

LOADING AND BRACING IN BOXCARS AND ON FLATCARS, AND IN VAN TRAILERS AND ON FLATBED TRAILERS, OF AMMUNITION AND COMPONENTS ON PALLETS AND/OR SKIDDED BASES, AND CONTAINERS, FOR ON-DEPOT AND/OR INTRA-PLANT MOVEMENT

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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. THIS DOCUMENT IS DESIGNED TO AUGMENT THE GUIDANCE CONTAINED WITHIN U.S. ARMY MATERIEL COMMAND SAFETY MANUAL AMC-R 385-100, AND OTHER SERVICE PUBLICATIONS. THE ITEMS DEPICTED HEREIN ARE REPRESENTATIVE OF THE VARIOUS AMMUNITION ITEMS THAT MAY BE MOVED. THE BLOCKING AND BRACING PROCEDURES SHOWN ARE EXAMPLES OF SECURING THESE ITEMS FOR MOVEMENT, AND REPRESENT ONLY A PORTION OF THOSE THAT MAY BE USED. DEVIATIONS FROM THE DEPICTED PROCEDURES OR ADDITIONAL PROCEDURES/METHODS MAY BE AUTHORIZED BY THE INSTALLATION COMMANDING OFFICER OR THE COMMANDING OFFICER'S DESIGNATED REPRESENTATIVE.
- C. THE OUTLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE FOR ALL PALLET UNITS AND SKIDDED UNITS OF CONVENTIONAL AMMUNITION ITEMS AND SMALL MISSILES, LARGE AIR FORCE MISSILE AND BOMB CONTAINERS, LARGE GUIDED MISSILE CONTAINERS, AS WELL AS UNPALLETIZED ITEMS.
- D. THE OUTLOADING PROCEDURES DEPICTED WITHIN THIS DOCUMENT ARE APPLICABLE FOR RAILCAR LOADING AND MOTOR CARRIER LOADING FOR ON-DEPOT AND/OR INTRA-PLANT MOVEMENTS. RAIL PROCEDURES INCLUDE CONVENTIONAL TYPE BOXCARS, BOXCARS EQUIPPED WITH VARIOUS TYPES OF SELF-CONTAINED MECHANICAL BRACING DEVICES, CUSHIONED BOXCARS EQUIPPED WITH LOAD DIVIDER BULKHEADS AND CONVENTIONAL FLATCARS. MOTOR CARRIER PROCEDURES INCLUDE VAN TRAILERS AND FLATBED TRAILERS. NOTE THAT STRADDLE LIFT TYPE TRAILERS MAY ALSO BE USED.
- E. THE BLOCKING AND BRACING PROCEDURES HEREIN ARE BASED ON THE MOVEMENT OF AMMUNITION AND EXPLOSIVES AND MISSILES UNDER CONTROLLED CONDITIONS. THE ON-DEPOT AND/OR INTRA-PLANT ENVIRONMENT, WITH RESTRICTED SPEEDS OF CONVEYANCES, LESS DENSE TRAFFIC PATTERNS, EXPERIENCED VEHICLE DRIVERS AND TRAIN CREWS, SAFELY ALLOWS RELAXATION OF THE MORE STRINGENT OFF-INSTALLATION REQUIREMENTS. IT IS ONLY WHEN THESE CONTROLLED CONDITIONS EXIST AND ARE STRICTLY ADHERED TO THAT THE BLOCKING AND BRACING PROCEDURES CAN BE MINIMIZED.
- F. ALL MUNITIONS MUST BE RESTRAINED TO PREVENT EXCESSIVE MOVEMENT WITHIN A CLOSED BOXCAR, OR VAN TRAILER, OR ON A FLATCAR OR FLATBED TRAILER.
- G. THROUGHOUT THIS DOCUMENT, THE TERM "LOAD UNIT" IS USED. A LOAD UNIT IS DESCRIBED AS THE GROUP OF ITEMS WHICH IS ONE UNIT LONG BY FULL LOAD WIDTH BY FULL LOAD HEIGHT, WHETHER ONE LAYER OR MORE. WHEN POSSIBLE TO DO SO, LOADS SHOULD BE LIMITED TO ONE LAYER IN HEIGHT.
- H. IF A CARLOAD OR TRUCKLOAD CONSISTS OF MORE THAN ONE COMPATIBILITY GROUP OF MATERIAL, THE PERSON IN CHARGE SHALL ENSURE THAT THE VEHICLE DOES NOT CONTAIN ITEMS THAT ARE PROHIBITED FROM BEING LOADED OR TRANSPORTED TOGETHER. COMPATIBILITY SHALL BE STRICTLY MAINTAINED. NON-COMPATIBLE ITEMS SHALL BE MOVED IN SEPARATE CONVEYANCES. REFER TO AMCR 385-100 OR BUREAU OF EXPLOSIVES TARIFF NO. BOE 6000 FOR GUIDANCE.
- J. EVERY RAILCAR AND MOTOR VEHICLE CONTAINING ANY QUANTITY OF AMMUNITION ITEMS OR MISSILES SHALL BE PLACARDED WITH THE CORRECT PLACARDS CONSISTENT WITH THE HAZARD CLASSIFICATION OF THE LOAD.
- K. AMMUNITION AND MISSILES NOT PACKED IN WATER TIGHT CONTAINERS SHOULD BE COVERED WITH WATER-RESISTANT TARPULINS WHEN BEING MOVED ON OPEN TOP VEHICLES DURING INCLEMENT WEATHER.
- L. LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE. IF THOSE MEMBERS SPECIFICALLY IDENTIFIED AS "STRUTS" WITHIN A DEPICTED BOXCAR LOAD ARE SPECIFIED TO BE 4" X 4" MATERIAL, IT IS PERMISSIBLE TO USE TWO LAMINATED PIECES OF 2" X 6" MATERIAL IN LIEU OF EACH 4" X 4" STRUT. DOUBLED 2" X 6" STRUTS WILL BE LAMINATED W/1-10d NAIL EVERY 6".

(CONTINUED AT RIGHT)

(GENERAL NOTES CONTINUED)

- M. NOTICE: A STAGGERED NAILING PATTERN WILL BE USED WHEREVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES. ALSO, A STAGGERED NAILING PATTERN WILL BE USED WHEN DUNNAGE IS NAILED TO THE FLOOR OR SIDEWALL (IF APPLICABLE) OF THE TRANSPORTING VEHICLE, OR WHEN LAMINATING DUNNAGE. THE NAILING PATTERN WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL DOES NOT PENETRATE INTO OR NEAR A CRACK BETWEEN FLOOR BOARDS OR SIDEWALL BOARDS. 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.
- N. POWER DRIVEN STAPLES MAY BE USED AS ALTERNATIVE FASTENERS FOR NAILS WHEN CONSTRUCTING DUNNAGE ASSEMBLIES WHICH ARE TO BE USED IN THE DELINEATED LOADS. THE STAPLES TO BE USED MUST BE EQUAL IN LENGTH TO THE SPECIFIED NAIL SIZE AND MUST BE SUBSTITUTED ON A ONE STAPLE FOR ONE NAIL BASIS. STAPLES WHICH ARE 2-1/2" OR LESS IN LENGTH SHOULD BE IN ACCORDANCE WITH FEDERAL SPECIFICATION FF-N-105 AS NEARLY AS PRACTICABLE. STAPLES WHICH ARE LONGER THAN 2-1/2" WILL BE A COMMERCIAL GRADE, OF A QUALITY EQUIVALENT TO THOSE MANUFACTURED BY SENCO PRODUCTS INCORPORATED. NOTE: STAPLES WILL NOT BE SUBSTITUTED FOR NAILS IN ANY LOAD RESTRAINING FLOOR DUNNAGE APPLICATION.
- O. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF ONE SEAL WITH TWO PAIR OF NOTCHES OR CRIMPS WILL BE USED TO SEAL THE JOINT.
- P. THROUGHOUT THIS PROCEDURAL DRAWING, PORTIONS OF THE BLOCKING COMPONENTS AND OF THE DEPICTED CARS OR TRAILERS, SUCH AS A CAR OR TRAILER SIDEWALL, HAVE BEEN OMITTED FROM THE LOAD VIEWS FOR CLARITY PURPOSES.
- Q. THE QUANTITIES SHOWN IN THE DEPICTED LOADS ARE TYPICAL. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE TRANSPORT VEHICLE BEING LOADED OR THE QUANTITY TO BE MOVED, HOWEVER, THE APPROVED METHODS SPECIFIED HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING, AND STAYING OF THE UNITS.
- R. CAUTION: WHEN POWER OR PNEUMATIC NAILERS ARE BEING USED IN THE APPLICATION OF NAILED FLOORLINE BLOCKING OR BRACING, PALLET UNITS, CONTAINERS, ETC. BEING LOADED INTO THE TRANSPORT VEHICLE MUST BE POSITIONED TO ALLOW A CLEAR PATH OF EXIT FOR THE OPERATOR AT ALL TIMES, SHOULD AN EMERGENCY EXIT BECOME NECESSARY.
- S. 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.
- T. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "GENERAL NOTES" SECTIONS WHICH PRECEDE THE DEPICTED OUTLOADING METHODS.

MATERIAL SPECIFICATIONS

LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND
FED SPEC MM-L-751.

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.

STRAP - - - - - : WEBBING, UNIVERSAL TIEDOWN,
NSN 5340-00-980-9277, PN10900880, OR
NSN 1670-00-725-1437, PN1376-013, OR
NSN 5340-01-089-4997, PN1166958B, OR
NSN 5340-01-204-3009, PN9392419.

STRAP, WEB - - - - - : WEB SLING AND TIEDOWN ASSOCIATION
RECOMMENDED STANDARD SPECIFICATION
FOR SYNTHETIC WEB TIEDOWNS, FIRST
PUBLISHED IN 1991.

STRAPPING, STEEL - - : ASTM D3953; FLAT STRAPPING, TYPE 1 OR
2, 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, GRADE 1006
OR BETTER.

STAPLE, STRAP - - - : COMMERCIAL GRADE.

STAKE
POCKET PROTECTOR - - : COMMERCIAL GRADE.

ANTI-CHAFING
MATERIAL - - - - - : MIL-B-121 (OR EQUAL); NEUTRAL BARRIER
MATERIAL.

ROPE - - - - - : FED SPEC RR-W-410; IMPROVED PLOW
STEEL WIRE, PREFORMED, REGULAR LAY, 6
X 19, FLEXIBLE IWRC, MACWHYTE WIRE
ROPE CO. (OR EQUAL).

CLIP - - - - - : FED SPEC FF-C-450; TYPE I, CLASS 1,
"U" BOLT, CROSBY, HEAVY DUTY (OR
EQUAL).

THIMBLE - - - - - : FED SPEC FF-T-276; TYPE II.

HARDBOARD - - - - - : ANSI/AHA A135.4, CLASS 1.

FIBERBOARD - - - - - : FED SPEC PPP-F-320; TYPE SF (SOLID
FIBERBOARD), CLASS DOMESTIC, ALL
GRADES.

CHAIN - - - - - : NATIONAL ASSOCIATION OF CHAIN
MANUFACTURER'S WELDED CHAIN
SPECIFICATION ADOPTED NOVEMBER 1975.

LOAD BINDER - - - - : FED SPEC GGG-B-325.

STRAP ANCHOR PLATE - : NSN 5340-00-252-3014 (FOR 1-1/4"
STRAP).

STRAP ANCHOR
PLATE NAIL - - - - - : NSN 5340-00-290-7140.

DUNNAGE, INFLATABLE : COMMERCIAL GRADE.

PIN, HITCH - - - - - : COMMERCIAL GRADE.

FIBERBOARD,
HONEYCOMB - - - - - : COMMERCIAL GRADE.

STYROFOAM - - - - - : COMMERCIAL GRADE.

GENERAL NOTES FOR CONVENTIONAL BOXCARS

(GENERAL NOTES CONTINUED)

- A. THE OUTLOADING PROCEDURES DEPICTED ON PAGES 4 THRU 17 ARE APPLICABLE FOR MOVEMENTS IN CONVENTIONAL BOXCARS. CARS WHICH ARE 50'-6" LONG BY 9'-2" WIDE HAVE BEEN SHOWN. HOWEVER, THE PROCEDURES ARE ALSO APPLICABLE FOR BOXCARS OF OTHER LENGTHS AND WIDTHS.
- B. BOXCARS SHOULD BE USED FOR THE LOADING OF PALLET UNITS AND SKIDDED UNITS OF AMMUNITION AND EXPLOSIVES AND PALLETIZED SMALL MISSILES. BOXCARS CAN ALSO BE USED FOR MOVEMENTS OF LONG MISSILE CONTAINERS AND OTHER LARGE ITEMS IF OPEN TOP VEHICLES, EITHER FLATCARS OR FLATBED TRAILERS, ARE NOT AVAILABLE.
- C. PALLET UNITS AND SKIDDED UNITS SHOULD BE LOADED IN A DOUBLE ROW PATTERN, WITH THE UNITS POSITIONED AGAINST THE CAR SIDEWALLS. SEE THE TYPICAL LOAD VIEW ON PAGE 5. MISSILE CONTAINERS SHOULD ALSO BE LOADED AGAINST THE CAR SIDEWALLS. SEE THE TYPICAL LOAD VIEW ON PAGE 9. IF A THIRD ROW OF PALLET UNITS, SKIDDED UNITS, OR MISSILE CONTAINERS IS TO BE LOADED, IT SHOULD BE POSITIONED SO AS TO BE CENTERED IN THE CAR. IF THE QUANTITY TO BE MOVED WILL WORK OUT, PALLET UNITS, SKIDDED UNITS, AND/OR CONTAINERS CAN BE LOADED ONE-WIDE DOWN THE CENTER OF THE CAR. SEE THE TYPICAL LOAD VIEW ON PAGE 10.
- D. LATERAL BRACING IS NOT REQUIRED FOR SINGLE-LAYER LOADS OF PALLET UNITS OR SKIDDED UNITS IF THE VOID IS LESS THAN ONE-HALF THE UNIT DIMENSION ACROSS THE CAR. FOR 48" AND 45-1/2" WIDE UNITS, LATERAL BRACING IS NOT REQUIRED. BRACING IS REQUIRED FOR PALLET UNITS POSITIONED WITH THE 35" LENGTH DIMENSION ACROSS THE CAR, UNLESS THEY ARE LOADED THREE UNITS WIDE.
- E. LATERAL BRACING IS REQUIRED FOR LOADS OF TWO OR MORE LAYERS OF PALLET UNITS OR SKIDDED UNITS. BRACING IS REQUIRED FOR PALLET UNITS HAVING THE 35" LENGTH DIMENSION ACROSS THE CAR IF THE VOID IS MORE THAN 4", AND FOR SKIDDED UNITS AND FOR OTHER PALLET UNIT SIZES AND POSITIONS WHEN THE VOID IS 6" OR MORE. NAILED SIDE BLOCKING MAY BE USED AT THE FLOOR LEVEL, OR ANTI-SWAY BRACES MAY BE USED. ANTI-SWAY BRACES WILL BE USED FOR ALL UPPER LAYERS, UNLESS THE STACK IS UNITIZED. THEN AN ANTI-SWAY BETWEEN THE TOP-LAYER UNITS IS SUFFICIENT. IF A LATERAL VOID IS TOO SMALL FOR THE INSTALLATION OF ANTI-SWAY BRACES, CRIB FILL ASSEMBLIES MAY BE USED. SEE THE "TYPICAL CRIB FILL" DETAIL ON PAGE 16. EMPTY PALLETS MAY BE POSITIONED ON EDGE BETWEEN THE ROWS OR STYROFOAM SHEETS MAY BE USED ALONG WITH THE PALLETS OR WITHOUT. HANGING HONEYCOMB STYLE FIBERBOARD ASSEMBLIES MAY BE POSITIONED BETWEEN THE ROWS. SEE THE "SIDE FILL" DETAIL ON PAGE 16. INFLATABLE DUNNAGE MAY BE USED FOR LATERAL VOIDS OF FROM 4" TO 12". SEE THE LOAD VIEW ON PAGE 7 WHERE INFLATABLE DUNNAGE IS USED FOR LONGITUDINAL BRACING. THE NAILED FLOORLINE BLOCKING AND/OR ANTI-SWAY BRACES ARE THEN NOT REQUIRED.
- F. CONTAINERS WHICH ARE SHORTER THAN THE INSIDE WIDTH OF THE BOXCAR BY 1" OR MORE SHOULD BE LOADED CROSSWISE. CONTAINERS WHICH ARE LONGER THAN 1" LESS THAN THE INSIDE WIDTH OF THE BOXCAR MUST BE LOADED LONGITUDINALLY.
- G. LATERAL BRACING FOR CROSSWISE-POSITIONED CONTAINERS IS NOT REQUIRED IF THE TOTAL EXCESS SPACE ACROSS THE BOXCAR IS LESS THAN 20" FOR EITHER SINGLE-LAYER LOADS OR LOADS OF MORE THAN ONE LAYER. LONGITUDINALLY ADJACENT CONTAINER STACKS MAY BE POSITIONED AGAINST OPPOSITE SIDEWALLS, IF DESIRED. IF THE SPACE IS MORE THAN A TOTAL OF 20", NAILED SIDE BLOCKING SHOULD BE INSTALLED ON ONE SIDE OR ON EACH SIDE, AS APPLICABLE, OR SIDE FILL ASSEMBLIES MAY BE USED. SEE THE DETAIL ON PAGE 37. IF NECESSARY TO STACK THE CONTAINERS, THE UPPER-LAYER CONTAINERS MUST BE UNITIZED TO THE LOWER CONTAINER WITH ONE 1-1/4" STEEL STRAPPING.
- H. LATERAL BRACING IS NOT REQUIRED FOR SINGLE-LAYER LOADS OF LENGTHWISE-POSITIONED CONTAINERS IF THE VOID IS LESS THAN ONE-HALF THE CONTAINER DIMENSION WHICH IS POSITIONED ACROSS THE WIDTH OF THE CAR, UNLESS IT IS NEEDED TO ALIGN STRONG POINTS OF LONGITUDINALLY ADJACENT CONTAINERS.
- J. LATERAL BRACING IS REQUIRED FOR LOADS OF TWO OR MORE LAYERS OF LENGTHWISE-POSITIONED CONTAINERS. NAILED SIDE BLOCKING MAY BE USED AT THE FLOOR LEVEL, OR ANTI-SWAY BRACES MAY BE USED. ANTI-SWAY BRACES WILL BE USED FOR ALL UPPER LAYERS UNLESS THE STACK IS UNITIZED. THEN AN ANTI-SWAY BRACE BETWEEN THE TOP-LAYER CONTAINERS IS SUFFICIENT. IF A LATERAL VOID IS TOO SMALL FOR THE INSTALLATION OF ANTI-SWAY

