

APPROVED BY U.S. COAST GUARD <i>R.W. Tama</i> DATE <u>7/7/88</u>	APPROVED BY HAZARDOUS MATERIALS SYSTEMS (BOE) ASSOCIATION OF AMERICAN RAILROADS <i>J.A. Ashman</i> DATE <u>6/8/88</u>
---	--

LOADING AND BRACING¹ ON COMMERCIAL FLATRACK CONTAINERS OF CBU-87/B & CBU-89/B CLUSTER BOMBS IN CNU-411/E SHIPPING AND STORAGE CONTAINERS

<u>ITEM</u>	<u>INDEX</u>	<u>PAGE (S)</u>
GENERAL NOTES, AND MATERIAL SPECIFICATIONS -----		2
TYPICAL CONTAINER DETAIL -----		3
TYPICAL FULL LOAD PROCEDURES -----		4,5
GENERAL DETAILS -----		6-8

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

REVISIONS			DRAFTSMAN	PROJ ENG
			dh	WRF
			CHECKER	LOG ENGRG OFFICE
			GGG	W. G. G. G.
APPROVED, U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND				
<i>S. S. Byrd T MBS</i>				
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND (AMC)				
<i>William F. Ernst</i>				
U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL				
U.S. ARMY AMC DRAWING				
AUGUST 1988				
CLASS	DIVISION	DRAWING	FILE	
19	48	7092	SP 15J5	

DO NOT SCALE

GENERAL NOTES

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1, AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. ALL 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.
- C. THE SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO THE CBU-87/B AND CBU-89/B CLUSTER BOMBS IN A CNU-411/E CONTAINER. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CNU-411/E CONTAINER WITH BOMBS INSTALLED. SEE PAGE 3 FOR DETAIL OF THE CONTAINER. **CAUTION:** REGARDLESS OF THE QUANTITY OF CONTAINERS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE FLATRACK INCLUDING LADING AND DUNNAGE MUST NOT BE EXCEEDED.
- D. A STAGGERED NAILING PATTERN WILL BE USED WHEREVER POSSIBLE, WHEN NAILS ARE DRIVEN INTO THE 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.
- E. THE LOAD AS SHOWN IS BASED ON A 20'-0" LONG BY 8'-0" WIDE COMMERCIAL FLATRACK CONTAINER WITH FULL HEIGHT ENDWALLS, WITH INSIDE DIMENSIONS OF 18'-8" LONG BY 7'-10" WIDE. THE LOAD AS SHOWN CAN BE SHIPPED BY ANY FORM OF SURFACE TRANSPORTATION. **NOTE:** OTHER FLATRACK CONTAINERS OF THE SAME DESIGN CONFIGURATION CAN ALSO BE USED.
- F. DUNNAGE LUMBER SPECIFIED IS OF A NOMINAL SIZE. FOR EXAMPLE, 1" X 6" MATERIAL IS ACTUALLY 3/4" THICK BY 5-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE.
- G. WHEN LOADING THE CNU-411/E CONTAINERS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD BETWEEN THE LOAD BEARING GATES AND THE LADING. ALTHOUGH A TOTAL OF ONE INCH (1") OF UNBLOCKED SPACE ACROSS THE WIDTH OF THE LOAD IS PERMITTED, LONGITUDINAL VOIDS WITHIN THE LOAD ARE TO BE HELD TO A MINIMUM NOT EXCEEDING ONE-HALF INCH (1/2"). EXCESSIVE SLACK CAN BE ELIMINATED FROM A LOAD BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS DUNNAGE TO THE LOAD BEARING GATE (S). NAIL EACH ADDITIONAL PIECE OF DUNNAGE TO THE LOAD BEARING GATE ASSEMBLY W/1 APPROPRIATELY SIZED NAIL EVERY EIGHT INCHES (8").
- H. PORTIONS OF THE FLATRACK ENDWALLS DEPICTED WITHIN THIS DRAWING HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- J. WHEN INSTALLING THE LOAD BEARING GATES, THE GATE ASSEMBLY MUST BE POSITIONED SO AS TO BE SUPPORTED AND IN LINE WITH THE STRONG POINTS OF THE FLATRACK ENDWALLS. **NOTE:** SOME FLATRACK ENDWALLS WILL REQUIRE FILL PIECES TO BE INSTALLED ON THE LOAD BEARING GATE TO PROVIDE A UNIFORM LOAD BEARING SURFACE. NAIL THESE FILL PIECES TO THE LOAD BEARING GATE W/1 APPROPRIATELY SIZED NAIL EVERY SIX INCHES (6").
- K. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF ONE (1) SEAL WITH TWO (2) PAIR OF NOTCHES WILL BE USED TO SEAL THE JOINT WHEN A NOTCH-TYPE SEALER IS BEING USED. A MINIMUM OF TWO (2) SEALS, BUTTED TOGETHER, WITH TWO (2) 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 7 FOR GUIDANCE.
- L. REQUIREMENTS CITED WITHIN THE BUREAU OF EXPLOSIVES PAMPHLET 6C APPLY WHEN THE SHIPMENT MOVES BY TRAILER/CONTAINER-ON-FLAT-CAR (T/COFC). SPECIAL T/COFC NOTES FOLLOW.
1. A LOADED CONTAINER MUST BE ON A CHASSIS EQUIPPED WITH TWO BOGIE ASSEMBLIES WHEN BEING MOVED IN TOFC SERVICE.
 2. 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.

