



OPERATING AND SUPPORT HAZARD ANALYSIS (O&SHA)
FOR BRIDGE CRANE #7-30
LOCATED IN THE
ACOUSTIC TEST CHAMBER, BUILDING 7

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OPERATING AND SUPPORT HAZARD ANALYSIS (O&SHA)

Objectives

This Operating and Support Hazard Analysis is performed for Crane #7-30 (7-1/2-Ton Saturn) located in the Acoustic Test Chamber, Building 7. This Analysis identifies potential operational hazards, associated risks, and provides mechanisms for risk elimination and control. Areas reviewed in this Analysis are as follows:

- a. Crane related operational concerns that could cause death/injury to personnel or loss/damage to flight hardware, and
- b. Crane issues that affect normal operation of the lifting system.

Other conditions not related to crane operations in the Acoustic Test Chamber (environment - human relationship, etc.) that could be potential sources of danger are not part of this Analysis. This O&SHA should be combined, by others, with the analysis of other conditions to develop an overall Systems Hazard Analysis (SHA).

An O&SHA was performed and documented on the following worksheets.

OPERATING AND SUPPORT HAZARD ANALYSIS (O&SHA) WORKSHEET

SYSTEM: BUILDING 7, CATEGORY: CRITICAL, APPLICATION PHASE: LIFTING OPERATION
 SUBSYSTEM: 7-1/2-TON SATURN, CRANE 7-30, LOCATION: BUILDING 7

DATE: DECEMBER 1996
 PREPARED BY: M. CROMPTON AND R. GAYO

HAZARDOUS CONDITION	HAZARD CAUSE	HAZARD EFFECT	SEVERITY	SAFETY REQUIREMENTS	HAZARD ELIMINATION/ CONTROL PROVISIONS	LIKELIHOOD OF OCCURRENCE	STATUS	VERIFICATION METHOD
LOSS OF LOAD SUPPORT DUE TO COMPONENT FAILURE	HOOK FAILS, ROPE FAILS, ROPE DRUM FAILS, ROPE SHEAVES FAIL, ROPE CLAMP FAILS	LOSS (DAMAGE) OF FLIGHT HARDWARE	CATASTROPHIC	<p>NSS/GO-1740.9B:</p> <ul style="list-style-type: none"> • PARA. 203.d.(4) REQUIRES DAILY AND MONTHLY INSPECTION OF HOOKS FOR DEFORMATION OR CRACKS. • PARA. 203.d.(4) REQUIRES THAT HOOK BE VISUALLY INSPECTED FOR CRACKS AND DEFORMITIES, DAILY. • PARA. 203.e.(2) REQUIRES MONTHLY INSPECTION OF ROPE FOR DETERIORATION AND DAMAGE. • PARA. 203.e.(1) REQUIRES ANNUAL ROPE INSPECTION. • PARA. 203.e.(1)(a) REQUIRES PERIODIC INSPECTION FOR CRACKED, DEFORMED, OR CORRODED MEMBERS AND WELDS. PERFORM NONDESTRUCTIVE EXAMINATION AS NEEDED. • PARA. 201.f.(2)(i) REQUIRES ROPE ENDS TO BE ANCHORED SECURELY BY A CLAMP AND THE DRUM HAVE NO LESS THAN TWO FULL WRAPS WHEN THE HOOK IS AT ITS LOWEST POINT. 	<p>GSFC REQUIRES APPROVED, RECERT INSPECTION PROCEDURES FOR LIFTING DEVICES AND EQUIPMENT (LDE).</p> <ol style="list-style-type: none"> 1. PERFORM FMEA TO VERIFY ADEQUATE MARGIN OF SAFETY. 2. PROCEDURES VERIFY LOADS LIFTED ARE EQUAL TO OR LESS THAN RATED CAPACITY. 3. CAPACITY POSTED ON CRANE. 4. PERIODIC AND FREQUENT INSPECTIONS VERIFY NO DEGRADATION OF COMPONENTS THAT MAY REDUCE THE RATED CAPACITY. 5. ONLY CERTIFIED OPERATORS/RIGGERS SHALL PERFORM THE OPERATION. 6. DAILY INSPECTION. 	REMOTE	OPEN	<ul style="list-style-type: none"> • REVIEW RECERT PROCEDURE, DOCUMENT NO. 25-06-016-9 • OPERATOR & RECERT INSPECTIONS • PERFORM FMEA • OPERATOR CERTIFICATION <ul style="list-style-type: none"> • VERIFY LOG BOOK ENTRY
OVERLOADING	LABELED CAPACITY EXCEEDED	LOSS (DAMAGE) OF FLIGHT HARDWARE AND LIFTING DEVICE	CATASTROPHIC	<p>NSS/GO-1740.9B:</p> <ul style="list-style-type: none"> • PARA. 206.a.(4) REQUIRES THAT CRANES SHALL NOT BE LOADED BEYOND RATED LOAD EXCEPT DURING AUTHORIZED TESTS. • PARA. 201.b.(1) REQUIRES THAT THE RATED LOAD OF ALL CRANES BE PLAINLY MARKED ON EACH SIDE OF THE CRANE. • PARA 205.b.(2) REQUIRES CRITICAL LIFT OPERATORS TO BE TRAINED IN THE SPECIFIC HAZARDS AND SPECIAL PROCEDURES ASSOCIATED WITH THE LIFT. 	<p>CAPACITY LABEL PLAINLY MARKED ON EACH SIDE OF THE CRANE.</p> <p>GSFC REQUIRES RECERT INSPECTION PROCEDURES FOR LIFTING DEVICES AND EQUIPMENT (LDE).</p> <p>AN LDE OPERATOR TRAINING, EXAMINATION, AND LICENSING PROGRAM IS IN PLACE, IN ACCORDANCE WITH NSS/GO-1740.9B, PARA. 405.a.</p>	REMOTE	OPEN	<ul style="list-style-type: none"> • REVIEW CRITICAL LIFT PROCEDURES FOR TOTAL PAYLOAD WEIGHT, DOCUMENT NO. _____ • OPERATOR CERTIFICATION • PRE-LIFT BRIEFING • CRANE MARKING