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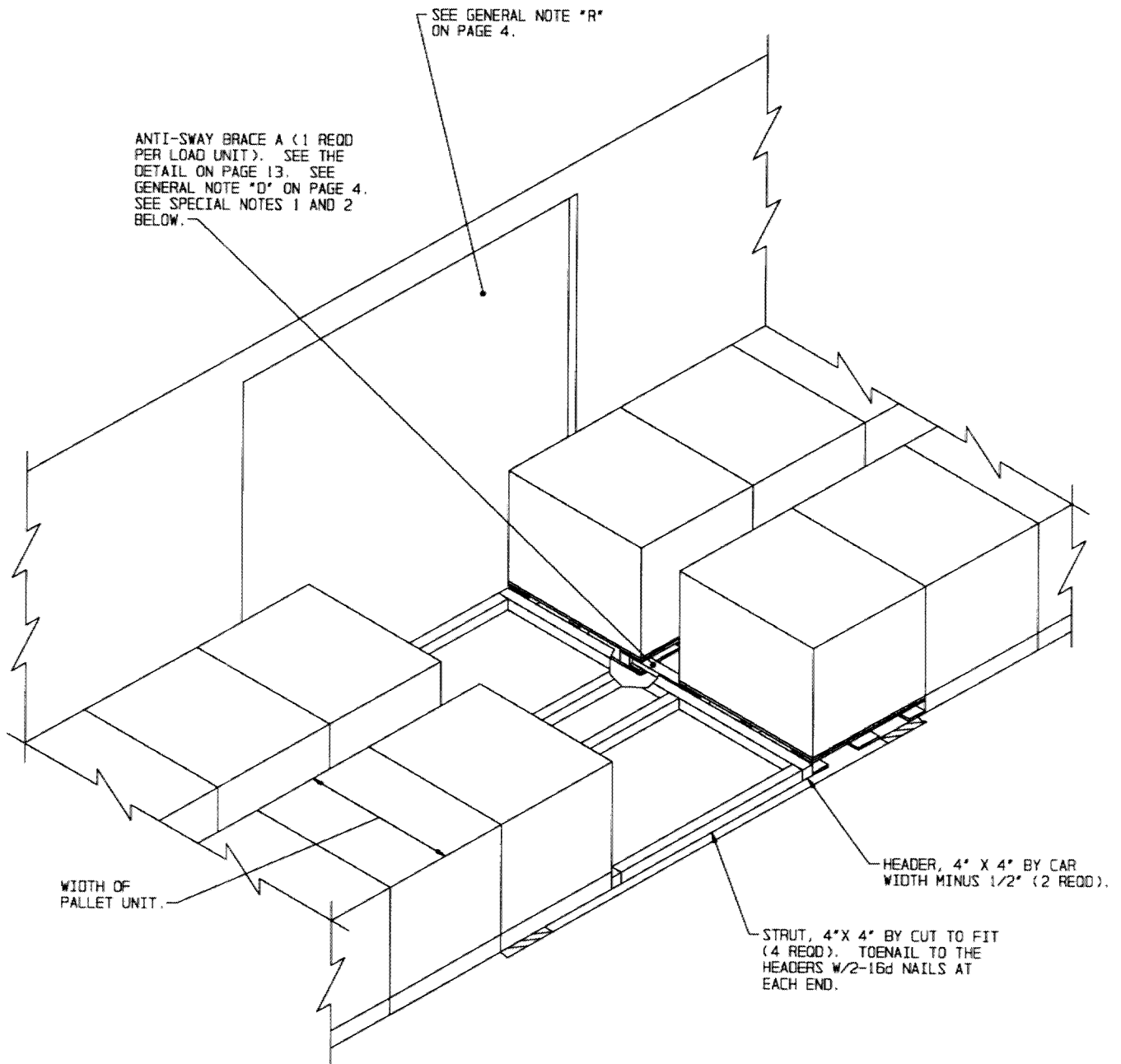
- K. LONGITUDINAL BRACING FOR FULL-LENGTH ONE-LAYER LOADS OF PALLET UNITS, SKIDDED UNITS, OR CONTAINERS CAN BE ACCOMPLISHED USING 4" X 4" BY CAR-WIDTH HEADERS AGAINST THE LADING, AND 4" X 4" CUT-TO-FIT STRUTS ALIGNED WITH THE STRONG POINTS OF THE PALLET UNITS OR SKIDDED UNITS, OR ALIGNED WITH THE SKIDS OF CONTAINERS. SEE THE TYPICAL LOAD VIEW ON PAGE 5.
- L. LONGITUDINAL BRACING FOR FULL-LENGTH LOADS OF MORE THAN ONE LAYER OF PALLET UNITS, SKIDDED UNITS, OR CONTAINERS CAN BE ACCOMPLISHED USING CENTER GATES AGAINST THE LADING, AND 4" X 4" BY CUT-TO-FIT STRUTS ALIGNED WITH THE STRONG POINTS OF THE PALLET UNITS OR SKIDDED UNITS, OR ALIGNED WITH THE SKIDS OF CONTAINERS. SEE THE TYPICAL LOAD VIEW ON PAGE 8. AS AN ALTERNATIVE, LONGITUDINAL BRACING FOR FULL-LENGTH LOADS OF MORE THAN ONE LAYER OF PALLETS OR SKIDDED UNITS MAY ALSO BE ACCOMPLISHED USING INFLATABLE DUNNAGE. SEE THE LOAD VIEW ON PAGE 7.
- M. LONGITUDINAL BRACING FOR PARTIAL-LENGTH ONE-LAYER LOADS OF PALLET UNITS, SKIDDED UNITS, OR CONTAINERS CAN BE ACCOMPLISHED USING NAILED HEADERS AND BACK-UP CLEATS. SEE THE TYPICAL LOAD VIEWS ON PAGES 6 AND 9. THE HEADERS SHOULD BE THE WIDTH OF THE LADING, OR CAR WIDTH, AS REQUIRED. THE HEADERS SHOULD BE OF A NUMBER OF LAYERS AS SPECIFIED BY THE "HEADER REQUIREMENTS" DETAIL ON PAGE 15. THE FIRST THICKNESS OF A HEADER SHOULD BE NAILED TO THE CAR FLOOR W/1-16d NAIL EVERY 18", USING NOT LESS THAN TWO NAILS. EACH ADDITIONAL THICKNESS OF A HEADER WILL BE NAILED TO THE FIRST W/1-40d NAIL EVERY 18", AGAIN WITH A MINIMUM OF TWO NAILS.
- N. BACK-UP CLEATS WILL BE OF THE SAME NUMBER OF LAYERS AS THE HEADER. THE FIRST THICKNESS OF A BACK-UP CLEAT WILL BE NAILED TO THE CAR FLOOR W/16d NAILS. EACH ADDITIONAL THICKNESS WILL BE NAILED W/40d NAILS. THE LENGTH OF THE BACK-UP CLEATS AND THE QUANTITY OF 16d AND 40d NAILS IN THE CLEATS WILL BE AS FOLLOWS.

QUANTITY	LENGTH	NO. NAILS	WEIGHT (LBS)		
			SINGLE	DOUBLED	TRIPLED
2	24"	5	16,000	13,000	10,000
2	30"	6	18,000	15,000	12,000
2	36"	7	20,000	17,000	14,000

- O. THE RISER METHOD OF PARTIAL-LAYER BRACING MAY BE USED FOR PALLET UNITS, SKIDDED UNITS, AND OTHER STRAIGHT-SIDED UNITS. SEE THE TYPICAL LOAD ON PAGE 11 AND A TYPICAL RISER ASSEMBLY DETAIL ON PAGE 15.
- P. SMALL QUANTITIES OF UNPALLETIZED BOXES, CYLINDRICAL CONTAINERS, AND SIMILAR ITEMS CAN BE BRACED USING LCL BRACES. SEE THE LOAD VIEW ON PAGE 12. SMALL QUANTITIES CAN ALSO BE SECURED TO THE CAR FLOOR USING STEEL STRAPPING AND STRAP ANCHOR PLATES AS SHOWN ON PAGE 12.
- Q. SMALL QUANTITIES OF UNPALLETIZED BOXES, CYLINDRICAL CONTAINERS, AND SIMILAR ITEMS CAN BE POSITIONED WITHIN A PALLET CRATE OR PALLET BOX FOR MOVEMENT. THERE ARE VARIOUS SIZES OF AMMUNITION PALLET CRATES (MIL-C-21215) WHICH CAN BE USED, OR A WOODEN/PLYWOOD PALLET BOX CAN BE USED. REFER TO AMC DRAWING 19-48-4296-20PM1010 FOR CONSTRUCTION DETAILS FOR A TYPICAL PALLET BOX. ITEMS WITHIN THESE PALLET CRATES OR PALLET BOXES SHOULD BE BRACED WITH WOOD OR STYROFOAM PIECES OR OTHER MATERIAL TO PREVENT EXCESSIVE SHIFTING OF THE ITEMS.
- R. LOADS SHOULD NOT EXTEND INTO THE DOORWAY. HOWEVER, IF A LOAD DOES EXTEND INTO THE DOORWAY BY ONE-HALF OR MORE OF THE LENGTH OF THE ITEM, DOORWAY PROTECTION MUST BE PROVIDED. SEE THE "TYPICAL DOORWAY PROTECTION" DETAIL ON PAGE 14. IN LIEU OF THE WOODEN GATE TYPE DOORWAY PROTECTION, NAILED DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS CAN BE USED. SEE THE "ALTERNATIVE DOORWAY PROTECTION" DETAIL ON PAGE 17.

- S. THE DOORS OF THE BOXCAR WILL BE CLOSED AND SECURED PRIOR TO MOVING THE CAR.

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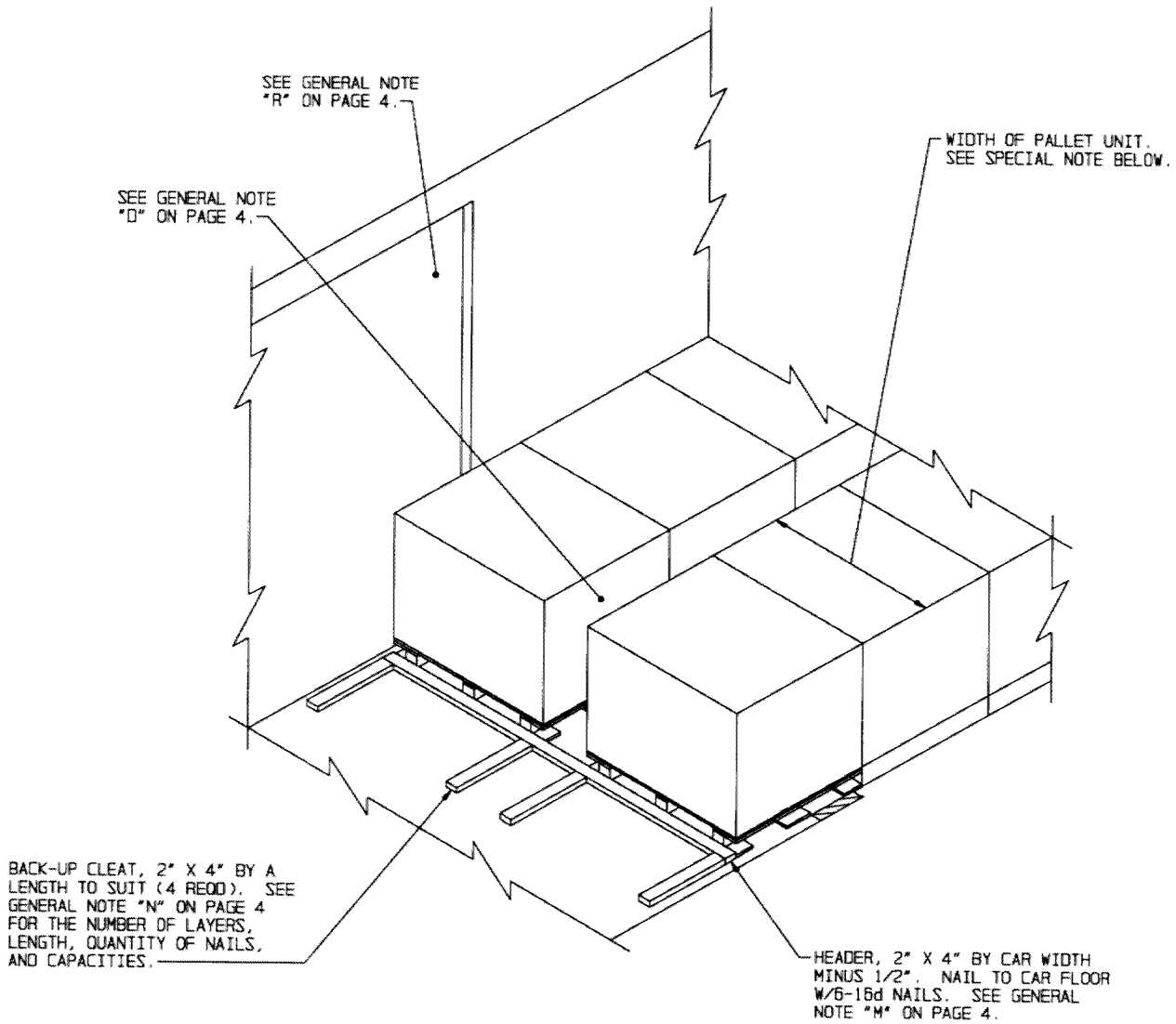


ISOMETRIC VIEW

SPECIAL NOTES:

1. THE USE OF AN ANTI-SWAY BRACE A IS RECOMMENDED FOR EACH LOAD UNIT ADJACENT TO THE CENTER BRACING. SECURE BY NAILING TO THE CAR FLOOR W/1-20d NAIL THRU A BRACE PIECE OF THE ASSEMBLY OR WITH A 2" X 4" BLOCK NAILED TO THE FLOOR NEXT TO THE ANTI-SWAY BRACE. LATERAL BRACING IS NOT REQUIRED FOR THE OTHER LOAD UNITS POSITIONED WITH THE WIDTH DIMENSION ACROSS THE CAR.
2. ANTI-SWAY BRACE B WILL BE USED BETWEEN Laterally ADJACENT PALLET UNITS WHEN THE PALLET UNITS ARE POSITIONED WITH THE LENGTH DIMENSION ACROSS THE CAR. SEE THE DETAIL ON PAGE 13.

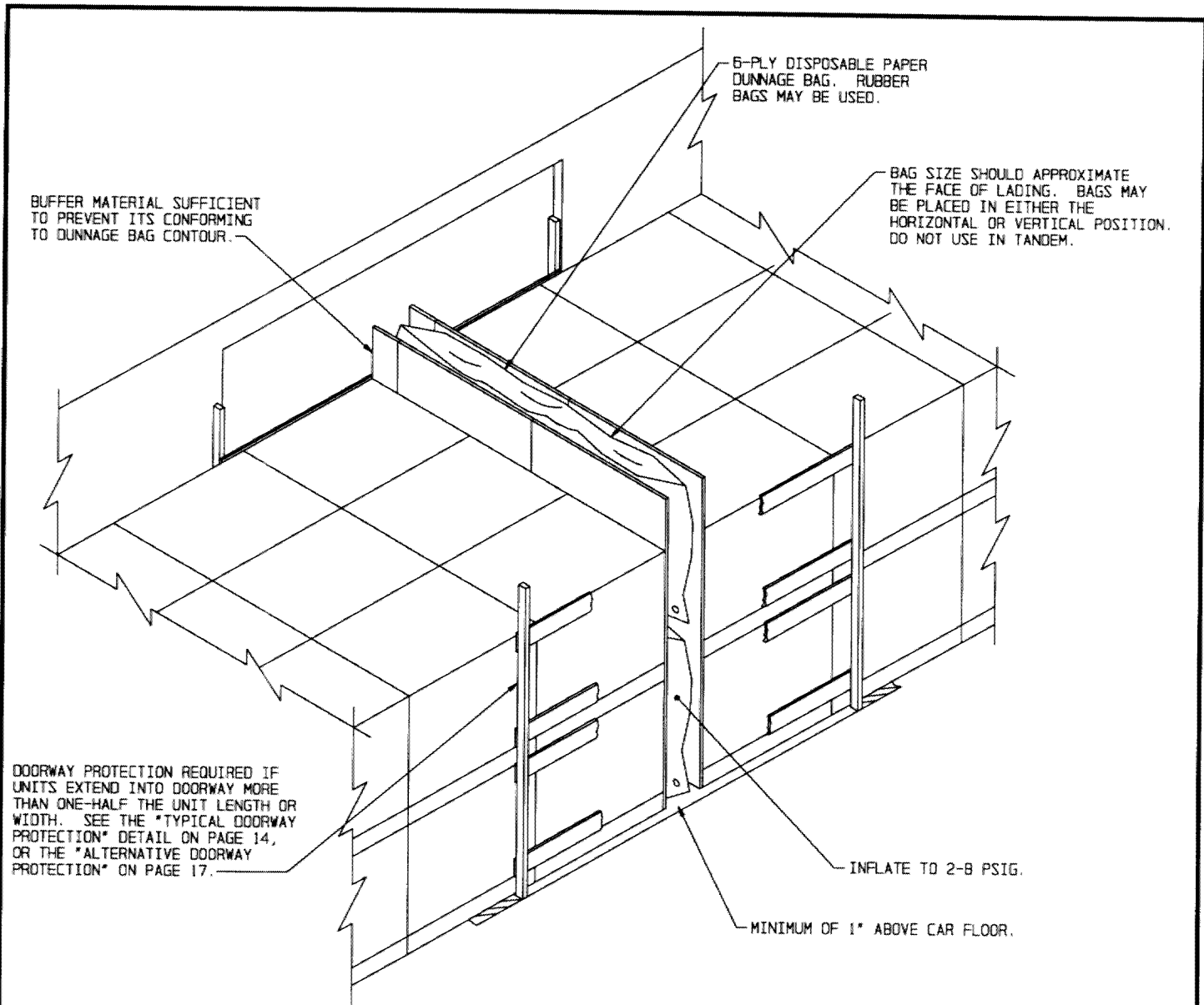
TYPICAL BLOCKING AND BRACING OF A FULL-LENGTH ONE-LAYER LOAD OF PALLET UNITS OR SKIDDED UNITS IN A CONVENTIONAL BOXCAR



ISOMETRIC VIEW

SPECIAL NOTE:

1. LATERAL BRACING IS NOT REQUIRED FOR PALLET UNITS POSITIONED WITH THE WIDTH DIMENSION ACROSS THE CAR. ANTI-SWAY BRACE B WILL BE USED BETWEEN LATERALLY ADJACENT PALLET UNITS WHEN THE PALLET UNITS ARE POSITIONED WITH THE LENGTH DIMENSION ACROSS THE CAR. SEE THE DETAIL ON PAGE 13.



ISOMETRIC VIEW

USE INFLATABLE DUNNAGE TO FILL A 4" TO 12" LONGITUDINAL SPACE (AFTER INFLATION). MAY ALSO BE USED FOR A LATERAL SPACE.

TYPICAL BLOCKING AND BRACING OF A FULL-LENGTH LOAD OF MORE THAN ONE LAYER OF PALLET UNITS OR SKIDDED UNITS USING INFLATABLE DUNNAGE IN A CONVENTIONAL BOXCAR

DOORWAY PROTECTION REQUIRED IF UNITS EXTEND INTO DOORWAY MORE THAN ONE-HALF THE UNIT LENGTH OR WIDTH. SEE THE "TYPICAL DOORWAY PROTECTION" DETAIL ON PAGE 14, OR THE "ALTERNATIVE DOORWAY PROTECTION" ON PAGE 17.

TYPICAL CENTER GATE (2 REQD). SEE THE DETAIL ON PAGE 14.

LENGTH OF PALLET UNIT.

ANTI-SWAY BRACE B (2 REQD PER LOAD UNIT). SEE THE DETAIL ON PAGE 13. SEE GENERAL NOTE "E" ON PAGE 4. SEE SPECIAL NOTE BELOW.

STRUT, 4" X 4" BY CUT TO FIT (4 REQD PER ROW/LAYER). TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END. SEE GENERAL NOTE "L" ON PAGE 2.

ISOMETRIC VIEW

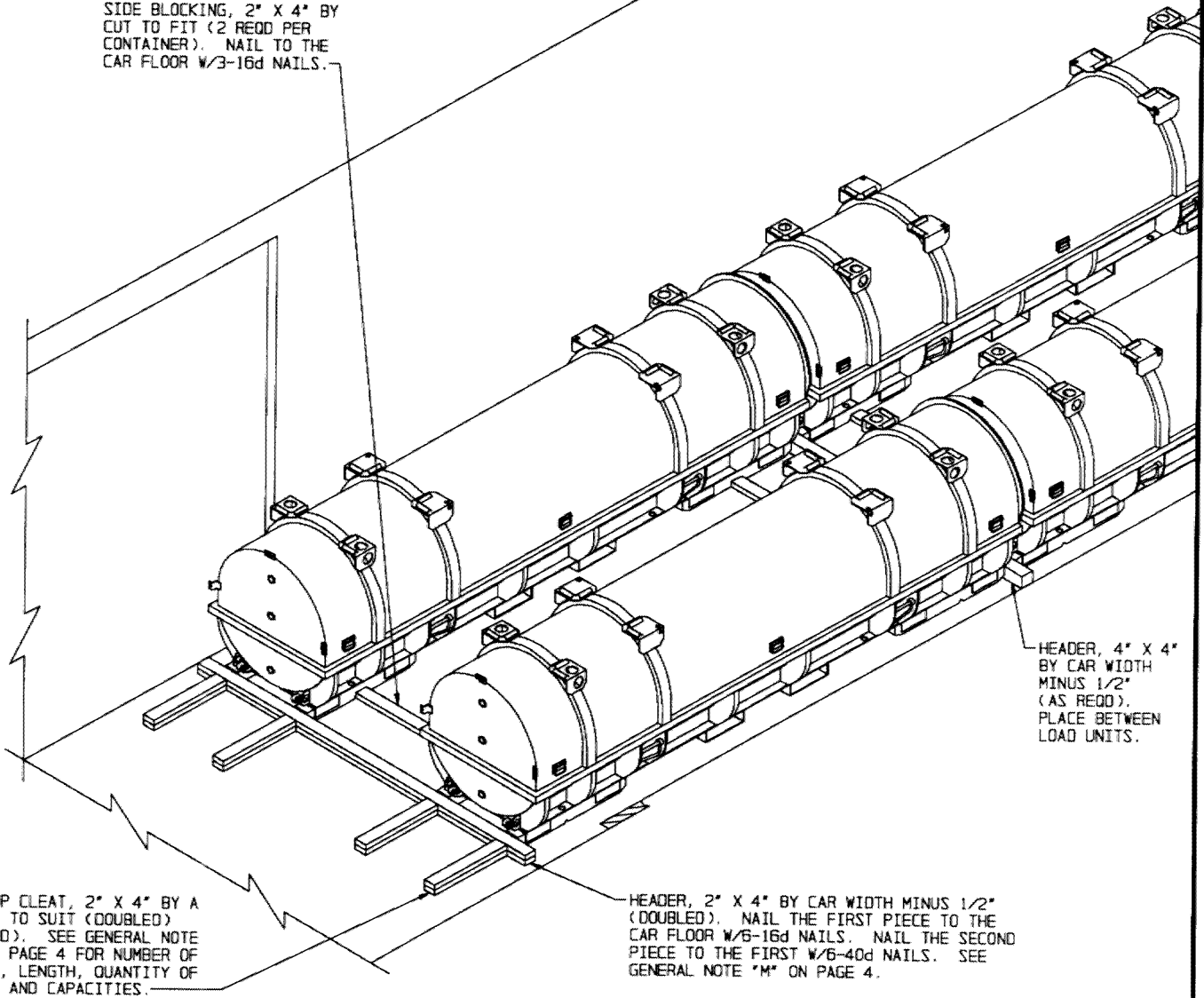
A 2-LAYER LOAD IS SHOWN AS TYPICAL.