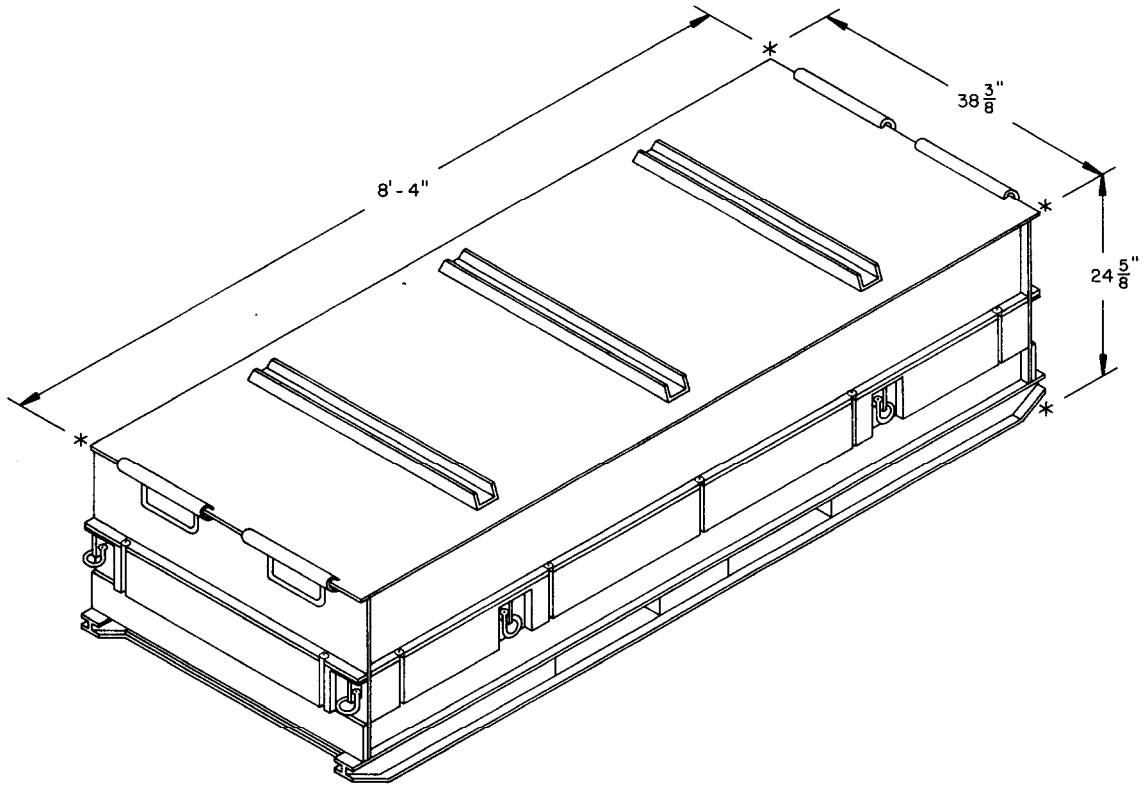
(CONTINUED AT RIGHT)

(GENERAL NOTES CONTINUED)

