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6 February 2007

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SUBJECT: Report No. 06-04, "Transportability Testing of the Joint Modular Intermodal Platform (JMIP)", TP-94-01, "Transportability Testing Procedures"

1. Enclosed please find subject report dated November 2006.

2. The POC is the undersigned, SJMAC-DEV, DSN 956-8908.

FOR THE DIRECTOR:

JERRY W. BEAVER
Chief, Validation Engineering Division

Encl
as

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FINAL REPORT
NOVEMBER 2006

REPORT NO. 06-04

TRANSPORTABILITY TESTING OF THE JOINT MODULAR INTERMODAL PLATFORM (JMIP) TP-94-01, "TRANSPORTABILITY TESTING PROCEDURES"

Prepared for:

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REPORT NO. 06-04 **NOVEMBER 2006**
TRANSPORTABILITY TESTING OF THE
JOINT MODULAR INTERMODAL PLATFORM (JMIP)
TP-94-01, REV. 2, JUNE 2004, "TRANSPORTABILITY TESTING PROCEDURES"

ABSTRACT

The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SJMAC-DEV), was tasked by the Logistics Research and Development Activity (AMSRD-AAR-AIL-F), Picatinny Arsenal, NJ to conduct transportability testing on the Joint Modular Intermodal Platform (JMIP) manufactured by SEA BOX Inc, East Riverton, NJ. The testing was conducted in accordance with TP-94-01, Revision 2, June 2004 "Transportability Testing Procedures."

The objective of the testing was to evaluate securing and transporting bulk ammunition on the JMIP when transportability tested in accordance with TP-94-01, Revision 2, June 2004.

The following observations resulted from the testing of JMIP:

1. Prior to the beginning of testing, hydraulic fluid was leaking from the rear of the JMIP.
2. The rear rollers could not be adjusted using the manual hydraulic pump.
3. The tie-down rings interfered with the dunnage.
4. Permanent end gates for blocking/bracing of the ammunition payloads are required with a usable deck length of 217 inches and usable deck width of 89 inches.
5. When loaded onto the PLS truck, the rails at the front of the JMIP did not rest on the PLS truck support (frog feet). The base of the JMIP, between the main rails, rested on the PLS load handling system.
6. The bracket at the rear of the JMIP broke loose from the JMIP rail.

7. The tie-down ring, without straps, on the right side was loose following completion of the washboard course. The tie-down ring could easily be pulled out of position.

8. When loading the JMIP into the intermodal container, tie-down rings were damaged due to contact with the side of the container door.

9. The rollers on the JMIP changed position during the PLS testing. Before the start of testing with the JMIP in the intermodal container, the JMIP had to be removed and the rollers adjusted.

10. When the A-frame is in the "transport mode", the A-frame contacts the inside of the container door.

11. The rear tiedowns contact the container wall and during testing the rear tie-down rings damaged the container wall.

12. The pins holding the A-frame in the container transport position bent during the hazard course testing and failed during the washboard course testing.

13. The main rail on PLS driver's side moved aft and retracted. Rail pinholes would no longer properly align on the PLS truck.

14. The corner lock on the PLS driver's side would not properly retract at the completion of testing. The lock had to be retracted using a hammer and pry bar.

15. The plate and corner locking mechanisms are susceptible to damage when the JMIP is moved using a forklift at the A-frame end.

16. The hydraulic motor would not operate upon completion of the testing.

17. During testing in the intermodal container a handle detached from the twistlock provision.

18. The pallets of 120MM Tank Ammunition with the tie-down straps in position exceeded the intermodal container door-opening dimension. Therefore, the 120MM Tank Ammunition, or similar wide load cannot be secured to the JMIP and transported in the intermodal container.

19. All tie-down/lifting provisions on the JMIP must conform to MIL-STD- 209, "Interface Standard for Lifting and Tie-down Provisions." Also, recommend that the cargo tie-down provisions be permanently attached.

20. All dimensions of the JMIP must conform to the NATO Interoperability Agreement, STANAG 2413.

The JMIP, as currently designed, is **not adequate**, for the transportation of bulk ammunition.

Prepared by:

PHILIP W. BARICKMAN
Lead Validation Engineer

Reviewed by:

JERRY W. BEAVER
Chief, Validation Engineering Division

U.S. ARMY DEFENSE AMMUNITION CENTER

VALIDATION ENGINEERING DIVISION
MCALESTER, OK 74501-9053

REPORT NO. 06-04

Transportability Testing of the Joint Modular Intermodal Platform (JMIP)
TP-94-01, Revision 2, June 2004 "Transportability Testing Procedures"

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PART 1 – INTRODUCTION

A. BACKGROUND. The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SJMAC-DEV), was tasked by the Logistics Research and Development Activity (AMSRD-AAR-AIL-F), Picatinny Arsenal, NJ to conduct transportability testing on the Joint Modular Intermodal Platform (JMIP) manufactured by SEA BOX Inc, East Riverton, NJ. The testing was conducted in accordance with TP-94-01, Revision 2, June 2004 "Transportability Testing Procedures."

B. AUTHORITY. This test was conducted IAW mission responsibilities delegated by the U.S. Army Joint Munitions Command (JMC), Rock Island, IL. Reference is made to the following:

1. AR 740-1, 15 June 2001, Storage and Supply Activity Operation.

2. OSC-R, 10-23, Mission and Major Functions of U.S. Army Defense Ammunition Center (DAC) 21 Nov 2000.

C. OBJECTIVE. The objective of the testing was to evaluate securing and transporting bulk ammunition on the Joint Modular Intermodal Platform (JMIP) when transportability tested in accordance with TP-94-01, Revision 2, June 2004.

D. OBSERVATIONS. The following observations resulted from the testing of JMIP:

1. Prior to the beginning of testing hydraulic fluid was leaking from the rear of the JMIP.
2. The rear rollers could not be adjusted using the manual hydraulic pump.
3. The tie-down rings interfered with the dunnage.

4. Permanent end gates for blocking/bracing of the ammunition payloads are required with a usable deck length of 217 inches and usable deck width of 89 inches.

5. When loaded onto the PLS truck, the rails at the front of the JMIP did not rest on the PLS truck support (frog feet). The base of the JMIP, between the main rails, rested on the PLS load handling system.

6. The bracket at the rear of the JMIP broke loose from the JMIP rail.

7. The tie-down ring, without straps, on the right side was loose following completion of the washboard course. The tie-down ring could easily be pulled out of position.

8. When loading the JMIP into the intermodal container tie-down rings were damaged due to contact with the side of the container door.