SPECIAL NOTE:

1. ANTI-SWAY BRACE B IS FOR USE WHEN PALLET UNITS ARE POSITIONED WITH THE LENGTH DIMENSION ACROSS THE CAR. ANTI-SWAY BRACE A WILL BE USED BETWEEN LATERALLY ADJACENT PALLET UNITS WHEN THE PALLET UNITS ARE POSITIONED WITH THE WIDTH DIMENSION ACROSS THE CAR. SEE THE DETAIL ON PAGE 13.

TYPICAL BLOCKING AND BRACING OF A FULL-LENGTH LOAD OF MORE THAN ONE LAYER OF PALLET UNITS, SKIDDED UNITS OR CONTAINERS USING WOODEN DUNNAGE IN A CONVENTIONAL BOXCAR

SIDE BLOCKING, 2" X 4" BY
CUT TO FIT (2 REQD PER
CONTAINER). NAIL TO THE
CAR FLOOR W/3-16d NAILS.



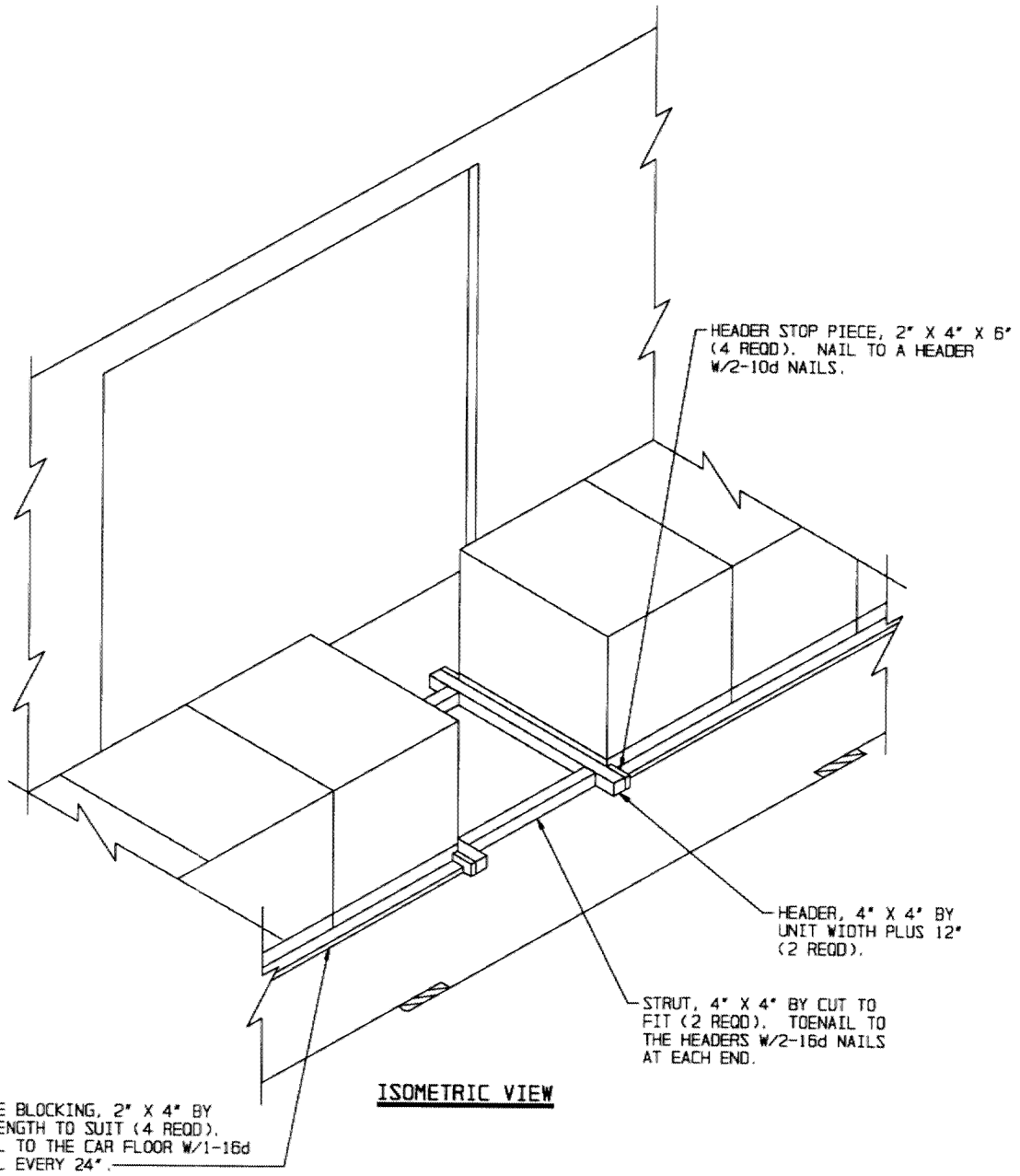
HEADER, 4" X 4"
BY CAR WIDTH
MINUS 1/2"
(AS REQD).
PLACE BETWEEN
LOAD UNITS.

BACK-UP CLEAT, 2" X 4" BY A
LENGTH TO SUIT (DOUBLED)
(4 REQD). SEE GENERAL NOTE
"N" ON PAGE 4 FOR NUMBER OF
LAYERS, LENGTH, QUANTITY OF
NAILS, AND CAPACITIES.

HEADER, 2" X 4" BY CAR WIDTH MINUS 1/2"
(DOUBLED). NAIL THE FIRST PIECE TO THE
CAR FLOOR W/6-16d NAILS. NAIL THE SECOND
PIECE TO THE FIRST W/6-40d NAILS. SEE
GENERAL NOTE "M" ON PAGE 4.

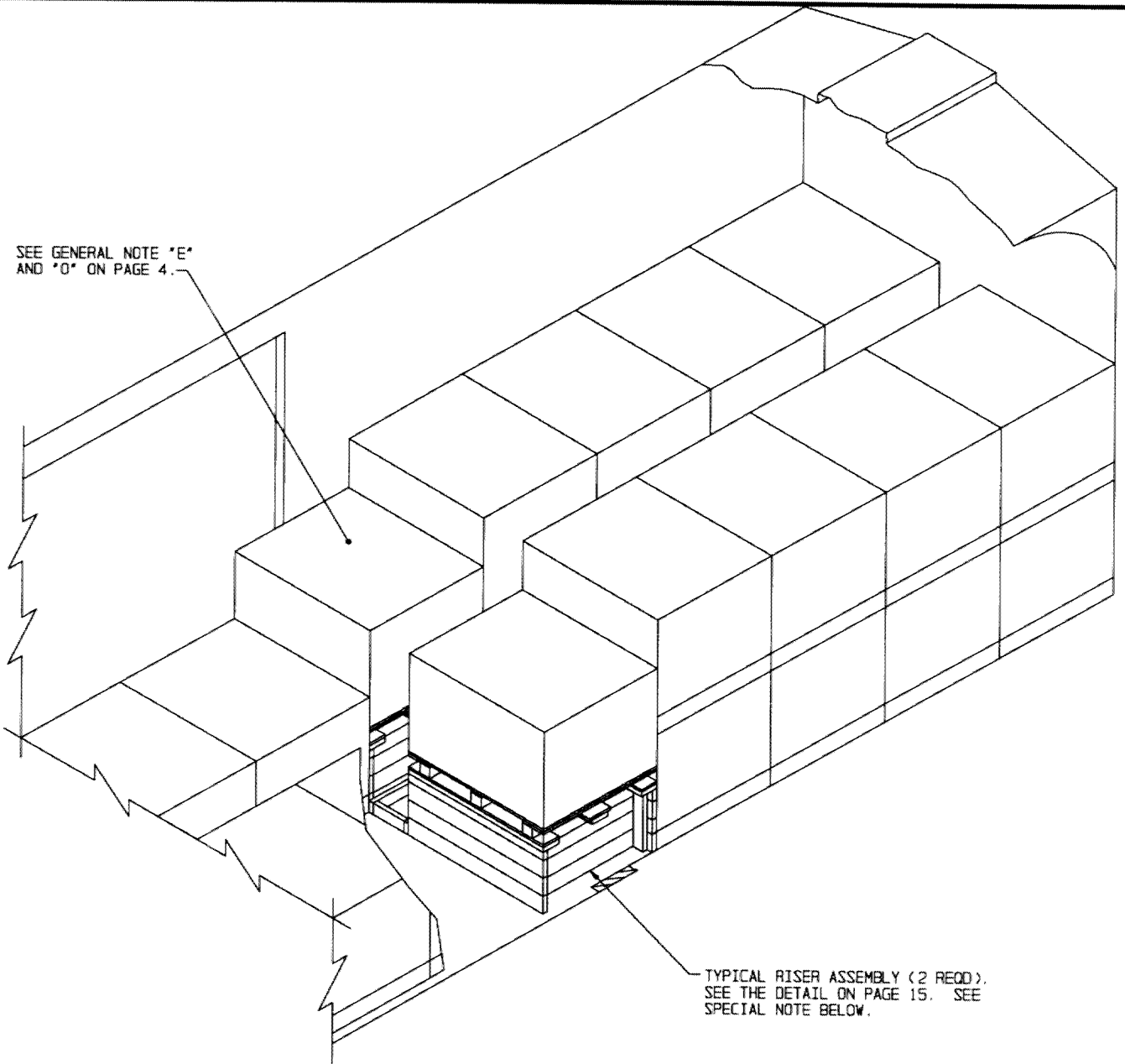
ISOMETRIC VIEW

TYPICAL BLOCKING AND BRACING OF A FULL OR
PARTIAL-LENGTH ONE-LAYER LOAD OF CONTAINERS IN A CONVENTIONAL BOXCAR



TYPICAL BLOCKING AND BRACING OF A FULL-LENGTH ONE-WIDE LOAD OF
PALLET UNITS, SKIDDED UNITS OR CONTAINERS USING WOODEN DUNNAGE IN A CONVENTIONAL BOXCAR

SEE GENERAL NOTE "E"
AND "O" ON PAGE 4.



ISOMETRIC VIEW

SPECIAL NOTE:

1. LATERAL BRACING IS REQUIRED BETWEEN THE RISER ASSEMBLIES
IF LATERAL BRACING IS REQUIRED BETWEEN Laterally
ADJACENT PALLET UNITS. SEE GENERAL NOTE "E" ON PAGE 4.

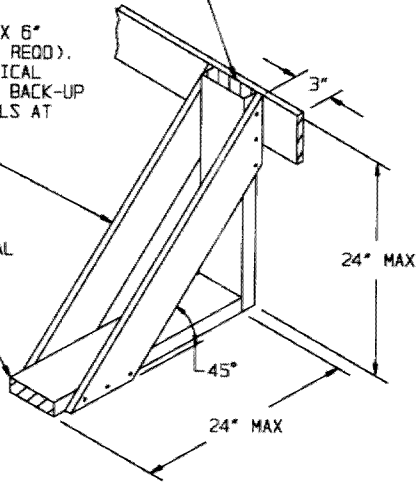
TYPICAL BLOCKING AND BRACING OF A PARTIAL-LAYER LOAD OF
PALLET UNITS OR SKIDDED UNITS USING THE RISER METHOD IN A CONVENTIONAL BOXCAR

HORIZONTAL PIECE, 1" X 6" BY A LENGTH TO SUIT (2 REOD). NAIL TO THE VERTICAL PIECES OF THE LCL BRACES W/3-6d NAILS AT EACH JOINT PRIOR TO PLACEMENT AGAINST LADING. SEE THE "LCL BRACE" DETAIL AT LEFT.

VERTICAL PIECE, 2" X 6" X 24" (1 REOD). NAIL TO THE BACK-UP CLEAT W/2-16d NAILS.

ANGLE BRACE, 1" X 6" BY CUT TO FIT (2 REOD). NAIL TO THE VERTICAL PIECE AND TO THE BACK-UP CLEAT W/3-8d NAILS AT EACH END.

BACK-UP CLEAT, 2" X 6" MATERIAL (1 REOD).

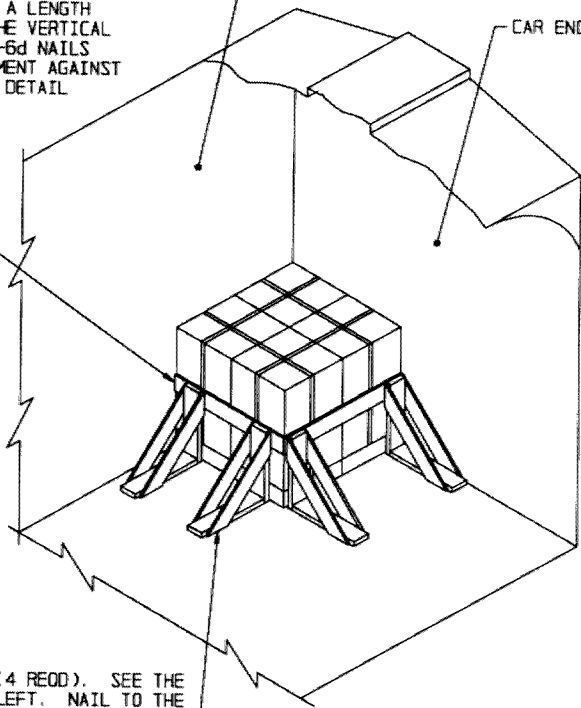


LCL BRACE

EACH LCL BRACE WILL SUPPORT 3,000 POUNDS OF LADING.

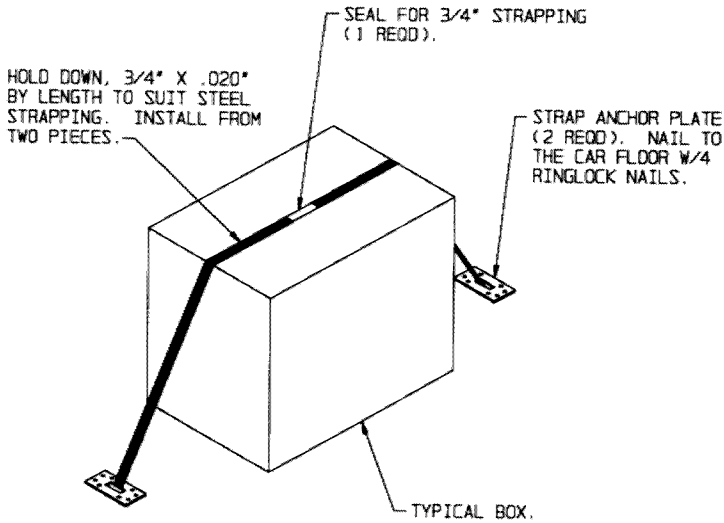
CAR SIDEWALL.

CAR ENDWALL.

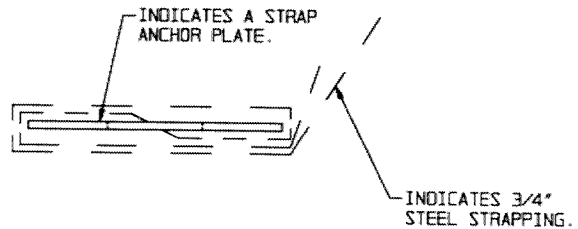


LCL BRACE (4 REOD). SEE THE DETAIL AT LEFT. NAIL TO THE CAR FLOOR W/7-16d NAILS.

ISOMETRIC VIEW



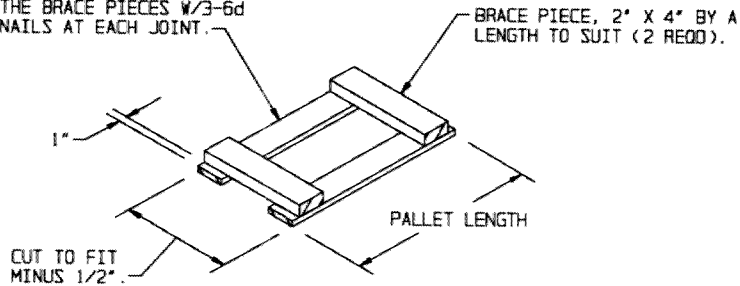
ISOMETRIC VIEW



APPLICATION OF STRAPPING TO STRAP ANCHOR PLATE

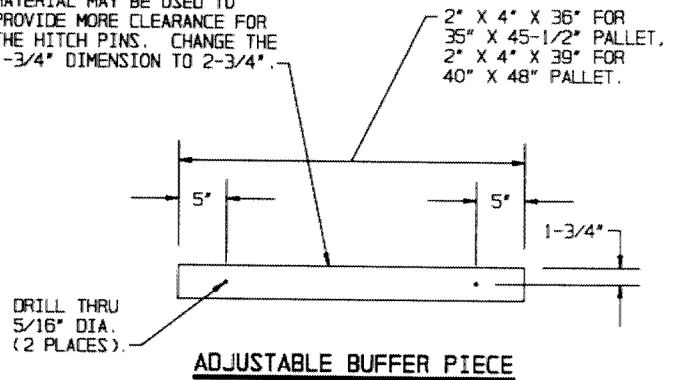
TYPICAL BLOCKING AND BRACING OF UNPALLETIZED ITEMS USING LCL BRACES AND/OR STRAP ANCHOR PLATES IN A CONVENTIONAL BOXCAR

STRINGER, 1" X 4" BY UNIT LENGTH (2 REQD). NAIL TO THE BRACE PIECES W/3-6d NAILS AT EACH JOINT.



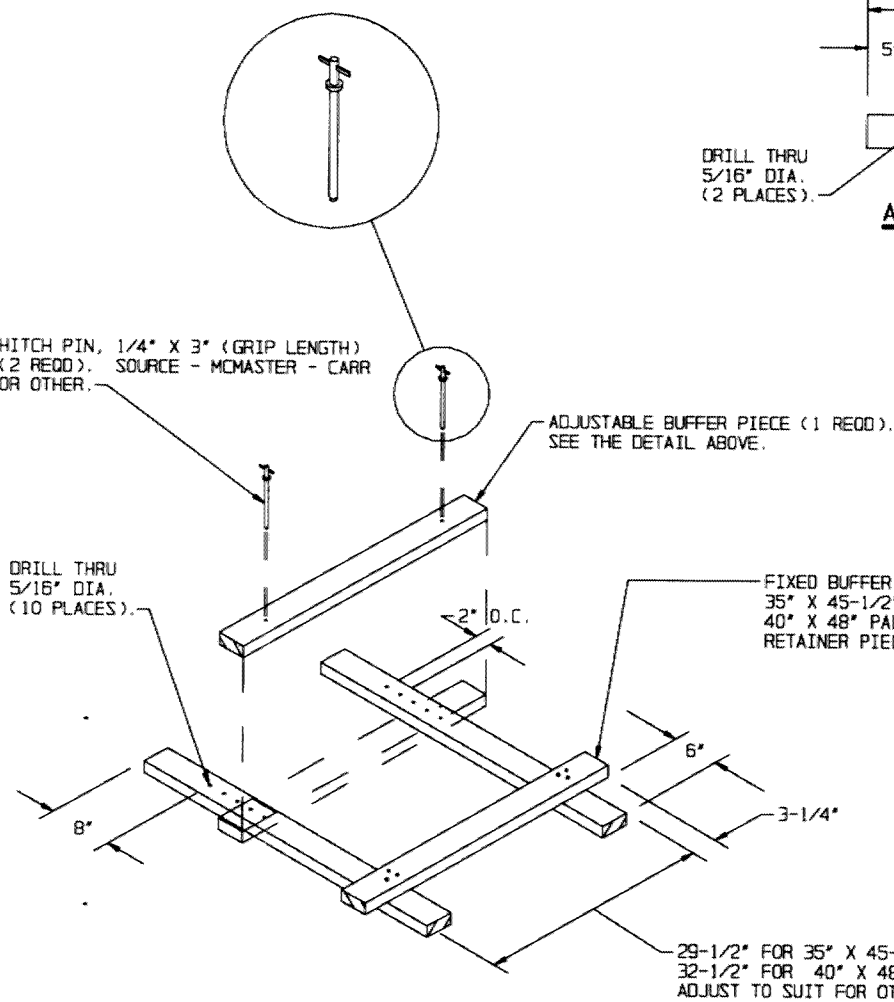
ANTI-SWAY BRACE A

2" X 4" MATERIAL. 2" X 6" MATERIAL MAY BE USED TO PROVIDE MORE CLEARANCE FOR THE HITCH PINS. CHANGE THE 1-3/4" DIMENSION TO 2-3/4".