- M. THE 2" STRAPPING USED FOR LOAD SECUREMENT, I. E., HOLD-DOWN STRAPS, WILL ONLY BE FASTENED TO THE FLATRACK CONTAINER BY UTILIZING TIEDOWN PROVISIONS LOCATED ON THE TOP OR ALONG THE SIDE OF THE FLATRACK BOTTOM SIDE RAILS. **CAUTION:** 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 WILL NOT BE DEFORMED, ESPECIALLY AT ITS EDGES, WHEN PROPERLY TENSIONED.
- N. THE OUTLOADING PROCEDURES SPECIFIED HEREIN CAN ALSO BE UTILIZED FOR THE SHIPMENT OF THE DEPICTED CNU-411/E 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 2,400 POUNDS.
- O. 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.
- P. CONVERSION TO METRIC EQUIVALENTS:
DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4 MM AND ONE POUND EQUALS 0.454 KG.
- Q. DURING INTRASTATE AND/OR INTERSTATE MOVES BY MOTOR CARRIER, A PROPER CHASSIS/MODIFIED FLAT BED TRAILER MUST BE USED TO PRECLUDE VIOLATION OF ONE OR MORE "WEIGHT LAWS" APPLICABLE TO THE STATE OF STATES INVOLVED.

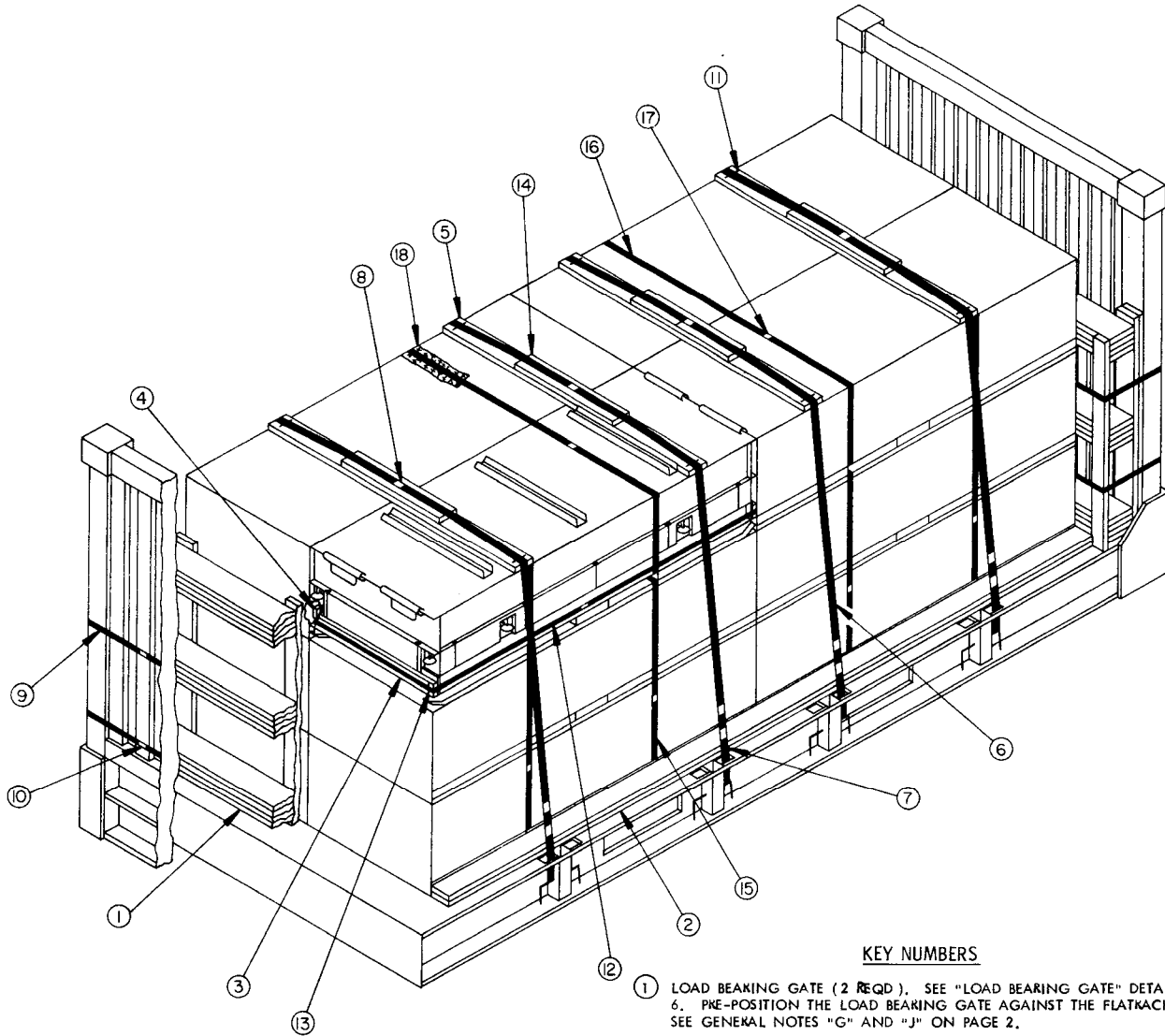
MATERIAL SPECIFICATIONS

- LUMBER -----: SEE TM 743-200-1, DUNNAGE LUMBER, FED SPEC MM-L-751.
- NAILS -----: COMMON; FED SPEC FF-N-105.
- STRAPPING, STEEL --: CLASS I, TYPE I OR IV, HEAVY DUTY, FINISH A, B (GRADE 2) OR C; FED SPEC QQ-S-781.
- STRAP SEAL -----: TYPE D, STYLE I, II, OR III, CLASS H, FINISH A, B (GRADE 2) OR C; FED SPEC QQ-S-781.
- STRAP STAPLE -----: COMMERCIAL GRADE.
- ANTI-CHAFING MATERIAL ---: NEUTRAL BARRIER MATERIAL; MIL-B-121 (OR EQUAL).



CNU-411/E CONTAINER DETAIL

CUBE	-----	55.3 CUBIC FEET (APPROX)
GROSS WEIGHT (CBU-87/B)	-----	2,370 POUNDS (APPROX)