OPERATING AND SUPPORT HAZARD ANALYSIS (O&SHA) WORKSHEET

SYSTEM: BUILDING 7, CATEGORY: CRITICAL, APPLICATION PHASE: LIFTING OPERATION
 SUBSYSTEM: 7-1/2-TON SATURN, CRANE 7-30, LOCATION: BUILDING 7

DATE: DECEMBER 1996
 PREPARED BY: M. CROMPTON AND R. GAYO

HAZARDOUS CONDITION	HAZARD CAUSE	HAZARD EFFECT	SEVERITY	SAFETY REQUIREMENTS	HAZARD ELIMINATION/ CONTROL PROVISIONS	LIKELIHOOD OF OCCURRENCE	STATUS	VERIFICATION METHOD
POWER IS APPLIED CONTINUOUSLY TO HOIST MOTOR	"DOWN" CONTACTOR FAILS CLOSED	NO EFFECT WITHOUT CONCURRENT MECHANICAL LOAD BRAKE AND E-STOP SWITCH FAILURE.	CATASTROPHIC	NSS/GO-1740.9B: PARA. 401.g.(6) REQUIRES THAT THE ELECTRICAL SYSTEM BE FAIL-SAFE AND NOT CAUSE THE HOIST TO OPERATE IN A SPEED RANGE FASTER THAN COMMANDED. • PARA. 7.d. REQUIRES A RED, EMERGENCY STOP BUTTON THAT OPERATES THE MAINLINE CONTACTOR AND/OR MAIN CIRCUIT BREAKER. • PARA. 203.a REQUIRES DAILY SAFETY INSPECTIONS.	REQUIREMENT MET BY DESIGN - THREE INDEPENDENT FAILURES ARE NECESSARY FOR HAZARD TO OCCUR; I.E., "DOWN" CONTACTOR FAILURE, LOAD BRAKE FAILURE, AND E-STOP SWITCH FAILURE. OPERATOR RESPONSE INSTRUCTIONS FOR VARIOUS EMERGENCY SCENARIOS ARE INCLUDED IN TRAINING. GSFC REQUIRES APPROVED RECERT INSPECTION PROCEDURES FOR LIFTING DEVICES AND EQUIPMENT. DAILY SAFETY INSPECTION PERFORMED.	REMOTE	OPEN	• REVIEW RECERT PROCEDURE, DOCUMENT NO. 25-06-016-9 • OPERATOR & RECERT INSPECTIONS • CRANE OPERATOR TRAINING INCLUDES EMERGENCY PROCEDURES. • CHECK LOG BOOK ENTRY
POWER IS APPLIED CONTINUOUSLY TO HOIST MOTOR	"DOWN" SWITCH FAILS CLOSED	NO EFFECT WITHOUT CONCURRENT MECHANICAL LOAD BRAKE AND E-STOP SWITCH FAILURE.	CATASTROPHIC	NSS/GO-1740.9B: • PARA. 401.g.(6) REQUIRES THAT THE ELECTRICAL SYSTEM BE FAIL-SAFE AND NOT CAUSE THE HOIST TO OPERATE IN A SPEED RANGE FASTER THAN COMMANDED. • PARA. 401.g.(5) REQUIRES A RED, EMERGENCY STOP BUTTON THAT OPERATES THE MAINLINE CONTACTOR AND/OR MAIN CIRCUIT BREAKER. • PARA. 203.a REQUIRES DAILY SAFETY INSPECTIONS.	REQUIREMENT MET BY DESIGN - TWO INDEPENDENT FAILURES ARE NECESSARY FOR HAZARD TO OCCUR; I.E., MECHANICAL LOAD BRAKE AND E-STOP SWITCH FAILURE. GSFC REQUIRES APPROVED RECERT INSPECTION PROCEDURES FOR LIFTING DEVICES AND EQUIPMENT. DAILY SAFETY INSPECTION PERFORMED.	REMOTE	OPEN	• REVIEW RECERT PROCEDURE, DOCUMENT NO. 25-06-016-9 • OPERATOR & RECERT INSPECTIONS • CRANE OPERATOR TRAINING INCLUDES EMERGENCY PROCEDURES. • CHECK LOG BOOK ENTRY

OPERATING AND SUPPORT HAZARD ANALYSIS (O&SHA) WORKSHEET

SYSTEM: BUILDING 7, CATEGORY: CRITICAL, APPLICATION PHASE: LIFTING OPERATION
 SUBSYSTEM: 7-1/2-TON SATURN, CRANE 7-30, LOCATION: BUILDING 7

