APPROVED BY
BUREAU OF EXPLOSIVES

DATE 10/27/92

<u>MLRS</u>

LOADING AND BRACING WITH WOODEN
DUNNAGE ON COMMERCIAL FLATRACK
CONTAINERS OF ROCKET POD/
CONTAINERS (RP/C) FOR MULTIPLE
LAUNCH ROCKET SYSTEM

LOADING AND BRACING SPECIFICATIONS
SET FORTH WITHIN THIS DRAWING ARE
APPLICABLE TO LOADS THAT ARE TO
BE SHIPPED BY TRAILER/CONTAINERON-FLAT-CAR (T/COFC) RAIL CARRIER
SERVICE. THESE SPECIFICATIONS MAY
ALSO BE USED FOR LOADS THAT ARE
TO BE MOVED BY MOTOR OR WATER
CARRIERS. SEE GENERAL NOTE "L" ON
PAGE 2.

U.S. ARMY MATERIEL COMMAND DRAWING				
APPROVED, U.S. ARMY MISSILE COMMAND	DRAFTSMAN		TECHNICIAN	ENGINEER
	R.HAYNES		R.HAYNES	
Paul w Hones				
APPROVED BY ORDER OF COMMANDING GENERAL, U.S.	VALIDATION ENGINEERING DIVISION		TRANSPORTATION ENGINEERING DIVISION	LOGISTICS ENGINEERING OFFICE
ARMY MATERIEL COMMAND	Am (MIL	W. Frui	Re Wit East
William 7 Ernst	// MARCH 1993			
U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL	CLASS	DIVISIO	N DRAWING	FILE
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DO NOT SCALE

GENERAL NOTES

- THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- LOADS SHIPPED BY THE PROCEDURES DEPICTED IN THIS DRAWING MUST BE IN ACCORDANCE WITH THE REQUIREMENTS SET FORTH IN TITLE 49, THE UNITED STATES CODE OF FEDERAL REGULATIONS; AR 55-355/AFM 75-2; DOD 4500-32-R; DOD 5100.76-M; DOD 6055.9-STD; AS WELL AS ANY AND ALL OTHER APPLICABLE SERVICE REGULATIONS.
- THE SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO THE MULTIPLE LAUNCH ROCKET SYSTEM (MLRS) COMPLETE ROUND, WHEN PACKED IN THE ROCKET POD/CONTAINER (RP/C). WHEN PACKED IN THE HOCKET POUR CONTAINER HEREIN MEANS THE RP/C SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE RP/C WITH ROCKET COMPONENTS. REGARDLESS OF THE NUMBER OF CONTAINERS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE FLATRACK INCLUDING LADING MUST NOT BE EXCEEDED.
- THE LOAD AS SHOWN IS BASED ON A 20'-0" LONG BY 8'-0" WIDE COMMERCIAL FLATRACK CONTAINER WITH FULL HEIGHT END WALLS, AND INSIDE DIMENSIONS OF 19'-4" LONG BY 7'-2" WIDE. THE LOAD AS SHOWN CAN BE SHIPPED BY ANY FORM OF SURFACE TRANSPORTATION. NOTICE: OTHER CONTAINERS OF THE SAME DESIGN CONFIGURATION CAN ALSO BE USED.
- WHEN LOADING THE RP/C, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD BETWEEN THE END WALL GATE AND TO ACHIEVE A TIGHT LOAD BETWEEN THE END WALL GATE AND THE LADING. ALTHOUGH A TOTAL OF ONE INCH OF UNBLOCKED SPACE ACROSS THE WIDTH OF A LOAD IS PERMITTED, LONGITUDINAL VOIDS WITHIN THE LOAD ARE TO BE HELD TO A MINIMUM, NOT EXCEEDING 1/2". EXCESSIVE SLACK CAN BE ELIMINATED FROM A LOAD BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE BEARING PIECE ON THE END WALL GATE AT ONE END OF THE LOAD. NAIL EACH ADDITIONAL PIECE TO THE RETAINER PIECE W/I APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE THICKNESS AND QUANTITY OF THE RETAINER PIECES IN THE END WALL GATES WILL BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE LENGTH OF THE LADING.
- DUNNAGE LUMBER SPECIFIED IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE AND 4" X 4" MATERIAL IS ACTUALLY 3-1/2" THICK BY 3-1/2" WIDE.
- 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 ADDITIONALLY, 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