GROSS WEIGHT (CBU-89/B)	-----	1,930 POUNDS (APPROX)



ISOMETRIC VIEW

(KEY NUMBERS CONTINUED)

- ⑪ STAPLE, 2-1/8" X 1" LEG LENGTH (8 REQD). FASTEN HOLD-DOWN STRAPS, PIECES MARKED ⑥, TO THE STRAPPING BOARD, PIECE MARKED ⑤, WITH TWO STAPLES PER HOLD-DOWN STRAP AS SHOWN ABOVE. AS AN ALTERNATIVE, TWO NAILS MAY BE BENT OVER THE STRAP FORMING A U-SHAPE.
- ⑫ FILL PIECE RETENTION STRAP, 3/4" X .035" OR .031" BY LENGTH TO SUIT (REF: 25'-0") (12 REQD). SEE PAGE 7 FOR PROPER METHOD OF INSTALLATION. SEE SPECIAL NOTE ON PAGE 7.
- ⑬ STAPLE, 15/16" X 3/4" LEG LENGTH (72 REQD). FASTEN PIECE MARKED ⑫ TO PIECES MARKED ③ AND ④ WITH SIX STAPLES PER CNU-411/E CONTAINER. SEE PAGE 7 FOR PROPER PLACEMENT OF STAPLES.
- ⑭ PURCHASE BOARD, 2" X 6" X 26" (4 REQD). POSITION ON THE CENTER OF THE STRAPPING BOARD, PIECE MARKED ⑤ AND NAIL W/3-10d NAILS.
- ⑮ UNITIZATION STRAP, 1-1/4" X .031" OR .035" BY A LENGTH TO SUIT (REF: 17'-0") (8 REQD). POSITION THROUGH THE FORKLIFT OPENINGS OF THE UPPER AND LOWER CONTAINERS OF EACH LOAD STACK AS SHOWN ABOVE, AS FAR APART AS FORKLIFT OPENINGS PERMIT.
- ⑯ BUNDLING STRAP, 1-1/4" X .031" OR .035" BY A LENGTH TO SUIT (REF: 17'-0") (4 REQD). POSITION THROUGH THE FORKLIFT OPENINGS OF THE CONTAINERS ON THE TOP LAYER OF THE LOAD AS SHOWN ABOVE, AS FAR APART AS FORKLIFT OPENINGS PERMIT.
- ⑰ SEAL, 1-1/4" (12 REQD). FASTEN PIECE MARKED ⑮ AND ⑯ WITH ONE SEAL CRIMPED WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "K" ON PAGE 2.
- ⑱ ANTI-CHAFING MATERIAL (AS REQD). POSITION UNDER STRAPS AT ALL POINTS OF CONTACT WITH THE CONTAINER.