DATE: DECEMBER 1996
 PREPARED BY: M. CROMPTON AND R. GAYO

HAZARDOUS CONDITION	HAZARD CAUSE	HAZARD EFFECT	SEVERITY	SAFETY REQUIREMENTS	HAZARD ELIMINATION/CONTROL PROVISIONS	LIKELIHOOD OF OCCURRENCE	STATUS	VERIFICATION METHOD
WORM GEARING FAILS TO HOLD LOAD	LEAD ANGLE INSUFFICIENT TO PREVENT BACK DRIVING	NO EFFECT WITHOUT CONCURRENT MOTOR BRAKE AND E-STOP SWITCH FAILURE.	CATASTROPHIC	NSS/GO-1740.9B: <ul style="list-style-type: none"> • PARA. 401.f.(2) REQUIRES THAT HOISTS HAVE TWO MEANS OF BRAKING, EACH OF WHICH CAN HOLD THE RATED LOAD. • PARA. 203.a REQUIRES DAILY SAFETY INSPECTIONS. 	THE HOIST HAS TWO MAIN BRAKES, EACH OF WHICH IS CAPABLE OF STOPPING AND HOLDING RATED LOAD. OPERATOR RESPONSE INSTRUCTIONS FOR VARIOUS EMERGENCY SCENARIOS ARE INCLUDED IN TRAINING. GSFC REQUIRES APPROVED RECERT INSPECTION PROCEDURES FOR LIFTING DEVICES AND EQUIPMENT. DAILY SAFETY INSPECTION PERFORMED.	REMOTE	OPEN	<ul style="list-style-type: none"> • REVIEW RECERT PROCEDURE, DOCUMENT NO. 25-06-016-9 • VERIFY WORM GEAR LEAD ANGLE IS SUFFICIENT TO PREVENT BACK DRIVING. INCLUDE IN PERIODIC INSPECTION PROCEDURE. • OPERATOR & RECERT INSPECTIONS • CRANE OPERATOR TRAINING INCLUDES EMERGENCY PROCEDURES. <ul style="list-style-type: none"> • CHECK LOG BOOK ENTRY
BRAKE INCAPABLE OF HOLDING A LOAD	THE USE OF GEAR OILS OTHER THAN RECOMMENDED	LOSS (DAMAGE) OF FLIGHT HARDWARE AND PERSONNEL INJURY	CATASTROPHIC	NSS/GO-1740.9B: <ul style="list-style-type: none"> • PARA. 404 REQUIRES THAT A PREVENTATIVE MAINTENANCE PROGRAM BE ESTABLISHED. • PARA 203.a REQUIRES DAILY SAFETY INSPECTIONS. CMAA SPECIFICATION NO. 74 REQUIRES THAT THE CRANE BE LUBRICATED IN ACCORDANCE WITH CRANE MANUFACTURER'S RECOMMENDATIONS. MANUFACTURER'S RECOMMENDED LUBRICATION SCHEDULE IS PROVIDED IN PUBLICATION WR-1.680-1.	GSFC REQUIRES APPROVED RECERT INSPECTION PROCEDURES FOR LIFTING DEVICES AND EQUIPMENT. ONLY TRAINED AND AUTHORIZED PERSONNEL TO PERFORM MAINTENANCE WORK. DAILY SAFETY INSPECTION PERFORMED.	REMOTE	OPEN	<ul style="list-style-type: none"> • REVIEW RECERT PROCEDURE, DOCUMENT NO. 25-06-016-9 • OPERATOR & RECERT INSPECTIONS • INCLUDE TYPE OIL IN PERIODIC INSPECTION PROCEDURE • CHECK LOG BOOK ENTRY

