CRITICAL ITEMS LIST

Reference Designator: SES
Name/Quantity: ERCM SAFETY TETHER EXTENSION STRAP
Drawing Reference: 10162-20060-01

Project: SHUTTLE
LRU Name/Quantity: ERCM SAFETY TETHER EXTENSION STRAP
LRU Part Number: 10162-20060-01

Subsystem: EVA TETHERS
Effectivity: All Orbiters

FAILURE MODE NUMBER	CRITICALITY
SES FM01	1/1

FUNCTION

PROVIDES EXTENDED HOOK ATTACHMENT LOOP BETWEEN ERCM SAFETY TETHER AND CREWMEMBER WAIST TETHER

FAILURE MODE AND CAUSE

LOSS OF EXTENSION STRAP

CAUSE:

BROKEN STRAP DUE TO DAMAGED OR DEFECTIVE MATERIAL, BROKEN STITCHES

EXECUTE PROCESSING

REDUNDANCY SCREENS	REMAINING PATHS
A -	
B - N/A	N/A
C -	

MISSION PHASE	TIME TO EFFECT	TIME TO CORRECT
EVA	IMMEDIATE	N/A

FAILURE EFFECT	RETENTION RATIONALE
END ITEM EXTENSION STRAP SEPARATES FROM SAFETY TETHERS.	A DESIGN THE EXTENSION STRAP IS FABRICATED FROM 1" KEVLAR WEBBING (MIL-T-87130) WHICH HAS A TENSILE STRENGTH OF 6000 LBS. KEVLAR 5-PLY CORD IS USED FOR STITCHING PER FED-STD-751-A, LOCK STITCH TYPE 301, 7 TO 10 STITCHES PER INCH. ALL CUT EDGES OF FABRIC AND WEBBING ARE COATED WITH KEL-F-800 TO PREVENT FRAYING.
MISSION NONE	PROPERTIES OF KEVLAR REDUCE DETERIORATION FROM EXPOSURE TO SPACE ENVIRONMENTS.
CREW/VEHICLE POSSIBLE LOSS OF CREWMEMBER DUE TO SEPARATION FROM ORBITER.	B TEST COMPONENT ACCEPTANCE TEST - DURING MANUFACTURING, A PROTOTYPE WAS FABRICATED FROM THE LOTS OF FLIGHT MATERIALS AND PROOF LOAD TESTED TO 2000 LBS. POA TEST - DURING POA, EACH STRAP IS ACCEPTANCE LOAD TESTED TO 600 LBS. PER TLC DOCUMENT 10107-70091.
INTERFACE ERCM TETHER SEPARATES FROM CREWMEMBER WAIST TETHER	

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CRITICAL ITEMS LIST

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Project: SHUTTLE
LRU Name/Quantity: ERCM SAFETY TETHER EXTENSION STRAP
LRU Part Number: 10162-20060-01

Subsystem: EVA TETHERS
Effectivity: All Orbiters

FAILURE MODE NUMBER
SES FM01

CRITICALITY
1/1

FUNCTION

PROVIDES EXTENDED HOOK ATTACHMENT LOOP BETWEEN ERCM SAFETY TETHER AND CREWMEMBER WAIST TETHER.

FAILURE MODE AND CAUSE

LOSS OF EXTENSION STRAP

CAUSE:

BROKEN STRAP DUE TO DAMAGED OR DEFECTIVE MATERIAL, BROKEN STITCHES

REDUNDANCY SCREENS	REMAINING PATHS
A - B - N/A C -	N/A

MISSION PHASE	TIME TO EFFECT	TIME TO CORRECT
EVA	IMMEDIATE	N/A

FAILURE EFFECT

END ITEM

EXTENSION STRAP SEPARATES FROM SAFETY TETHERS.

MISSION

NONE

CREW/VEHICLE

POSSIBLE LOSS OF CREWMEMBER DUE TO SEPARATION FROM ORBITER.

INTERFACE

ERCM TETHER SEPARATES FROM CREWMEMBER WAIST TETHER.