KEY NUMBERS

- ① LOAD BEARING GATE (2 REQD). SEE "LOAD BEARING GATE" DETAIL ON PAGE 6. PRE-POSITION THE LOAD BEARING GATE AGAINST THE FLATRACK ENDWALLS. SEE GENERAL NOTES "G" AND "J" ON PAGE 2.
- ② SIDE BLOCKING, 2" X 6" X 16'-8" (DOUBLED) (2 REQD). POSITION THE FIRST PIECE AGAINST THE CONTAINER SKID AND NAIL W/1-10d NAIL EVERY SIX INCHES (6"). POSITION THE SECOND PIECE ON TOP OF THE FIRST AND NAIL IN A LIKE MANNER. SEE SPECIAL NOTE 1 ON PAGE 5 AND GENERAL NOTE "D" ON PAGE 2.
- ③ LATERAL FILL PIECE, 2" X 4" X 38-1/4" (24 REQD). SEE PAGE 7 FOR PROPER METHOD OF INSTALLATION. SEE SPECIAL NOTE ON PAGE 7.
- ④ LONGITUDINAL FILL PIECE, 1" X 4" X 7'-11" (12 REQD). SEE PAGE 7 FOR PROPER METHOD OF INSTALLATION. SEE SPECIAL NOTE ON PAGE 7.
- ⑤ STRAPPING BOARD, 2" X 6" X 77" (4 REQD). POSITION AS SHOWN ABOVE. SEE SPECIAL NOTE 2 ON PAGE 5.
- ⑥ HOLD-DOWN STRAP, 2" X .050" BY A LENGTH TO SUIT (REF: 22'-0") (4 REQD). SECURE THE LOAD TO THE FLATRACK SIDE TIEDOWN POINTS. SEE GENERAL NOTE "M" ON PAGE 2.
- ⑦ PADS, STRAPPING, 2" X .050" X 18" (8 REQD). PRE-POSITION THE PADS BETWEEN THE FLATRACK TIEDOWN POINTS AND PIECE MARKED ⑥. FASTEN WITH ONE SEAL CRIMPED WITH ONE PAIR OF NOTCHES. SEE "TIEDOWN DETAIL A" ON PAGE 8 AND GENERAL NOTE "M" ON PAGE 2.
- ⑧ SEAL, 2" (20 REQD). FASTEN PIECE MARKED ⑥ WITH ONE SEAL CRIMPED WITH TWO PAIR OF NOTCHES. FASTEN PIECE MARKED ⑦ WITH ONE SEAL CRIMPED WITH ONE PAIR OF NOTCHES. SEE "TIEDOWN DETAIL A" ON PAGE 8 AND GENERAL NOTES "K" AND "M" ON PAGE 2.
- ⑨ GATE STRAP, 3/4" X .031" OR .035" BY A LENGTH TO SUIT (REF: 22'-0") (4 REQD). POSITION AROUND THE FLATRACK ENDWALL AND PIECE MARKED ① AS SHOWN ABOVE.
- ⑩ SEAL, 3/4" (16 REQD). FASTEN PIECE MARKED ⑨ AND PIECE MARKED ⑫ WITH 1 SEAL, CRIMPED WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "K" ON PAGE 2.

