



National Aeronautics and Space Administration
John F. Kennedy Space Center

SPP NUMBER: S-18
REVISION: F
DATE: 09 June 2008

ISS/Spacecraft Processing
Standard Practices and Procedures

**NASA SUSPENDED LOAD OPERATION
ANALYSIS/APPROVAL**

Approved By:

// Original DCR Signed By //

*Mark Jager
Director,
Spacecraft Services

Boeing-KSC*

*// Original DCR Signed By G. Thomas
Pentrack for //
Russell R. Romanella
Director,
International Space Station and
Spacecraft Processing
NASA-KSC*

// Original DCR Signed By Jeff Beach for //

*Maynette E. Smith
Chief,
Safety and Mission Assurance (S&MA)
International Space Station (ISS) and
Spacecraft Processing Division
NASA-KSC*

*// Original DCR Signed By George
Hamilton for //
Patrick A. Simpkins, Ph.D.
Director,
Engineering Directorate
NASA-KSC*

CHANGE HISTORY

DEVIATION/WAIVER LOG

1.0 PURPOSE

Performance of suspended load operations is permitted by the NASA Alternate Safety Standard for Suspended Load Operations when the Standard's requirements are met. This standard has been approved by the Occupational Safety and Health Administration (OSHA) as an alternate to 29 Code of Federal Regulations (CFR) 1910.179(n)(3)(vi), 29CFR 1910.180(h)(3)(vi), and 29CFR 1910.180(h)(4)(ii). This procedure establishes the system for the initiation and processing of Suspended Load Operations Analysis/Approval (SLOAA) reports, in accordance with the Alternate Standard for Suspended Load Operations requirements APPENDIX A of NASA-STD-8719.9.

2.0 APPLICABILITY

The Standard Practices and Procedures detailed in this document are applicable to the NASA International Space Station (ISS) and Spacecraft Processing Directorate, the NASA Safety and Mission Assurance Directorate's International Space Station (ISS)/Spacecraft Processing Division, NASA Engineering, and the contractor Spacecraft Services organization. The Spacecraft Services organization is defined as the contractor or teammate organization that performs the Checkout, Assembly, and Payload Processing Services (CAPPS) contract (NAS10-02007) and the portion of the ISS contract (NAS15-10000) that is performed at KSC.

3.0 REQUIREMENTS

3.1 Suspended Load Analysis/Approval

- a. A NASA Suspended Load Operation Analysis/Approval (SLOAA) report is required for any operation that exposes an employee to a suspended load hazard. An approved report grants acceptance of a permanent residual risk when employee exposure to a suspended load hazard cannot be eliminated by design, operationally or procedurally. It may be approved for repetitive operations or for special, one-time-only operations on a case-by-case basis.
- b. A suspended load operation for crane/hoist systems that do not have a single-failure point shall require approval by the NASA ISS and Spacecraft Processing Safety and Mission Assurance Division (SA-C) Chief. NASA Headquarters Office of Safety and Mission Assurance approval is required for crane/hoist systems that have critical, single-failure points.

3.1 **Suspended Load Analysis/Approval (Continued)**

- c. NASA SLOAA reports shall be generated in accordance with the NASA Alternate Standard for Suspended Load Operations requirements APPENDIX A of NASA-STD-8719.9, Standard for Lifting Devices and Equipment, KNPR 8715.3, KSC Safety Practices Procedural Requirements, Section 15.4.

3.2 **SLOAA Package Requirements**

- a. The report initiator, the applicable Work Authorization Document (WAD) author, Task Leader or Design organization, with Safety's assistance, compiles a package in support of every suspended load operation addressed in the report. The package shall include the following:
 - 1. SLOAA report that includes statements for each of the 15 special requirements as listed in NASA-STD-8719.9, Appendix A. Be sure to include all detailed design and engineering analyses and alternatives that were considered during the design phase for eliminating suspended load operations as specified in requirement A.4.1.
 - 2. If the equipment is locally designed, the System Assurance Analysis (SAA) will have a detailed hazard analysis and the design alternatives that were proposed to eliminate the suspended load. This will be effective with the release of SPP S-21 Rev A.
 - 3. System Assurance Analysis (SAA) reports number for the appropriate crane(s) or hoist(s).
 - 4. Applicable Work Authorization Document number (i.e., OMI, TPS, etc.)
 - 5. Any additional supporting data deemed necessary.
 - 6. A completed signature sheet, Approval Sheet for Suspended Load Operations, KSC Form 20-200. This form shall be used for all KSC approval signatures (Boeing and NASA), except for that of the NASA ISS and Spacecraft Processing Safety and Mission Assurance Division (SA-C) Chief, who signs the last page of the report.

