

APPROVED BY
BUREAU OF EXPLOSIVES

D. L. Hardy
DATE 3-17-97

LOADING AND BRACING[●] IN MILVAN CONTAINERS[⊕] OF MK-82 (500 POUND) BOMBS ON MHU-149/E METAL PALLETS

● LOADING AND BRACING SPECIFICATIONS SET FORTH WITHIN THIS DRAWING ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL CARRIER SERVICE. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE MOVED BY MOTOR OR WATER CARRIERS.

⊕ ONLY MILVAN CONTAINERS WHICH HAVE BEEN MODIFIED TO INCLUDE A MECHANICAL LOAD-BRACING SYSTEM THAT SATISFIES THE REQUIREMENTS OF THE BUREAU OF EXPLOSIVES PAMPHLET 6C WILL BE USED FOR THE MOVEMENT OF AMMUNITION BY T/COFC SERVICE. CAUTION: OTHER REQUIREMENTS OF PAMPHLET 6C ALSO APPLY.

U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY INDUSTRIAL OPERATIONS COMMAND <i>Timothy R. Fore</i>	ENGINEER	BASIC		DO NOT SCALE			
		REV.		WEBSITE: HTTP://WWW.DAC.ARMY.MIL			
	TECHNICIAN	BASIC	R. HAYNES	APRIL 1997			
		REV.					
	DRAFTSMAN	BASIC					
		REV.					
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND <i>William F Ernst</i> DEFENSE AMMUNITION CENTER	TRANSPORTATION ENGINEERING DIVISION		<i>William R. Smith</i>				
	VALIDATION ENGINEERING DIVISION	TESTED	<i>James H. ...</i>	CLASS	DIVISION	DRAWING	FILE
	LOGISTICS ENGINEERING OFFICE		<i>Thomas J. ...</i>	19	48	8642	15PB11

PROJECT SP 341-97

GENERAL NOTES

(GENERAL NOTES CONTINUED)