RETENTION RATIONALE

DURING PDA, THE FOLLOWING INSPECTION POINTS ARE PERFORMED AT THE ASSEMBLY LEVEL IN ACCORDANCE WITH ILC DOCUMENT 10107-70871.

1. VISUAL INSPECTION FOR MATERIAL DEGRADATION.

2. VISUAL INSPECTION FOR STRUCTURAL DAMAGE AFTER ACCEPTANCE LOAD TEST.

D FAILURE HISTORY

NO FAILURE HISTORY EXISTS ON THIS ITEM.

E GROUND TURNAROUND

EXTENSION STRAP REMAINS STOWED ON ERCM TETHER IN PAYLOAD BAY ONE YEAR OR UNTIL EVA USE. IF STRAP HAS NOT BEEN USED, IT IS INSPECTED FOR BROKEN STITCHES, ABRASION OR DAMAGE PER ILC DOCUMENT 10107-70873, AND LOAD TESTED BEFORE VEHICLE INSTALLATION PER BOEING DOCUMENT PS28/PTA-B6004. STRAPS THAT ARE USED ARE REPLACED.

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PREPARED BY: C.L HARTMAN REVISION DATE: 1/90

CRITICAL ITEMS LIST

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Drawing Reference: 10162-20060-01

Project: SHUTTLE
LRU Name/Quantity: ERCM SAFETY TETHER EXTENSION STRAP
LRU Part Number: 10162-20060-01

Subsystem: EVA TETHERS
Effectivity: All Orbiters

FAILURE MODE NUMBER SES FM01	CRITICALITY 1/1

FUNCTION

PROVIDES EXTENDED HOOK ATTACHMENT LOOP BETWEEN ERCM SAFETY TETHER AND CREWMEMBER WAIST TETHER.

FAILURE MODE AND CAUSE

LOSS OF EXTENSION STRAP

CAUSE:

BROKEN STRAP DUE TO DAMAGED OR DEFECTIVE MATERIAL, BROKEN STITCHES

REDUNDANCY SCREENS	REMAINING PATHS
A - B - N/A C -	N/A

MISSION PHASE	TIME TO EFFECT	TIME TO CORRECT
EVA	IMMEDIATE	N/A

FAILURE EFFECT

END ITEM

EXTENSION STRAP SEPARATES FROM SAFETY TETHERS.

MISSION

NONE

CREW/VEHICLE

POSSIBLE LOSS OF CREWMEMBER DUE TO SEPARATION FROM ORBITER.

INTERFACE

ERCM TETHER SEPARATES FROM CREWMEMBER WAIST TETHER.

RETENTION RATIONALE

CERTIFICATION TEST -
DURING DESIGN VERIFICATION TESTING, THE STRAP SAMPLE WITHSTOOD A LOAD OF 2800 LBS. PER TPS D1620007. NO STITCHING OR WEBBING FAILURE WAS OBSERVED.

C INSPECTION

COMPONENTS AND MATERIAL MANUFACTURED TO ILC REQUIREMENTS AT AN APPROVED SUPPLIER ARE DOCUMENTED FROM PROCUREMENT THROUGH SHIPPING BY THE SUPPLIER. ILC INCOMING RECEIVING INSPECTION VERIFIES THAT THE MATERIALS RECEIVED ARE AS IDENTIFIED IN THE PROCUREMENT DOCUMENTS, THAT NO DAMAGE HAS OCCURED DURING SHIPMENT AND THAT SUPPLIER CERTIFICATION WAS BEEN RECEIVED WHICH PROVIDES TRACEABILITY INFORMATION.