4.0 RESPONSIBILITIES

None

5.0 PROCESS

5.1 Suspended Load Analysis/Approval Reports

a. Initiator

1. **Prepares** SLOAA report and **compiles** the supporting data package. **Completes** Approval Sheet for Suspended Load Operations, KSC Form 20-200. **Types** name on the "Prepared by" line and **initials** next to the name.
2. **Obtains** signature of both UB and NE NASA counterparts or their respective NASA counterpart leads.
3. **Delivers** the completed report and supporting data package and Approval Sheet to Boeing SHEA.

b. Boeing SHEA

4. **Assists** initiator of report, as necessary. **Validates** the SLOAA and supporting data package for compliance with the alternate standard. **Verifies** the Approval Sheet has proper signatures and titles.
5. **Contacts** NASA KSC Lifting Devices Equipment Manager (LDEM) and **obtains** a number for the SLOAA report.
6. **Obtains** the signature of the Chief of Safety, Health, and Environmental Affairs and the Senior Manager of Lifting and Handling.
7. **Forwards** the suspended load report and supporting documentation to the NASA KSC LDEM for review and approval.

c. NASA KSC Lifting Devices and Equipment Manager

8. **Assesses** the SLOAA report and concurs by signing the Approval Sheet.

d. Initiator

9. **Obtains** report approval signature from the NASA ISS and Spacecraft Processing Safety and Mission Assurance Division (SA-C) Chief and from the NASA Headquarters Office of Safety and Mission Assurance, if required. **Returns** the approved or disapproved request to Boeing SHEA.

5.1 Suspended Load Analysis/Approval Reports (Continued)

e. Boeing SHEA

10. **Provides** a copy of the approved/disapproved request to the initiator and other applicable organizations. **Maintains** the original package in the Suspended Load file.

f. Initiator

11. **Incorporates** suspended load operation safety requirements into the applicable WAD, upon approval of the SLOAA report.

6.0 DEFINITIONS

- 6.1 De minimis violation - complying with the clear intent of a standard but deviating from its particular requirements in a manner that has no direct or immediate relationship to employee's safety or health. De minimis violations are not included in a citation.
- 6.2 Employee Exposure – Having any part of the body beneath the load such that if the crane and/or hoist system were to fail and the load were to drop, the employee could be injured or killed if he or she were in the envelope of the falling load.
- 6.3 Suspended Load Operation Definition – An operation is considered a suspended load operation and subject to the requirements of this standard if it meets all three of the following criteria:
- a. The operation involves the use of a crane or hoist that supports the weight of a suspended load. This excludes operations where the load is secured in a holding fixture or on substantial blocks supporting the entire load even though the crane/hoist may still be attached. No distinction is made between a static and dynamic load. Rigging, i.e., slings, Hydra-sets, lifting fixtures, shackles, etc., when attached to the hook, is considered part of the load.
 - b. Personnel involved in the operation have any part of their body directly beneath the suspended load. This excludes operations where employees have their hands on the sides of a load, i.e., to guide the load.
 - c. In the event of a crane/hoist failure, the load could contact personnel working directly beneath it as it drops and could possibly result in injury or death. This excludes operations where employees have their hands only partially under a load, such that a crane or hoist device failure would push their hands out of the way, not resulting in injury. This also excludes situations where the falling load would come to rest on hardware that is not suspended before an employee could be injured.

7.0 REFERENCES

7.1 Applicable Documents

- a. [NASA-STD-8719.9](#), Standard for Lifting Devices and Equipment
- b. [KNPR 8715.3](#), KSC Safety Practices Procedural Requirements

7.2 Forms

- a. [KSC Form 20-200](#), Approval Sheet for Suspended Load Operations

7.3 Appendices

None

7.4 Quality Records

Description	OPR	File Location; Where Maintained (Bldg., Room)	Retention Duration	Archive Location	Archive Duration
KSC Form 20-200, Approval Sheet for Suspended Load Operations	Initiator	SHEA, SSPF, 2064	Retain documents for 5 years after last payload launch. Destroy 6 years after last launch in payload series.(per NPR 1441.1, 8680, 36, B, 2)	N/A	N/A