9. The rollers on the JMIP changed position during the PLS testing. Before the start of testing with the JMIP in the intermodal container the JMIP had to be removed and the rollers adjusted.

10. When the A-frame is in the "transport mode" the A-frame contacts the inside of the container door.

11. The rear tie-down rings contact the container wall and during testing the rear tie-down rings damaged the container wall.

12. The pins holding the A-frame in the container transport position bent during the hazard course testing and failed during the washboard course testing.

13. The main rail on PLS driver's side moved aft and retracted. Rail pinholes would no longer properly align on the PLS truck.

14. The corner lock on the PLS driver's side would not properly retract at the completion of testing. The lock had to be retracted using a hammer and pry bar.

15. The plate and corner locking mechanisms are susceptible to damage when the JMIP is moved using a forklift at the A-frame end.

16. The hydraulic motor would not operate upon completion of the testing.

17. During testing in the intermodal container a handle detached from the twistlock provision.

18. The pallets of 120MM Tank Ammunition with the tie-down straps in position exceeded the intermodal container door-opening dimension. Therefore, the 120MM Tank Ammunition, or similar wide load cannot be secured to the JMIP and transported in the intermodal container.

19. All tie-down/lifting provisions on the JMIP must conform to MIL-STD- 209, "Interface Standard for Lifting and Tie-down Provisions." Also, recommend that the cargo tie-down provisions be permanently attached.

20. All dimensions of the JMIP must conform to the NATO Interoperability Agreement, STANAG 2413.

E. CONCLUSION. The JMIP, as currently designed, is **not adequate**, for the transportation of bulk ammunition.

PART 2 - ATTENDEES

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Bob Cook (570) 362-1239	52 Madison St. Newton, NJ 07860

PART 3 - TEST EQUIPMENT

1. Joint Modular Intermodal Platform
   Manufactured by SEA BOX, East Riverton, NJ
   Model Number: J-MIP LN702
   Serial Number: 00002
   Date of Manufacture: 27 February 2006
   Tare Weight: 3,960 pounds

2. Palletized Load System Truck
   Model #: M1074
   Manufactured by Oshkosh Truck Corporation, Oshkosh, WI
   ID #: 10T2P1NH6N1044011
   NSN: 2320-01-304-2277
   Serial #: 44011
   Curb Weight: 55,000 pounds

3. Truck, Tractor, MTV, M1088 A1
   ID #: J0231
   NSN: 2320 01 447 3893
   VSN: NL1FR5
   MFG Serial #: T-018447EFJM
   Weight: 19,340 pounds

4. Semitrailer, flatbed, breakbulk/container transporter, 34 ton
   Model #: M872A1
   Manufactured by Heller Truck Body Corporation, Hillsdale, NJ
   ID #: 11-1505 NX05NZ
   NSN: 2330 01 109 8006
   Weight: 19,240 pounds

5. Intermodal Container

ID # CMCU 200006-8

Date of Manufacture: 06/99

Manufactured by Charleston Marine Containers, Charleston, SC

Tare Weight: 4,870 pounds

Maximum Gross Weight: 67,200 pounds

PART 4 - TEST PROCEDURES

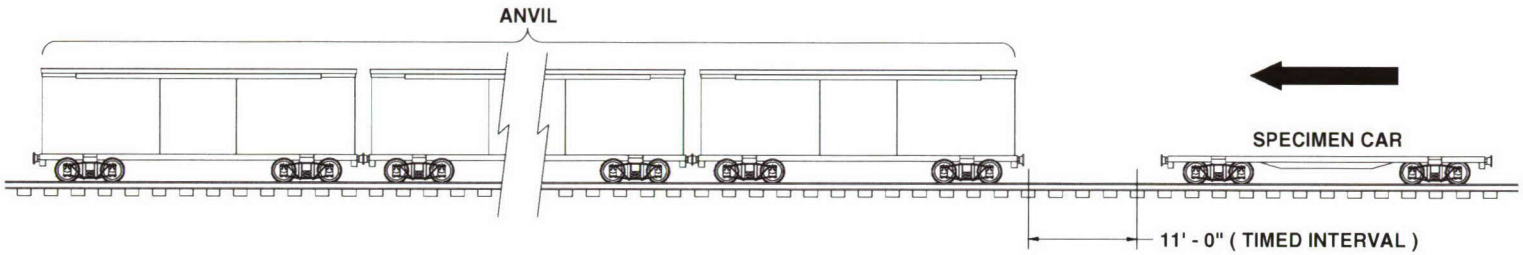
The test procedures outlined in this section were extracted from TP-94-01, "Transportability Testing Procedures," Revision 2, June 2004, for validating tactical vehicles and outloading procedures used for shipping munitions by tactical truck, railcar, and ocean-going vessel.

The rail impact will be conducted with the loaded intermodal container secured directly to the railcar. Inert (non-explosive) items were used to build the load. The test loads were prepared using the blocking and bracing procedures proposed for use with munitions (***see Part 6- Drawings for procedures***). The weight and physical characteristics (weights, physical dimensions, center of gravity, etc.) of the test loads were similar to live (explosive) ammunition.

A. RAIL TEST. RAIL IMPACT TEST METHOD. The test load or vehicle will be secured to a flatcar. The equipment needed to perform the test will include the specimen (hammer) car, four empty railroad cars connected together to serve as the anvil, and a railroad locomotive. The anvil cars will be positioned on a level section of track with air and hand brakes set and with draft gears compressed. The locomotive unit will push the specimen car toward the anvil at a predetermined speed, then disconnect from the specimen car approximately 50 yards away from the anvil cars allowing the specimen car to roll freely along the track until it strikes the anvil. This will constitute an impact. Impacting will be accomplished at speeds of 4, 6, and 8.1 mph in one direction and at a speed of 8.1 mph in the reverse direction. The tolerance for the speeds is plus 0.5 mph, minus 0.5 mph for the 4 mph and 6 mph impacts, and plus 0.5 mph, minus 0 mph for the 8.1 mph impacts. The impact speeds will be determined by using an electronic counter to measure the time for the specimen car to traverse an 11-foot distance immediately prior to contact with the anvil cars (see Figure 1).