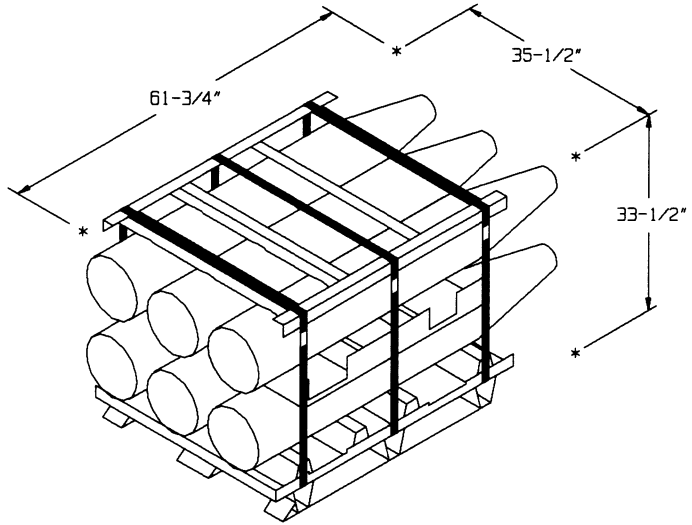
- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE OUTLOADING PROCEDURES SPECIFIED HEREIN ARE APPLICABLE TO THE MK-82 (500 POUND) BOMB ON MHU-149/E METAL PALLET. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE MHU-149/E METAL PALLET WITH MK-82 BOMBS INSTALLED. SEE PAGE 3 FOR DETAILS OF THE PALLET UNIT. **CAUTION:** REGARDLESS OF THE QUANTITY OF PALLETS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE MILVAN MUST NOT BE EXCEEDED.
- C. THE LOADS AS SHOWN ARE BASED ON A 20' LONG BY 8' WIDE BY 8' HIGH MILVAN CONTAINER WITH INSIDE DIMENSIONS OF 19'-4" LONG BY 92" WIDE BY 87" HIGH. THE LOADS ARE DESIGNED FOR TRAILER/CONTAINER-ON-FLATCAR (T/COFC) SHIPMENT.
- D. THE SPECIFIED OUTLOADING PROCEDURES ARE FOR CONTAINERS EQUIPPED WITH SELF-CONTAINED MECHANICAL BRACING DEVICES AS DESCRIBED WITHIN BUREAU OF EXPLOSIVES PAMPHLET 6C. CROSS MEMBER ATTACHMENT FACILITIES WITHIN THESE CONTAINERS MUST PROVIDE FOR THE INSTALLATION OF LOAD BLOCKING CROSS MEMBERS AT THE HEIGHTS SPECIFIED. THE WEIGHT DIMENSIONS SPECIFIED WITHIN THIS DRAWING FOR THE INSTALLATION OF CROSS MEMBERS CONFORM WITH THE BUREAU OF EXPLOSIVES PAMPHLET 6C, WITH THE EXCEPTION THAT TWO ADDITIONAL BELT RAILS HAVE BEEN SHOWN: ONE AT 72" AND ONE AT 83" HIGH FROM THE CONTAINER FLOOR. VOIDS LENGTHWISE WITHIN THE LOAD MUST BE HELD TO A MINIMUM. CROSS MEMBERS MUST BE PLACED AGAINST THE LADING AS TIGHTLY AS THE HOLE SPACING IN THE CROSS MEMBER ATTACHMENT FACILITY PERMITS. EACH CROSS MEMBER WILL BE INSTALLED WITH THE ENDS ATTACHED AS NEARLY AS POSSIBLE IN "MATED" POSITIONS (AT EQUAL HEIGHT AND AT EQUAL DISTANCES FROM THE END OF THE CONTAINER). CROSS MEMBERS IN EMPTY CONTAINERS AND THOSE NOT USED IN LOADED CONTAINERS MUST BE FASTENED INTO BELT RAILS FOR SHIPMENT. COMPONENTS ASSIGNED TO EACH CONTAINER MUST REMAIN THEREWITH EVEN THOUGH UNUSED DURING SOME SHIPMENTS. SEE THE "FILL DETAIL" ON PAGE 5 FOR THE DUNNAGING METHOD REQUIRED TO ELIMINATE AN EXCESSIVE LENGTHWISE VOID WITHIN A LOAD. THE LOAD BLOCKING COMPONENT DESIGNATED AS "CROSS MEMBER" HEREIN, IS IDENTIFIED AS "BEAM ASSEMBLY" WITHIN TM 55-8115-200-23 & P, DATED DECEMBER 1979. THE BEAM ASSEMBLY IS FURTHER IDENTIFIED AS NSN 8115-00-165-6623.
- E. DUNNAGE LUMBER SPECIFIED IS OF A NOMINAL SIZE. FOR EXAMPLE, 1" X 4" MATERIAL IS ACTUALLY 3/4" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE.
- F. **CAUTION:** DO NOT NAIL DUNNAGE MATERIAL TO THE MILVAN WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- G. 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.
- H. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS ONE OF THE SIDEWALLS, HAVE NOT BEEN SHOWN IN THE LOAD VIEW FOR CLARITY PURPOSES.
- J. 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.