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 SUBSYSTEM: 7-1/2-TON SATURN, CRANE 7-30, LOCATION: BUILDING 7

DATE: DECEMBER 1996
 PREPARED BY: M. CROMPTON AND R. GAYO

HAZARDOUS CONDITION	HAZARD CAUSE	HAZARD EFFECT	SEVERITY	SAFETY REQUIREMENTS	HAZARD ELIMINATION/ CONTROL PROVISIONS	LIKELIHOOD OF OCCURRENCE	STATUS	VERIFICATION METHOD
POWER IS APPLIED CONTINUOUSLY TO HOIST MOTOR	SPEED CONTROL FAILS INTO FAST SPEED	NO EFFECT WITHOUT CONCURRENT E-STOP FAILURE.	CATASTROPHIC	NSS/GO-1740.9B: <ul style="list-style-type: none"> • PARA. 201.g.(6) REQUIRES THAT THE ELECTRICAL SYSTEM BE FAIL-SAFE AND NOT CAUSE THE HOIST TO OPERATE IN A SPEED RANGE FASTER THAN COMMANDED. • PARA. 201.g.(4) REQUIRES A RED, EMERGENCY STOP BUTTON THAT OPERATES THE MAINLINE CONTACTOR AND/OR MAIN CIRCUIT BREAKER. • PARA. 203.a REQUIRES DAILY SAFETY INSPECTIONS. 	REQUIREMENTS MET BY DESIGN - MULTIPLE INDEPENDENT FAILURES ARE NECESSARY FOR HAZARD TO OCCUR; I.E., SPEED CONTROL AND E-STOP FAILURE. GSFC REQUIRES APPROVED RECERT INSPECTION PROCEDURES FOR LIFTING DEVICES AND EQUIPMENT. DAILY SAFETY INSPECTION PERFORMED.	REMOTE	OPEN	<ul style="list-style-type: none"> • REVIEW RECERT PROCEDURE, DOCUMENT NO. 25-06-016-9 • OPERATOR & RECERT INSPECTIONS • CRANE OPERATOR TRAINING INCLUDES EMERGENCY PROCEDURES. • CHECK LOG BOOK ENTRY
BRAKES FAIL TO HOLD LOAD	MOTOR BRAKE FAILS	NO EFFECT WITHOUT CONCURRENT WORM GEAR FAILURE	CATASTROPHIC	NSS/GO-1740.9B: <ul style="list-style-type: none"> • PARA. 201.f.(2)(6) REQUIRES THAT HOISTS HAVE TWO MEANS OF BRAKING, EACH OF WHICH CAN HOLD THE RATED LOAD. • PARA. 203.a REQUIRES DAILY SAFETY INSPECTIONS. 	THE HOIST HAS TWO MAIN BRAKES, EACH OF WHICH IS CAPABLE OF STOPPING AND HOLDING RATED LOAD. DAILY SAFETY INSPECTION PERFORMED.	REMOTE	OPEN	<ul style="list-style-type: none"> • REVIEW RECERT PROCEDURE, DOCUMENT NO. 25-06-016-9 • OPERATOR & RECERT INSPECTIONS • CHECK LOG BOOK ENTRY

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HAZARDOUS CONDITION	HAZARD CAUSE	HAZARD EFFECT	SEVERITY	SAFETY REQUIREMENTS	HAZARD ELIMINATION/ CONTROL PROVISIONS	LIKELIHOOD OF OCCURRENCE	STATUS	VERIFICATION METHOD