ADJUSTABLE BUFFER PIECE

HITCH PIN, 1/4" X 3" (GRIP LENGTH) (2 REQD). SOURCE - MCMASTER - CARR OR OTHER.

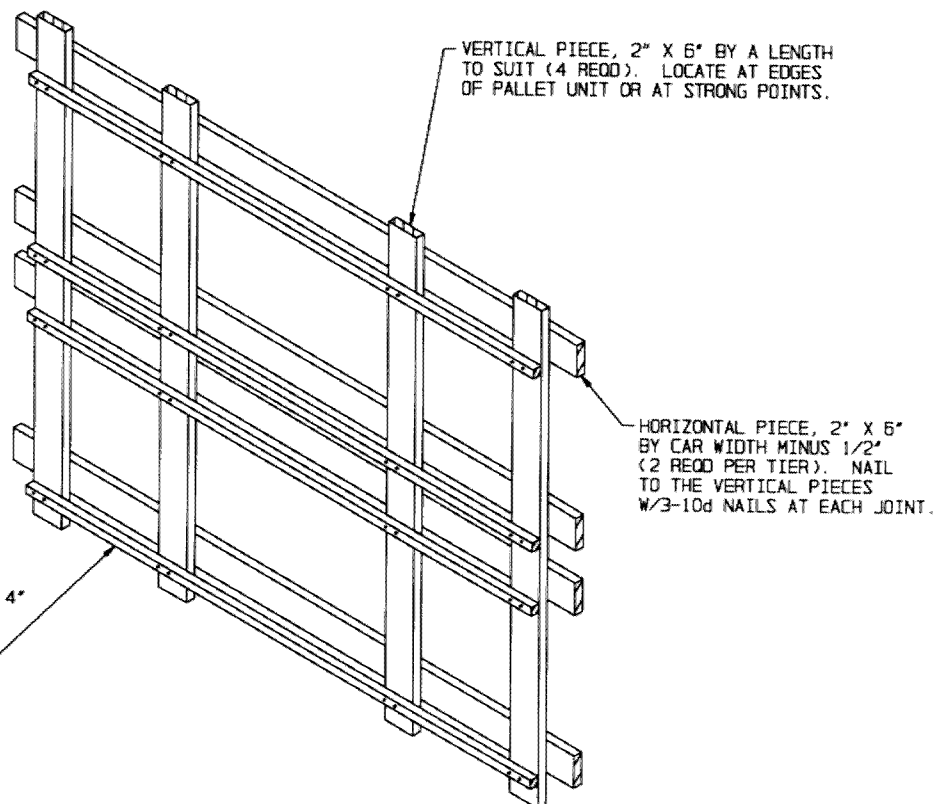


ANTI-SWAY BRACE B

THE ANTI-SWAY BRACE SHOULD BE PARTIALLY PRE-ASSEMBLED BY NAILING THE FIXED BUFFER PIECE TO THE RETAINING PIECES. AFTER A PALLET UNIT IS LOADED, INSERT THE ENDS OF THE RETAINER PIECES HAVING THE HOLES COMPLETELY INTO THE FORK OPENINGS OF THE PALLET. AFTER THE SECOND PALLET UNIT IS LOADED, WITHDRAW THE ASSEMBLY AND INSERT THE FIXED END UNDER THE SECOND PALLET. PLACE THE ADJUSTABLE BUFFER PIECE AND SECURE WITH THE HITCH PINS.

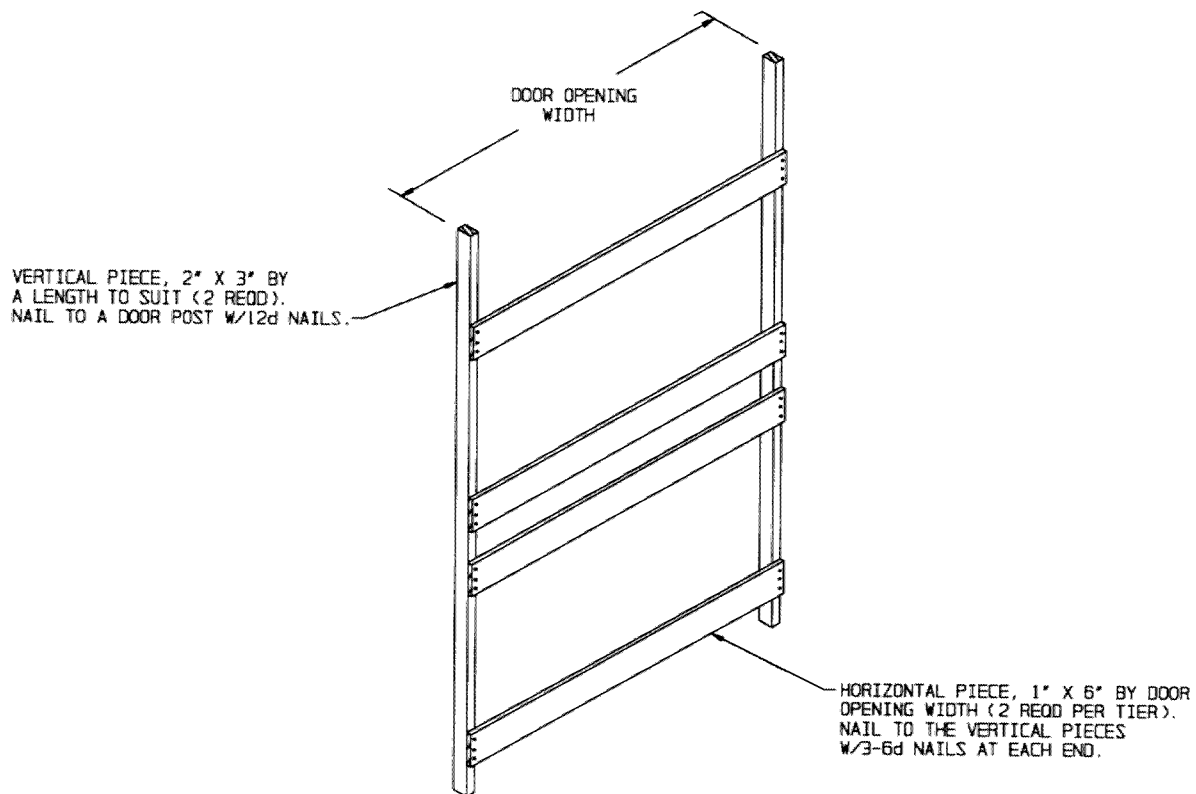
FIXED BUFFER PIECE, 2" X 4" X 36" FOR 35" X 45-1/2" PALLET, 2" X 4" X 39" FOR 40" X 48" PALLET (1 REQD). NAIL TO THE RETAINER PIECES W/3-10d NAILS AT EACH JOINT.

29-1/2" FOR 35" X 45-1/2" PALLET, 32-1/2" FOR 40" X 48" PALLET, ADJUST TO SUIT FOR OTHER CONTAINERS.



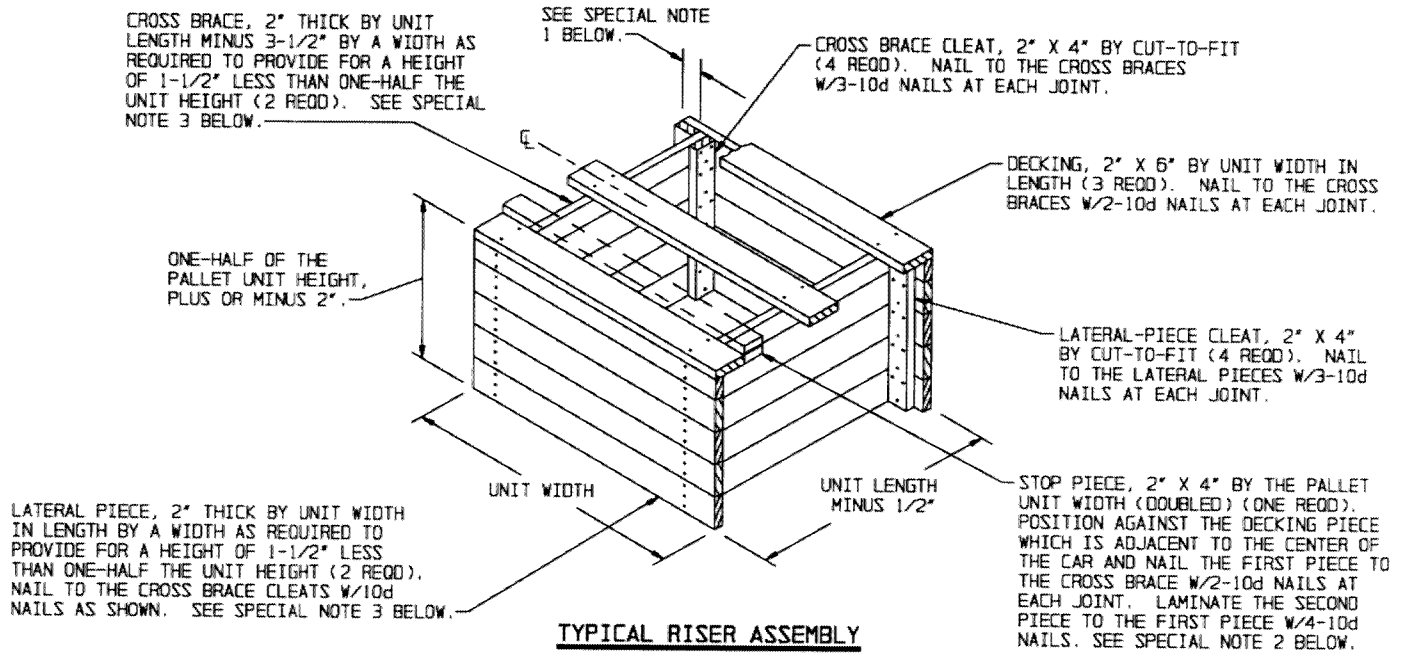
TYPICAL CENTER GATE

CENTER GATE SHOWN IS FOR A 2-LAYER LOAD.



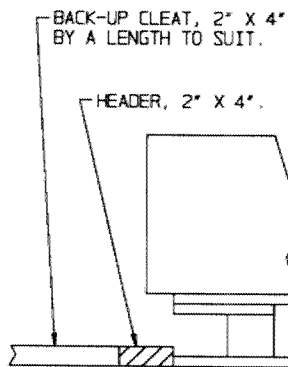
TYPICAL DOORWAY PROTECTION

DOORWAY PROTECTION SHOWN IS FOR A 2-LAYER LOAD.

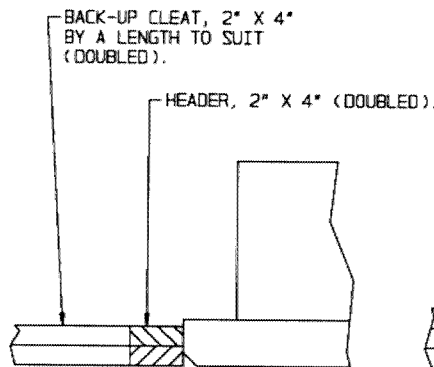


SPECIAL NOTES:

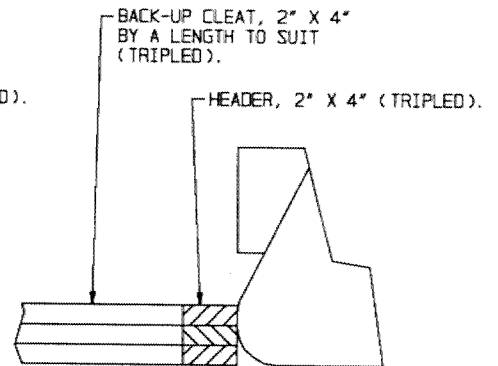
1. IF THE BOXES OVERHANG THE PALLET WIDTH THIS DIMENSION WILL BE THE AMOUNT OF OVERHANG PLUS 3-1/2". IF THE BOXES ARE FLUSH WITH THE EDGE OF THE PALLET THIS DIMENSION WILL BE 3-1/2". THIS WILL ALIGN THE STRONG POINTS OF THE PALLET WITH THE STRONG POINTS OF THE RISER ASSEMBLY.
2. THE STOP PIECE SHOWN ON THE RISER ASSEMBLY ABOVE IS ONLY FOR USE WHEN THE PALLET UNITS ARE POSITIONED IN THE CAR WITH THE UNIT WIDTH PARALLEL TO THE CAR SIDEWALLS.
3. EMPTY PALLETS OF A PROPER SIZE MAY BE USED IN LIEU OF A RISER ASSEMBLY. NAIL 1" X 6" AND/OR 2" X 6" BY UNIT WIDTH MATERIAL TO THE PALLET TO OBTAIN THE PROPER HEIGHT.



FOR SQUARE-END CONTAINERS, OR PALLETS.



FOR CONTAINERS WITH BEVELED SKIDS.

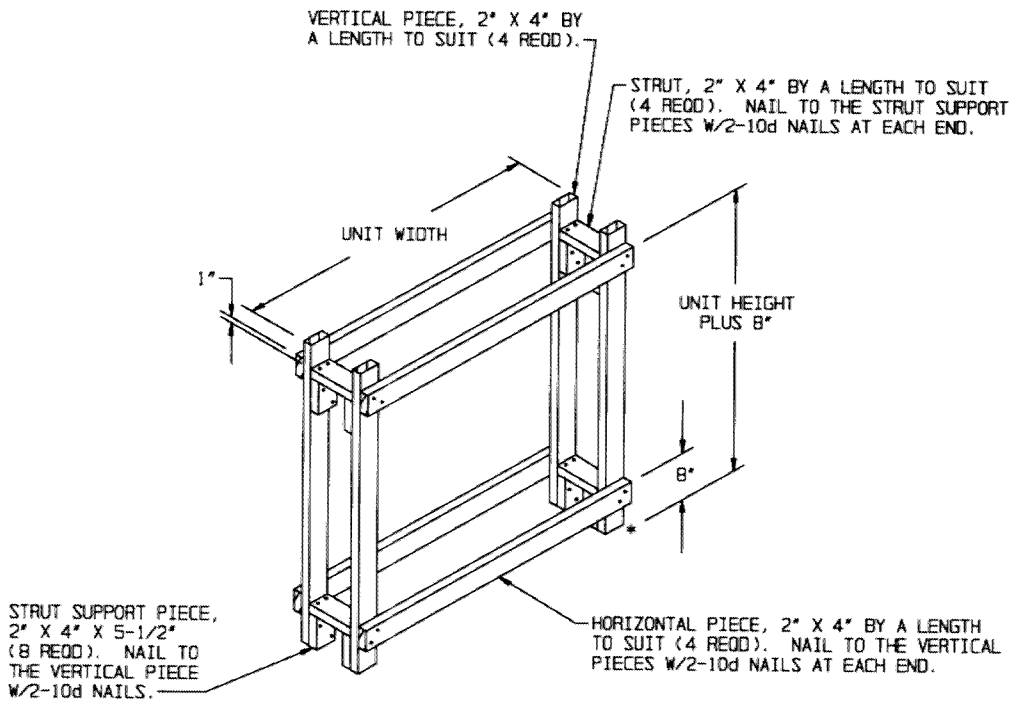


FOR CONTAINERS WITH ROUNDED SKID ENDS.

HEADER REQUIREMENTS

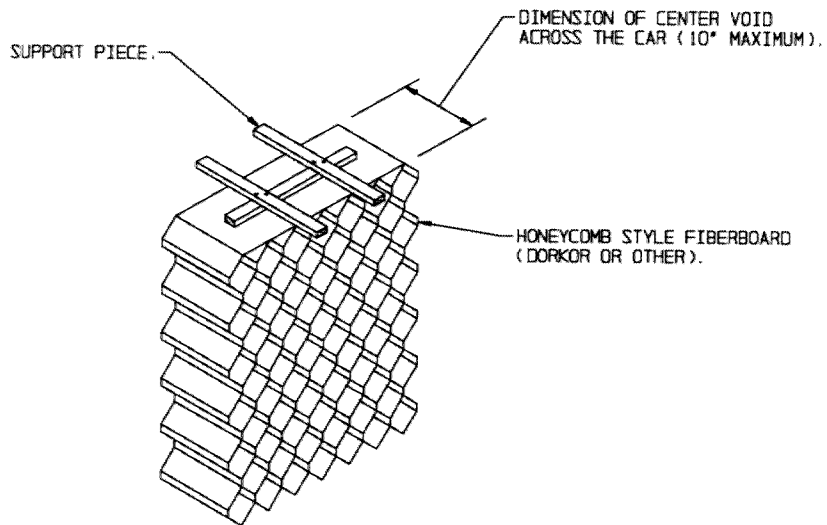
FOR LENGTH AND NAILING OF THE HEADERS, AND FOR THE QUANTITY AND LENGTH OF THE BACK-UP CLEATS AND THE NUMBER OF NAILS, REFER TO GENERAL NOTES "M" AND "N" ON PAGE 4 FOR CONVENTIONAL BOXCAR, AND GENERAL NOTES "E" AND "F" ON PAGE 24 FOR FLATCAR.

DETAILS



TYPICAL CRIB FILL

CRIB FILL SHOWN IS FOR A 2-LAYER LOAD.



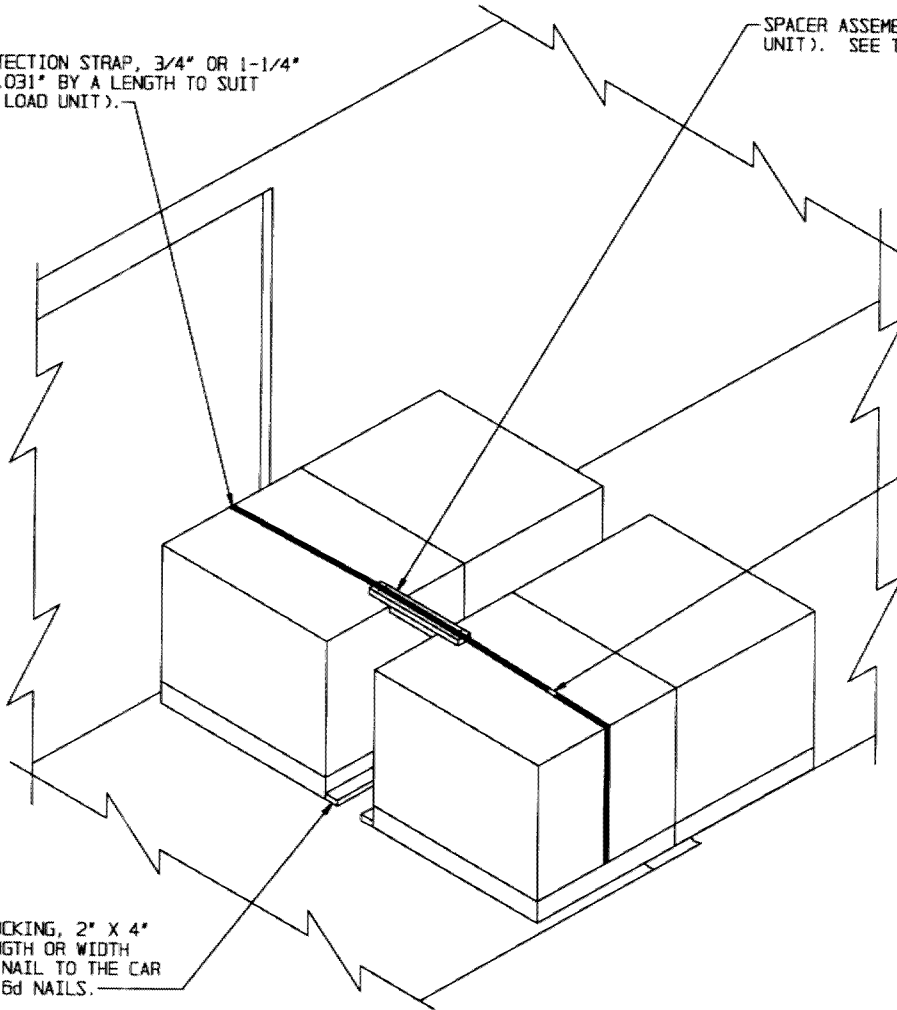
SIDE FILL

DOORWAY PROTECTION STRAP, 3/4" OR 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT (1 REQD PER LOAD UNIT).

