not be allowed at SSC. Roofers working on low-sloped roofs, with unprotected sides and edges six (6) feet or more above lower levels shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems or a combination of warning line system and guardrail system, warning line system and safety net system, or warning line system and personal fall arrest system.
- c. Controlled Access Zones are not an acceptable means of worker protection from fall hazards at SSC.
- d. Controlled Access Zones can be used to limit personnel access to an area to protect workers from falling object hazards due to overhead work (e.g. overhead bricklaying work, overhead crane work, etc.).

## 6.0 SAFETY REQUIREMENTS FOR FALL PROTECTION SYSTEMS

### 6.1 Personal Fall Arrest Systems

The kind of personal fall arrest system selected should match the particular work situation, and any possible free fall distance should be kept to an absolute minimum. The work environment must also be considered when selecting a personal fall arrest system.

- a. In no case shall free fall distance be allowed to exceed six (6) feet, nor allow the worker to contact any lower level.

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- b. A full body harness shall be used for fall protection at SSC. Body belts are not acceptable for use as a personal fall arrest system.
- c. Only lanyards with built in deceleration devices or self-retracting life lines which limit free fall distance to two (2) feet or less shall be used at SSC.
- d. Wire rope or rope covered wire lanyards and some plastics such as nylon will not be used where there is an electrical hazard.
- e. Where lanyards, connectors and lifelines are subject to damage by work operations such as welding, chemical cleaning and sandblasting, the component shall be protected, or the securing systems should be used.
- f. Anchorage connectors shall be capable of withstanding (without breaking) a 5000 pound load multiplied by the maximum number of personal fall arrest systems that may be attached to the connector. No more than one personal fall arrest system will be connected to an anchorage point (see definitions) unless specifically certified for such a purpose.
- g. Anchorage connectors will not be exposed to sharp edges, abrasive surfaces and physical hazards such as thermal, electrical or chemical sources. Anchorage points must be designed and designated only for fall protection; never use a fall protection anchorage point for lifting or hoisting materials.
- h. Permanent anchorage points designated only for fall protection shall be professionally designed and installed to bring an employee to a complete stop as part of a complete personal fall arrest system which maintains a safety factor of at least two and is installed under the supervision of a qualified person and must be stamped by a professional engineer.
- i. Permanent anchorage points designated only for fall protection shall be identified by location and anchorage strength should be predicted using nondestructive testing and analytical methods prior to use but no longer than five years by a professional engineer. Reference ANSI-ASSP Z359-6-2016 *Specifications and Design Requirements for Active Fall Protection Systems*.
- j. Equipment used as part of a personal fall arrest system shall comply with the requirements of 29 CFR 1926.502(d) *Personal Fall Arrest Systems*. Lifting devices/straps are not approved for fall protection.
- k. Workers shall tie off to an Approved or Certified anchorage point (see definition). In the event there is a question on where to tie off; consult your competent safety person or qualified professional engineering department person for guidance:

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- **Approved Anchorage:** Shall be capable of withstanding the forces of at least 5,000 pounds (22.2 kN) per employee attached. The following are SSC approved anchorage points: steel I-beams, steel columns, and concrete columns.
- **Certified Anchorage:** Shall be professionally designed by a Qualified Engineer and installed to bring an employee to a complete stop as part of a complete personal fall arrest system which maintains a safety factor of at least two and is installed under the supervision of a qualified person.. The following anchorage points shall be approved by engineering, safety and stamped by a professional engineer prior to use: Pipes, and grating/decking if used in conjunction with a load dissipation plate designed for the type and grade of grating.

1. The following are not approved anchorage points: cable trays, handrails, and guardrails.

## 6.2 Positioning Device Systems

Positioning device systems shall conform to all provisions of OSHA 29 CFR 1926.502 (e) *Positioning Device Systems*.