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MATERIAL SPECIFICATIONS

FED SPEC MM-L-751; DOUGLAS FIR OR COMPARABLE LUMBER WITH STRAIGHT GRAIN LUMBER - - - - - : AND FREE FROM MATERIAL DEFECTS.

NAILS - - - - - : FED SPEC FF-N-105; COMMON.

PLYWOOD ----: COMMERCIAL ITEM DESCRIPTION

A-A-55057, TYPE A, CONSTRUCTION AND INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE

MAY BE SUBSTITUTED.

STRAPPING, STEEL - -: ASTM D3953; FLAT STRAPPING, TYPE 1
OR 2, HEAVY DUTY, COATED FINISH
(ORGANIC), ZINC-COATED (GRADE 2), OR

UNCOATED.

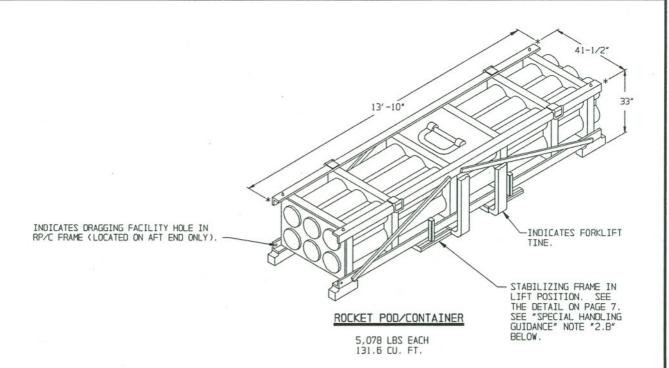
SEAL, STRAP - - - -: ASTM D3953; CLASS H, FINISH A, B (GRADE 2), OR C, TYPE D, STYLE I, II, OR IV.

WIRE, CARBON STEEL -: ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, .0800° DIA, GRADE 1006 OR BETTER.

FIBERBOARD - - - - -: FED SPEC PPP-F-320; SOLID SHEET STOCK.

(GENERAL NOTES CONTINUED)