SPACER ASSEMBLY (1 REQD PER LOAD UNIT). SEE THE DETAIL BELOW.

SEAL FOR 3/4" OR 1-1/4" STRAPPING (1 REQD PER STRAP). DOUBLE CRIMP.

DOORWAY BLOCKING, 2" X 4" BY UNIT LENGTH OR WIDTH (2 REQD). NAIL TO THE CAR FLOOR W/3-16d NAILS.



ALTERNATIVE DOORWAY PROTECTION

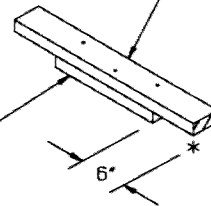
FOR CARS EQUIPPED WITH PLUG TYPE DOORS OR AS AN ALTERNATIVE TO THE TYPICAL DOORWAY PROTECTION SHOWN ON PAGE 14 IN CARS EQUIPPED WITH SLIDING DOORS.

SPECIAL NOTE:

1. IF THE BOXCAR BEING USED IS EQUIPPED WITH STRAP ANCHOR FACILITIES ON THE DOOR CORNER POSTS OR IN THE DOORWAY AREA, STEEL DOORWAY PROTECTION STRAPS MAY BE USED IN LIEU OF OTHER METHODS SHOWN HEREIN. ALSO, IF AVAILABLE, WEB STRAPS MAY BE USED AS DOORWAY PROTECTION PROVIDED THEY PROPERLY ATTACH TO THE CAR AND THEY DO NOT PROTRUDE SO AS TO INTERFERE OR CAUSE DAMAGE TO THE CARGO.

SUPPORT PIECE, 2" X 4" BY A LENGTH TO SUIT (1 REQD). NAIL TO THE SPACER PIECE W/3-10d NAILS.

SPACER PIECE, 2" X 4" BY A LENGTH TO SUIT (1 REQD).



SPACER ASSEMBLY

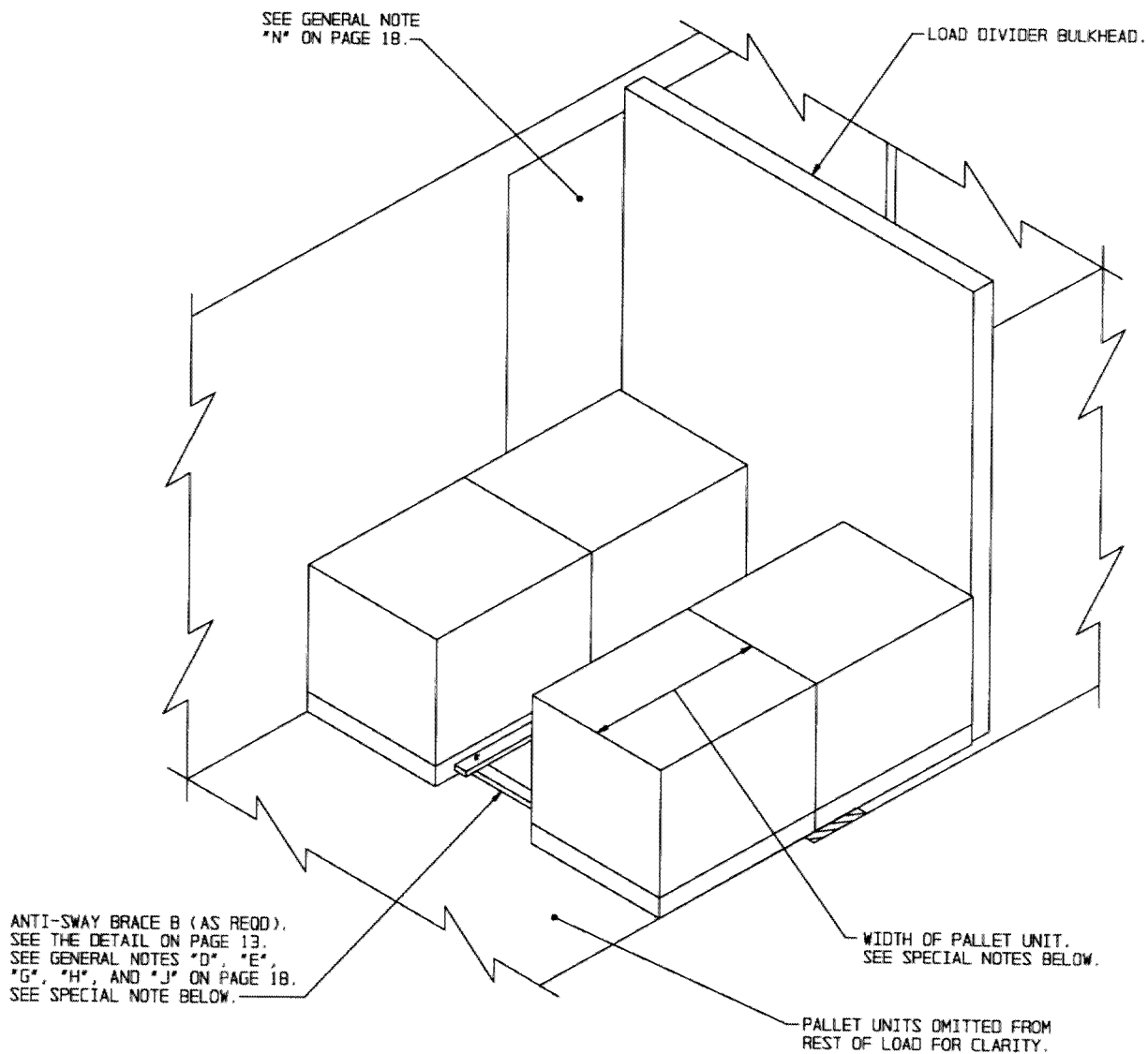
DETAILS

GENERAL NOTES FOR LOAD DIVIDER BOXCAR

(GENERAL NOTES CONTINUED)

- A. THE OUTLOADING PROCEDURES DEPICTED ON PAGES 18 AND 19 ARE APPLICABLE FOR MOVEMENTS IN BOXCARS EQUIPPED WITH LOAD DIVIDER BULKHEADS. CARS WHICH ARE 50'-6" LONG BY 9'-2" WIDE HAVE BEEN SHOWN. HOWEVER, THE PROCEDURES ARE ALSO APPLICABLE FOR BOXCARS OF OTHER LENGTHS AND WIDTHS.
- B. BOXCARS EQUIPPED WITH LOAD DIVIDER BULKHEADS SHOULD BE USED FOR THE LOADING OF PALLET UNITS AND SKIDDED UNITS OF AMMUNITION AND EXPLOSIVES AND PALLETIZED SMALL MISSILES. THESE CARS CAN ALSO BE USED FOR MOVEMENTS OF LONG MISSILE CONTAINERS AND OTHER LARGE ITEMS, IF OPEN TOP VEHICLES, EITHER FLATCARS OR FLATBED TRAILERS, ARE NOT AVAILABLE.
- C. PALLET UNITS AND SKIDDED UNITS SHOULD BE LOADED IN A DOUBLE ROW PATTERN, WITH THE UNITS POSITIONED AGAINST THE CAR SIDEWALLS. MISSILE CONTAINERS SHOULD ALSO BE LOADED AGAINST THE CAR SIDEWALLS. IF A THIRD ROW OF PALLET UNITS, SKIDDED UNITS, OR MISSILE CONTAINERS IS TO BE LOADED IT SHOULD BE POSITIONED SO AS TO BE CENTERED IN THE CAR.
- D. LATERAL BRACING IS NOT REQUIRED FOR SINGLE-LAYER LOADS OF PALLET UNITS OR SKIDDED UNITS IF THE VOID IS LESS THAN ONE-HALF THE UNIT DIMENSION ACROSS THE CAR. FOR 48" AND 45-1/2" WIDE UNITS, LATERAL BRACING IS NOT REQUIRED. BRACING IS REQUIRED FOR UNITS POSITIONED WITH THE 35" LENGTH DIMENSION ACROSS THE CAR, UNLESS THEY ARE LOADED THREE UNITS WIDE.
- E. LATERAL BRACING IS REQUIRED FOR LOADS OF TWO OR MORE LAYERS OF PALLET UNITS OR SKIDDED UNITS. BRACING IS REQUIRED FOR PALLET UNITS HAVING THE 35" LENGTH DIMENSION ACROSS THE CAR IF THE VOID IS MORE THAN 4", AND FOR SKIDDED UNITS AND FOR OTHER PALLET UNIT SIZES AND POSITIONS WHEN THE VOID IS 6" OR MORE. NAILED SIDE BLOCKING MAY BE USED AT THE FLOOR LEVEL, OR ANTI-SWAY BRACES MAY BE USED. ANTI-SWAY BRACES WILL BE USED FOR ALL UPPER LAYERS, UNLESS THE STACK IS UNITIZED. THEN AN ANTI-SWAY BRACE BETWEEN THE TOP-LAYER UNITS IS SUFFICIENT. IF A LATERAL VOID IS TOO SMALL FOR THE INSTALLATION OF ANTI-SWAY BRACES, CRIB FILL ASSEMBLIES MAY BE USED. SEE THE "TYPICAL CRIB FILL" DETAIL ON PAGE 16. EMPTY PALLETS MAY BE POSITIONED ON EDGE BETWEEN THE ROWS OR STYROFOAM SHEETS MAY BE USED ALONG WITH THE PALLETS OR WITHOUT. HANGING HONEYCOMB STYLE FIBERBOARD ASSEMBLIES MAY BE POSITIONED BETWEEN THE ROWS. SEE THE "SIDE FILL" DETAIL ON PAGE 16. INFLATABLE DUNNAGE MAY BE USED FOR LATERAL VOIDS OF FROM 4" TO 12". SEE THE LOAD VIEW ON PAGE 7 WHERE INFLATABLE DUNNAGE IS USED FOR LONGITUDINAL BRACING. THE NAILED FLOORLINE BLOCKING AND/OR ANTI-SWAY BRACES ARE THEN NOT REQUIRED.
- F. CONTAINERS WHICH ARE SHORTER THAN THE INSIDE WIDTH OF THE BOXCAR BY 1" OR MORE SHOULD BE LOADED CROSSWISE. CONTAINERS WHICH ARE LONGER THAN 1" LESS THAN THE INSIDE WIDTH OF THE BOXCAR MUST BE LOADED LONGITUDINALLY.
- G. LATERAL BRACING FOR CROSSWISE-POSITIONED CONTAINERS IS NOT REQUIRED IF THE TOTAL EXCESS SPACE ACROSS THE BOXCAR IS LESS THAN 20" FOR EITHER SINGLE-LAYER LOADS OR LOADS OF MORE THAN ONE LAYER. LONGITUDINALLY ADJACENT CONTAINER STACKS MAY BE POSITIONED AGAINST OPPOSITE SIDEWALLS, IF DESIRED. IF THE SPACE IS MORE THAN A TOTAL OF 20", NAILED SIDE BLOCKING SHOULD BE INSTALLED ON ONE SIDE OR ON EACH SIDE, AS APPLICABLE, OR SIDE FILL ASSEMBLIES MAY BE USED. SEE THE DETAIL ON PAGE 37. IF NECESSARY TO STACK THE CONTAINERS, THE UPPER-LAYER CONTAINERS MUST BE UNITIZED TO THE LOWER CONTAINER WITH ONE 1-1/4" STEEL STRAPPING.
- H. LATERAL BRACING IS NOT REQUIRED FOR SINGLE-LAYER LOADS OF LENGTHWISE-POSITIONED CONTAINERS IF THE VOID IS LESS THAN ONE-HALF THE CONTAINER DIMENSION WHICH IS POSITIONED ACROSS THE WIDTH OF THE CAR, UNLESS IT IS NEEDED TO ALIGN STRONG POINTS OF LONGITUDINALLY ADJACENT CONTAINERS.
- J. LATERAL BRACING IS REQUIRED FOR LOADS OF TWO OR MORE LAYERS OF LENGTHWISE-POSITIONED CONTAINERS. NAILED SIDE BLOCKING MAY BE USED AT THE FLOOR LEVEL, OR ANTI-SWAY BRACES MAY BE USED. ANTI-SWAY BRACES WILL BE USED FOR ALL UPPER LAYERS, UNLESS THE STACK IS UNITIZED. THEN AN ANTI-SWAY BRACE BETWEEN THE TOP-LAYER CONTAINERS IS SUFFICIENT. IF A LATERAL VOID IS TOO SMALL FOR THE INSTALLATION OF ANTI-SWAY BRACES, CRIB FILL ASSEMBLIES MAY BE USED. SEE THE "TYPICAL CRIB FILL" DETAIL ON PAGE 16. EMPTY PALLETS MAY BE POSITIONED ON EDGE BETWEEN THE ROWS OR STYROFOAM SHEETS MAY BE USED ALONG WITH THE PALLETS OR WITHOUT. INFLATABLE DUNNAGE MAY BE USED FOR LATERAL VOIDS OF FROM 4" TO 12". SEE THE LOAD VIEW ON PAGE 7 WHERE INFLATABLE DUNNAGE IS USED FOR LONGITUDINAL BRACING. HANGING HONEYCOMB STYLE FIBERBOARD ASSEMBLIES MAY BE POSITIONED BETWEEN THE ROWS. SEE THE "SIDE FILL" DETAIL ON PAGE 16. THE NAILED FLOORLINE BLOCKING AND/OR ANTI-SWAY BRACES ARE THEN NOT REQUIRED.
- K. IF THE CAR IS EQUIPPED WITH ADJUSTABLE SIDE FILLERS, THESE MAY BE USED TO REDUCE THE AMOUNT OF LATERAL SPACE IN A LOAD. THE USE OF THESE SIDE FILLER ASSEMBLIES MAY ALTER THE LATERAL BRACING REQUIREMENTS SPECIFIED IN GENERAL NOTES "D", "E", "G", "H" AND "J".
- L. CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS CAN BE USED FOR MOVEMENT OF A PARTIAL LAYER LOAD BY INSTALLING A BULKHEAD AT THE END OF THE PARTIAL LAYER TO BE BRACED. THE LOAD MAY CONTINUE TOWARD THE CENTER OF THE CAR IN ONE OR MORE LESS LAYERS THAN THE PARTIAL LOAD BEHIND THE BULKHEADS, IF DESIRED. BRACE THE REDUCED LOAD IN THE CENTER AREA OF THE CAR WITH HEADERS AND STRUTS AS SHOWN ON PAGE 5 OR WITH CENTER GATES AND STRUTS AS SHOWN BY THE PROCEDURES ON PAGE 6.
- M. SMALL QUANTITIES OF UNPALLETIZED BOXES, CYLINDRICAL CONTAINERS, AND SIMILAR ITEMS CAN BE POSITIONED WITHIN A PALLET CRATE OR PALLET BOX FOR MOVEMENT. THERE ARE VARIOUS SIZES OF AMMUNITION PALLET CRATES (MIL-C-21215) WHICH CAN BE USED, OR A WOODEN/PLYWOOD PALLET BOX CAN BE USED. REFER TO AMC DRAWING 19-48-4296-20PM1010 FOR CONSTRUCTION DETAILS FOR A TYPICAL PALLET BOX. ITEMS WITHIN THESE PALLET CRATES OR PALLET BOXES SHOULD BE BRACED WITH WOOD OR STYROFOAM PIECES OR OTHER MATERIAL TO PREVENT EXCESSIVE SHIFTING OF THE ITEMS.
- N. LOADING INTO THE DOORWAY AREA OF A CAR SHOULD BE AVOIDED IF POSSIBLE. IF NECESSARY TO LOAD INTO THE DOORWAY, AND ONE-HALF OR MORE OF THE ITEM EXTENDS INTO THE DOORWAY, DOORWAY PROTECTION MUST BE PROVIDED. DOORWAY PROTECTION FOR A CAR EQUIPPED WITH SLIDING DOORS CAN BE DOORWAY GATES. SEE THE "TYPICAL DOORWAY PROTECTION" DETAIL ON PAGE 14. IF THE CAR IS EQUIPPED WITH PLUG TYPE DOORS, NAILED SIDE BLOCKING AND DOORWAY PROTECTION STRAPS MUST BE USED. SEE THE "ALTERNATIVE DOORWAY PROTECTION" DETAIL ON PAGE 17.
- O. THE DOORS OF THE BOXCAR WILL BE CLOSED AND SECURED PRIOR TO MOVING THE CAR.

(CONTINUED AT RIGHT)



ISOMETRIC VIEW

SPECIAL NOTE:

1. ANTI-SWAY BRACE B IS APPLICABLE FOR PALLET UNITS POSITIONED WITH THE LENGTH DIMENSION ACROSS THE CAR, AND WILL BE USED IN EACH LAYER OF THE LOAD. ANTI-SWAY BRACE A WILL BE USED BETWEEN LATERALLY ADJACENT PALLET UNITS IN ALL LAYERS IF THE PALLET UNITS ARE POSITIONED WITH THE WIDTH DIMENSION ACROSS THE CAR AND THE LOAD IS MORE THAN ONE LAYER. SEE THE DETAIL ON PAGE 13. LATERAL BRACING IS NOT REQUIRED FOR A ONE-LAYER LOAD WHEN THE PALLET UNITS ARE POSITIONED WITH THE WIDTH DIMENSION ACROSS THE CAR.

TYPICAL LOADING AND BRACING OF PALLET UNITS AND/OR SKIDDED UNITS IN A BOXCAR EQUIPPED WITH LOAD DIVIDER BULKHEADS

GENERAL NOTES

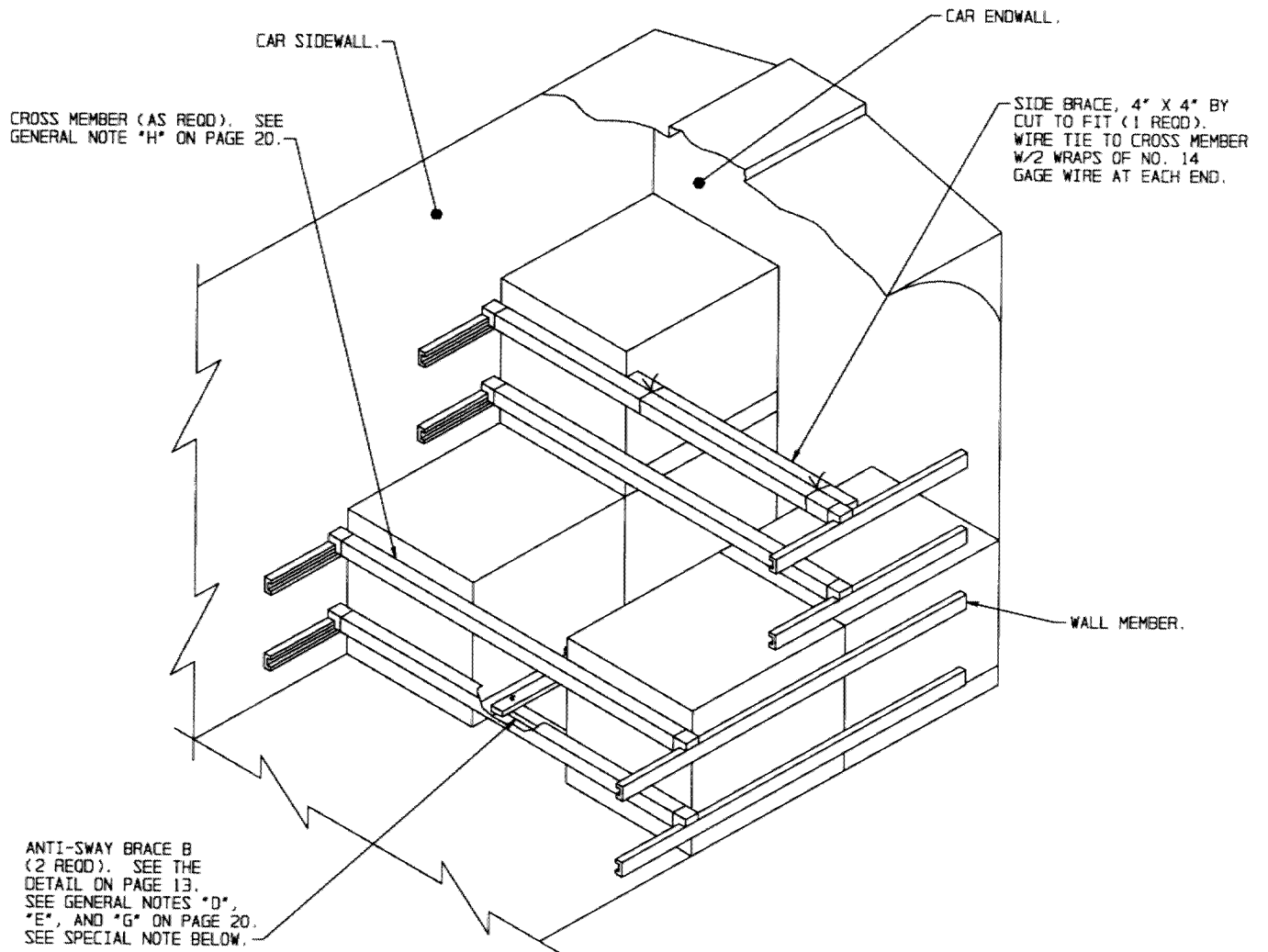
(GENERAL NOTES CONTINUED)

FOR CARS EQUIPPED WITH MECHANICAL BRACING DEVICES

- J. SMALL QUANTITIES OF UNPALLETIZED BOXES, CYLINDRICAL CONTAINERS, AND SIMILAR ITEMS CAN BE POSITIONED WITHIN A PALLET CRATE OR PALLET BOX FOR MOVEMENT. THERE ARE VARIOUS SIZES OF AMMUNITION PALLET CRATES (MIL-C-21215) WHICH CAN BE USED, OR A WOODEN/PLYWOOD PALLET BOX CAN BE USED. REFER TO AMC DRAWING 19-48-4296-20PM1010 FOR CONSTRUCTION DETAILS FOR A TYPICAL PALLET BOX. ITEMS WITHIN THESE PALLET CRATES OR PALLET BOXES SHOULD BE BRACED WITH WOOD OR STYROFOAM PIECES OR OTHER MATERIAL TO PREVENT EXCESSIVE SHIFTING OF THE ITEMS.
- K. LOADING INTO THE DOORWAY AREA OF A CAR SHOULD BE AVOIDED IF POSSIBLE. IF NECESSARY TO LOAD INTO THE DOORWAY, DOORWAY MEMBERS MUST BE INSTALLED IN EACH DOORWAY TO PROVIDE FOR ATTACHMENT OF THE LOAD BLOCKING CROSS MEMBERS AND TO PROVIDE DOORWAY PROTECTION FOR THE LADING.
- L. PARTIAL LAYERS MAY BE RETAINED BY INSTALLATION OF CROSS MEMBERS AT THE NECESSARY LOCATIONS.
- M. THE DOORS OF THE BOXCAR WILL BE CLOSED AND SECURED PRIOR TO MOVING THE CAR.
- N. ALL UNUSED CROSS MEMBERS, DOORWAY MEMBERS, AND ADJUSTABLE WALL MEMBERS IF APPLICABLE, WILL BE LOCKED INTO PLACE IN THE BOXCAR WHERE THEY WILL NOT INTERFERE WITH UNLOADING OPERATIONS.