## 6.3 Safety Net Systems

The following instructions/rules shall apply to Safety Net Systems:

- Safety nets systems and their use shall comply with all provisions of OSHA 29 CFR 1926.502, *Fall Protection Systems, Criteria and Practices* – Safety Net Systems, and 1926.105, *Safety Nets*, for the safe design, use, and maintenance of safety net systems.
- Should the need arise to use a safety net, the organization or contractor shall prepare a detailed fall protection plan to NASA safety. This plan shall include the following:
  - Specifications or design details on the netting system itself.
  - Layout of the netting system to show protection afforded to the various work levels.
  - Basic schedule of installation to assure that the nets are installed in a timely process to afford protection of the workers.
  - Basic outline of safety training to be provided workers exposed to this fall protection system.
  - Inspection requirements and policies with respect to stopping work given that a safety problem is discovered with the net.
- The most recent certification record for each net and net installation shall be available at the jobsite for inspection.

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#### 6.4 Warning Line Systems

The following instructions/rules shall apply to warning line systems:

- a. Warning Line Systems shall conform to all provisions of OSHA 29 CFR 1926.502 (e) – *Positioning device systems*, and OSHA 29 CFR 1926.501(b)10 – *Duty to have fall protection*, respectively.
- b. Access points to enter the warning line system shall be protected by some means of fall protection other than the warning line near the roofs edge.

#### 6.5 Protection From Falling Objects

The following instructions/rules shall apply to protect from falling objects:

- a. Protection from falling objects shall comply with all provisions of OSHA 29 CFR 1910.135 *Head Protection* and OSHA 29 CFR 1910.29 (k) *Fall protection systems and falling object protection-criteria and practices*.
- b. When an employee is exposed to falling objects, each employee shall wear head protection that meets federal requirements.

**NOTE: Head protection devices that the employer demonstrates are at least as effective as head protection devices that are constructed in accordance with the above standard will be deemed to be in compliance with the requirements of this section.**

- c. Erecting toe boards, screens, or guardrail systems to prevent objects from falling to a lower level.
- d. Erecting canopy structures and keeping potential falling objects far enough from an edge, hole, or opening to prevent them from falling to a lower level. Ensure canopies used for falling object protection are strong enough to prevent collapse and to prevent penetration by falling objects.
- e. Barricading the area into which objects could fall, prohibiting employees from entering the barricaded area, and keeping objects far enough from an edge or opening to prevent them from falling to a lower level.
- f. Where tools, equipment, or materials are piled higher than the top of the toeboard, paneling or screening is installed from the toeboard to the midrail of the guardrail system and for a length that is sufficient to protect employees below.

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## 7.0 TRAINING

The following instructions/rules shall apply to fall protection training:

- a. All employees who will be required to use fall protection in the performance of their duties shall be properly trained prior to performing any tasks/jobs requiring fall protection.
- b. Training and refresher training will be performed in accordance with the frequency described in SCWI-3410-0003, *Training Certification and Schedule Report*.

### 7.1 Training Requirements

- a. Personnel using fall arrest systems shall be trained in the safe use of the fall arrest system prior to use.
- b. Training shall include:
  - Procedural steps and use of Activity Hazard Analysis.
  - Fall Protection Equipment methods of use, inspection, and storage as well as manufacturer's recommendations for proper anchoring and tie-off techniques.
  - Estimation of free fall distance, including determination of deceleration distance, and total fall distance to prevent striking a lower level.
  - Differences between Fall Restraint vs. Fall Arrest and Full Body Harness vs. Body Belt.
  - Difference between a double locking snap hook and single action snap hook.
  - Anchorage points and devices used to assist with anchorage. Example: An articulating boom has fall restraint versus fall arrest connections.
  - Examples of Horizontal lifeline applications, deceleration devices, drop line, lanyards, double locking snap hooks, positioning belt and devices, restraint lines, rope grabs, connectors and other hardware.
  - Proper use and application of Safety Nets and Guarding.
  - Limitations and application of shock absorbing and self-retracting lanyards.
  - Definitions of: Approved, Catenary line, Controlled Access Zone, Control zone, failure, low-pitched roof, roll out, strength member, and warning line system.
- c. Retraining shall be done when:
  - Inadequacies in an affected employee's knowledge or use of fall protection systems or equipment indicate that the employee no longer has the requisite understanding or skill necessary to use equipment or perform the job safely.
  - Changes in the workplace render previous training obsolete or inadequate.
  - Changes in the types of fall protection systems or equipment to be used render previous training obsolete or inadequate.

