

APPROVED BY U.S. COAST GUARD <i>MDM</i>	APPROVED BY HAZARDOUS MATERIALS SYSTEMS (BOE) ASSOCIATION OF AMERICAN RAILROADS <i>J. H. Deaton</i>
DATE <u>8/1/88</u>	DATE <u>7/6/88</u>

# LOADING AND BRACING ON COMMERCIAL FLATRACK CONTAINERS OF THE AIM 7F MISSILE IN CNU-305/E SHIPPING AND STORAGE CONTAINERS

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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. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE MOVED BY MOTOR OR WATER CARRIERS. SEE GENERAL NOTE "L".

**DO NOT SCALE**

REVISIONS				DRAFTSMAN	SD	PROJECT
				<i>Dir</i>		<i>WRM/WRA</i>
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## 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 AIM 7F MISSILE IN CNU-305/E CONTAINER. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CNU-305/E CONTAINER, WITH MISSILES INSTALLED. SEE PAGE 3 FOR DETAILS 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 END WALLS, AND INSIDE DIMENSIONS OF 18'-8" LONG BY 7'-10" WIDE. THE LOAD AS SHOWN CAN BE SHIPPED BY ANY FORM OF SURFACE TRANSPORTATION. NOTICE: 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-305/E CONTAINERS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD BETWEEN THE LOAD BEARING GATE AND THE END WALL GATE. 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 REMOVED FROM A LOAD BY INCREASING THE LENGTH OF THE STRUT MEMBERS, AT ONE OR BOTH ENDS OF THE LOAD. THE STRUTS, AFTER INSTALLATION, SHOULD BE OF EQUAL LENGTH (REF: PLUS OR MINUS ONE INCH) AT BOTH ENDS OF THE LOAD.
- 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 END WALL GATES, THE GATE ASSEMBLY MUST BE POSITIONED SO AS TO BE SUPPORTED AND IN LINE WITH THE STRONG POINTS OF THE FLATRACK END WALLS. NOTE: SOME FLATRACK ENDWALLS 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 EIGHT INCHES (8").
- 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.

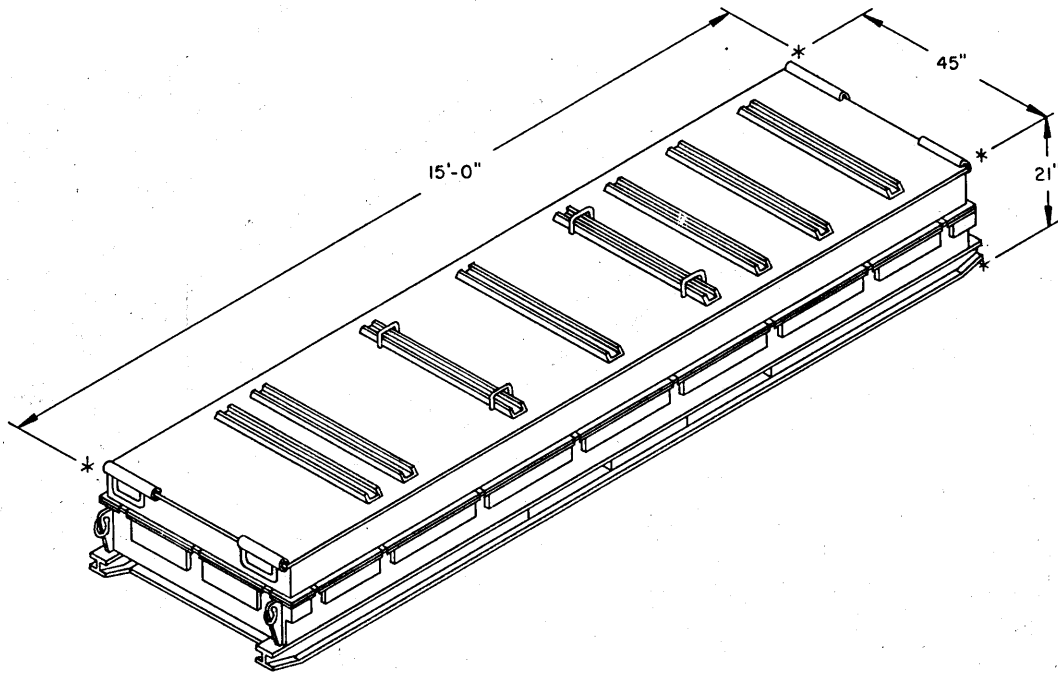
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## MATERIAL SPECIFICATIONS

- 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-5-781.
- STRAP SEAL -----: TYPE D, STYLE I, II, OR III, CLASS H. FINISH A, B, (GRADE 2), OR C, FED SPEC QQ-5-781.
- STRAP STAPLE -----: COMMERCIAL GRADE.