ASSOCIATION OF AMERICAN RAILROADS (AAR)

STANDARD TEST PLAN



4 BUFFER CARS (ANVIL)
WITH DRAFT GEAR
COMPRESSED AND AIR BRAKES IN A SET POSITION

ANVIL CAR TOTAL WT. 250,000 LBS (APPROX)

SPECIMEN CAR IS RELEASED BY SWITCH ENGINE TO
ATTAIN: IMPACT NO. 1 @ 4 MPH
IMPACT NO. 2 @ 6 MPH
IMPACT NO. 3 @ 8.1 MPH

THEN THE CAR IS REVERSED AND RELEASED BY SWITCH ENGINE TO ATTAIN:

IMPACT NO. 4 @ 8.1 MPH

Figure 1. Rail Impact Sketch

B. ON/OFF ROAD TEST.

1. HAZARD COURSE. The test load or vehicle will be transported over the 200-foot-long segment of concrete-paved road consisting of two series of railroad ties projecting 6 inches above the level of the road surface. The hazard course will be traversed two times (see Figure 2).

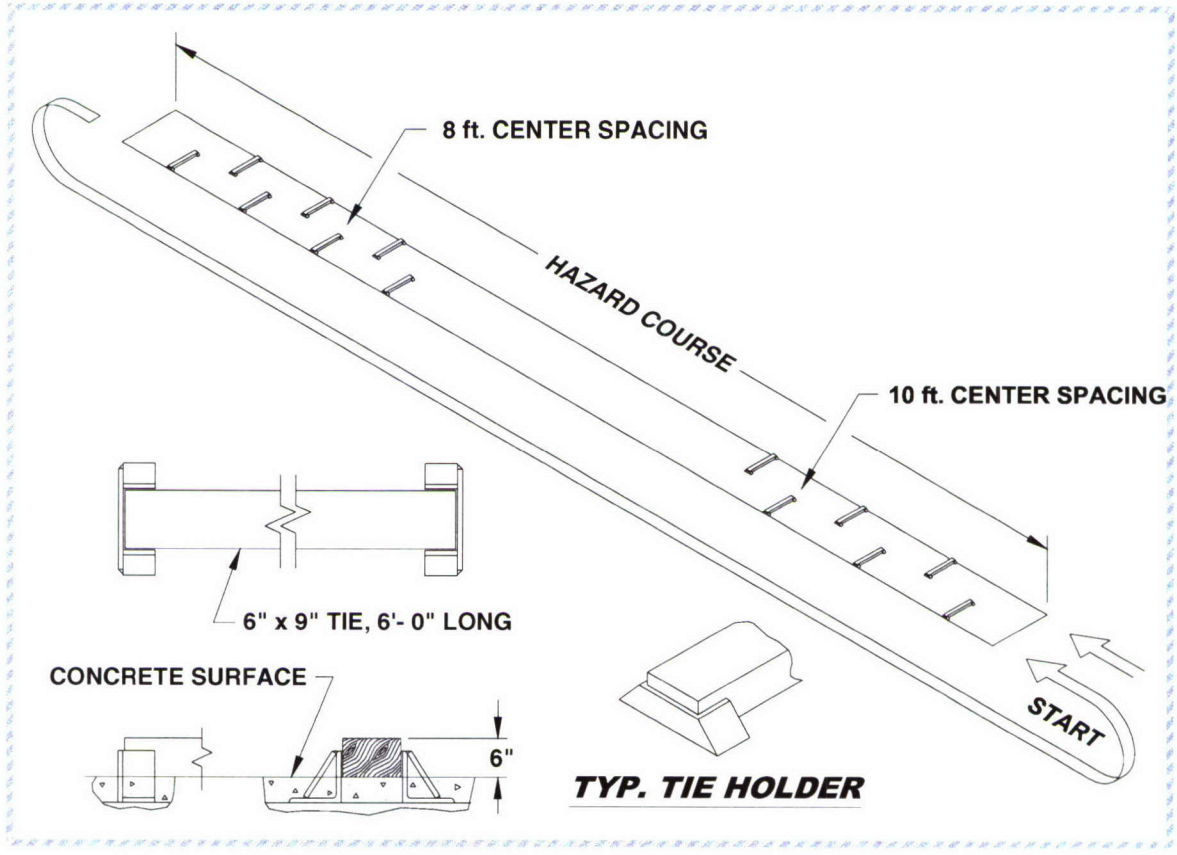


Figure 2. Hazard Course Sketch

a. The first series of 6 ties are spaced on 10-foot centers and alternately positioned on opposite sides of the road centerline for a distance of 50 feet.

b. Following the first series of ties, a paved roadway of 75 feet separates the first and second series of railroad ties.

c. The second series of 7 ties are spaced on 8-foot centers and alternately positioned on opposite sides of the road centerline for a distance of 48 feet.

d. The test load is driven across the hazard course at speeds that will produce the most violent vertical and side-to-side rolling reaction obtainable in traversing the hazard course (approximately 5 mph).

2. ROAD TRIP. The test load or vehicle will be transported for a distance of 30 miles over a combination of roads surfaced with gravel, concrete, and asphalt. The test route will include curves, corners, railroad crossings and stops and starts. The test load or vehicle will travel at the maximum speed for the particular road being traversed, except as limited by legal restrictions.

3. PANIC STOPS. During the road trip, the test load or vehicle will be subjected to three (3) full airbrake stops while traveling in the forward direction and one in the reverse direction while traveling down a 7 percent grade. The first three stops are at 5, 10, and 15 mph while the stop in the reverse direction is approximately 5 mph. This testing will not be required if the Rail Impact Test is performed.

4. WASHBOARD COURSE. The test load or vehicle will be driven over the washboard course at a speed that produces the most violent response in the vertical direction.

C. OCEAN-GOING VESSEL TEST. Shipboard Transportation Simulator (Test Method 5). The Shipboard Transportation Simulator (STS) is used for testing loads in 8-foot-wide by 20-foot-long intermodal freight containers. The specimen shall be positioned onto the STS and securely locked in place using the cam lock at each corner. Using the procedure detailed in the operating instructions, the STS shall begin oscillating at an angle of 30 degrees, plus or minus 2 degrees, either side of vertical center and a frequency of 2 cycles-per-

minute (30 seconds, plus or minus 2 seconds) for a duration of two (2) hours. This frequency shall be observed for apparent defects that could cause a safety hazard. The frequency of oscillation shall then be increased to 4 cycles-per-minute (15 seconds, plus or minus one second per cycle) and the apparatus operated for two (2) hours. If an inspection of the load does not indicate an impending failure, the frequency of oscillation shall be further increased to 5 cycles-per-minute (12 seconds, plus or minus one second per cycle), and the apparatus operated for four (4) hours. The operation does not necessarily have to be continuous; however, no changes or adjustments to the load or load restraints shall be permitted at any time during the test. After once being set in place, the test load (specimen) shall not be removed from the apparatus until the test has been completed or is terminated.