SPECIAL NOTES:

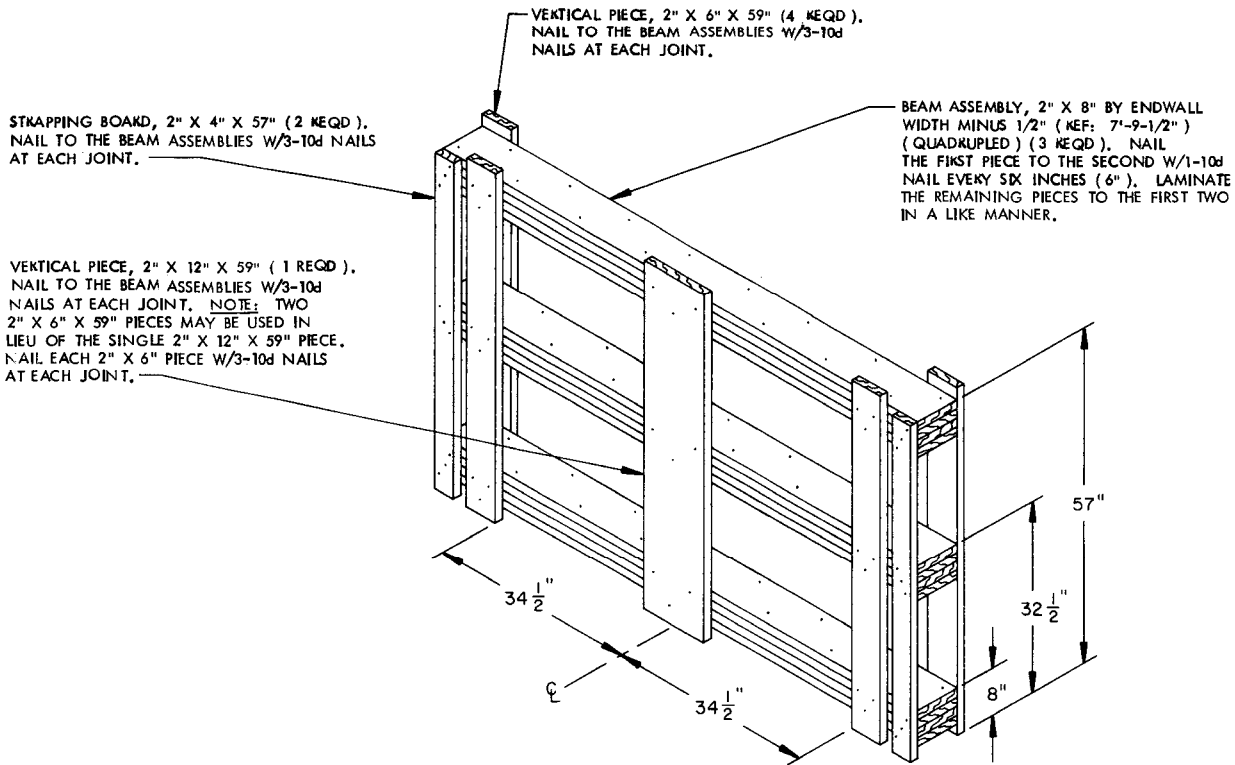
1. FOR FLATRACKS WHERE THE SIDE BLOCKING CANNOT BE NAILED TO THE FLOOR, A DOUBLED 2" X 6" CAN BE USED. SEE "ALTERNATIVE SIDE BLOCKING PROCEDURES" ON PAGE 8.
2. POSITION THE STRAPPING BOARDS, PIECE MARKED (5) AND THE HOLD-DOWN STRAPS, PIECE MARKED (6), SO AS TO BE VERTICALLY IN LINE WITH THE FLATRACK TIEDOWN POINTS AND PERPENDICULAR TO THE FLATRACK FLOOR WHEN VIEWED FROM THE SIDE OF THE FLATRACK. NOTE: THE POSITION OF THE STRAPPING BOARD MUST BE WITHIN 24" FROM EACH END OF THE CONTAINERS.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	95	32
2" X 4"	86	58
2" X 6"	150	190
2" X 8"	187	249
2" X 12"	10	20
NAILS	NO. REQD	POUNDS
10d (3")	564	8-3/4
STEEL STRAPPING, 3/4" X .035" OR .031" --- 388' REQD --- 28 LBS SEAL FOR 3/4" STRAPPING ----- 16 REQD --- NIL STEEL STRAPPING, 1-1/4" X .035" OR .031" --- 204' REQD --- 29 LBS SEAL FOR 1-1/4" STRAPPING ----- 12 REQD --- NIL STEEL STRAPPING, 2" X .050" ----- 88' REQD --- 29 LBS SEAL FOR 2" STRAPPING ----- 20 REQD --- 4 LBS PAD, ----- 12' REQD --- 3 LBS STAPLE FOR 3/4" STRAPPING ----- 72 REQD --- NIL STAPLE FOR 2" STRAPPING ----- 8 REQD --- NIL		

LOAD AS SHOWN

<u>ITEM</u>	<u>QUANTITY</u>	<u>WEIGHT (APPROX)</u>
PALLETS -----	12 @ 2,370 LBS -----	28,440 LBS
DUNNAGE -----		1,128 LBS
FLATRACK -----		5,732 LBS
TOTAL WEIGHT -----		35,300 LBS



LOAD BEARING GATE DETAIL

SEE GENERAL NOTE "J" ON PAGE 2.