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- d. Training shall be documented.
- e. Training for NASA employees shall be conducted by the NASA Direct Operations and Maintenance Contractor by trained and competent persons.

## 8.0 RECORDS AND FORMS

All records and electronic forms are assumed to be the latest edition unless otherwise indicated. Quality Records are identified in the SSC Master Records Index.

- a. SSC-820, *SSC Fall Protection Field Audit Form*
- b. SSC-852, *SSC Construction Safety Job Site Audit*
- c. SSC-879, *SSC Construction Safety Weekly Inspection*

## 9.0 ACRONYMS AND ABBREVIATIONS

ANSI	American National Standards Institute
CFR	Code of Federal Regulations
NASA	National Aeronautics and Space Administration
OSHA	Occupational Safety and Health Administration
SCWI	Stennis Common Work Instruction
SMA	Safety and Mission Assurance Directorate
SSC	John C. Stennis Space Center

## 10.0 DEFINITIONS

Activity Hazard Analysis - is a document that allows employers and supervisors to manage, examine, and document risks involved in certain hazardous workplace activities prior to work activities.

Anchorage - a secure point of attachment for lifelines, lanyards, or deceleration devices which is capable of withstanding the forces of at least 5,000 pounds (22.2 kN) per employee attached (Approved), or shall be designed by a professional engineer, installed to bring an employee to a complete stop as part of a complete personal fall arrest system which maintains a safety factor of at least two (2); and is installed under the supervision of a qualified person (Certified).

Approved Anchorage - Anchorage point that a competent person can judge to be capable of supporting the predetermined anchorage forces and incorporates an energy-absorbing device.

Body belt - means a strap with means both for securing about the waist and for attaching to other components such as a lanyard used with positioning systems, travel restraint systems, or ladder safety systems. Body belts are prohibited as part of a personal fall arrest system.

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Body harness - Straps that secure about the employee in a manner to distribute the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders, with provisions for attaching a lanyard, lifeline, or deceleration devices. “body harness system” means a Class III full body harness.

Carabiner - a connector generally comprised of a trapezoidal or oval shaped body with a closed gate or similar arrangement that may be opened to attach another object and, when released, automatically closes to retain the object.

Catenary line - See horizontal lifeline.

Certification - The act of attesting in writing that the criteria established by these standards or some other designated standard have been met.

Certified Anchorage – Anchorage point resulting in documentation that determines and attests to criteria that meet the requirements of OSHA and 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.

Competent person – A designated person knowledgeable of fall protection equipment, including the manufacturers recommendations and instructions for the proper use, inspection, and maintenance; and who is capable of identifying existing and potential fall hazards; and who has the authority to take prompt corrective action to eliminate those hazards; and who is knowledgeable of the rules contained in this section regarding the erection, use, inspection, and maintenance of fall protection equipment and systems.

Connector - a device which is used to couple (connect) parts of the personal fall arrest system and positioning device systems together. It may be an independent component of the system, such as a carabiner, or it may be an integral component of part of the system (such as a buckle or D-ring sewn into a body harness, or a snap hook spliced or sewn to a lanyard or self-retracting lanyard).

Continuous fall protection - the design and use of a fall protection system such that no exposure to an elevated fall hazard occurs. This may require more than one fall protection system or a combination of prevention or protection measures.