- H. PORTIONS OF ONE OF THE FLATRACK END WALLS DEPICTED WITHIN THIS DRAWING HAVE NOT BEEN SHOWN IN THE LOAD VIEW FOR
- J. WHEN INSTALLING BLOCKING ASSEMBLIES, THE ASSEMBLIES MUST
 BE POSITIONED SD AS TO BE SUPPORTED AND IN LINE WITH THE
 STRONG POINTS OF THE FLATRACK END WALLS. NOTE: SOME
 FLATRACK END WALLS WILL REQUIRE FILL PIECES TO BE
 INSTALLED ON THE END WALL GATE TO PROVIDE A UNIFORM LOAD
 BEARING SURFACE. NAIL THESE FILL PIECES TO THE END WALL
 GATE W/1 APPROPRIATELY SIZED NAIL EVERY SIX INCHES.
- K. WHEN STEEL STRAPPING IS SEALED IN AN END-OVER-END LAP JOINT, A MINIMUM OF ONE SEAL WITH TWO PAIR OF NOTCHES WILL BE USED TO SEAL THE JOINT WHEN A NOTCH-TYPE SEALER IS BEING USED. A MINIMUM OF TWO SEALS, BUTTED TOGETHER WITH TWO PAIR OF CRIMPS PER SEAL, WILL BE USED TO SEAL THE JOINT WHEN A CRIMP-TYPE SEALER IS BEING USED. REFER TO THE "STRAP JOINT A" AND "STRAP JOINT B" DETAILS ON PAGE 5 FOR GUIDANCE.
- L. REOUIREMENTS CITED WITHIN THE BUREAU OF EXPLOSIVES PAMPHLET 6C APPLY WHEN THE SHIPMENT MOVES BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC). SPECIAL T/COFC NOTES FOLLOW:
 - A LOADED CONTAINER MUST BE ON A CHASSIS EQUIPPED WITH TWO BOGIE ASSEMBLIES WHEN BEING MOVED IN TOFC SERVICE.
 - THE LOAD LIMIT OF A T/COFC RAILCAR MUST NOT BE EXCEEDED, NOR WILL A CAR BE LOADED SO THAT THE TRUCK UNDER ONE END OF THE CAR CARRIES MORE THAN ONE-HALF OF THE LOAD LIMIT FOR THAT CAR.
- M. DURING INTRASTATE AND/OR INTERSTATE MOVES BY MOTOR CARRIER, A PROPER CHASSIS OR MODIFIED FLAT BED TRAILER MUST BE USED TO PRECLUDE VIOLATION OF ONE OR MORE "WEIGHT LAWS" APPLICABLE TO THE STATE OR STATES INVOLVED.
- THE 2" STRAPPING USED FOR LOAD SECUREMENT, I.E., HOLDDOWN STRAPS, WILL ONLY BE FASTENED TO THE FLATRACK CONTAINER BY UTILIZING TIEDOWN PROVISIONS LOCATED ON THE TOP OR ALONG UTILIZING TIEDOWN PROVISIONS LOCATED ON THE TOP OR ALONG THE SIDE OF THE FLATRACK BOTTOM SIDE RAILS. <u>CAUTION</u>: THE LOAD SECUREMENT STRAPS WILL NOT BE POSITIONED AROUND THE UNDERSIDE OR THROUGH THE FORKLIFT POCKETS OF THE FLATRACK CONTAINER. ADDITIONALLY, THE FLATRACK TIEDOWN PROVISIONS MUST BE AT LEAST AS STRONG AS THE 2" LOAD SECUREMENT STRAPPING BEING USED; AND BE OF A SUFFICIENT WIDTH TO RECEIVE THE 2" STRAPPING AND BE OF A DESIGN WHICH WILL PROVIDE A BEARING SURFACE ACROSS THE FULL WIDTH OF THE 2" STRAPPING SO THAT THE STRAPPING WHEN PROPERLY TENSIONED. ESPECIALLY AT ITS EDGES, WHEN PROPERLY TENSIONED.
- O. THE OUTLOADING PROCEDURES SPECIFIED HEREIN CAN ALSO BE UTILIZED FOR THE SHIPMENT OF THE DEPICTED CONTAINERS WHEN THEY ARE LOADED WITH AN ITEM WHICH IS IDENTIFIED DIFFERENTLY BY NOMENCLATURE THAN THE ITEM DESIGNATED WITHIN THE DRAWING TITLE, PROVIDED THE GROSS WEIGHT OF THE CONTAINER DOES NOT EXCEED 5,300 POUNDS.
- REFER TO ASSOCIATION OF AMERICAN RAILROADS MANUAL "GENERAL RULES GOVERNING THE LOADING OF COMMODITIES ON OPEN TOP CARS" FOR APPLICABLE LOADING RULES AS FOLLOWS: PREFACE, 1A, 2, 5, 10, AND 15. NOTE THAT ALL STRAPPING USED FOR LOAD SECUREMENT, I.E., HOLD-DOWN STRAPS, MUST BE MARKED AS SPECIFIED IN LOADING RULE 15.
- CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METHIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454KG.