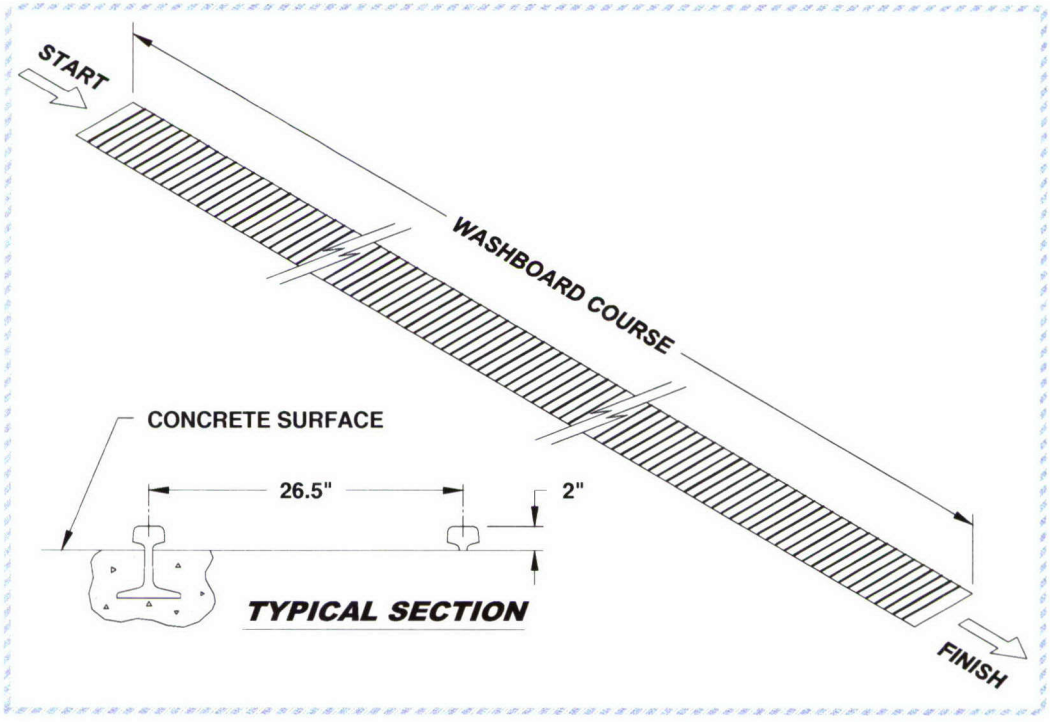


Figure 3. Washboard Course Sketch

PART 5 - TEST RESULTS

5.1

Test Specimen: SEA BOX JMIP

Payload: 120MM Tank Ammunition

Testing Date: 27 June 2006

A. OBSERVATION. The pallets of 120MM Tank Ammunition with the tie-down straps in position exceeded the intermodal container door-opening dimension. When engaged in the tie-down ring the hook of the strap extended past the width of the JMIP. The overhang on the left side was 1.25 inches and on the right side was 2.375 inches. The overall width was 94.875 inches and the intermodal door opening dimension of the SEA BOX container was 92.5 inches. Therefore, the JMIP with payload was too wide to load the intermodal container.

Photo 1. Overhang of Hook.

B. CONCLUSION. The 120MM Tank Ammunition or similar wide load cannot be secured to the JMIP and transported in the intermodal container.

5.2

Test Specimen: SEA BOX JMIP on the PLS truck.

Payload: 155MM Separate Loading Projectiles

Testing Date: 28 June 2006

Gross Weight: 15,540 pounds (Including JMIP and projectiles).

Notes:

1. When loaded onto the PLS truck, the rails at the front of the JMIP did not rest on the PLS truck support (frog feet). The base of the JMIP, between the main rails, rested on the PLS load handling system.
2. Prior to the beginning of testing hydraulic fluid was leaking from the rear of the JMIP.
3. Prior to the beginning of testing the rollers could not be adjusted using the manual hydraulic pump.
4. The tie-down rings and hooks interfered with the dunnage.

Photo 2. JMIP Base Resting on PLS Load Handling System.

A. ON/OFF ROAD TESTS.

1. HAZARD COURSE.

Pass No.	Elapsed Time	Avg. Velocity (mph)
1	24 Seconds	6
2	20 Seconds	7

Figure 4.

Remarks:

1. Figure 4 lists the average speeds of the test load through the Hazard Course.
2. Inspection following Passes #1 & #2 did not reveal any damage to the JMIP.

2. ROAD TRIP:

Remarks:

1. The Road Trip was conducted between the Road Hazard Course Passes #2 and #3.
2. Inspection following the Road Trip revealed no damage or movement of the JMIP.

3. PANIC STOPS: Inspection following completion of each of the Panic Stops did not reveal any damage or movement of the JMIP.

4. HAZARD COURSE:

Pass No.	Elapsed Time	Avg. Velocity (mph)
3	20 Seconds	7
4	19 Seconds	7

Figure 5.

Remarks:

1. Figure 5 lists the average speeds of the test load through the Hazard Course.
2. Inspection following Pass #4 revealed that the weld that attached the side sway bracket to the main rail failed.

Photo 3. Broken Side Sway Bracket Weld.

5. WASHBOARD COURSE:

Remarks:

1. Inspection following the Washboard Course did not reveal any damage to the JMIP.
2. Unused tie-down ring along the side was loose and could easily be removed.

Photo 4. Loose Tie-down Ring.

B. OBSERVATIONS:

1. Permanent end gates for blocking/bracing of the ammunition payloads are required with a usable deck length of 217 inches and usable deck width of 89 inches.

2. All dimensions of the JMIP must conform to the NATO Interoperability Agreement, STANAG 2413.

3. All tie-down/lifting provisions on the JMIP must conform to MIL-STD-209, "Interface Standard for Lifting and Tie-down Provisions." Also, recommend that the cargo tie-down provisions be permanently attached.

C. CONCLUSION: The JMIP, as currently designed, is **not adequate**, for the transportation of ammunition.

5.3

Test Specimen: SEA BOX JMIP in an Intermodal Container

Payload: 155MM Separate Loading Projectiles

Testing Date: 29-30 June 2006

Gross Weight: 20, 410 pounds (Including JMIP, projectiles and intermodal container).

Notes:

1. When loading the JMIP in the intermodal container, the tie-down rings were damaged due to contact with the side of the container.