Control zone - the area between the warning line and the unprotected sides and edges of the walking/working surface.

Controlled Access Zone – an area in which certain work (e.g., overhand bricklaying) may take place without the use of guardrail systems, personal fall arrest systems, or safety net systems and access to the zone is controlled.

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D-ring - a connector used: (i) In a harness as an integral attachment element or fall arrest attachment; (ii) In a lanyard, energy absorber, lifeline, or anchorage connector as an integral connector; or (iii) In a positioning or travel restraint system as an attachment element.

Deceleration device - any mechanism, such as a rope grab, rip stitch lanyard, specifically woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

Deceleration distance - the additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of an employee's body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the employee comes to a full stop.

Double Locking snap hook - a connecting snap hook that requires two separate forces to open the gate; one to deactivate the gatekeeper and a second to depress and open the gate which automatically closes when released; used to minimize roll out or accidental disengagement.

Drop line - a vertical lifeline secured to an upper anchorage for the purpose of attaching a lanyard or device.

Elimination - physically removing it, is the most effective hazard control. For example, if employees must work high above the ground, the hazard can be eliminated by moving the piece they are working on to ground level to eliminate the need to work at heights.

Failure - load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

Fall Arrester - A device that travels on a lifeline and will automatically engage or lock onto the lifeline in the event of a fall.

Fall arrest system - the use of multiple, approved safety equipment components such as; body harnesses, lanyards, deceleration devices, drop lines, horizontal and/or vertical lifelines and anchorages, interconnected and rigged as to arrest a free fall.

Fall distance - the actual distance from the workers support to the level where a fall would stop.

Fall restraint system - an approved device and any necessary components that function together to restrain an employee in such a manner as to prevent that employee from falling to a lower level.

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When standard guardrails are selected, compliance with applicable sections governing their construction and use shall constitute approval.

Fallen Worker Rescue Plan - addresses the procedures, equipment, and personnel needed to ensure that a rescue proceeds quickly and efficiently when a fall occurs.

Free fall - the act of falling before a personal fall arrest system begins to apply force to arrest the fall.

Free fall distance - the vertical displacement of the fall arrest attachment point on the employee's body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance, and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

Full Body Harness - a configuration of connected straps to distribute a fall arresting force over at least the thighs, shoulders and pelvis, with provisions for attaching a lanyard, lifeline, or deceleration devices. "Full body harness system" means a Class III full body harness.

Guardrail System - a barrier erected along an unprotected or exposed side, edge, or other area of a walking working surface to prevent employees from falling to a lower level.

Hardware - snap hooks, D-rings, bucklers, carabineers, adjusters, O-rings, that are used to attach the components of a fall protection system.

Horizontal lifeline - a rail, rope, wire, or synthetic cable that is installed in a horizontal plane between two (2) anchorages and used for attachment of a workers lanyard or lifeline device while moving horizontally; used to control dangerous pendulum like swing falls. Horizontal lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

Lanyard - a flexible line of webbing, rope, or cable used to secure a body belt or harness to a lifeline or an anchorage point usually two (2), four (4), or six (6) feet long.

Leading edge - the advancing edge of a floor, roof, or formwork which changes location as additional floor, roof, or formwork sections are placed, formed, or constructed. Leading edges not actively under construction are considered to be "unprotected sides and edges, and positive methods of fall arrest or fall restraint shall be required to protect exposed workers.

Lifeline - a vertical line from a fixed anchorage or between two (2) horizontal anchorages, independent of walking or working surfaces, to which a lanyard or device is secured. Lifeline as referred to in this text is one which is part of a fall protection system used as back-up safety for an elevated worker.

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Low pitched roof - a roof having a slope equal to or less than four (4) in twelve (12) (vertical to horizontal).

Mechanical equipment - all motor or human propelled wheeled equipment except for wheelbarrows, mop carts, robotic thermoplastic welders and robotic crimpers.