SPECIAL HANDLING GUIDANCE

- POD STACKING FOR OUTLOADING PURPOSES.
 - A. THE UPPER POD SHOULD BE PLACED AS CLOSELY AS POSSIBLE IN VERTICAL ALIGNMENT WITH THE LOWER POD.
 - B. WHEN STACKING THESE PODS, CARE MUST BE EXERCISED TO ENSURE THAT THE INTERLOCKING HOLES IN THE BOTTOM OF THE POD SKIDS ALIGN CORRECTLY WITH THE INTERLOCKING PINS ON THE TOP OF THE POD FRAME. THIS WILL PRECLUDE DAMAGE TO THE SKIDS AND ENSURE PROPER FUNCTIONING OF THE POD INTERLOCKS.
- 2. POD OR POD STACK HANDLING.

NOTES: (1) MATERIALS HANDLING EQUIPMENT (MHE) IS INTENDED TO MEAN EQUIPMENT SUCH AS FORKLIFT TRUCKS, CRANES, HAND TRUCKS, DOLLIES, ROLLER ASSEMBLIES, SLINGS, SPREADER BARS, AND STABILIZING FRAMES.

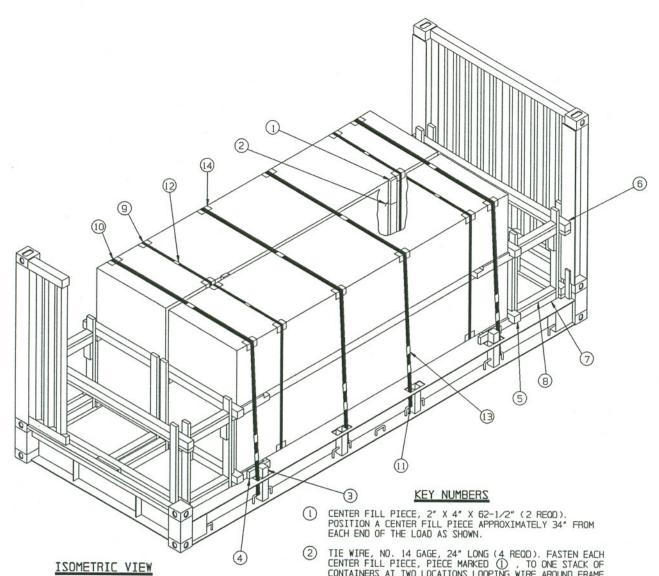
(2) PRECAUTIONARY HANDLING TECHNIQUES NORMALLY EMPLOYED OR AS SPECIFIED FOR THE TYPE OF COMMODITY INVOLVED WILL BE OBSERVED.

- A. ONLY APPROVED AND APPROPRIATELY SIZED MHE WILL BE USED FOR HANDLING THE DEPICTED PODS.
- B. IF HANDLING IS ACCOMPLISHED WITH A FORKLIFT TRUCK, THE TINES OF THE FORKLIFT ARE TO BE INSERTED INTO THE MLRS POO STABILIZING FRAME SHOWN IN THE DETAIL ON PAGE 4. THE FORKLIFT CARRIAGE IS TO BE CENTERED ON THE CENTER OF GRAVITY OF THE MLRS RP/C. NOTE: 1/4" SAFETY CHAINS ARE NOT SHOWN BUT WILL BE WELDED TO THE STABILIZING FRAME FOR SECUREMENT TO THE FORKLIFT CARRIAGE.

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(SPECIAL HANDLING GUIDANCE CONTINUED)