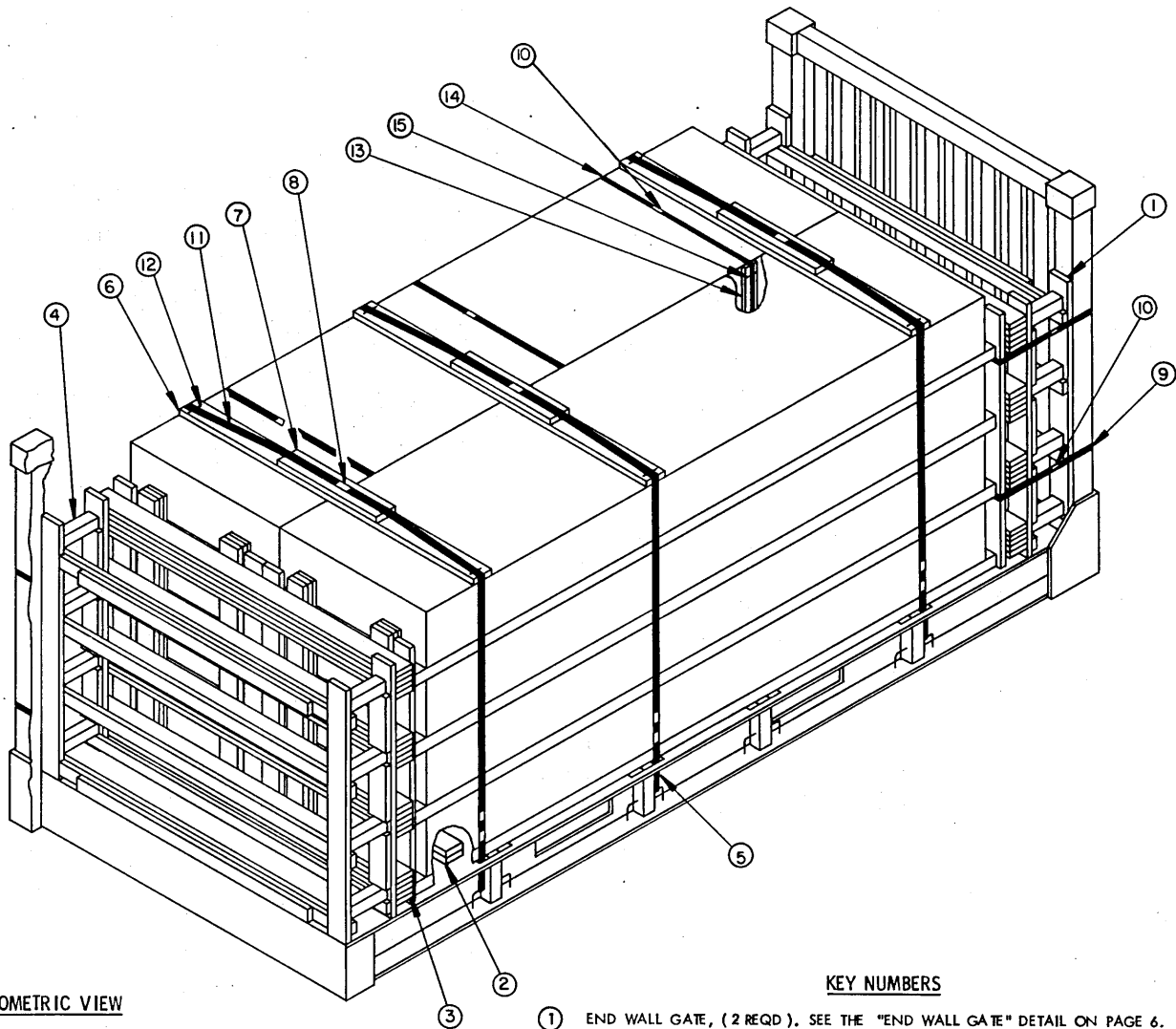
## (GENERAL NOTES CONTINUED)

- 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; 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-305/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 2,860 POUNDS.
- O. 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 25.4MM AND ONE POUND EQUALS 0.454KG.
- P. 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 OR STATES INVOLVED.
- Q. 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.