Permanent Anchorage - Designed, installed, and used, under the supervision of qualified person, as part of a complete personal fall protection system that maintains a safety factor of at least two.

Personal fall arrest system - a system used to arrest an employee in a fall from a walking-working surface. It consists of a body harness, anchorage, and connector. The means of connection may include a lanyard, deceleration device, lifeline, or a suitable combination of these.

Personal fall protection system - a system (including all components) an employer uses to provide protection from falling or to safely arrest an employee's fall if one occurs. Examples of personal fall protection systems include personal fall arrest systems, positioning systems, and travel restraint systems.

Positioning belt - a single or multiple strap that can be secured around the workers body to hold the user in a work position; for example, a lineman's belt, a rebar belt, or saddle belt.

Positioning system (work-positioning system) - a system of equipment and connectors that, when used with a body harness or body belt, allows an employee to be supported on an elevated vertical surface, such as a wall or window sill, and work with both hands free. Positioning systems also are called "positioning system devices" and "work-positioning equipment."

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

Restraint line - a line from a fixed anchorage or between two (2) anchorages to which an employee is secured in such a way as to prevent the worker from falling to a lower level.

Roll out - unintentional disengagement of a snap hook caused by the gate being depressed under torque or contact while twisting or turning; a particular concern with single action snap hooks that do not have a locking gatekeeper.

Roof - the exterior surface on the top of a building. This does not include floors or form work which, because a building has not been completed, temporarily become the top surface of a building.

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Roofing work - the hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the roof deck.

Rope grab - a fall arrester that is designed to move up or down a lifeline suspended from a fixed overhead or horizontal anchorage point, or lifeline, to which the belt or harness is attached. In the event of a fall, the rope grab locks onto the lifeline rope through compression to arrest the fall. The use of a rope grab device is restricted for all restraint applications.

Safety factor - the ratio of the design load and the ultimate strength of the material.

Safety line - see lifeline.

Safety monitor system - a system of fall restraint used in conjunction with a warning line system only, where a competent person as defined by this part, having no additional duties, monitors the proximity of workers to the fall hazard when working between the warning line and the unprotected sides and edges including, the leading edge of a low pitched roof or walking/working surface.

Self-retracting lifeline (SRL) - a deceleration device which contains a drum wound line which may be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which after onset of a fall, automatically locks the drum and arrests the fall.

Shock absorbing lanyard - a flexible line of webbing, cable, or rope used to secure a harness to a lifeline or anchorage point that has an integral shock absorber.

Single action snap hook - means a connecting snap hook that requires a single force to open the gate which automatically closes when released.

Snap hook - a self-closing connecting device with a gatekeeper latch or similar arrangement that will remain closed until manually opened. This includes single action snap hooks that open when the gatekeeper is depressed and double action snap hooks that require a second action on a gatekeeper before the gate can be opened.

Static line - see horizontal lifeline.

Strength member - any component of a fall protection system that could be subject to loading in the event of a fall.

Steep roof - a roof having a slope greater than four (4) in twelve (12) (vertical to horizontal).

Travel restraint (tether) line - a rope or wire rope used to transfer forces from a body support to an anchorage or anchorage connector in a travel restraint system.

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Travel restraint system - a combination of an anchorage, anchorage connector, lanyard (or other means of connection), and body support that an employer uses to eliminate the possibility of an employee going over the edge of a walking-working surface.

Unprotected sides and edges - any side or edge (except at entrances to points of access) of a floor, roof, ramp or runway where there is no wall or guardrail system.

Walking/working surface - for the purpose of this section, any area whose dimensions are forty-five (45) inches or greater in all directions, through which workers pass or conduct work.

Warning line system - a barrier erected on a walking and working surface or a low pitch roof (four (4) in 12 or less), to warn employees that they are approaching an unprotected fall hazard(s).

Work area - that portion of a walking/working surface where job duties are being performed.