- C. EACH OF THE TWO UNITIZING STRAPS SHOULD BE POSITIONED AROUND THE CONTAINERS AS SHOWN, NEAR THE CONTAINER STRONG POINTS (I.E., THE LATERAL FRAME MEMBERS). BULKHEADS). PLACE STRAPPING SO THAT IT LAYS FLAT AND STRAIGHT WITH THE CONTOUR OF THE CONTAINERS I.E., VERTICAL ALONG THE SIDES AND STRAIGHT ACROSS THE TOP AND BOTTOM OF THE STACK.
- D. PLACE FOLDED FIBERBOARD UNDER THE STRAPPING AT ALL POINTS OF CONTACT WITH THE CONTAINER AND SECURE TO PREVENT DISLODGEMENT DURING AND AFTER STRAP APPLICATION. STRIPS OF FIBERBOARD MATERIAL MAY BE TAPED OR STRING-TIED TO THE CONTAINER OR STRAPPING, OR IT CAN BE FORMED INTO STRAP ENCIRCLING TUBES BY WINDING THE MATERIAL AROUND THE STRAPPING TO FORM A SELF-HOLDING UNIT.
- E. STRAPPING WILL BE FIRMLY TENSIONED, AND EACH END-OVER-END LAP JOINT WILL BE SEALED WITH ONE STRAP SEAL AS SHOWN, NOTCH EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "K" ON PAGE 2. THE LAP JOINTS WILL BE MADE ALONG THE SIDE OF THE STACK SO THAT THE SEALS WILL NOT BE IN CONTACT WITH THE CONTAINERS DURING STRAP TENSIONING, CARE SHOULD BE EXERCISED TO INSURE THAT THE CONTAINERS ARE NOT DAMAGED. EXCESS STRAPPING (STRAP ENDS) SHOULD BE CUT OFF OR BROKEN OFF NEAR THE JOINT SEALS.
- 4. CAUTION: CARE MUST BE EXERCISED DURING HANDLING OF THE CONTAINERS TO PREVENT DAMAGE CAUSED BY BUMPING OR DROPPING OF THE CONTAINERS.



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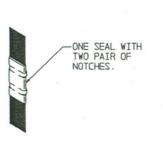
- STACK UNITIZING STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT LONG STEEL STRAPPING (REF: 19'-0") (4 REOD). INSTALL EACH UNITIZING STRAP TO ENCIRCLE A STACK OF PODS AS SHOWN ABOVE.
- HOLD-DOWN STRAP, 2" X .044" OR .050" BY A LENGTH TO SUIT LONG STEEL STRAPPING (REF: 26'-0") (4 REOD). INSTALL EACH STRAP FROM TWO 13'-0" LONG PIECES. FASTEN TO A TIEDOWN PROVISION ON THE SIDE OF THE FLATRACK AND BRING THEM UP TO THE TOP OF THE LOAD WHERE THEY CAN BE TENSIONED AND SEALED. (10) HOLD-DOWN STRAP,
- (1) PAD, STRAPPING, 2" X .044" OR .050" X 18" LONG STEEL STRAPPING (8 REOD). POSITION THE PAD BETWEEN THE HOLD-DOWN STRAP, PIECE MARKED (10) AND THE FLATRACK TIEDOWN PROVISION AND SECURE WITH ONE SEAL CRIMPED WITH ONE PAIR OF NOTCHES. SEE THE "STRAP JOINT DETAILS" ON PAGE 5 AND GENERAL NOTE "K" ON PAGE 2.
- (2) SEAL FOR 1-1/4" STRAPPING (4 REOD, 1 PER STRAP). NOTCH EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "K" ON PAGE 2.
- SEAL FOR 2" STRAPPING (20 REOD, 5 PER STRAP). NOTCH SEACH SEAL WITH TWO PAIR OF NOTCHES, EXCEPT FOR THOSE USED TO SECURE THE PADS, PIECES MARKED (1). SEE THE "STRAP JOINT DETAILS" ON PAGE 5 AND GENERAL NOTE "K" ON
- FOLDED FIBERBOARD (AS REOD). POSITION UNDER ALL STRAPS AT POINTS OF CONTACT WITH THE FRAME EDGES OF THE RP/CS.