**CNU-305E CONTAINER DETAIL**

CONTAINER	-----	820 LBS ( APPROX )
CUBE	-----	97.3 CUBIC FEET ( APPROX )
GROSS WEIGHT	-----	2,860 LBS ( APPROX )



ISOMETRIC VIEW

( KEY NUMBERS CONTINUED )

- ⑪ HOLD-DOWN STRAP, 2" X .050" BY A LENGTH TO SUIT ( REF: 25'-0" ) ( 3 REQD ). SEE GENERAL NOTE "M" ON PAGE 2. FORM FROM TWO PIECES AND POSITION OVER THE LOAD AS SHOWN ABOVE.
- ⑫ STAPLE, 2-1/8" X 3/4" LEG LENGTH ( 6 REQD ). FASTEN PIECE MARKED ⑪ TO PIECE MARKED ⑥ WITH TWO STAPLES PER STRAP AS SHOWN ABOVE.
- ⑬ ANTI-CHAFING BOARD, 1" X 4" X 6'-0" ( 3 REQD ). POSITION AS SHOWN IN THE LOAD ABOVE. SEE SPECIAL NOTE 2 ON PAGE 5.
- ⑭ BUNDLING STRAP, 1-1/4" X .031" OR .035" BY A LENGTH TO SUIT ( REF: 23'-0" ) ( 3 REQD ). PRE-POSITION THE BUNDLING STRAPS UNDER ONE LOAD UNIT AND AROUND PIECE MARKED ⑬. SEE SPECIAL NOTE 2 ON PAGE 5.
- ⑮ STAPLE, 1-17/32" X 3/4" LEG LENGTH ( 6 REQD ). FASTEN PIECE MARKED ⑭ TO PIECE MARKED ⑬ WITH TWO STAPLES PER BOARD, ONE AT THE TOP AND ONE AT THE BOTTOM OF THE ANTI-CHAFING BOARD.

KEY NUMBERS

- ① END WALL GATE, ( 2 REQD ). SEE THE "END WALL GATE" DETAIL ON PAGE 6. POSITION AGAINST THE FLATRACK END WALL AS SHOWN ABOVE. SEE GENERAL NOTE "J" ON PAGE 2.
- ② FLOOR LINE BLOCKING, 2" X 6" X 37-1/2" ( DOUBLED ) ( 4 REQD ). NAIL THE FIRST PIECE AS SHOWN ON THE "FLOOR DUNNAGE PLAN" DETAIL ON PAGE 7 W/10-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/10-20d NAILS. SEE GENERAL NOTE "D" ON PAGE 2.
- ③ LOAD BEARING GATE ( 2 REQD ). SEE "LOAD BEARING GATE" DETAIL ON PAGE 6. POSITION AGAINST THE CONTAINERS AND IN LINE WITH THE END WALL GATE AS SHOWN ABOVE.
- ④ STRUT, 4" X 4" BY A LENGTH-TO-SUIT ( REF: 10" ) ( 16 REQD ). TOENAIL TO THE LOAD BEARING AND END WALL GATE W/2-12d NAILS AT EACH JOINT. SEE GENERAL NOTE "G" ON PAGE 2.
- ⑤ PAD, STRAPPING, 2" X .050" X 18" ( 6 REQD ). PRE-POSITION THE PAD BETWEEN THE HOLD-DOWN STRAP, PIECE MARKED ⑪, AND THE FLATRACK SIDE RAIL AND SECURE WITH ONE SEAL CRIMPED WITH ONE PAIR OF NOTCHES.
- ⑥ STRAPPING BOARD, 2" X 6" X 7'-6" ( 3 REQD ). POSITION THE STRAPPING BOARDS AS SHOWN ABOVE. SEE SPECIAL NOTE 3 ON PAGE 5.
- ⑦ PURCHASE BOARD, 2" X 6" X 30" ( 3 REQD ). CENTER ON THE STRAPPING BOARD PIECE MARKED ⑥ AND NAIL W/4-10d NAILS. SEE GENERAL NOTE "D" ON PAGE 2.
- ⑧ SEAL FOR 2" STRAPPING ( 15 REQD, 5 PER STRAP ). FASTEN PIECE MARKED ⑤ WITH ONE SEAL CRIMPED WITH ONE PAIR OF NOTCHES. FASTEN PIECE MARKED ⑮ WITH ONE SEAL CRIMPED WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "K" ON PAGE 2.
- ⑨ GATE STRAP, 1-1/4" X .030" OR .035" BY A LENGTH TO SUIT ( REF: 22'-0" ) ( 4 REQD ). POSITION AROUND PIECE MARKED ③ AND THE FLATRACK END WALL AS SHOWN ABOVE.
- ⑩ SEAL, FOR 1-1/4" STRAPPING ( 7 REQD, 1 PER STRAP ). FASTEN PIECE MARKED ⑨ AND ⑭ WITH ONE SEAL EACH, CRIMPED WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "K" ON PAGE 2.