LATERAL FILL PIECE, 2" X 4" X 38-1/4" (2 REQD), POSITION BETWEEN THE CONTAINER SKIDS AND CONTAINER TIEDOWN RINGS. NOTCH TO FIT AS REQUIRED.

STRAPPING, 3/4" X .035" OR .031" BY LENGTH TO SUIT (REF: 25'-0") (1 REQD). POSITION AROUND THE CONTAINER AND FILL PIECES AS TYPICALLY SHOWN.

INDICATES THE SIDE OF THE CONTAINER WHICH IS IN CONTACT WITH A LATERALLY ADJACENT CONTAINER. NOTE: BOTH CONTAINERS WILL REQUIRE LONGITUDINAL FILL PIECES.

STAPLE ((6 REQD)). FASTEN THE STRAPPING TO THE LATERAL AND LONGITUDINAL FILL PIECES AT EACH CORNER WITH ONE (1) STAPLE. SEE KEY NUMBER (1) ON PAGE 4 FOR AN ALTERNATIVE METHOD.

SEAL, 3/4" (1 REQD). FASTEN THE STRAPPING WITH ONE SEAL, CRIMPED WITH TWO PAIR OF NOTCHES.

LONGITUDINAL FILL PIECE, 1" X 4" X 7'-11" (1 REQD). POSITION BETWEEN THE CONTAINER SKIDS AND CONTAINER TIEDOWN RINGS.

CNU-411/E CONTAINER WITH FILL PIECES INSTALLED

SPECIAL NOTE:

PRIOR TO PLACING A CNU-411/E CONTAINER UPON A FLATRACK FOR SHIPMENT, TWO LATERAL AND ONE LONGITUDINAL FILL PIECE MUST BE INSTALLED AS SHOWN ABOVE. THE LONGITUDINAL FILL PIECE MUST BE INSTALLED ON THE SIDE OF THE CONTAINER WHICH IS IN LATERAL CONTACT WITH A SECOND CONTAINER.



ONE SEAL WITH TWO PAIR OF NOTCHES.