- K. TO MAKE LOADING EASIER, TO HELP ACHIEVE A TIGHT LOAD ACROSS A CONTAINER, AND TO PREVENT UNACCEPTABLE DAMAGE TO LADING UNITS WHEN LOADING A MILVAN, A SLIP-SHEET CAN BE USED EFFECTIVELY AS A "SHOEHORN" TYPE DEVICE. THE SLIP-SHEET WILL PROVIDE A SMOOTH SURFACE THAT WILL PREVENT UNIT STRAPS AND/OR CONTAINERS FROM INTERLOCKING OR CATCHING ON OTHER PROJECTIONS WHEN LATERALLY ADJACENT LADING UNITS ARE BEING LOADED. A SLIP-SHEET WILL BE USED AFTER ONE-HALF OF A STACK IS LOADED WITH ONE OF ITS SIDES IN TIGHT CONTACT AT ONE SIDE OF THE MILVAN. THE SLIP-SHEET IS TO BE PLACED AGAINST THE OTHER SIDE OF THE HALF-STACK BEFORE THE LAST HALF OF THE STACK IS LOADED. AFTER A STACK IS COMPLETED, THE SLIP-SHEET IS TO BE REMOVED FOR SUBSEQUENT USE WITH THE NEXT STACK. A SLIP-SHEET OF SUITABLE SIZE CAN BE MADE FROM A SHEET OF 1/8" TEMPERED HARDBOARD (MASONITE) OR FROM A SHEET OF ANY OTHER MATERIAL THAT WILL SATISFY THE REQUIREMENTS.
- L. MAXIMUM LOAD WEIGHT CRITERIA:
- THE MAXIMUM LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPABILITY FACTORS. ALTHOUGH THE HEAVIEST MAXIMUM LOAD IS DELINEATED IN THE LOAD VIEW, PROVISIONS ARE INCLUDED WITHIN THIS DRAWING SO THAT THE BASIC LOAD CAN BE ADJUSTED TO SATISFY A LESSER QUANTITY OF LADING UNITS. DEPENDING ON TRANSPORTATION ROUTING, IT MAY BE NECESSARY TO REDUCE THE LOAD WEIGHT TO SATISFY "WEIGHT LAWS" OF CERTAIN STATES. ALSO, IT MAY BE NECESSARY TO REDUCE THE LOAD WEIGHT TO SATISFY OTHER WEIGHT RESTRICTIONS IMPOSED ON THE INTERMODAL CONTAINER SYSTEM.
- M. SPECIAL T/COFC NOTES:
- CAUTION:** LOADED CONTAINERS MUST BE ON CHASSIS EQUIPPED WITH TWO BOGIE ASSEMBLIES WHEN BEING MOVED IN TOFC SERVICE, REGARDLESS OF THE LOAD WEIGHT WITHIN THE CONTAINER.
 - LOAD LIMITS OF T/COFC RAIL CARS 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.
 - CHASSIS/CONTAINERS COUPLED INTO A 40-FOOT TRAILER CONFIGURATION MUST BE PLACED AT THE B-END OF A TOFC RAIL CAR. THE REAR END OF THE 40-FOOT UNIT WILL OVERHANG THE END OF THE CAR IF IT IS PLACED AT THE A-END. TWENTYFOOT AND 40-FOOT UNITS CAN BE LOADED ON THE SAME CAR.
- N. WHEN LOADING PALLET UNITS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD (TIGHT AGAINST THE DUNNAGE ASSEMBLIES). THE UNBLOCKED SPACE ACROSS THE WIDTH OF A LOAD BAY IS NOT TO EXCEED 1-1/2". EXCESSIVE GAPS CAN BE ELIMINATED BY ADJUSTING THE WIDTH OF THE CENTER FILL ASSEMBLIES, AS NECESSARY, TO FACILITATE VARIANCE IN THE UNIT SIZE.
- O. WHETHER A CONTAINER IS FULL OR IS LOADED WITH A REDUCED QUANTITY OF LADING UNITS, THE LENGTHWISE CENTER OF GRAVITY OF THE LOAD MUST BE WITHIN 12", IN EITHER DIRECTION, OF THE MID-POINT OF THE CONTAINER.
- P. THE QUANTITY OF PALLET UNITS SHOWN IN THE LOAD ON PAGE 4 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE "ALTERNATIVE LOADING PROCEDURE" DETAIL ON PAGE 5.
- IF A LOAD IS REDUCED BY ONLY A SMALL AMOUNT (ONE OR TWO LADING UNITS), LADING UNITS NORMALLY MAY BE ELIMINATED FROM THE REAR OF THE LOAD.
 - IF A LOAD IS REDUCED BY A LARGE AMOUNT (MORE THAN TWO LADING UNITS), LADING UNITS SHOULD BE ELIMINATED AS REQUIRED AND THE TOTAL LOAD SHIFTED FORE OR AFT, AS NECESSARY, TO ACHIEVE A SYMMETRICAL WEIGHT DISTRIBUTION. THE DEPICTED PROCEDURES WILL BE FOLLOWED AS CLOSELY AS POSSIBLE, MAKING ONLY THOSE ADJUSTMENTS TO THE DUNNAGE WHICH ARE REQUIRED TO ACCOMMODATE THE NUMBER OF UNITS TO BE SHIPPED.