**SPECIAL NOTES:**

1. THE LOAD AS SHOWN ON PAGE 4 MAY BE REDUCED BY AN EVEN NUMBER OF CONTAINERS, SUCH AS TWO OR FOUR UNITS FROM THE TOP LAYERS OF THE LOAD. NOTICE THE PROCEDURES DEPICTED HEREIN ARE NOT APPLICABLE FOR THE SHIPMENT OF AN ODD NUMBER OF CONTAINERS, SUCH AS FIVE OR SEVEN.
2. THE ANTI-CHAFING BOARDS SHOULD BE POSITIONED ON ONE LOAD STACK IN THE FOLLOWING MANNER. POSITION THREE BUNDLING STRAPS UNDER ONE LOAD STACK APPROXIMATELY TWO FEET FROM EACH END OF THE CONTAINER AND ONE STRAP IN THE CENTER OF THE CONTAINER AS SHOWN IN THE LOAD ON PAGE 4. POSITION THE ANTI-CHAFING BOARDS, PIECE MARKED (13) BETWEEN THE BUNDLING STRAPS, PIECE MARKED (14), AND THE CONTAINERS, AND FASTEN WITH ONE 1-1/4" SEAL, CRIMPED WITH A SINGLE PAIR OF NOTCHES. **NOTE:** THE ANTI-CHAFING BOARDS SHOULD BE POSITIONED NEXT TO OR ALONG SIDE OF THE CONTAINER LID FASTENERS, BUT NOT ON TOP OF THE FASTENERS. SEE GENERAL NOTE "K" ON PAGE 2.
3. THE STRAPPING BOARDS ARE TO BE POSITIONED ON THE FLAT SURFACE OF THE CONTAINER LIDS, NOT OVER OR ON TOP OF THE CONTAINER REINFORCING RIBS. THE STRAPPING MUST BE POSITIONED SO AS TO BE IN VERTICAL ALIGNMENT WITH THE FLATRACK TIEDOWN POINTS. SEE GENERAL NOTE "M" ON PAGE 2.

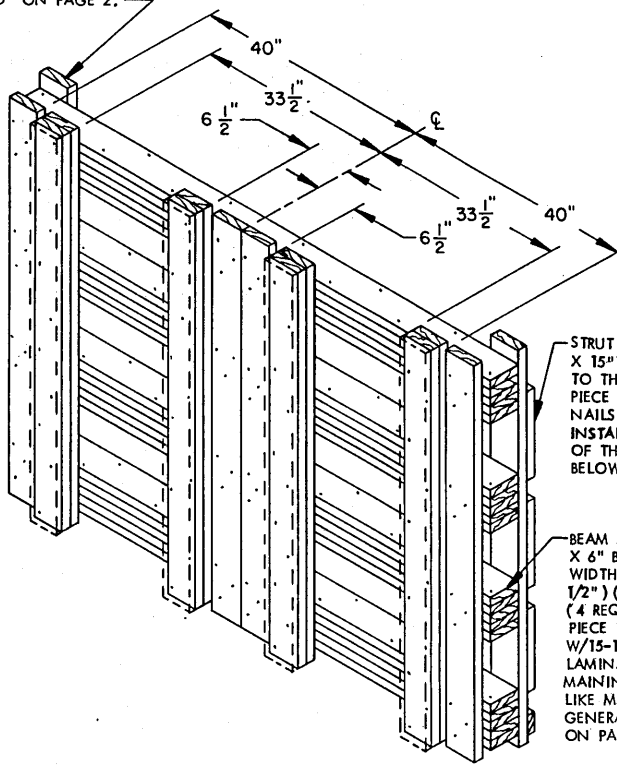
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	18	6
1" X 6"	46	23
2" X 4"	116	78
2" X 6"	563	563
4" X 4"	14	19
NAILS	NO. REQD	POUNDS
8d (2-1/2")	72	3/4
10d (3")	956	15
12d (3-1/4")	64	1-1/4
20d (4")	40	1-1/2
STEEL STRAPPING, 1-1/4" X .035" OR .031"-----	157' REQD--	22-1/2 LBS
SEAL FOR 1-1/4" STRAPPING-----	7 REQD--	2 LBS
STEEL STRAPPING, 2" X .035" OR .031"-----	84' REQD--	28 LBS
SEAL FOR 2" STRAPPING-----	15 REQD--	3 LBS
STAPLES, 2-1/8" X 3/4"-----	6 REQD--	NIL
STAPLES, 1-17/32" X 3/4"-----	6 REQD--	NIL