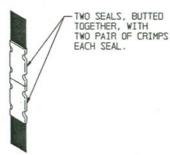
- TIE WIRE, NO. 14 GAGE, 24" LONG (4 REOD). FASTEN EACH CENTER FILL PIECE, PIECE MARKED (1), TO ONE STACK OF CONTAINERS AT TWO LOCATIONS LOOPING WIRE AROUND FRAME OF CONTAINER, BRINGING ENDS TOGETHER, AND TWISTING TAUT.
- 3 STAKE, 4" X 4" X 15" (4 REOD). INSTALL THE STAKES INTO THE FLATRACK STAKE POCKETS WITH A TIGHT (SNUG) FIT. NOTE: REFERENCE DIMENSIONS FOR A TIGHT FITTING STAKE ARE 3-1/8" (ACTUAL) X 3-1/4" (ACTUAL). TOENAIL TO THE FILLER PIECE, PIECE MARKED (4), W/2-104 NAILS ON EACH SIDE OF THE STAKE. NAIL W/1-204 NAIL THROUGH THE HOLE PROVIDED IN THE FACE OF THE FLATRACK STAKE POCKET AND INTO THE STAKE. BEND THE PROTRIDING HEAD OF THE NAIL OVER AGAINST THE STAKE POCKET OVER AGAINST THE STAKE POCKET.
- FILLER PIECE, 2" X 4" X 12" (4 REOD). CENTER ON THE FACE OF THE STAKE, PIECE MARKED $\ensuremath{\mbox{\ \ 3}}$ AS SHOWN.
- (5) LOAD BEARING GATE (2 REOD). SEE THE "LOAD BEARING GATE" DETAIL ON PAGE 5. CENTER ASSEMBLY AGAINST END OF LOAD. SEE GENERAL NOTE "G" ON PAGE 2.
- END WALL GATE (2 REOD). SEE THE "END WALL GATE DETAIL" ON PAGE 6. POSITION AS SHOWN SO THAT THE RETAINER PIECES ARE LOCATED ON THE INSIDE EDGES OF THE CORNER POSTS. NOTE:
 NAIL A 1/2" X 5" X 5" PLYWOOD SHIM TO THE FACE OF EACH END
 OF THE LOWER BEAM ASSEMBLY TO PROVIDE A UNIFORM FIT OF THE GATE AGAINST THE CORNER POSTS.
- STRUT "A", 4" X 4" BY CUT-TO-FIT (REF: 22") (12 REOD). INSTALL AS SHOWN AND TOENAIL EACH END TO THE GATES W/2-12d NAILS. NOTE: THE BOTTOM CENTER STRUTS NEED TO BE 1-1/2" LONGER THAN THE OUTSIDE STRUTS.
- STRUT "B", 2" X 4" BY CUT- TO- FIT (REF: 22") (12 REOD). LAMINATE TO STRUT "A", PIECE MARKED \bigcirc , W/4-10d NAILS. NOTE: THE BOTTOM CENTER STRUTS NEED TO BE 1-1/2" LONGER THAN THE OUTSIDE STRUTS.

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SPECIAL NOTE:

 A 4-UNIT LOAD OF ROCKET POD/CONTAINERS (RP/C) IS DEPICTED ON A COMMERCIAL FLATRACK CONTAINER.