FAILURE OF THE GEAR BOX	DISENGAGES DUE TO STRUCTURAL FAILURE	LOAD WILL DROP - COULD CAUSE DAMAGE TO FLIGHT HARDWARE, FACILITY, AND PERSONNEL	CATASTROPHIC	GEAR BOXES, SPEED REDUCERS, AND COUPLINGS SHALL BE CONSIDERED SINGLE FAILURE POINTS IF THEY ARE LOCATED BETWEEN THE DRUM AND THE BRAKE, IN ACCORDANCE WITH NSTS 22206, REVISION D. NSS/GO-1740.9B, PARA. 203.a REQUIRES DAILY SAFETY INSPECTIONS.	NSS/GO-1740.9B: • PARA. 202.a. AND b. REQUIRE A PROOF LOAD TEST BEFORE FIRST USE, 125% OF THE RATED LOAD. GSFC REQUIRES APPROVED RECERT INSPECTION PROCEDURES FOR LIFTING DEVICES AND EQUIPMENT. CRITICAL LIFT REQUIREMENTS, IN ACCORDANCE WITH GMI 1710.6 SHALL INCLUDE SPECIAL LIFT PROCEDURES. CRITICAL LIFT OPERATORS MUST BE TRAINED IN THE SPECIFIC HAZARDS AND SPECIAL PROCEDURES ASSOCIATED WITH THE LIFT. HOISTS USED FREQUENTLY FOR CRITICAL LIFTS SHALL BE LOAD TESTED AT LEAST ONCE A YEAR. OPERATOR RESPONSE INSTRUCTIONS FOR VARIOUS EMERGENCY SCENARIOS ARE INCLUDED IN TRAINING. DAILY SAFETY INSPECTION PERFORMED.	REMOTE	OPEN	• REVIEW RECERT PROCEDURE, DOCUMENT NO. 25-06-016-9 • OPERATOR & RECERT INSPECTIONS • CRANE OPERATOR TRAINING INCLUDES EMERGENCY PROCEDURES. • CRITICAL LIFT PROCEDURE, DOCUMENT NO. _____ • CHECK LOG BOOK ENTRY
OVERHEATING OF HOIST MOTOR AND OVERLOAD LIMITING CLUTCH	EXCEEDED CLUTCH CAPACITY	UNABLE TO LIFT LOAD, HOIST SYSTEM INOPERATIVE	DELAY FOR REPAIRS	NSS/GO-1740.9B: • PARA. 406.b.(4) REQUIRES THAT THE HOIST SHALL NOT BE LOADED BEYOND RATED LOAD. • PARA 203.a REQUIRES DAILY SAFETY INSPECTIONS.	LDE OPERATORS ARE TRAINED AND CERTIFIED. CRITICAL LIFT OPERATORS MUST BE TRAINED IN THE SPECIFIC HAZARDS AND SPECIAL PROCEDURES ASSOCIATED WITH THE LIFT. DAILY SAFETY INSPECTION PERFORMED.	REMOTE	OPEN	• REVIEW RECERT PROCEDURE, DOCUMENT NO. 25-06-016-9 • OPERATOR & RECERT INSPECTIONS • VERIFICATION OF CRITICAL LIFT OPERATOR CERTIFICATION • CRITICAL LIFT PROCEDURE TOTAL PAYLOAD WEIGHT NOT TO EXCEED RATED CAPACITY, DOCUMENT NO. _____ • CHECK LOG BOOK ENTRY