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
CONTAINER	8 @ 2,860	22,880 LBS
DUNNAGE		1,432 LBS
FLATRACK		
CONTAINER		5,732 LBS
TOTAL WEIGHT		30,044 LBS

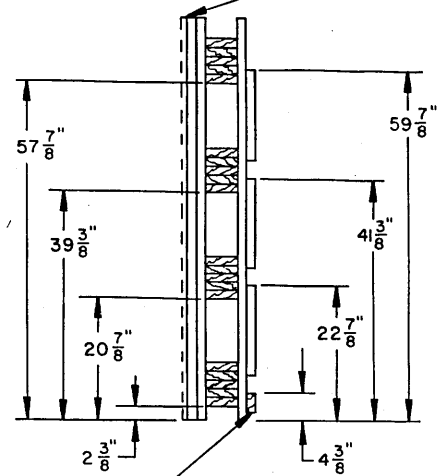
8 CONTAINER LOAD ON A 20'-0" FLATRACK CONTAINER

VERTICAL PIECE, 2" X 6" X 67-3/4" FOR A 4-HIGH LOAD, 49" FOR A 3-HIGH LOAD, AND 30-3/4" FOR A 2-HIGH LOAD (14 REQD.). NAIL W/3-10d NAILS PER EACH BEAM ASSEMBLY. WHEN REQUIRED, LAMINATE THE SECOND PIECE TO THE FIRST W/1-10d NAIL EVERY 8". SEE GENERAL NOTE "D" ON PAGE 2.



LOAD BEARING GATE

FILL PIECE, THICKNESS TO SUIT (REF: 1/2") X 6" X 67-3/4" FOR A 4-HIGH LOAD, 49" FOR A 3-HIGH LOAD, AND 30-3/4" FOR A 2-HIGH LOAD (4 REQD.). NAIL TO THE VERTICAL PIECE W/1-10d NAIL EVERY 8". SEE GENERAL NOTE "D" ON PAGE 2.



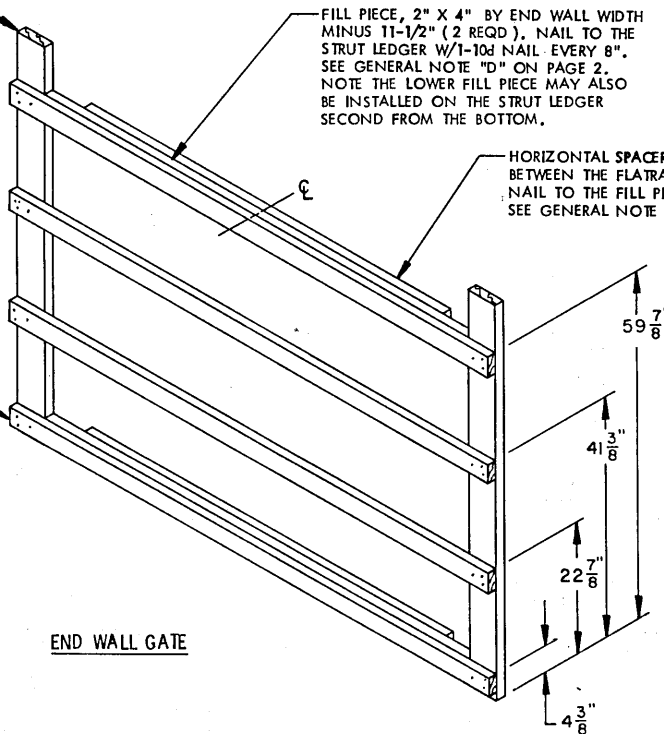
STRUT LEDGER, 2" X 4" BY END WALL WIDTH MINUS 1/2". NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH END.