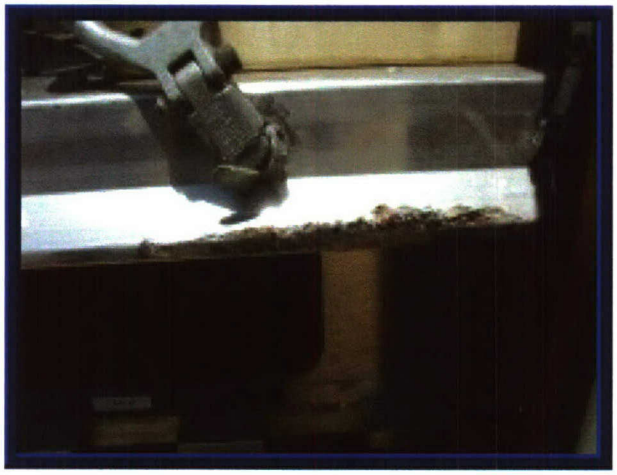


Photo 5. Damaged Tie-Down Ring.

The rollers on the JMIP changed position during the PLS testing. Before the start of testing with the JMIP in the intermodal container the JMIP had to be removed and the rollers adjusted.

Photo 6. Rollers Holding the Main Rails off of the Container Floor.

2. When inside the intermodal container the A-frame contacts the inside of the container door.

Photo 7. A-frame Contacting the Container Door.

A. ON/OFF ROAD TESTS.

1. HAZARD COURSE.

Photo 8. Hazard Course Testing of the SEA BOX JMIP

Pass No.	Elapsed Time	Avg. Velocity (mph)
1	27 Seconds	6
2	25 Seconds	6

Figure 6.

Remarks:

1. Figure 6 lists the average speeds of the test load through the Hazard Course.
2. Inspection following Pass #1 revealed that the pin holding the A-frame in the "Container Transport" position fatigued and bent.

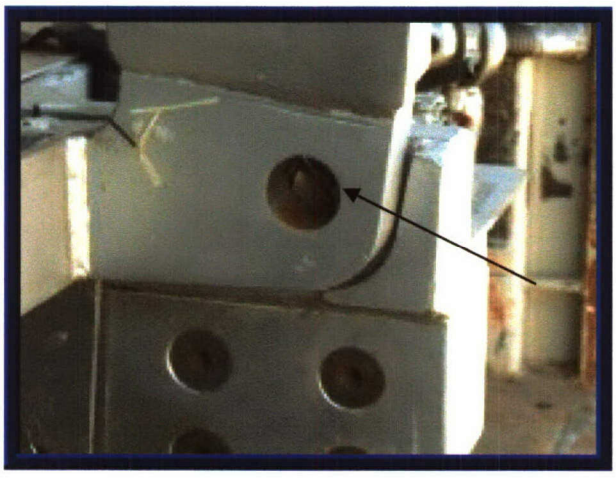


Photo 9. Damaged Pin.

2. **ROAD TRIP:**

Remarks:

1. The Road Trip was conducted between the Road Hazard Course Passes #2 and #3.
2. Inspection following the Road Trip revealed no damage or movement of the JMIP.

3. **PANIC STOPS:** Inspection following completion of each of the Panic Stops did not reveal any damage or movement of the JMIP.

4. **HAZARD COURSE:**

Pass No.	Elapsed Time	Avg. Velocity (mph)
3	26 Seconds	6
4	23 Seconds	7

Figure 7.

Remarks:

1. Figure 7 lists the average speeds of the test load through the Hazard Course.
2. Inspection following Passes #3 & #4 did not reveal any damage to the JMIP.

3. **WASHBOARD COURSE:**

Remarks:

Inspection following completion of the washboard course revealed that the pins holding the A-frame in the "Container Transport" sheared. Following the failure of the pins the A-frame fell onto the JMIP deck.

Photo 10. Washboard Course Testing of the JMIP.

Photo 11. Collapsed A-frame from Failed Pin.

B. SHIPBOARD TRANSPORTATION SIMULATOR (STS).

Remarks:

Following completion of the STS testing the one of the JMIP corner locks would not disengage properly. A hammer and pry bar had to be used to disengage the corner lock from the shoring slot.

Photo 12. Disengagement of Corner Lock of JMIP with Tools.

C. OBSERVATIONS:

1. The JMIP rear tie-downs contacted the container wall and during testing damaged the container wall.

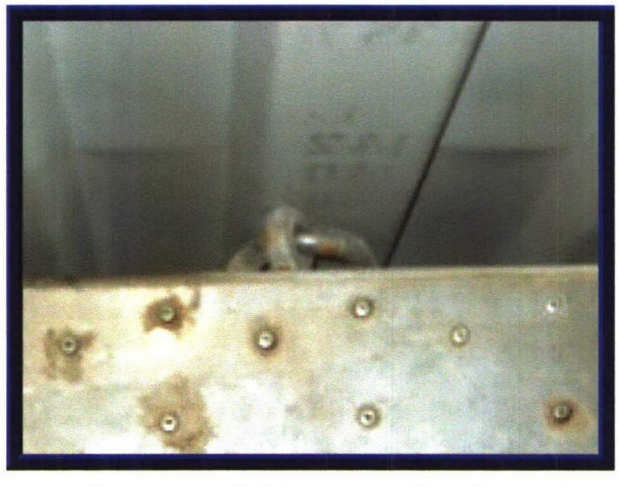


Photo 13. Contact of Tiedown with Container Wall.

Photo 14. Damage to Container Wall from Tiedown.

2. The handle for raising/lower the JMIP interlocks fell off during testing.

Photo 15. Loose Interlock Handle.

2. The plate and corner locking mechanisms are susceptible to damage when the JMIP is moved using a forklift at the A-frame end.

3. The JMIP was unloaded from the container using the PLS truck. The main rail on the PLS driver's side moved and retracted during the testing. The rail transport pin holes would no longer properly align on the PLS truck.

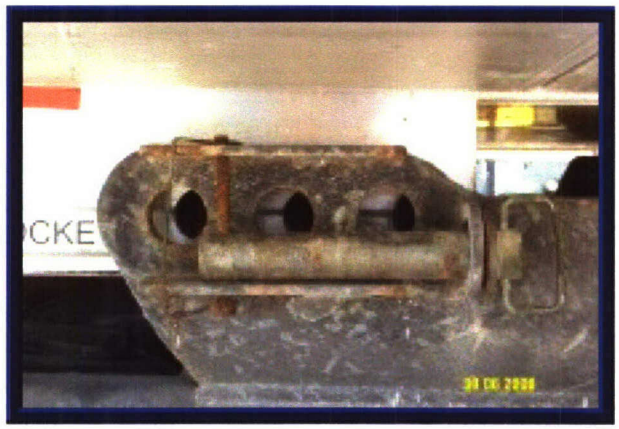


Photo 16. Misaligned Rail Pin Holes.