- A. THE OUTLOADING PROCEDURES DEPICTED ON PAGES 20 THRU 22 ARE APPLICABLE FOR MOVEMENTS IN BOXCARS EQUIPPED WITH MECHANICAL BRACING DEVICES OF VARIOUS DESIGN AND MANUFACTURE. CARS WHICH ARE 50'-6" LONG BY 9'-2" WIDE HAVE BEEN SHOWN. HOWEVER, THE PROCEDURES ARE ALSO APPLICABLE FOR BOXCARS OF OTHER LENGTHS AND WIDTHS.
- B. MECHANICAL BRACING EQUIPPED BOXCARS SHOULD BE USED FOR THE LOADING OF PALLET UNITS AND SKIDDED UNITS OF AMMUNITION AND EXPLOSIVES. THESE CARS CAN ALSO BE USED FOR MOVEMENTS OF LONG MISSILE CONTAINERS AND OTHER LARGE ITEMS, PROVIDED THE CROSS MEMBERS IN THOSE CARS CAN BE INSTALLED AGAINST STRONG POINTS OF THE CONTAINERS. IF OPEN TOP VEHICLES, EITHER FLATCARS OR FLATBED TRAILERS ARE AVAILABLE, THEY MAY FACILITATE LOADING.
- C. PALLET UNITS AND SKIDDED UNITS SHOULD BE LOADED IN A DOUBLE ROW PATTERN, WITH THE UNITS POSITIONED AGAINST THE CAR SIDEWALLS. SEE THE TYPICAL LOAD VIEW ON PAGE 21. MISSILE CONTAINERS SHOULD ALSO BE LOADED AGAINST THE CAR SIDEWALLS. IF A THIRD ROW OF PALLET UNITS, SKIDDED UNITS, OR MISSILE CONTAINERS IS TO BE LOADED IT SHOULD BE POSITIONED SO AS TO BE CENTERED IN THE CAR. SEE PAGE 22 FOR MAXIMUM LOAD GUIDANCE BASED ON THE CONTACT AREA OF THE LOAD ON THE CROSS MEMBERS.
- D. LATERAL BRACING IS NOT REQUIRED FOR SINGLE LAYER LOADS OF PALLET UNITS OR SKIDDED UNITS IF THE VOID IS LESS THAN ONE-HALF THE UNIT DIMENSION ACROSS THE CAR. FOR 48" AND 45-1/2" WIDE UNITS, BRACING IS NOT REQUIRED. BRACING IS REQUIRED FOR UNITS POSITIONED WITH THE 35" DIMENSION ACROSS THE CAR, UNLESS THEY ARE LOADED THREE UNITS WIDE.
- E. LATERAL BRACING IS REQUIRED FOR LOADS OF TWO OR MORE LAYERS OF PALLET UNITS OR SKIDDED UNITS. BRACING IS REQUIRED FOR PALLET UNITS HAVING THE 35" LENGTH DIMENSION ACROSS THE CAR IF THE VOID IS MORE THAN 4", AND FOR SKIDDED UNITS AND FOR OTHER PALLET UNIT SIZES AND POSITIONS WHEN THE VOID IS 6" OR MORE. NAILED SIDE BLOCKING MAY BE USED AT THE FLOOR LEVEL, OR ANTI-SWAY BRACES MAY BE USED. ANTI-SWAY BRACES WILL BE USED FOR ALL FULL UPPER-LAYER LOAD UNITS UNLESS THE STACK IS UNITIZED. THEN AN ANTI-SWAY BRACE BETWEEN THE TOP-LAYER UNITS IS SUFFICIENT. IF A LATERAL VOID IS TOO SMALL FOR THE INSTALLATION OF ANTI-SWAY BRACES, CRIB FILL ASSEMBLIES MAY BE USED. SEE THE "TYPICAL CRIB FILL" DETAIL ON PAGE 16. EMPTY PALLETS MAY BE POSITIONED ON EDGE BETWEEN THE ROWS OR STYROFOAM SHEETS MAY BE USED ALONG WITH THE PALLETS OR WITHOUT. HANGING HONEYCOMB STYLE FIBERBOARD ASSEMBLIES MAY BE POSITIONED BETWEEN THE ROWS. SEE THE "SIDE FILL" DETAIL ON PAGE 16. THE NAILED FLOORLINE BLOCKING AND/OR ANTI-SWAY BRACES ARE THEN NOT REQUIRED.
- F. GENERALLY, CONTAINERS SHOULD BE LOADED LENGTHWISE IN A CAR. LATERAL BRACING IS NOT REQUIRED FOR SINGLE-LAYER LOADS OF CONTAINERS IF THE VOID IS LESS THAN ONE-HALF THE CONTAINER DIMENSION WHICH IS POSITIONED ACROSS THE WIDTH OF THE CAR, UNLESS IT IS NEEDED TO ALIGN STRONG POINTS OF LONGITUDINALLY ADJACENT CONTAINERS.
- G. LATERAL BRACING IS REQUIRED FOR LOADS OF TWO OR MORE LAYERS OF CONTAINERS. NAILED SIDE BLOCKING MAY BE USED AT THE FLOOR LEVEL, OR ANTI-SWAY BRACES MAY BE USED. ANTI-SWAY BRACES WILL BE USED FOR ALL UPPER LAYERS UNLESS THE STACK IS UNITIZED. THEN AN ANTI-SWAY BRACE BETWEEN THE TOP-LAYER CONTAINERS IS SUFFICIENT. IF A LATERAL VOID IS TOO SMALL FOR THE INSTALLATION OF ANTI-SWAY BRACES, CRIB FILL WILL BE USED. SEE THE "TYPICAL CRIB FILL" DETAIL ON PAGE 16. EMPTY PALLETS MAY BE POSITIONED ON EDGE BETWEEN THE ROWS, OR STYROFOAM SHEETS MAY BE USED ALONG WITH THE PALLETS OR WITHOUT. THE NAILED FLOORLINE BLOCKING AND/OR ANTI-SWAY BRACES ARE THEN NOT REQUIRED.
- H. CROSS MEMBERS SHOULD BE INSTALLED TO BRACE LOADS IN EACH END OF THE CAR. A MINIMUM OF ONE CROSS MEMBER WILL BE USED FOR EACH LAYER. ADDITIONAL CROSS MEMBERS PER LAYER MAY BE USED AS DICTATED BY THE WEIGHT OF THE LOAD OR THE CONFIGURATION OF THE LOAD. FOR INSTANCE, SEPARATE LOADING PROJECTILES WILL REQUIRE TWO CROSS MEMBERS PER LAYER, ONE ALIGNED WITH THE BASE AND ONE WITH THE COVER. SEE THE "MAXIMUM ALLOWABLE LOAD RATINGS FOR SINGLE, DOUBLE, AND TRIPLE CROSS MEMBERS" DETAIL ON PAGE 22 FOR GUIDANCE. THE LOAD IN EACH END OF THE CAR CAN BE "BAYED OFF" TO COMPLY WITH THE MAXIMUM WEIGHT RESTRICTIONS FOR THE CROSS MEMBERS. WHEN LOADING CONTAINERS HAVING PROTRUDING SKIDS, EACH LOAD UNIT MUST BE "BAYED OFF".

(CONTINUED AT RIGHT)



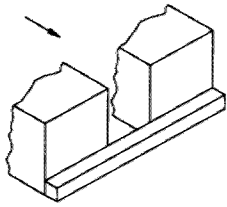
ISOMETRIC VIEW

SPECIAL NOTE:

1. ANTI-SWAY BRACE B IS APPLICABLE FOR PALLET UNITS POSITIONED WITH THE LENGTH DIMENSION ACROSS THE CAR, AND WILL BE USED IN EACH LAYER OF THE LOAD. ANTI-SWAY BRACE A WILL BE USED BETWEEN LATERALLY ADJACENT PALLET UNITS IN ALL LAYERS IF THE PALLET UNITS ARE POSITIONED WITH THE WIDTH DIMENSION ACROSS THE CAR AND THE LOAD IS MORE THAN ONE LAYER. SEE THE DETAIL ON PAGE 13. LATERAL BRACING IS NOT REQUIRED FOR A ONE-LAYER LOAD WHEN THE PALLET UNITS ARE POSITIONED WITH THE WIDTH DIMENSION ACROSS THE CAR.

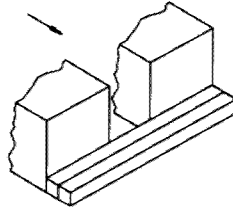
TYPICAL BLOCKING AND BRACING OF PALLET UNITS AND/OR SKIDDED UNITS IN A BOXCAR EQUIPPED WITH MECHANICAL BRACING DEVICES

10,000 LB LOAD



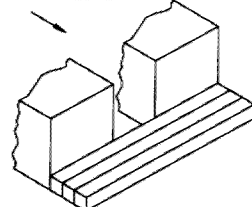
SINGLE

18,000 LB LOAD



DOUBLE

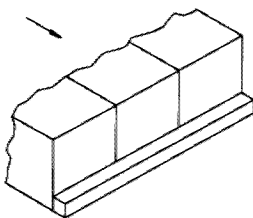
24,000 LB LOAD



TRIPLE

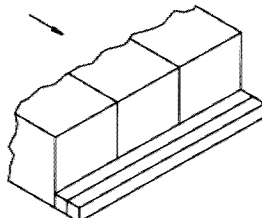
LOAD CONCENTRATED ON END PORTIONS OF CROSSMEMBERS, ONE-THIRD BOXCAR WIDTH

10,000 LB LOAD



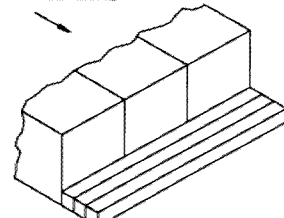
SINGLE

18,000 LB LOAD



DOUBLE

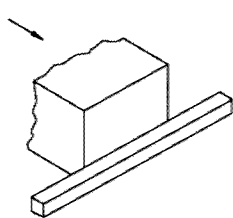
24,000 LB LOAD



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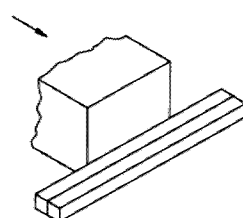
LOAD EVENLY DISTRIBUTED ACROSS FULL LENGTH OF CROSSMEMBER

7,500 LB LOAD



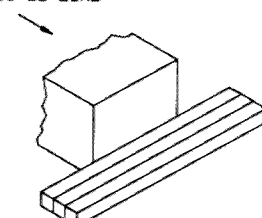
SINGLE

13,500 LB LOAD



DOUBLE

18,000 LB LOAD



TRIPLE

LOAD CONCENTRATED IN CENTRAL PORTION OF CROSSMEMBER, ONE-HALF BOXCAR WIDTH

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GENERAL NOTES FOR FLATCARS

(GENERAL NOTES CONTINUED)

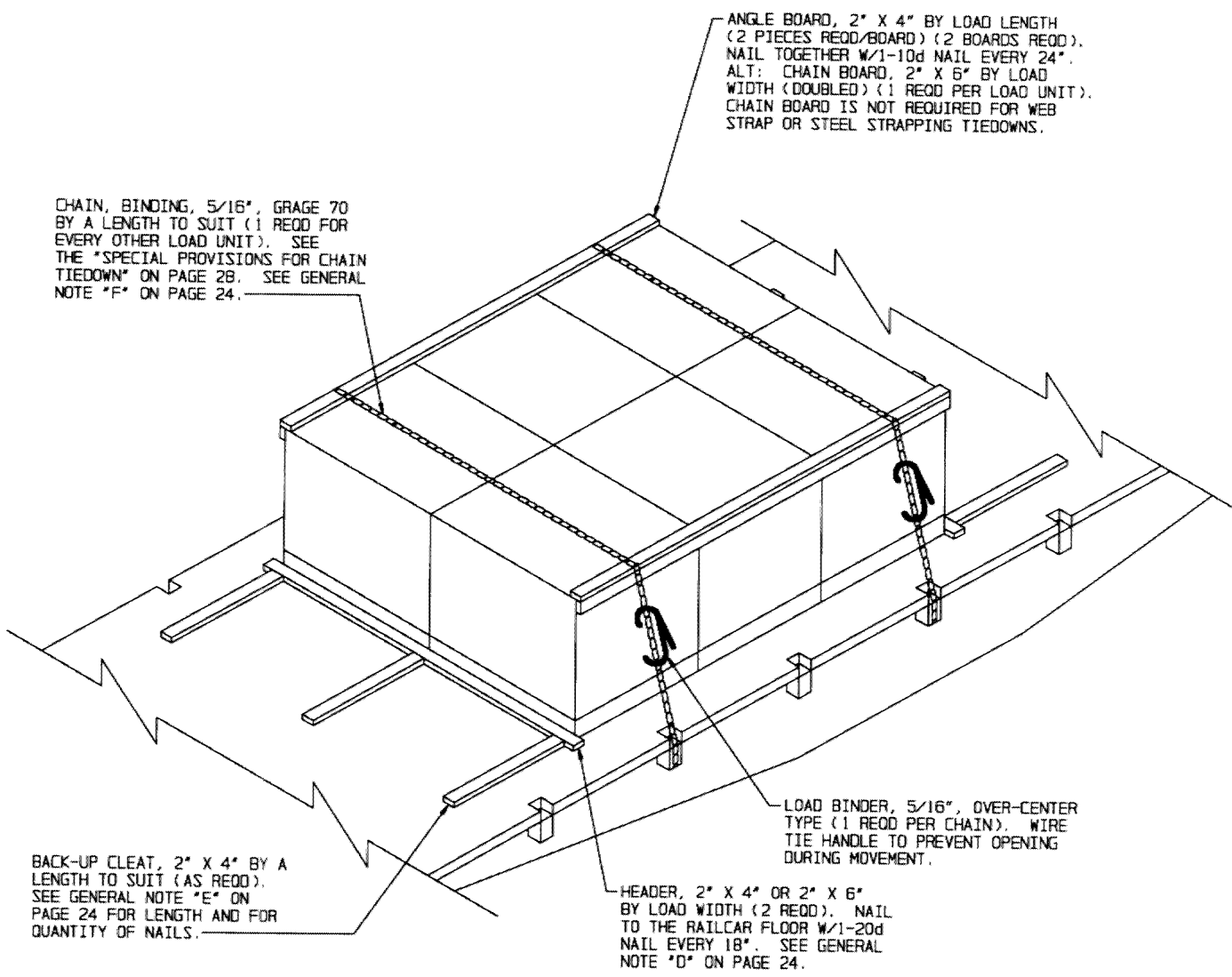
- A. THE OUTLOADING PROCEDURES DEPICTED ON PAGES 24 THRU 29 ARE APPLICABLE FOR MOVEMENTS ON FLATCARS. FLATCARS WHICH ARE 41'-6" LONG BY 9'-0" WIDE HAVE BEEN SHOWN. HOWEVER, THE PROCEDURES ARE ALSO APPLICABLE FOR CARS OF OTHER LENGTHS AND WIDTHS.
- B. FLATCARS SHOULD BE USED FOR THE LOADING OF LONG MISSILE CONTAINERS AND OTHER LARGE ITEMS. THESE MUST BE LOADED WITH THE LONG DIMENSION LENGTHWISE ON THE CAR. FLATCARS MAY ALSO BE USED FOR PALLET UNITS AND SKIDDED UNITS OF AMMUNITION AND EXPLOSIVES. LOADS SHOULD BE LIMITED TO ONE LAYER IN HEIGHT.
- C. PALLET UNITS AND SKIDDED UNITS MAY BE LOADED ON A FLATCAR WITH EITHER DIMENSION ACROSS THE CAR. IF PALLET UNITS OR SKIDDED UNITS ARE SO WIDE THAT THEY COVER UP THE STAKE POCKETS ON THE CAR, THE UNITS MUST BE LOADED WITH THE OTHER DIMENSION ACROSS THE CAR OR IN A 1-WIDE CONFIGURATION. IF LOADING TWO UNITS WIDE ON THE CAR, THE JOINT OF THE TWO ROWS SHOULD BE CENTERED ON THE CAR WIDTH. IF LOADING ONLY ONE UNIT WIDE, THE ROW SHOULD BE CENTERED ON THE CAR WIDTH.
- D. HEADERS ARE REQUIRED AT EACH END OF A LOAD AS A MINIMUM. HEADERS WILL ALSO BE REQUIRED BETWEEN LOAD UNITS WHEN LOADING SKIDDED MISSILE CONTAINERS OR SIMILAR ITEMS. THE HEADERS SHOULD BE THE WIDTH OF THE LADING, OR CAR WIDTH, AS REQUIRED. THE HEADERS SHOULD BE OF A NUMBER OF LAYERS AS SPECIFIED BY THE "HEADER REQUIREMENTS" DETAIL ON PAGE 15. THE FIRST THICKNESS OF A HEADER SHOULD BE NAILED TO THE CAR FLOOR W/1-20d NAIL EVERY 18", USING NOT LESS THAN TWO NAILS. EACH ADDITIONAL THICKNESS OF A HEADER WILL BE NAILED TO THE FIRST W/1-50d NAIL EVERY 18", AGAIN WITH A MINIMUM OF TWO NAILS.
- E. BACK-UP CLEATS ARE REQUIRED AT EACH END OF A LOAD AS A MINIMUM. THE BACK-UP CLEATS WILL BE OF THE SAME NUMBER OF LAYERS AS THE HEADERS. THE LENGTH OF THE BACK-UP CLEATS, THE QUANTITY OF 20d NAILS IN THE FIRST LAYER, AND THE QUANTITY OF 50d NAILS IN THE ADDED LAYERS WILL BE AS FOLLOWS.

- H. STACKED CONTAINERS WHICH ARE NOT EQUIPPED WITH TIEBARS MUST BE UNITIZED WITH 1-1/4" STEEL STRAPPING. CONTAINERS WHICH ARE 60" OR LESS IN LENGTH WILL BE UNITIZED WITH ONE STRAP. CONTAINERS WHICH ARE OVER 60" LONG WILL BE UNITIZED WITH TWO STRAPS.
- J. SMALL QUANTITIES OF UNPALLETIZED BOXES, CYLINDRICAL CONTAINERS, AND SIMILAR ITEMS CAN BE POSITIONED WITHIN A PALLET CRATE OR PALLET BOX FOR MOVEMENT. THERE ARE VARIOUS SIZES OF AMMUNITION PALLET CRATES (MIL-C-21215) WHICH CAN BE USED, OR A WOODEN/PLYWOOD PALLET BOX CAN BE USED. REFER TO AMC DRAWING 19-48-4296-20PM1010 FOR CONSTRUCTION DETAILS FOR A TYPICAL PALLET BOX. ITEMS WITHIN THESE PALLET CRATES OR PALLET BOXES SHOULD BE BRACED WITH WOOD OR STYROFOAM PIECES OR OTHER MATERIAL TO PREVENT EXCESSIVE SHIFTING OF THE ITEMS.