VERTICAL PIECE, 2" X 6" X 67-3/4" FOR A 4-HIGH LOAD, 49" FOR A 3-HIGH LOAD AND 30-3/4" FOR A 2-HIGH LOAD (2 REQD.).

FILL PIECE, 2" X 4" BY END WALL WIDTH MINUS 1 1/2" (2 REQD.). NAIL TO THE STRUT LEDGER W/1-10d NAIL EVERY 8". SEE GENERAL NOTE "D" ON PAGE 2. NOTE THE LOWER FILL PIECE MAY ALSO BE INSTALLED ON THE STRUT LEDGER SECOND FROM THE BOTTOM.

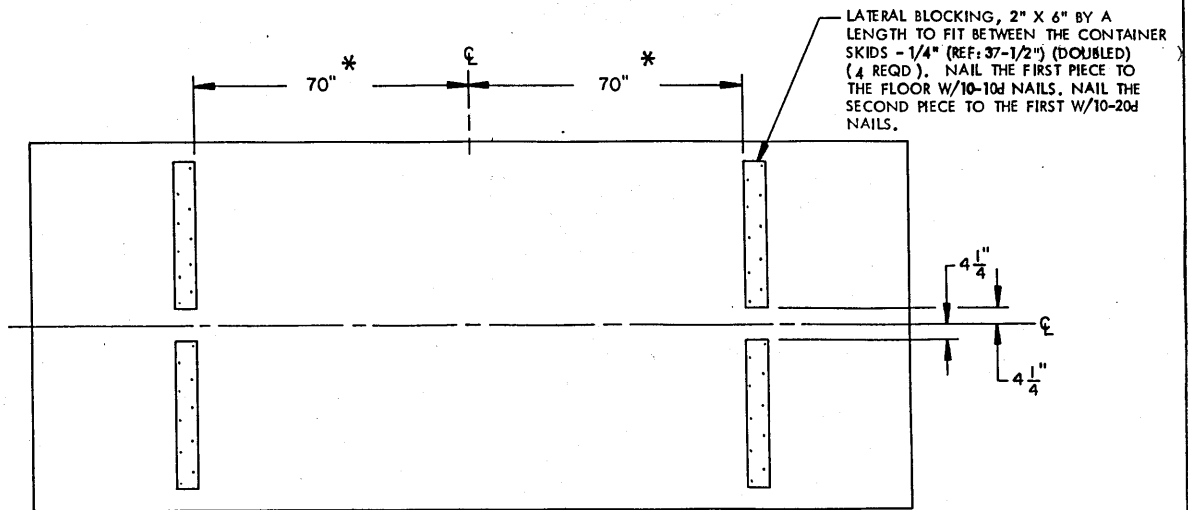
HORIZONTAL SPACER, 2" X 4" BY A LENGTH-TO-FIT BETWEEN THE FLATRACK VERTICAL POSTS (2 REQD.). NAIL TO THE FILL PIECE W/1-10d NAIL EVERY 8". SEE GENERAL NOTE "D" ON PAGE 2.

STRUT LEDGER, 2" X 4" BY ENDWALL WIDTH MINUS 1/2" (4 REQD.). NAIL TO THE VERTICAL PIECE W/3-10d NAILS AT EACH JOINT.



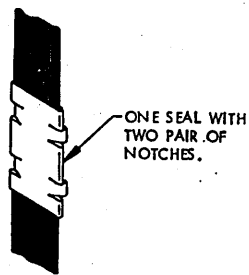
END WALL GATE

DETAILS

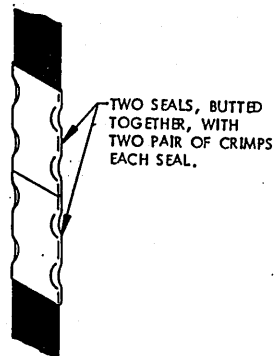


**FLOOR DUNNAGE PLAN**

\* DEPENDING ON THE TYPE OF CNU-305/E CONTAINER BEING SHIPPED, THE LATERAL BLOCKING MAY BE SHIFTED LEFT OR RIGHT SEVERAL INCHES TO AVOID CONTACT WITH THE CONTAINER REINFORCING RIBS.