4. The hydraulic motor would not operate upon completion of the testing.

D. <u>CONCLUSION</u>: The JMIP, as currently designed, is **<u>not adequate</u>**, for the transportation of ammunition.

PART 6 – DRAWINGS

The following drawing represents the load configuration that was subjected to the test criteria. The drawing was used as a reference. The actual tie-down configuration is shown in the photos.

TEST SKETCH

LOADING AND TIEDOWN* PROCEDURES FOR AMMUNITION ITEMS LOADED ON THE SEABOX JOINT MODULAR INTERMODAL PLATFORM (JMIP)

* NOTE: THE AMMUNITION TIEDOWN PROCEDURES CONTAINED WITHIN THIS DOCUMENT ARE TYPICAL. THE DEPICTED ITEMS ARE REPRESENTATIVE OF THE VARIOUS TYPES OF AMMUNITION THAT MAY BE RESTRAINED AND TRANSPORTED ON THE SEABOX JOINT MODULAR INTERMODAL PLATFORM (JMIP). THESE PROCEDURES WERE USED IN SUPPORT OF THE SEABOX JMIP AMMUNITION CERTIFICATION TRANSPORTABILITY TEST PROGRAM.

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GENERAL NOTES

A. WEB STRAP TIEDOWN ASSEMBLIES MUST BE SECURELY HOOKED INTO ANCHORING DEVICES ON THE TRANSPORTING PLATFORM AND FIRMLY TENSIONED. FIRMLY TENSIONED MEANS WHEN THE OPERATOR PULLS ON THE RATCHET HANDLE BY HAND, THE RATCHET WILL NOT ADVANCE ANOTHER NOTCH. NO TYPE OF MECHANICAL EXTENSION OR LEVER WILL BE USED. EXERCISE CARE DURING STRAP APPLICATION. AVOID "TWISTS" AND/OR "KNOTS" IN THE STRAP. THE STRAP MUST FORM A STRAIGHT "LAY" ON THE RATCHET TAKE-UP SPOOL WHEN TENSIONING. AFTER INITIAL WEBBING-TO-WEBBING CONTACT HAS BEEN MADE (ROTATING THE TAKE-UP SPOOL UNTIL NO METAL ON THE SPOOL IS SHOWING AND THE STRAP HAS MADE CONTACT WITH ITSELF), THE TENSIONED STRAP MUST FORM AT LEAST 1/2 BUT NO MORE THAN 1-1/2 WRAPS OF STRAP ON THE TAKE-UP SPOOL OF THE TENSIONING RATCHET. AFTER TENSIONING IS COMPLETED, ENSURE THAT THE SPOOL LOCKING LATCH IS FULLY SEATED AT BOTH ENDS OF THE SPOOL IN MATCHING LOCKING NOTCHES. TIE BACK THE LOOSE ENDS OF THE STRAP AFTER TENSIONING IS COMPLETED (LOOSE ENDS MAY BE FOLDED AND TAPED OR TIED TO THE TENSIONING STRAP).

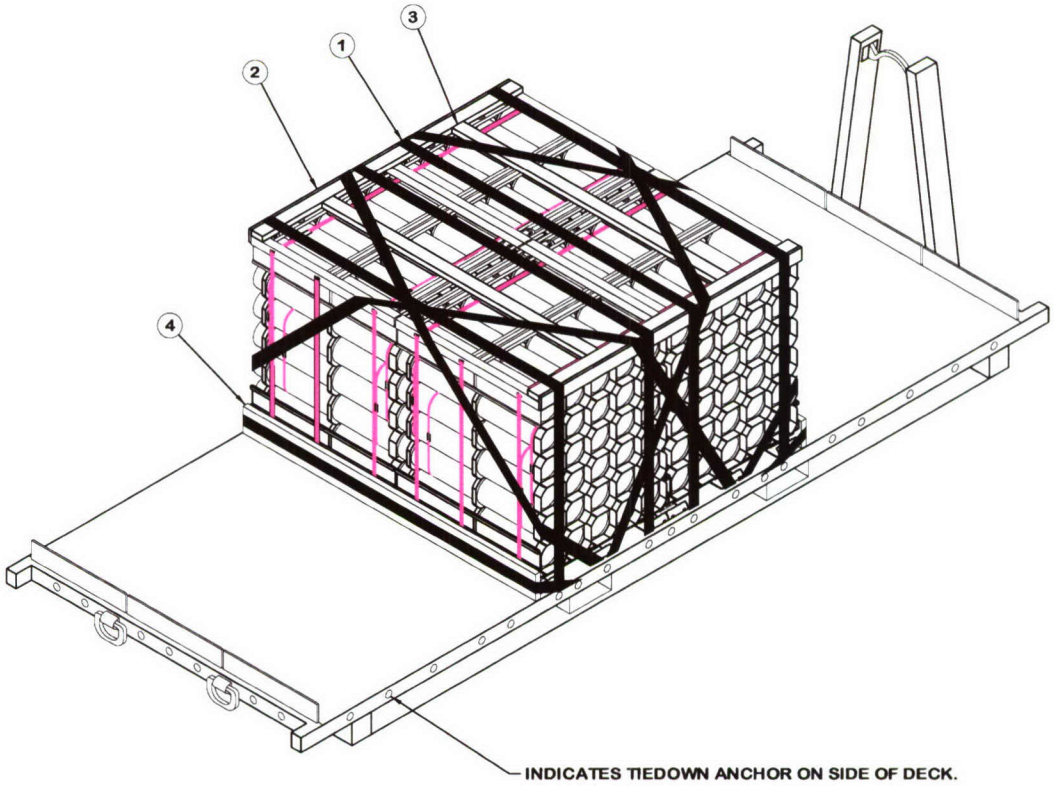
B. ADJUSTABLE SCUFF SLEEVES PROVIDED ON WEB STRAP ASSEMBLIES WILL BE LOCATED TO PROVIDE A PAD WHERE STRAPS PASS OVER SHARP EDGES, OR RATCHETS AND HOOKS ON PREVIOUSLY INSTALLED WEB STRAP TIEDOWN ASSEMBLIES.

C. A STAGGERED NAILING PATTERN WILL BE USED WHENEVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES OR WHEN LAMINATING DUNNAGE. ADDITIONALLY, THE NAILING PATTERN FOR AN UPPER PIECE OF LAMINATED DUNNAGE WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL FOR THAT PIECE WILL NOT BE DRIVEN THROUGH, ONTO, OR RIGHT BESIDE A NAIL IN A LOWER PIECE.