(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

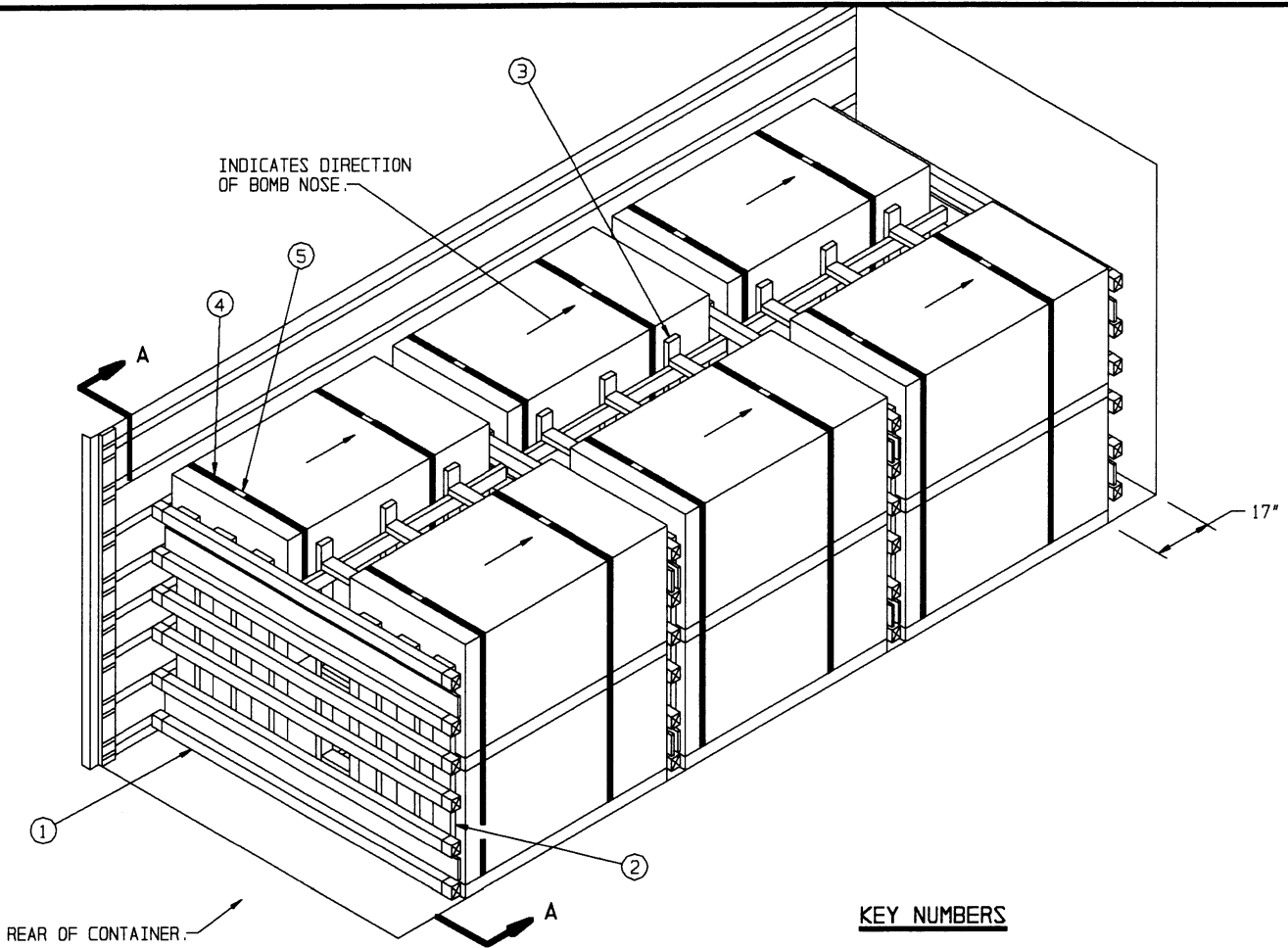
- LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.
- NAILS - - - - - : FED SPEC FF-N-105; COMMON.
- STRAPPING, STEEL - - : ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH A, B (GRADE 2), OR C.
- SEAL, STRAP - - - - : ASTM D3953; CLASS H, FINISH A, B (GRADE 2), OR C, DOUBLE NOTCH TYPE, STYLE I, II, OR IV.
- WIRE, CARBON STEEL - : ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH. .0800" DIA OR BETTER.

- Q. WHEN STEEL STRAPPING IS SEALED AT 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 SEAL 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.
- R. AS REQUIRED BY THE ASSOCIATION OF AMERICAN RAILROADS (AAR), ALL 1-1/4" AND 2" STEEL STRAPPING USED FOR LOAD RESTRAINT MUST BE MARKED AS SPECIFIED WITHIN THE APPLICABLE AAR RULES GOVERNING LOADING, BLOCKING AND BRACING OF FREIGHT WITHIN THE CONVEYANCE. FOR THE SPECIFIC MARKING SIZE, FREQUENCY, ETC., REQUIRED, REFER TO THE APPROPRIATE AAR LOADING RULES.