QUANTITY	LENGTH	NAILS	WEIGHT (LBS)			
			SINGLE	DOUBLE	TRIPLED	QUAD
2	30"	8	20,000	18,000	15,000	11,250
2	36"	9	23,000	21,000	18,000	14,250
2	42"	11	25,000	23,000	22,000	18,000
2	48"	12	30,000	28,000	25,000	22,500

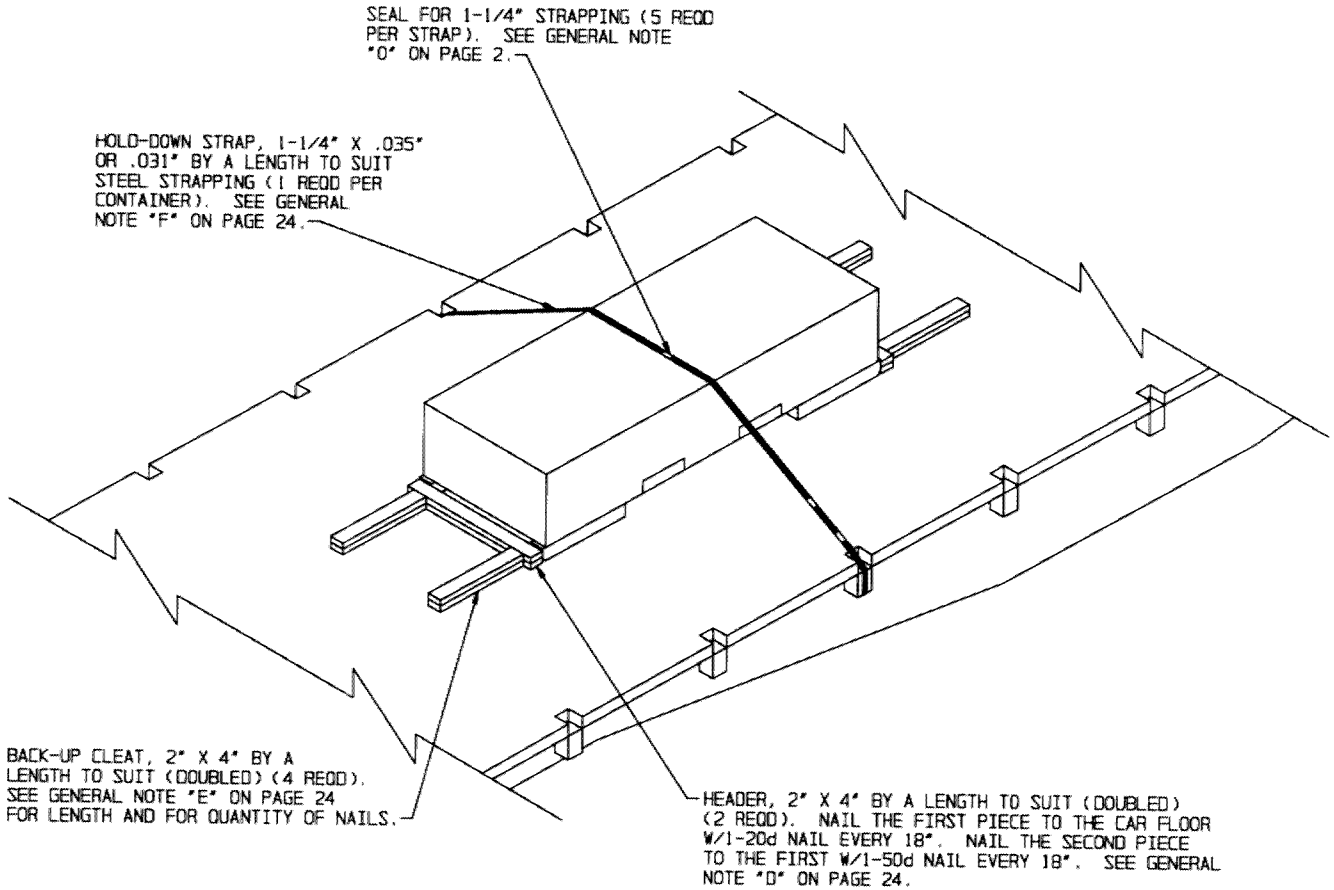
- F. ALL ITEMS MUST BE SECURED TO THE FLATCAR STAKE POCKETS. ONE TIEDOWN IS ADEQUATE FOR A LOAD UNIT 8'-0" OR LESS IN LENGTH, UNLESS THE WEIGHT OF THE LOAD UNIT REQUIRES MORE TIEDOWNS. TWO TIEDOWNS ARE REQUIRED FOR A LOAD UNIT WHICH IS OVER 8'-0" LONG. THE FOLLOWING MATERIAL MAY BE USED FOR TIEDOWN PURPOSES.
 - 1. WEB STRAP TIEDOWN ASSEMBLIES MAY BE USED, ONE FOR EACH 5,000 POUNDS OF LADING. SEE THE "SPECIAL PROVISIONS FOR WEB STRAP TIEDOWN" ON PAGE 29.
 - 2. STEEL STRAPPING, 1-1/4" X .035" OR .031" MAY BE USED, ONE FOR EACH 5,000 POUNDS OF LADING.
 - 3. STEEL STRAPPING, 2" X .050" OR .044" MAY BE USED, ONE FOR EACH 10,000 POUNDS OF LADING.
 - 4. STEEL CHAIN, 5/16" OR LARGER, ALONG WITH APPROPRIATELY SIZED LOAD BINDERS, MAY BE USED, ONE FOR EACH 5,000 POUNDS OF LADING. SEE THE "SPECIAL PROVISIONS FOR CHAIN TIEDOWN" ON PAGE 28. LADING MUST BE PROTECTED FROM DAMAGE BY THE CHAIN. DOUBLED 2" X 6" MATERIAL SHOULD BE USED UNDER THE CHAIN FOR PALLET UNITS AND WOODEN CRATES, UNLESS ANGLE BOARDS ARE BEING USED. REJECT RUBBER-LINED FIRE HOSE CAN BE USED UNDER THE CHAIN FOR ROUND OR SQUARE METAL CONTAINERS.
- G. STACKED CONTAINERS EQUIPPED WITH TIEBARS NEED NOT BE UNITIZED WITH STRAPPING FOR TRANSPORT.

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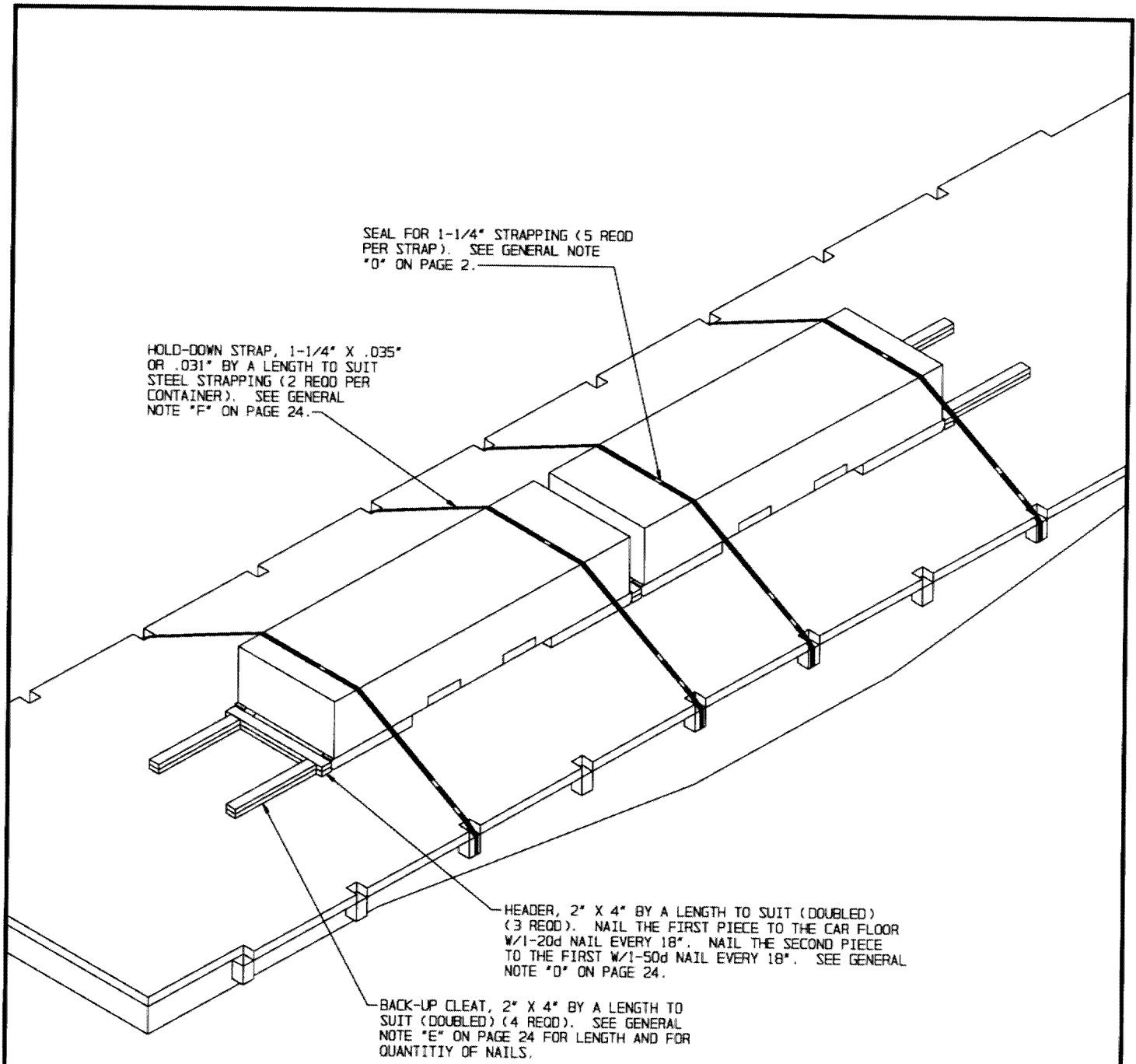


ISOMETRIC VIEW

TYPICAL BLOCKING AND BRACING OF PALLET UNITS AND/OR SKIDDED UNITS ON A FLATCAR



ISOMETRIC VIEW



SEAL FOR 1-1/4" STRAPPING (5 REED PER STRAP). SEE GENERAL NOTE "D" ON PAGE 2.

HOLD-DOWN STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT STEEL STRAPPING (2 REED PER CONTAINER). SEE GENERAL NOTE "F" ON PAGE 24.

HEADER, 2" X 4" BY A LENGTH TO SUIT (DOUBLED) (3 REED). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-20d NAIL EVERY 18". NAIL THE SECOND PIECE TO THE FIRST W/1-50d NAIL EVERY 18". SEE GENERAL NOTE "D" ON PAGE 24.

BACK-UP CLEAT, 2" X 4" BY A LENGTH TO SUIT (DOUBLED) (4 REED). SEE GENERAL NOTE "E" ON PAGE 24 FOR LENGTH AND FOR QUANTITY OF NAILS.

ISOMETRIC VIEW

SPECIAL PROVISIONS FOR CHAIN TIEDOWN

LADING MAY BE SECURED TO THE FLATCAR OR FLATBED TRAILER BY CHAINS AND LOAD BINDERS IN LIEU OF STEEL STRAPPING OR WEB STRAPPING, PROVIDED THE FOLLOWING CONDITIONS ARE MET AND THE PROCEDURES CONTAINED ON PAGE 25 AND/OR 39 ARE FOLLOWED.

1. ONLY CHAINS AND LOAD BINDERS OF GOOD QUALITY WILL BE USED. ALL CHAINS AND LOAD BINDERS SHALL CONFORM TO THE NATIONAL ASSOCIATION OF CHAIN MANUFACTURER'S WELDED CHAIN SPECIFICATION ADOPTED NOVEMBER 1975.
2. ALL CHAINS SHALL BE MARKED AS PRESCRIBED BY THE NATIONAL ASSOCIATION OF CHAIN MANUFACTURER'S WELDED CHAIN SPECIFICATION ADOPTED NOVEMBER 1975. AT LEAST ONE LINK IN EVERY 36 LINKS SHALL CARRY THE MANUFACTURER'S PERMANENT AND DISTINCTIVE MARK IDENTIFYING THE GRADE OF CHAIN. CHAINS NOT MARKED IN THIS MANNER SHALL NOT BE USED. IN ADDITION TO THE GRADE MARKING, THE CHAIN MAY ALSO CARRY LETTER MARKINGS OR SYMBOLS IDENTIFYING THE CHAIN MANUFACTURER. THE PRESENCE OF THE MANUFACTURER'S IDENTIFICATION MARKING IS NOT MANDATORY.
3. BEFORE AND DURING INSTALLATION, THE CHAINS AND LOAD BINDERS SHALL BE INSPECTED FOR BENT HOOKS, STRETCH, GOUGES, BENT LINKS, WEAR, OR ANY OTHER NOTICEABLE DEFECTS. ANY DEFICIENCY SHALL BE CAUSE FOR REJECTION OF A CHAIN OR LOAD BINDER. CHAINS MUST NOT BE TWISTED DURING INSTALLATION. CAUTION: EXTREME CARE MUST BE EXERCISED WHEN TENSIONING CHAINS TO PREVENT DAMAGE OR PERMANENT DEFORMATION TO THE LADING.
4. CHAIN SIZES AND GRADES APPROVED FOR USE WITH FLATBED TRAILER LOADS ARE AS FOLLOWS:
 - A. 3/8", GRADE 43 HIGH TEST CHAIN
 - B. 5/16", GRADE 70 BINDING CHAIN
 - C. 3/8", GRADE 70 BINDING CHAIN
 - D. 5/16", GRADE 80 ALLOY STEEL CHAIN
 - E. 3/8", GRADE 80 ALLOY STEEL CHAIN
5. THE GRABHOOKS ON THE ENDS OF THE CHAIN MAY BE OF THE FOLLOWING TYPES WITH GRADE MARKINGS AS INDICATED.
 - A. CLEVIS GRABHOOKS, 3/8" SIZE, DO NOT REQUIRE GRADE MARKING. ALLOY GRABHOOKS, 5/16" SIZE, SHALL CARRY THE MANUFACTURER'S GRADE MARK OF 7, 70, OR 700. THE HOOKS SHALL BE USED ON THE APPROPRIATE SIZE CHAIN.
 - B. CLOSED EYE GRABHOOKS, 3/8" AND 5/16" SIZE, MAY BE USED ON THE APPROPRIATE SIZE CHAIN IF THEY ARE A PART OF A CHAIN ASSEMBLY WHICH WAS PROVIDED BY A CHAIN MANUFACTURER, AND THE CHAIN ASSEMBLY CARRIES THE CORRECT GRADE IDENTIFICATION MARKING AS PREVIOUSLY STATED. CLOSED EYE GRABHOOKS THAT FORM A PART OF THE CHAIN ASSEMBLY ARE EXEMPT FROM GRADE MARKINGS.
6. CONNECTING LINKS USED FOR CHAIN REPAIR MUST BE CORRECTLY MARKED AND BE EQUAL TO OR GREATER IN STRENGTH THAN THE CHAIN THEY ARE REPAIRING. CHAINS WITH UNMARKED CONNECTING LINKS SHALL NOT BE USED.
7. CHAIN AND FITTING OF A HIGHER GRADE MAY BE SUBSTITUTED FOR THE GRADES SPECIFIED IN NOTE 4 ABOVE.
8. LOAD BINDERS SHALL BE 5/16" TO 3/8" SIZE AND HAVE A MINIMUM BREAKING STRENGTH OF 16,200 POUNDS (WORKING LOAD LIMIT OF 5,400 POUNDS). OVERCENTER TYPE LOAD BINDERS SHALL BE SAFETY WIRED TO PREVENT ACCIDENTAL OPENING DURING TRANSPORT. LOAD BINDER SIZE SHALL BE COMPATIBLE WITH THE SIZE OF THE CHAIN BEING USED.

SPECIAL PROVISIONS FOR WEB STRAP TIEDOWN

LADING MAY BE SECURED TO A FLATCAR OR FLATBED TRAILER BY WEB STRAP ASSEMBLIES IN LIEU OF STEEL STRAPPING OR CHAINS AND LOAD BINDERS, PROVIDED THE FOLLOWING CONDITIONS ARE MET AND THE PROCEDURES CONTAINED ON PAGE 25 AND/OR 39 ARE FOLLOWED.

1. ONLY WEB STRAPS OF GOOD QUALITY WILL BE USED. ALL COMMERCIAL WEB STRAPS AND ASSOCIATED HARDWARE SHALL CONFORM TO THE WEB SLING & TIEDOWN ASSOCIATION RECOMMENDED STANDARD SPECIFICATION FOR SYNTHETIC WEB TIEDOWNS, FIRST PUBLISHED IN 1991.
2. ALL COMMERCIAL WEB STRAP TIEDOWN ASSEMBLIES SHALL BE PERMANENTLY LABELED WITHIN 18" OF ONE END TO SHOW:
 - A. NAME OR TRADEMARK OF MANUFACTURER
 - B. WORKING LOAD LIMIT (WLL)
 - C. DATE OF MANUFACTURE (MONTH AND YEAR)
 - D. LOT NUMBER OF STRAP
3. COMMERCIAL WEB STRAP ASSEMBLY MINIMUM BREAKING STRENGTH WILL BE AT LEAST THREE TIMES THE WLL MARKED ON THE STRAP.
4. THE TOTAL BREAKING STRENGTH OF THE STRAPS USED TO RESTRAIN AMMUNITION ITEMS WILL BE AT LEAST 1-1/2 TIMES THE TOTAL WEIGHT OF THE ITEMS, WITH A MINIMUM OF TWO STRAPS POSITIONED OVER EACH LOAD UNIT ON A FLATCAR OR TRAILER FOR ITEMS LONGER THAN 8'-0". ONE STRAP MAY BE USED FOR ITEMS LESS THAN 8'-0" LONG, PROVIDING THE WEIGHT LIMIT OF THE STRAP IS NOT EXCEEDED.
5. WHEN USING COMMERCIAL STRAPS AND WINCHES FOR CARGO RESTRAINT, THE STRAPS WILL BE TENSIONED UNTIL TIGHT WITHOUT CAUSING DAMAGE TO THE CARGO. ONLY WINCH BARS WILL BE USED FOR OPERATING THE STRAP WINCHES.
6. BEFORE AND DURING INSTALLATION, THE WEB STRAP ASSEMBLIES SHALL BE INSPECTED FOR DEFECTS. STRAPS HAVING ANY OF THE FOLLOWING DEFECTS WILL NOT BE USED FOR THE RESTRAINT OF ANY AMMUNITION LOAD, WITH THE EXCEPTION OF ONE WITH FRAyed ENDS. A STRAP HAVING FRAyed ENDS CAN BE USED IF THE FRAyed END IS TRIMMED AND MELTED WITH HEAT OR FLAME UNTIL ALL STRANDS ARE SEIZED.
 - A. STRAP ASSEMBLY HARDWARE: SHALL BE INSPECTED FOR BENT HOOKS, GOUGES, BENT RATCHETS OR WINCHES, WEAR, OR ANY OTHER NOTICEABLE DEFECTS.
 - B. STRAP WEBBING: SHALL BE INSPECTED FOR KNOTS, EXCESSIVE ABRASIVE WEAR, TEARS, PUNCTURES, CUTS, ACID OR CAUSTIC BURNS, BROKEN STITCHES, FRAyed ENDS, OIL OR GREASE SPOTS EXCEEDING 6 SQUARE INCHES, BLEACHING OF COLOR, INCREASED STIFFNESS, OR ANY OTHER NOTICEABLE DEFECTS.
7. RATCHET HANDLES MUST BE IN THE LOCKED POSITION AND/OR WINCH LOCKING DEVICES MUST BE FULLY SEATED IN THE TEETH OF THE WINCH.
8. IF THE WINCHES BEING USED ARE THE REMOVABLE TYPE HAVING A WELDED ANGLE AND BOLT FOR ATTACHMENT TO THE FLATCAR OR FLATBED TRAILER, CARE MUST BE EXERCISED WHEN ATTACHING THE WINCHES TO THE FLATCAR OR TRAILER. IF EXCESSIVE FORCE IS EXERTED ON THE BOLT DURING TENSIONING, DEFORMATION OF THE WELDED ANGLE PIECE MAY OCCUR, AND SUBSEQUENTLY CAUSE FAILURE OF THE WINCH DURING TRANSPORT.
9. TRAIN CREWMEN AND VEHICLE DRIVERS MUST BE INSTRUCTED TO PERIODICALLY CHECK THE TIGHTNESS OF THE WEB STRAP ASSEMBLIES AND RE-TIGHTEN, IF NECESSARY.
10. IF PROVIDED ON OR WITH THE WEB STRAP ASSEMBLIES, SCUFF SLEEVES/WEB PROTECTORS WILL BE USED WHEREVER THE STRAP PASSES OVER A SHARP CORNER OR IRREGULAR SURFACE. IF NOT PROVIDED, ANTI-CHAFING MATERIAL OF A SUITABLE THICKNESS WILL BE USED TO INSURE THAT THE STRAP WEBBING IS NOT DAMAGED DURING TRANSPORT OF THE LOAD.