D. THE WEB STRAP RATCHETS SHOULD BE PLACED SYMMETRICALLY AROUND THE LOAD. FOR EXAMPLE, THE RATCHET FOR ONE STRAP ASSEMBLY SHOULD BE POSITIONED ON ONE SIDE OF THE PLATFORM AND THE RATCHET OF THE CORRESPONDING STRAP ASSEMBLY SHOULD BE POSITIONED ON THE OPPOSITE SIDE OF THE PLATFORM.

MATERIAL SPECIFICATIONS

LUMBER - - - - - - - -:	SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
NAILS - - - - - - - -:	ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).
STRAPPING, STEEL - -:	ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH A, B (GRADE 2), OR C.
STRAP - - - - - - - -:	WEBBING, UNIVERSAL TIEDOWN, NSN 5340-01-204-3009, PN9392419, OR NSN 5340-01-089-4997, PN11669588, OR NSN 1670-00-725-1437, PN1376-013, OR NSN 5340-00-980-9277, PN10900880.
SEAL, STRAP - - - -:	ASTM D3953; CLASS H, FINISH A, B (GRADE 2), OR C, DOUBLE NOTCH TYPE, STYLE I, II, OR IV.



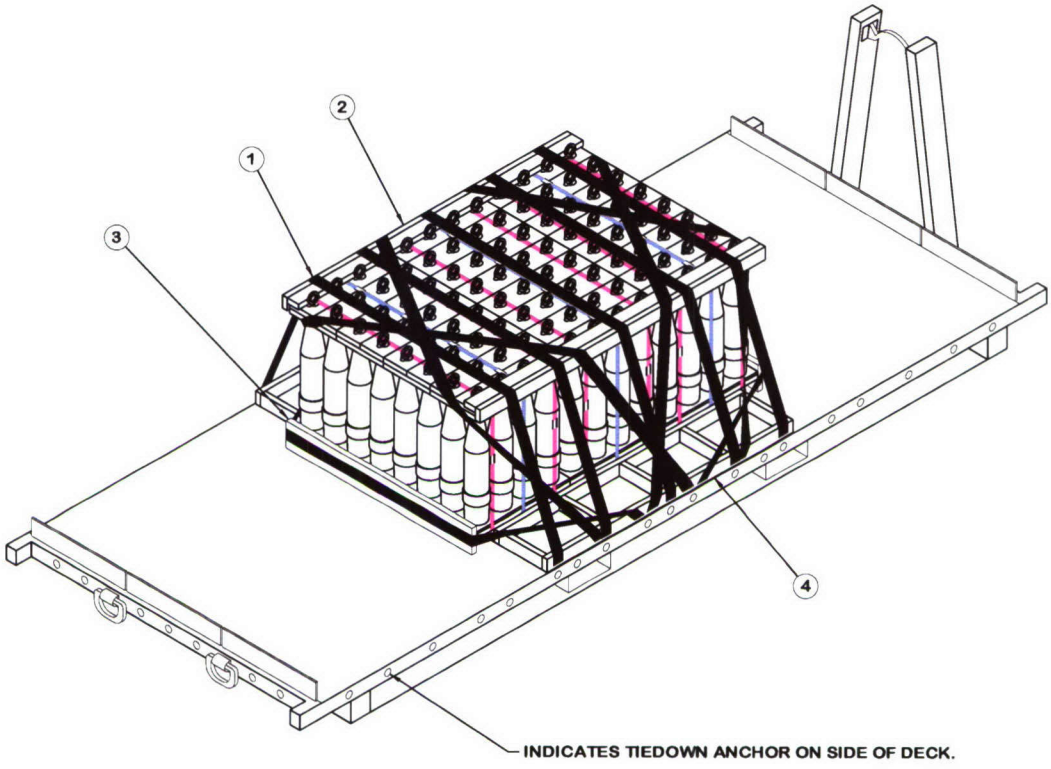
ISOMETRIC VIEW

KEY NUMBERS

1. 3" WIDE WEB STRAP TIEDOWN ASSEMBLY (10 REQD).
2. EDGE BOARD ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 6.
3. EDGE BOARD ASSEMBLY BRACE, 2" X 4" BY CUT-TO-FIT (REF: 6' 10-1/2") (2 REQD). TOE-NAIL TO EDGE BOARD ASSEMBLIES W/2-10d NAILS AT EACH JOINT.
4. END BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 5.

TEST LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	4	9,840 LBS
SEABOX MIP		3,800 LBS
DUNNAGE		193 LBS
TOTAL WEIGHT		13,833 LBS (APPROX)



ISOMETRIC VIEW

KEY NUMBERS

(1) 3" WIDE WEB STRAP TIEDOWN ASSEMBLY (11 REQD).

(2) EDGE BOARD ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 6.

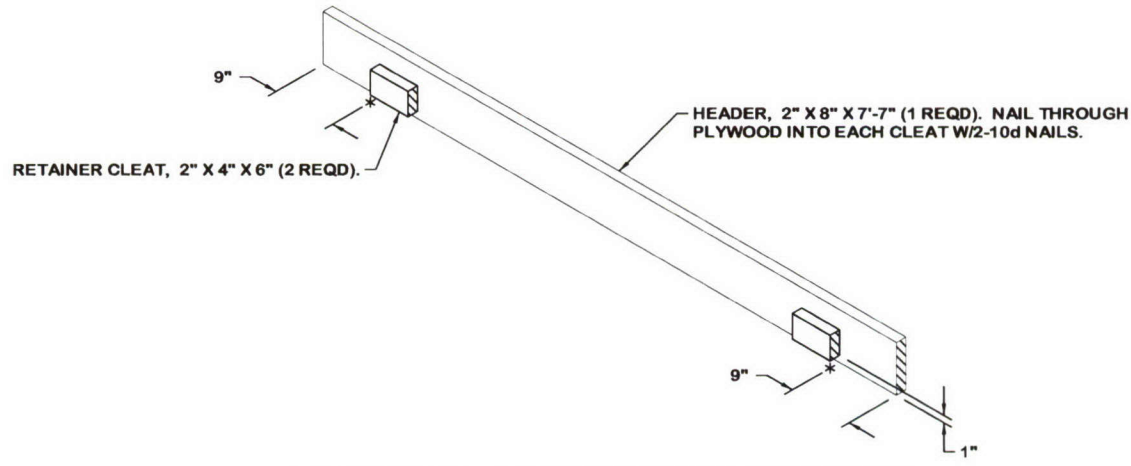
(3) END BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 5.