PALLET UNIT

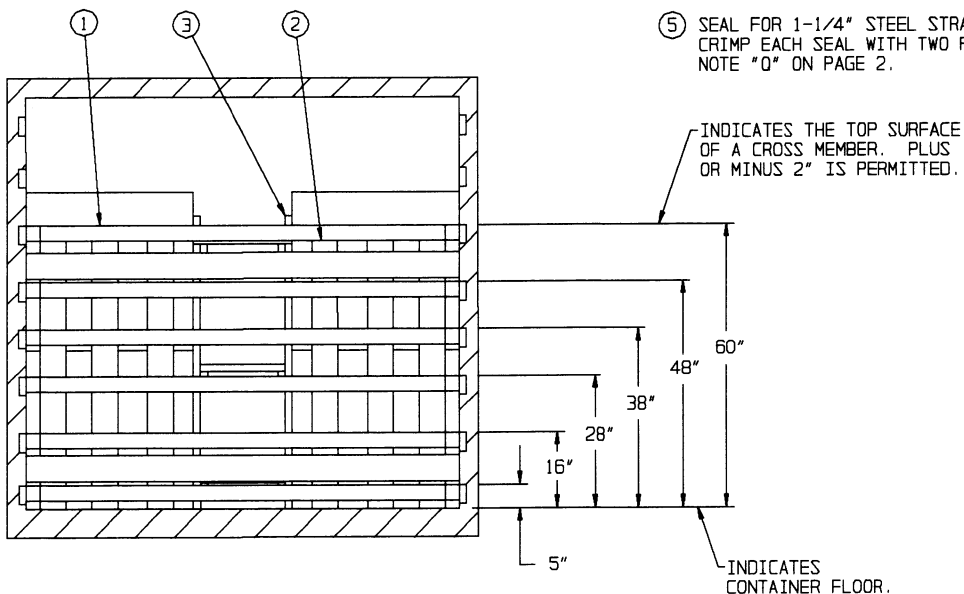
GROSS WEIGHT - - 3,035 LBS (APPROX)
CUBE - - - - - 42.5 CU FT (APPROX)



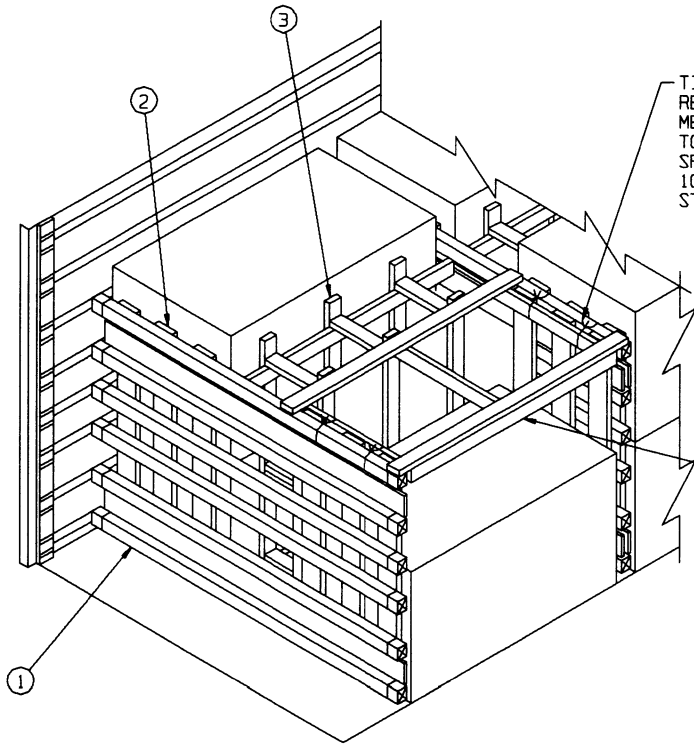
ISOMETRIC VIEW

KEY NUMBERS

- ① CROSS MEMBER (24 REQD). POSITION AT THE HEIGHTS AS SHOWN IN THE "SECTION A-A" VIEW AT THE LEFT. SEE THE "FILL DETAIL" ON PAGE 5. SEE GENERAL NOTE "D" ON PAGE 2.
- ② LOAD BEARING GATE (6 REQD). SEE THE DETAIL ON PAGE 6. SEE GENERAL NOTE "G" ON PAGE 2.
- ③ CENTER FILL ASSEMBLY (3 REQD). SEE THE DETAIL ON PAGE 6. SEE GENERAL NOTE "N" ON PAGE 2.
- ④ UNITIZING STRAP, 1-1/4" X .035" OR .031" X 18'-6" LONG STEEL STRAPPING (12 REQD). INSTALL SO AS TO ENCIRCLE TWO PALLET UNITS AS SHOWN.
- ⑤ SEAL FOR 1-1/4" STEEL STRAPPING (12 REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "Q" ON PAGE 2.