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DATE: DECEMBER 1996
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HAZARDOUS CONDITION	HAZARD CAUSE	HAZARD EFFECT	SEVERITY	SAFETY REQUIREMENTS	HAZARD ELIMINATION/ CONTROL PROVISIONS	LIKELIHOOD OF OCCURRENCE	STATUS	VERIFICATION METHOD
ROPE NOT SEATED IN GROOVE	SIDE PULL	WORN OUTSIDE WIRES	CATASTROPHIC	NSS/GO-1740.9B: <ul style="list-style-type: none"> • PARA. 206.a.(6) REQUIRES THAT THE HOIST NOT BE USED FOR SIDE PULLS. • PARA. 204 REQUIRES THAT A PREVENTATIVE MAINTENANCE PROGRAM BE ESTABLISHED. • PARA. 205.b.(2) REQUIRES CRITICAL LIFT OPERATORS TO BE TRAINED IN THE SPECIFIC HAZARDS AND SPECIAL PROCEDURES ASSOCIATED WITH THE LIFT. • PARA. 203.a REQUIRES DAILY SAFETY INSPECTIONS. ONLY CERTIFIED AND TRAINED OPERATORS SHALL BE AUTHORIZED TO OPERATE POWERED HOISTS IN ACCORDANCE WITH NSS/GO-1740.9B, PARA. 205.a.	GSFC REQUIRES APPROVED RECERT INSPECTION PROCEDURES FOR LIFTING DEVICES AND EQUIPMENT. AN LDE OPERATOR TRAINING, EXAMINATION, AND LICENSING PROGRAM IS IN PLACE, IN ACCORDANCE WITH NSS/GO-1740.9B, PARA. 405.a. STANDARD OPERATING PROCEDURE REQUIRED FOR OPERATOR TO PERFORM DAILY TEST AND INSPECTION. DAILY SAFETY INSPECTION PERFORMED.	REMOTE	OPEN	<ul style="list-style-type: none"> • REVIEW RECERT PROCEDURE, DOCUMENT NO. 25-06-016-9 • OPERATOR & RECERT INSPECTIONS • VERIFICATION OF CRITICAL LIFT OPERATOR CERTIFICATION <ul style="list-style-type: none"> • CHECK LOG BOOK ENTRY
IMPROPERLY SEATED LOAD	LOAD UNSECURED IN HOOK OR HAND CHAIN IS IMPROPERLY SEATED IN THE HAND CHAIN WHEEL. LIFTING BELOW CG IMBALANCED LOAD.	LOSS OF FLIGHT HARDWARE OR EQUIPMENT AND/OR INJURY TO PERSONNEL	CATASTROPHIC	PARA. 101.C.(1)(c) OF NSS/GO-1740.9B REQUIRES THAT SPECIFIC WRITTEN PROCEDURES BE PREPARED AND FOLLOWED FOR CRITICAL LIFTS.	CRITICAL LIFT OPERATORS MUST BE TRAINED IN THE SPECIFIC HAZARDS AND SPECIAL PROCEDURES ASSOCIATED WITH THE LIFT.	REMOTE	OPEN	<ul style="list-style-type: none"> • REVIEW SPECIFIC WRITTEN CRITICAL LIFT PROCEDURE • CONDUCT PRE-LIFT BRIEFING • PERFORM STABILITY ANALYSIS • CHECK OPERATOR CERTIFICATION
OPERATION WITH AN UNSAFE CONDITION IN LIFTING DEVICE	DEFICIENT HOOK, BRAKE, LOAD CHAIN, ETC.	LOSS OF FLIGHT HARDWARE OR EQUIPMENT AND/OR INJURY TO PERSONNEL	CATASTROPHIC	PARA. 206.a.(9) OF NSS/GO-1740.9B REQUIRES THAT THE OPERATOR TEST ALL CONTROLS PRIOR TO OPERATION	PARA. 403.f. OF NSS/GO-1740.9B REQUIRES THAT ALL INADEQUACIES BE CORRECTED PRIOR TO FURTHER USE.	REMOTE	OPEN	<ul style="list-style-type: none"> • CHECK LOG BOOK • PERFORM DAILY INSPECTION • VERIFY LDE RECERT STATUS
IMPROPER OPERATION	SUSPENDED LOAD UNATTENDED	LOSS OF FLIGHT HARDWARE OR EQUIPMENT AND/OR INJURY TO PERSONNEL	CATASTROPHIC	PARA. 206.a.(21) OF NSS/GO-1740.9B REQUIRES THAT LOAD MUST BE MANNED IF LOAD IS ON HOOK AND PERSONNEL NOT TO WORK UNDER SUSPENDED LOADS.	PARA. 101.c.(1)(e) OF NSS/GO-1740.9B REQUIRES THAT SPECIFIC WRITTEN PROCEDURES BE PREPARED AND FOLLOWED FOR ALL CRITICAL LIFTS.	REMOTE	OPEN	<ul style="list-style-type: none"> • REVIEW SPECIFIC WRITTEN, CRITICAL LIFT PROCEDURES