(4) SIDE BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 5.

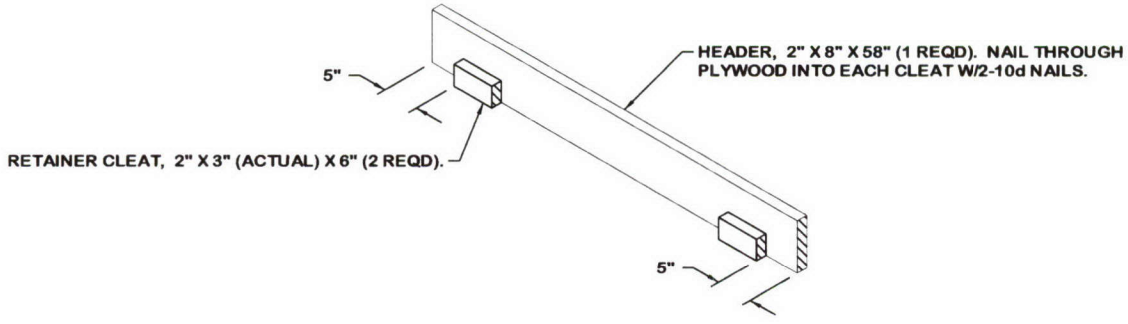
TEST LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	12	10,488 LBS
SEABOX MIP		3,800 LBS
DUNNAGE		225 LBS
TOTAL WEIGHT		14,513 LBS (APPROX)

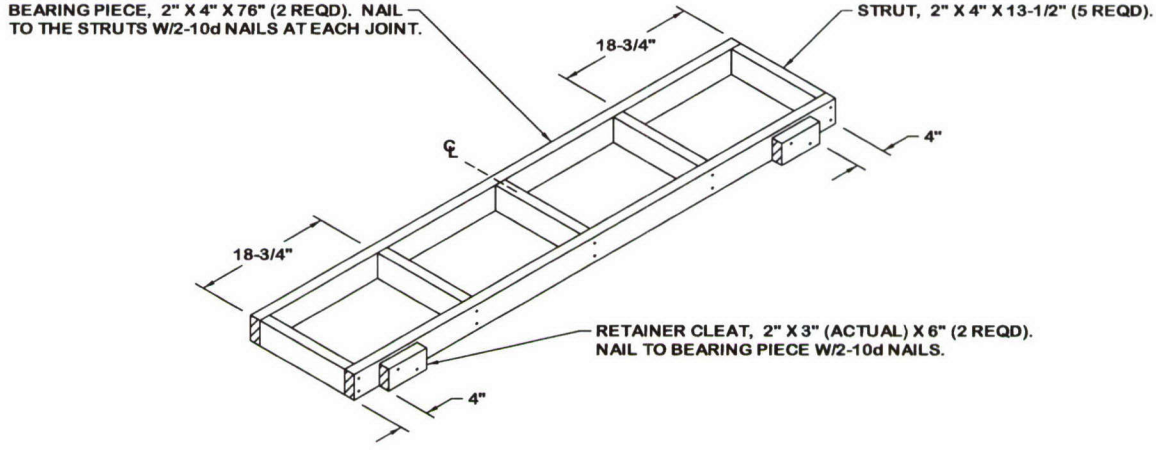
155MM SLP LOAD (10,700 LBS) ON SEABOX JOINT MODULAR INTERMODAL PLATFORM (JMIP)



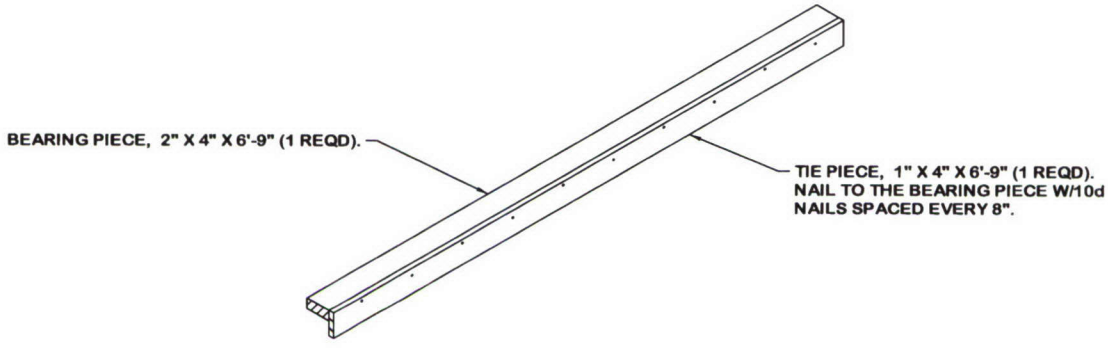
120MM TANK AMMO LOAD END BLOCKING ASSEMBLY



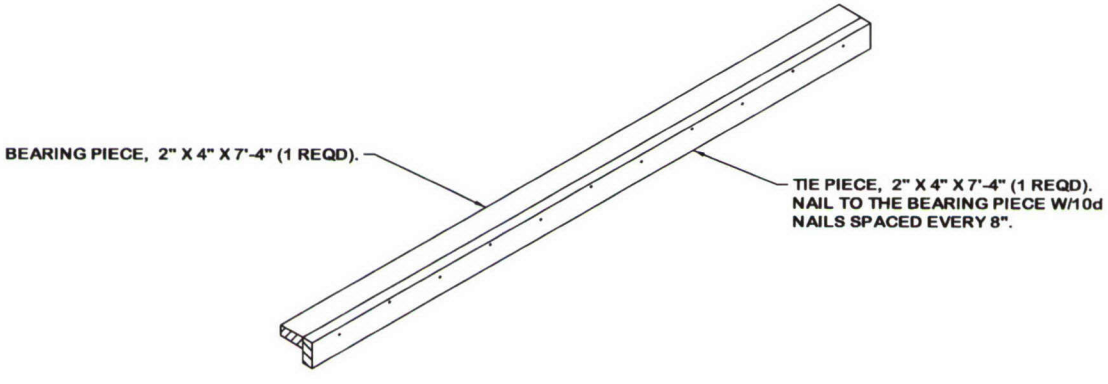
155MM SLP LOAD END BLOCKING ASSEMBLY



SIDE BLOCKING ASSEMBLY



120MM TANK AMMO LOAD EDGE BOARD ASSEMBLY



155MM SLP LOAD EDGE BOARD ASSEMBLY

Photos of 155MM SLP Test Load (Modified from Test Sketch).