SECTION A-A

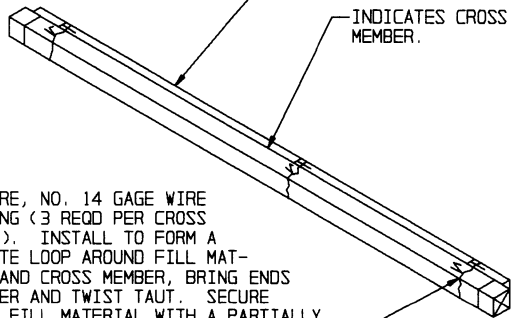


TIE WIRE, NO. 14 GAGE WIRE 18" LONG (4 REOD). WIRE TO FORM A LOOP AROUND CROSS MEMBER AND SPACER ASSEMBLY, BRING ENDS TOGETHER AND TWIST TAUT. SECURE TO THE SPACER ASSEMBLY WITH A PARTIALLY DRIVEN 10d NAIL BENT OVER THE WIRE OR WITH A STRAP STAPLE.

SPACER ASSEMBLY (1 REOD). SEE THE DETAIL BELOW.

ALTERNATIVE LOADING PROCEDURE
(REFER TO PAGE 4 FOR KEY NUMBERS)

FILL MATERIAL, 1" X 4" OR 2" X 4" MATERIAL BY CONTAINER WIDTH MINUS 1" (AS REOD).

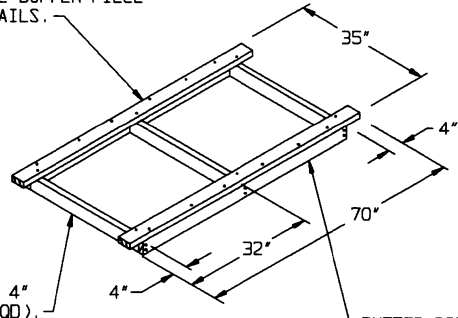


INDICATES CROSS MEMBER.

TIE WIRE, NO. 14 GAGE WIRE 18" LONG (3 REOD PER CROSS MEMBER). INSTALL TO FORM A COMPLETE LOOP AROUND FILL MATERIAL AND CROSS MEMBER, BRING ENDS TOGETHER AND TWIST TAUT. SECURE TO THE FILL MATERIAL WITH A PARTIALLY DRIVEN 10d NAIL BENT OVER THE WIRE, OR WITH A STRAP STAPLE.

FILL DETAIL

RETAINER PIECE, 2" X 4" X 70" (2 REOD). NAIL TO THE STRUTS W/1-10d NAIL AT EACH JOINT AND TO THE BUFFER PIECE W/6-10d NAILS.



STRUT, 2" X 4" X 32" (3 REOD).