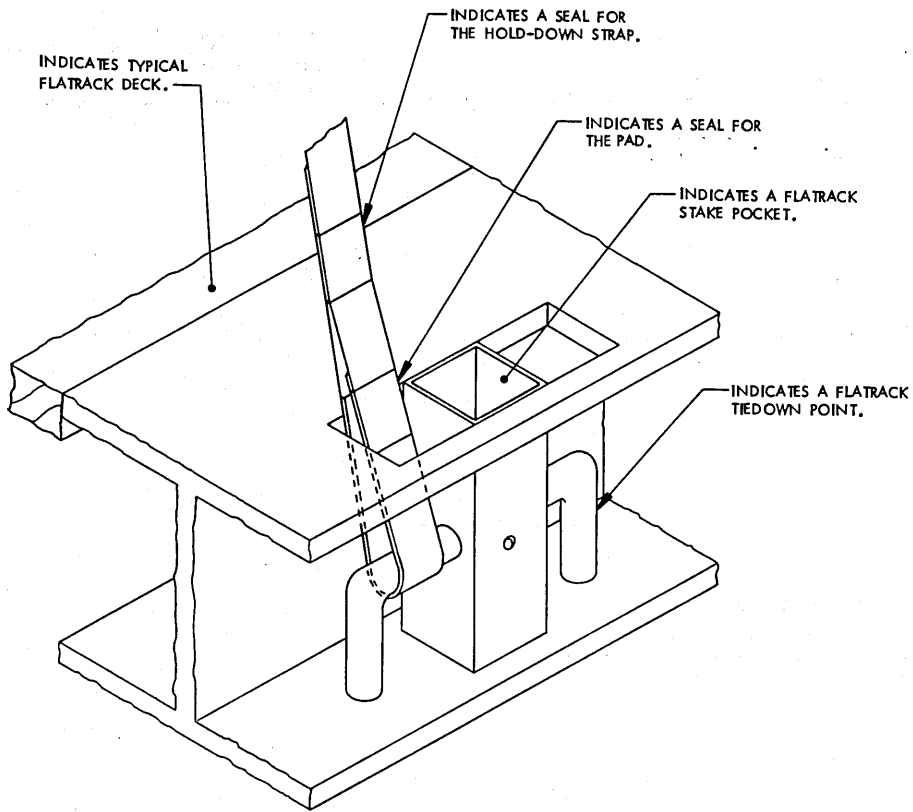


**STRAP JOINT A**  
METHOD OF SECURING A STRAP JOINT WHEN USING A NOTCH-TYPE SEALER.



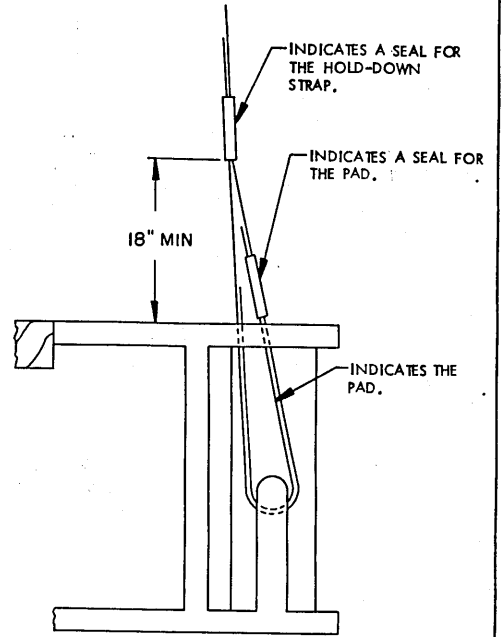
**STRAP JOINT B**  
METHOD OF SECURING A STRAP JOINT WHEN USING A CRIMP-TYPE SEALER.

**DETAILS**



**TIEDOWN DETAIL A**

SEE GENERAL NOTE "M" ON PAGE 2.



**SIDE VIEW**