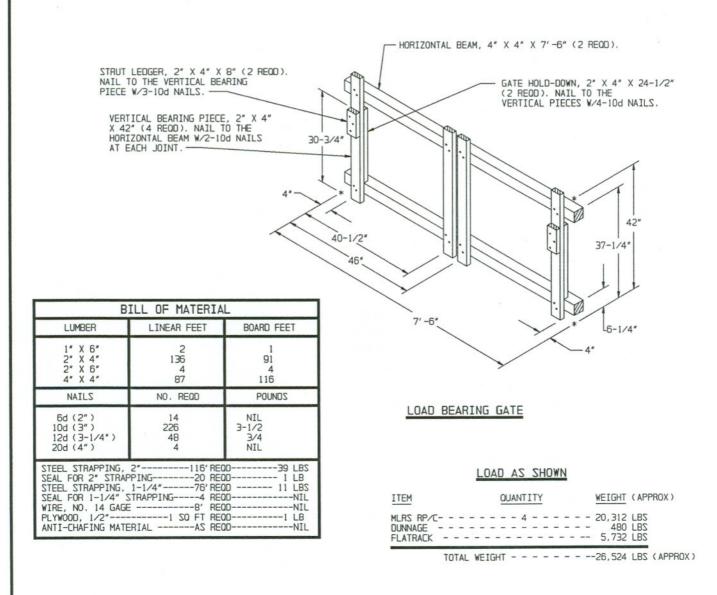
STRAP JOINT A

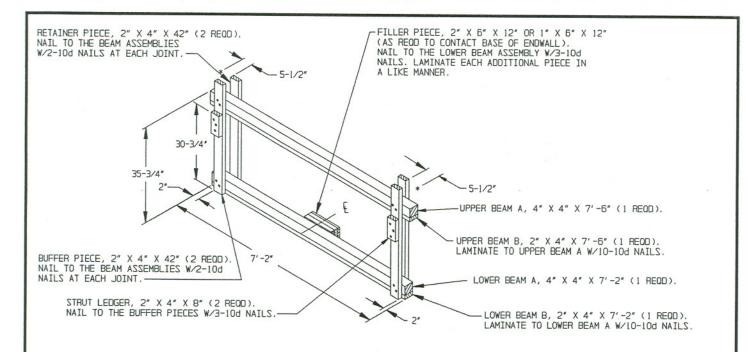
METHOD OF SECURING A STRAP JOINT WHEN USING A NOTCH-TYPE SEALER.

STRAP JOINT B

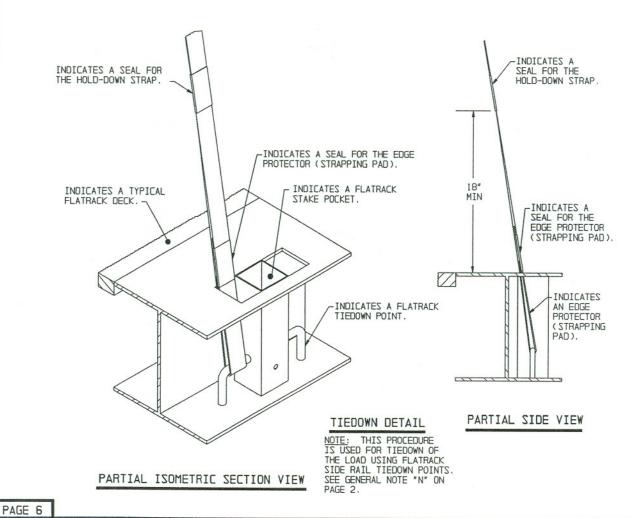
METHOD OF SECURING A STRAP JOINT WHEN USING A CRIMP-TYPE SEALER.

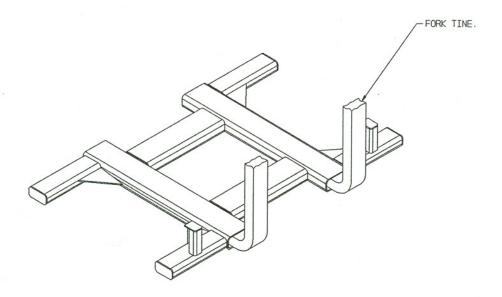
END-OVER-END LAP JOINT DETAILS





END WALL GATE





MLRS POD STABILIZING FRAME

REFER TO U.S. ARMY ARMAMENT MUNITIONS AND CHEMICAL COMMAND, DEFENSE AMMUNITION CENTER AND SCHOOL DRAWING NUMBER AC200000809 TO MANUFACTURE. THE DRAWING CAN BE OBTAINED FROM THE FOLLOWING ADDRESS: U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, ATTN: SMCAC-DES, SAVANNA, IL 61074-9639, DSN 585-8928, COMM (815) 273-8928.