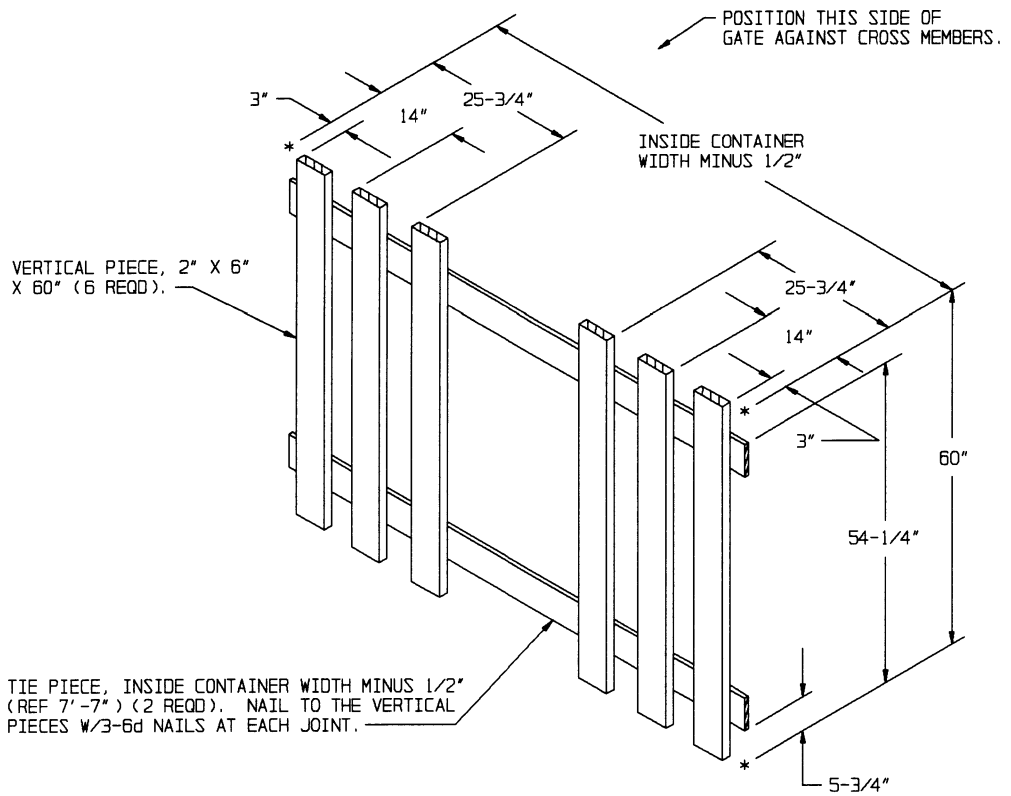
SPACER ASSEMBLY

BUFFER PIECE, 2" X 4" X 61-3/4" (2 REOD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.

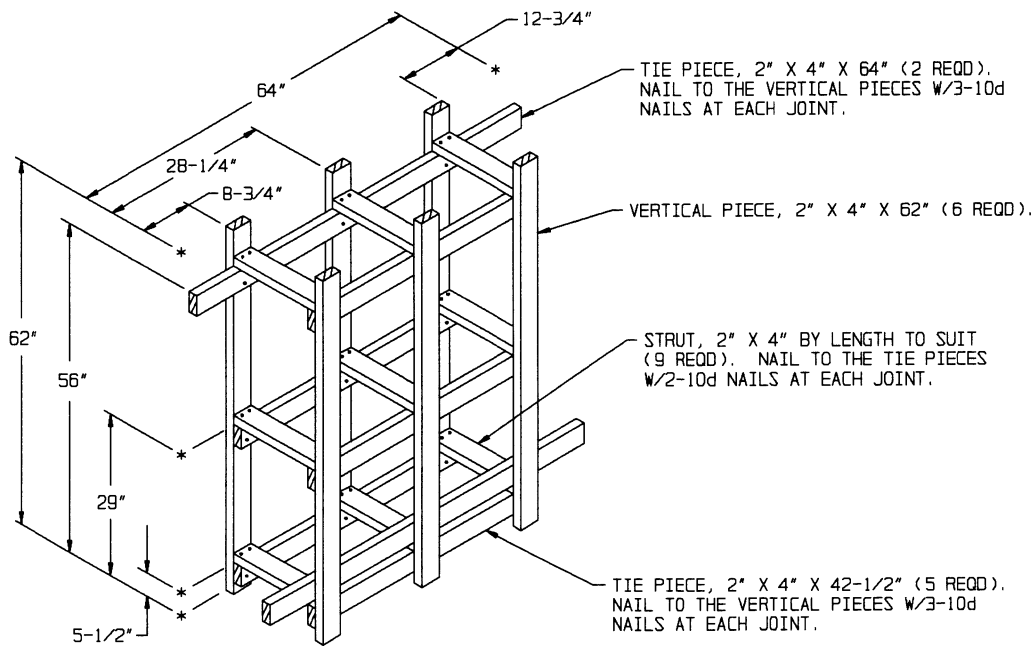
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	91	46
2" X 4"	214	143
2" X 6"	180	180
NAILS	NO. REOD	POUNDS
6d (2")	216	1-1/4
10d (3")	99	1-1/2
STEEL STRAPPING, 1-1/4"	222' REOD	32 LBS
SEAL FOR 1-1/4" STRAPPING	12 REOD	1/2 LB

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	12	36,420 LBS ROX)
DUNNAGE		773 LBS
CONTAINER		4,700 LBS
TOTAL WEIGHT		41,893 LBS (APPROX)



LOAD BEARING GATE



POSITION THIS END OF ASSEMBLY TOWARDS BASE END OF BOMB.

CENTER FILL ASSEMBLY