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HAZARDOUS CONDITION	HAZARD CAUSE	HAZARD EFFECT	SEVERITY	SAFETY REQUIREMENTS	HAZARD ELIMINATION/ CONTROL PROVISIONS	LIKELIHOOD OF OCCURRENCE	STATUS	VERIFICATION METHOD
					AN LDE OPERATOR TRAINING, EXAMINATION, AND LICENSING PROGRAM IS IN PLACE, IN ACCORDANCE WITH NSS/GO-1740.9B, PARA. 405.a.	REMOTE	OPEN	VERIFY LDE CRITICAL LIFT OPERATOR CERTIFICATION
LOSS OF LOAD SUPPORT	SLING/RIGGING HAVE INSUFFICIENT CAPACITY	LOSS OF FLIGHT HARDWARE OR EQUIPMENT AND/OR INJURY TO PERSONNEL	CATASTROPHIC	PARA. 406 REQUIRES THAT OPERATORS BE CERTIFIED TO PERFORM CRITICAL LIFTS AND BE TRAINED IN THE SPECIFIC HAZARDS AND SPECIAL PROCEDURES ASSOCIATED WITH THE LIFT.	AN LDE OPERATOR TRAINING, EXAMINATION, AND LICENSING PROGRAM IS IN PLACE, IN ACCORDANCE WITH NSS/GO-1740.9B, PARA. 405.a.	REMOTE	OPEN	<ul style="list-style-type: none"> • VERIFY LDE CRITICAL LIFT OPERATOR CERTIFICATION • CHECK CERTIFICATION TAG ON SLINGS.