THE FOLLOWING MIP's ARE PERFORMED DURING THE STRAP ASSEMBLY MANUFACTURING PROCESS TO ASSURE THE FAILURE CAUSES ARE PRECLUDED FROM THE FABRICATED ITEM:

1. VISUAL INSPECTION OF ALL MATERIALS TO VERIFY NO DAMAGE OR DEGRADATION.

2. CUT PIECES ARE INSPECTED FOR PROPER DIMENSIONS.

3. VISUAL INSPECTION OF ALL STITCHING TO VERIFY PROPER TENSION AND LENGTH.

EXPEDITE PROCESSING

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PREPARED BY C.L. HARTMAN REVISION

DATE: 1/90

Reference Designator: SES
Name/Quantity: ERCM SAFETY TETHER EXTENSION STRAP
Drawing Reference: 10162-20060-01

Project: SHUTTLE
LRU Name/Quantity: ERCM SAFETY TETHER EXTENSION STRAP
LRU Part Number: 10162-20060-01

Subsystem: EVA TETHERS
Effectivity: All Orbiters

FAILURE MODE NUMBER	CRITICALITY
SES FM01	1/1

FUNCTION

PROVIDES EXTENDED HOOK ATTACHMENT LOOP BETWEEN ERCM SAFETY TETHER AND CREWMEMBER WAIST TETHER.

FAILURE MODE AND CAUSE

LOSS OF EXTENSION STRAP

CAUSE:

BROKEN STRAP DUE TO DAMAGED OR DEFECTIVE MATERIAL, BROKEN STITCHES.

REDUNDANCY SCREENS	REMAINING PATHS
A - B - N/A C -	N/A

MISSION PHASE	TIME TO EFFECT	TIME TO CORRECT
EVA	IMMEDIATE	N/A

FAILURE EFFECT

END ITEM

EXTENSION STRAP SEPARATES FROM SAFETY TETHERS.

MISSION

NONE

CREW/VEHICLE

POSSIBLE LOSS OF CREWMEMBER DUE TO SEPARATION FROM ORBITER.

INTERFACE

ERCM TETHER SEPARATES FROM CREWMEMBER WAIST TETHER.

RETENTION RATIONALE

F OPERATIONAL USE

A. OPERATIONAL EFFECT OF FAILURE: WORSE CASE THIS FAILURE WOULD ALLOW THE CREWMEMBER TO BECOME SEPARATED FROM THE ORBITER. THE EVA TASK WOULD BE STOPPED TEMPORARILY. OVERALL TIME OF EVA MAY BE INCREASED.

B. CREW ACTION: THE REMAINING CREW IN THE ORBITER WOULD BE REQUIRED TO MANEUVER THE ORBITER OVER TO THE FREE-FLOATING CREWMEMBER FOR RESCUE. AT THIS POINT, THE CREWMEMBER COULD RETETHER TO THE ERCM TETHER OR TO THE ORBITER USING THE WAIST TETHER. WITH ADDITIONAL TIME, THE FAILURE COULD BE OVERCOME ALLOWING THE CREWMEMBER TO MOVE ABOUT THE PAYLOAD BAY WITH LIMITED FLEXIBILITY COMPARED TO THE NOMINAL CONFIGURATION.

C. CREW TRAINING: STANDARD CREW TRAINING TEACHES THE CREWMEMBER TO MANEUVER UNDER COMPLETE CONTROL AT ALL TIMES DURING EVA. FREE-FLOATING IS NOT SUGGESTED OR PRACTICED. THIS WOULD MINIMIZE THE CHANCE OF THE CREWMEMBER BECOMING SEPARATED FROM THE ORBITER.

D. MISSION CONSTRAINTS: EVA TASKS AND HARDWARE WILL BE DESIGNED SO THAT POSITIVE CREWMEMBER RESTRAINT AIDS WILL BE PROVIDED AT ALL WORK SITES AND EVA TRANSLATION PATHS.

E. IN-FLIGHT CHECKOUT: THE EVA CREWMEMBER WILL INSPECT ALL THE EVA RESTRAINT HARDWARE PRIOR TO ITS USE. THIS WILL MINIMIZE THE EFFECT OF FAILURES DURING EVA.

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EXPEDITE PROCESS 3

PREPARED BY C. E. HARTMAN REVISION DATE: 1/90