STRAP JOINT A

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

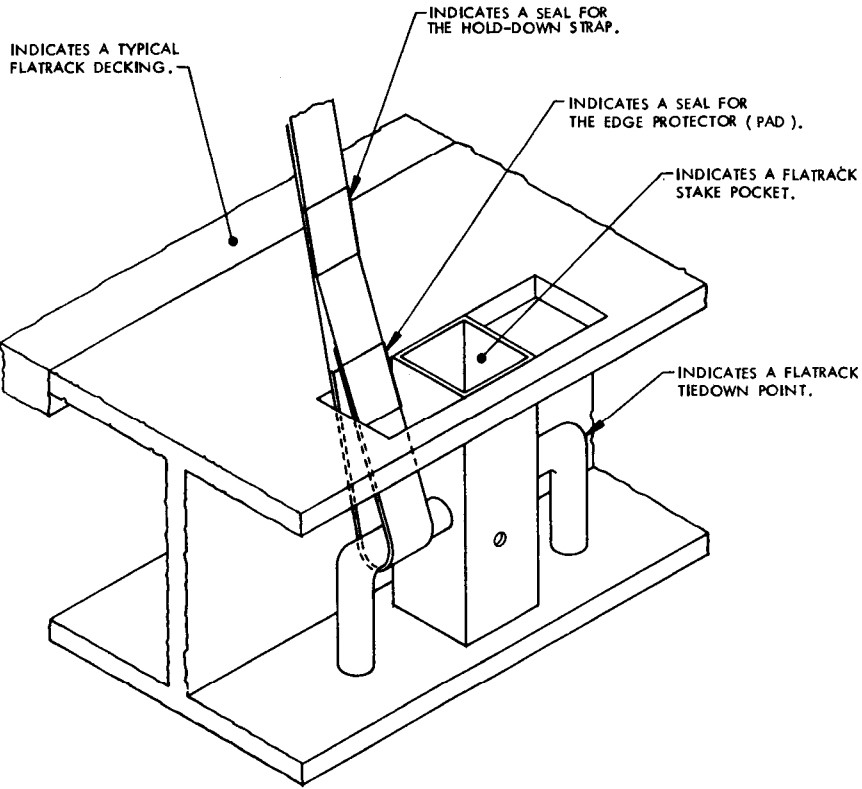


TWO SEALS, BUTTED TOGETHER, WITH TWO PAIR OF CRIMPS EACH SEAL.

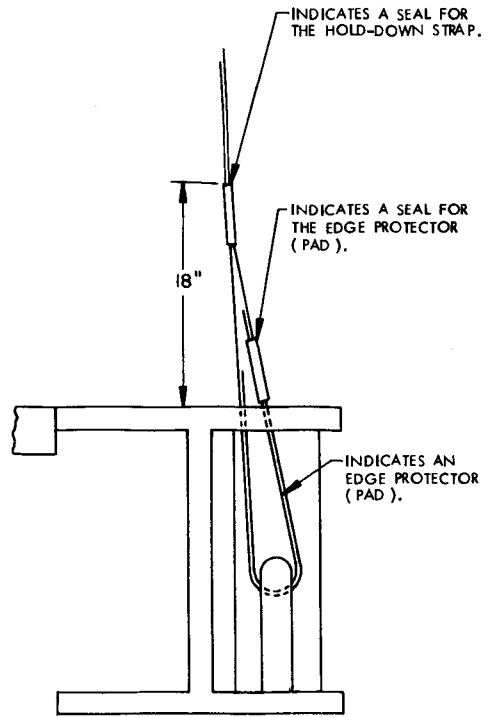
STRAP JOINT B

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

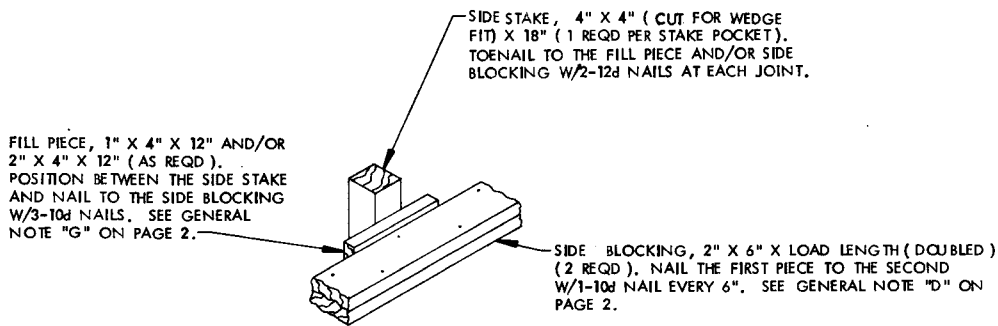
STRAP/JOINT DETAIL



TIEDOWN DETAIL A



SIDE VIEW



ALTERNATIVE SIDE BLOCKING PROCEDURES

INSTALLATION PROCEDURES:

- STEP 1: POSITION THE ASSEMBLED SIDE BLOCKING AGAINST THE CONTAINER SIDE RAILS.
- STEP 2: INSTALL THE SIDE STAKES IN THE FLATRACK CONTAINER STAKE POCKETS WITH A FORCED WEDGE FIT. NAIL THE SIDE STAKE TO THE STAKE POCKET W/1-30d NAIL THROUGH THE HOLE PROVIDED IN THE SIDE OF THE STAKE POCKET.
- STEP 3: POSITION FILL PIECE (S) BETWEEN THE SIDE BLOCKING AND SIDE STAKE SO AS TO ALLOW NO MORE THAN ONE HALF-INCH (1/2") OF LATERAL VOID BETWEEN THE CONTAINERS AND SIDE BLOCKING. NAIL AS SPECIFIED ABOVE.
- STEP 4: REPEAT STEPS 1, 2, AND 3 ON THE OPPOSITE SIDE OF THE FLATRACK.