GENERAL NOTES FOR VAN TRAILER

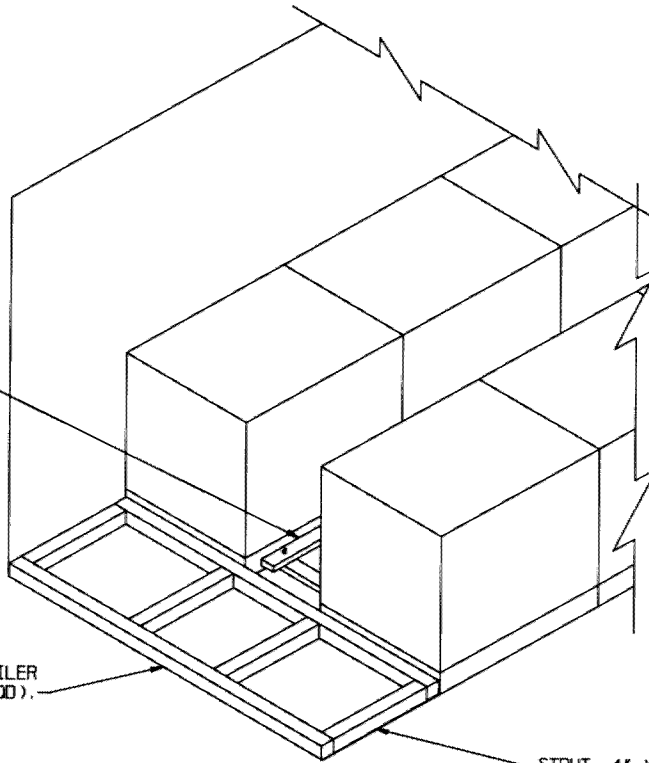
(GENERAL NOTES CONTINUED)

- A. THE OUTLOADING PROCEDURES DEPICTED ON PAGES 30 THRU 37 ARE APPLICABLE FOR MOVEMENTS IN CONVENTIONAL TYPE VAN TRAILERS AND APPLY TO TRAILERS HAVING WOOD, OR WOOD AND METAL, OR ALL METAL FLOORS. VAN TRAILERS WHICH ARE 40'-0" LONG BY 7'-8" WIDE (INSIDE DIMENSION) HAVE BEEN SHOWN, HOWEVER, THE PROCEDURES ARE ALSO APPLICABLE FOR TRAILERS WHICH ARE 89" THRU 99" IN WIDTH AND FOR TRAILERS OF OTHER LENGTHS FROM THE SHORTEST TO THE LONGEST AVAILABLE (REF: 24' TO 53'), AND FOR STRAIGHT TRUCK VANS. THE LOADING AND BRACING PROCEDURES SPECIFIED HEREIN ARE ALSO ADEQUATE FOR LOADS IN SHORTER OR LONGER VANS AND IN NARROWER OR WIDER VANS THAN SHOWN.
- B. VAN TRAILERS SHOULD BE USED FOR THE LOADING OF PALLET UNITS AND SKIDDED UNITS OF AMMUNITION AND EXPLOSIVES AND PALLETIZED SMALL MISSILES. VAN TRAILERS CAN ALSO BE USED FOR MOVEMENTS OF LONG MISSILE CONTAINERS AND OTHER LARGE ITEMS IF OPEN TOP VEHICLES, EITHER FLATBED TRAILERS OR FLATCARS, ARE NOT AVAILABLE.
- C. SOME TRAILERS MAY HAVE ROUNDED CORNERS AT THE FORWARD END AND WILL REQUIRE A FORWARD BLOCKING ASSEMBLY. SEE THE DETAIL ON PAGE 37. IF THE VAN TRAILER BEING USED IS EQUIPPED WITH A SQUARE FRONT OR WITH AN INSTALLED BULKHEAD, THE FORWARD BLOCKING ASSEMBLY IS NOT REQUIRED. POSITION THE LADING DIRECTLY AGAINST THE FORWARD PORTION OF THE TRAILER. NOTE THAT IF LOADING ONE OR MORE LAYERS OF MISSILE CONTAINERS OR ANY ITEM HAVING PROJECTIONS SUCH AS SKIDS, A FORWARD BLOCKING ASSEMBLY MUST BE USED. IF LOADING A ONE-LAYER LOAD OF MISSILE CONTAINERS HAVING PROJECTING SKIDS IN A TRAILER HAVING A SQUARE FRONT WALL, A 2" X 6" MAY BE POSITIONED ON EDGE AT THE FRONT IN LIEU OF USING A FORWARD BLOCKING ASSEMBLY.
- D. PALLET UNITS AND SKIDDED UNITS SHOULD BE LOADED IN A DOUBLE-ROW PATTERN, WITH THE UNITS POSITIONED AGAINST THE TRAILER SIDEWALLS. SEE THE TYPICAL LOAD VIEW ON PAGE 31. MISSILE CONTAINERS SHOULD ALSO BE LOADED AGAINST THE TRAILER SIDEWALLS. SEE THE TYPICAL LOAD VIEW ON PAGE 33. IF A THIRD ROW OF MISSILE CONTAINERS IS TO BE LOADED, IT SHOULD BE POSITIONED SO AS TO BE CENTERED IN THE TRAILER. IF THE QUANTITY TO BE MOVED WILL WORK OUT, PALLET UNITS, SKIDDED UNITS, AND/OR CONTAINERS CAN BE LOADED ONE-WIDE DOWN THE CENTER OF THE TRAILER. A SINGLE-ROW LOADING PATTERN SHOULD BE USED WHEN THE PALLET UNITS OR SKIDDED UNITS ARE TOO WIDE OR ARE TOO HEAVY TO FORM TWO ROWS. WHEN LOADING IN A SINGLE-ROW CONFIGURATION, THE LOAD IS RESTRICTED TO ONE LAYER IN HEIGHT AND SHOULD BE POSITIONED DOWN THE CENTER OF THE VAN. THE TOTAL UNBLOCKED SPACE ACROSS THE WIDTH OF A LOAD IS NOT TO EXCEED 20". LATERAL BRACING CAN BE PROVIDED BY INSTALLING RANDOM LENGTH, SINGLE THICKNESS 2" X 4" MATERIAL ALONG EACH SIDE OF THE ROW. NAIL W/1-10d NAIL EVERY 36".
- E. LATERAL BRACING IS NOT REQUIRED FOR SINGLE-LAYER LOADS OF PALLET UNITS OR SKIDDED UNITS IF THE VOID IS LESS THAN ONE-HALF THE UNIT DIMENSION ACROSS THE TRAILER. SIDE BLOCKING IS NOT REQUIRED FOR ITEMS ON 40" LONG PALLETS OR ON 45-1/2" WIDE PALLETS WHEN THE 40" AND 45-1/2" DIMENSIONS OF THE UNITS ARE ACROSS THE TRAILER. WHEN THE 35" LENGTH OF A PALLET UNIT IS ACROSS THE TRAILER, RANDOM LENGTH, SINGLE THICKNESS, 2" X 4" MATERIAL NAILED W/1-10d NAIL EVERY 36" MAY BE INSTALLED AGAINST EACH ROW, OR ANTI-SWAY BRACES MAY BE USED. SEE THE "ANTI-SWAY BRACE B" DETAIL ON PAGE 13. UNITS LESS THAN 36-3/4" LONG IN A 7'-8" WIDE VAN OR ANY LENGTH UNITS IN A 8'-2" WIDE VAN WILL REQUIRE THE USE OF LATERAL BRACING. NOTE THAT LATERAL BRACING IS ALWAYS REQUIRED WHEN IT IS NECESSARY TO ALIGN STRONG POINTS OF LONGITUDINALLY ADJACENT UNITS.
- F. LATERAL BRACING IS REQUIRED FOR LOADS OF TWO OR MORE LAYERS OF PALLET UNITS OR SKIDDED UNITS. BRACING IS REQUIRED FOR PALLET UNITS HAVING THE 35" DIMENSION ACROSS THE TRAILER, AND FOR SKIDDED UNITS AND FOR OTHER PALLET UNIT SIZES AND POSITIONS WHEN THE VOID IS 6" OR MORE. NAILED SIDE BLOCKING MAY BE USED AT THE FLOOR LEVEL, OR ANTI-SWAY BRACES MAY BE USED. ANTI-SWAY BRACES WILL BE USED FOR ALL UPPER LAYERS, UNLESS THE STACK IS UNITIZED. THEN AN ANTI-SWAY BRACE BETWEEN THE TOP-LAYER UNITS IS SUFFICIENT. IF A LATERAL VOID IS TOO SMALL FOR THE INSTALLATION OF ANTI-SWAY BRACES, CRIB FILL ASSEMBLIES MAY BE USED. SEE THE "TYPICAL CRIB FILL" DETAIL ON PAGE 16. EMPTY PALLETS MAY BE POSITIONED ON EDGE BETWEEN THE ROWS OR STYROFOAM SHEETS MAY BE USED ALONG WITH THE PALLETS OR WITHOUT. HANGING HONEYCOMB STYLE FIBERBOARD ASSEMBLIES MAY BE POSITIONED BETWEEN THE ROWS. SEE THE "SIDE FILL" DETAIL ON PAGE 16. INFLATABLE DUNNAGE MAY BE USED FOR LATERAL VOIDS OF FROM 4" TO 12". SEE THE LOAD VIEW ON PAGE 7 WHERE INFLATABLE DUNNAGE IS USED FOR LONGITUDINAL BRACING.
- G. CONTAINERS WHICH ARE SHORTER THAN THE INSIDE WIDTH OF THE VAN TRAILER BY 1" OR MORE SHOULD BE LOADED CROSSWISE. CONTAINERS WHICH ARE LONGER THAN 1" LESS THAN THE INSIDE WIDTH OF THE VAN TRAILER MUST BE LOADED LONGITUDINALLY.
- H. LATERAL BRACING FOR CROSSWISE-POSITIONED CONTAINERS IS NOT REQUIRED IF THE TOTAL EXCESS SPACE ACROSS THE TRAILER IS LESS THAN 20" FOR EITHER SINGLE-LAYER LOADS OR LOADS OF MORE THAN ONE LAYER. LONGITUDINALLY ADJACENT CONTAINER STACKS MAY BE POSITIONED AGAINST OPPOSITE SIDEWALLS, IF DESIRED. IF THE SPACE IS MORE THAN A TOTAL OF 20", NAILED SIDE BLOCKING SHOULD BE INSTALLED ON ONE SIDE OR ON EACH SIDE, AS APPLICABLE, OR SIDE FILL ASSEMBLIES MAY BE USED. SEE THE DETAIL ON PAGE 37. IF NECESSARY TO STACK THE CONTAINERS, THE UPPER-LAYER CONTAINERS MUST BE UNITIZED TO THE LOWER CONTAINER WITH ONE 1-1/4" STEEL STRAPPING.
- J. LATERAL BRACING IS NOT REQUIRED FOR SINGLE-LAYER LOADS OF LENGTHWISE-POSITIONED CONTAINERS IF THE VOID IS LESS THAN ONE-HALF THE CONTAINER DIMENSION WHICH IS POSITIONED ACROSS THE WIDTH OF THE TRAILER, UNLESS IT IS NEEDED TO ALIGN STRONG POINTS OF LONGITUDINALLY ADJACENT CONTAINERS.
- K. LATERAL BRACING IS REQUIRED FOR LOADS OF TWO OR MORE LAYERS OF LENGTHWISE-POSITIONED CONTAINERS. NAILED SIDE BLOCKING MAY BE USED AT THE FLOOR LEVEL, OR ANTI-SWAY BRACES MAY BE USED. ANTI-SWAY BRACES WILL BE USED FOR ALL UPPER LAYERS UNLESS THE STACK IS UNITIZED. THEN AN ANTI-SWAY BRACE BETWEEN THE TOP-LAYER CONTAINERS IS SUFFICIENT. IF A LATERAL VOID IS TOO SMALL FOR THE INSTALLATION OF ANTI-SWAY BRACES, CRIB FILL ASSEMBLIES MAY BE USED. SEE THE "TYPICAL CRIB FILL ASSEMBLY" DETAIL ON PAGE 16. EMPTY PALLETS MAY BE POSITIONED ON EDGE BETWEEN THE ROWS OR STYROFOAM SHEETS MAY BE USED ALONG WITH THE PALLETS OR WITHOUT. HANGING STYLE HONEYCOMB FIBERBOARD ASSEMBLIES MAY BE POSITIONED BETWEEN THE ROWS. SEE THE "SIDE FILL" DETAIL ON PAGE 16. THE NAILED FLOORLINE BLOCKING AND/OR ANTI-SWAY BRACES ARE THEN NOT REQUIRED.
- L. REAR BLOCKING IS NOT REQUIRED IF THE SPACE AT THE REAR OF THE LOAD, BETWEEN THE LADING AND THE REAR DOORS, MEASURES 1-1/2" OR LESS. IF THE SPACE AT THE REAR OF THE LOAD IS GREATER THAN 1-1/2" BUT LESS THAN 9", USE THE "REAR BLOCKING ASSEMBLY" DEPICTED ON PAGE 37. IF THE VOID AT THE REAR OF THE LOAD IS 9" OR GREATER, USE THE REAR BLOCKING AS SHOWN IN THE LOAD VIEW ON PAGE 31. SEE GENERAL NOTES "M" AND "R" BELOW.
- M. NAILED HEADERS MAY BE USED FOR REAR BLOCKING IN LIEU OF USING REAR BLOCKING ASSEMBLIES. HEADERS WILL BE 2" X 4" MATERIAL AND WILL BE TRAILER WIDTH MINUS 1/2" IN LENGTH OR WILL BE THE WIDTH OF THE PALLET UNIT OR CONTAINER. THE HEADERS SHOULD BE OF A NUMBER OF LAYERS AS SPECIFIED BY THE "HEADER REQUIREMENTS" DETAIL ON PAGE 15. THE FIRST THICKNESS OF A TRAILER WIDTH HEADER SHOULD BE NAILED TO THE TRAILER FLOOR W/6-10d NAILS. ITEM-WIDTH HEADERS WILL BE NAILED W/1-10d NAIL EVERY 18", USING NOT LESS THAN TWO NAILS. EACH ADDITIONAL THICKNESS OF A HEADER WILL BE NAILED TO THE FIRST IN A LIKE MANNER.
- N. ALTHOUGH NOT APPROVED FOR OVER-THE-ROAD USE, ADJUSTABLE SPREADERS HAVING RUBBER PAD ENDS AND LEVER LOCKING DEVICES MAY BE USED FOR LOAD RETENTION. SPREADERS SHOULD BE POSITIONED AS CLOSE AS POSSIBLE TO THE VERTICAL FRAME MEMBERS OF THE TRAILER SIDEWALL.
- O. A PARTIAL LOAD MAY BE BRACED USING LTL BRACES. GENERALLY, AT LEAST TWO LTL BRACES ARE TO BE USED AT EACH LOCATION. A BRACE WILL BE USED FOR EACH 3,000 POUNDS OF LADING. SEE THE PROCEDURES ON PAGE 35 FOR GUIDANCE. SMALL QUANTITIES CAN ALSO BE SECURED TO THE TRAILER FLOOR USING STEEL STRAPPING AND STRAP ANCHOR PLATES AS SHOWN ON PAGE 12.
- P. SMALL QUANTITIES OF UNPALLETIZED BOXES, CYLINDRICAL CONTAINERS, AND SIMILAR ITEMS CAN BE POSITIONED WITHIN A PALLET CRATE OR PALLET BOX FOR MOVEMENT. THERE ARE VARIOUS SIZES OF AMMUNITION PALLET CRATES (MIL-C-21215) WHICH CAN BE USED, OR A WOODEN/PLYWOOD PALLET BOX CAN BE USED. REFER TO AMC DRAWING 19-48-4296-20PM1010 FOR CONSTRUCTION DETAILS FOR A TYPICAL PALLET BOX. ITEMS WITHIN THESE PALLET CRATES OR PALLET BOXES SHOULD BE BRACED WITH WOOD OR STYROFOAM PIECES OR OTHER MATERIAL TO PREVENT EXCESSIVE SHIFTING OF THE ITEMS.
- Q. THE DOORS OF THE TRAILER WILL BE CLOSED AND SECURED PRIOR TO MOVING THE TRAILER.
- R. VOIDS AT THE REAR OF THE TRAILER BETWEEN THE LOAD AND THE DOORS CAN ALSO BE FILLED USING INFLATABLE DUNNAGE, EMPTY PALLETS POSITIONED ON EDGE, STYROFOAM PANELS, OR HONEYCOMB FIBERBOARD PANELS IN LIEU OF THE REAR BLOCKING ASSEMBLIES OR NAILED HEADERS.

(CONTINUED AT RIGHT)

ANTI-SWAY BRACE B (AS REQD),
SEE THE DETAIL ON PAGE 13.
SEE GENERAL NOTE "E" ON
PAGE 30.

HEADER, 4" X 4" BY TRAILER
WIDTH MINUS 1/2" (2 REQD).



STRUT, 4" X 4" BY CUT TO FIT
(4 REQD). POSITION AS SHOWN.
TOENAIL TO THE HEADERS W/2-16d
NAILS AT EACH END. SEE GENERAL
NOTES "L" AND "M" ON PAGE 30.

ISOMETRIC VIEW

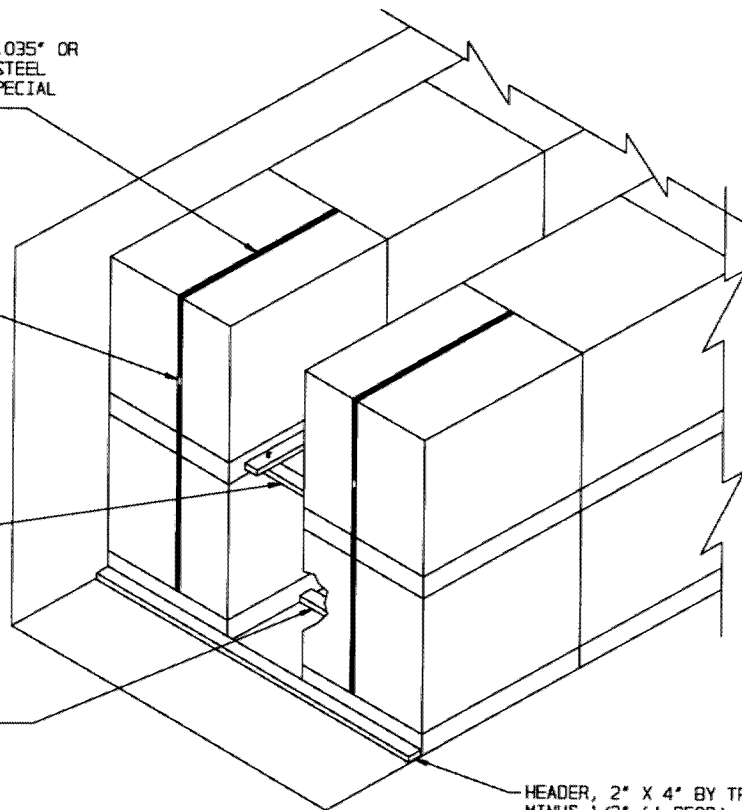
TYPICAL BLOCKING AND BRACING FOR FULL-LENGTH LOAD
OF PALLET UNITS AND/OR SKIDDED UNITS IN A VAN TRAILER

UNITIZING STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT STEEL STRAPPING (2 REQD). SEE SPECIAL NOTE BELOW.

SEAL FOR 1-1/4" STRAPPING (1 REQD PER STRAP). SEE GENERAL NOTE "D" ON PAGE 2.

ANTI-SWAY BRACE B (AS REQD). SEE THE DETAIL ON PAGE 13. SEE GENERAL NOTE "F" ON PAGE 30.

LATERAL BRACING, 2" X 4" BY CUT TO FIT (AS REQD). POSITION TO CENTER ON PALLET UNIT OR SKIDDED UNIT. NAIL TO THE TRAILER FLOOR W/3-10d NAILS. SEE GENERAL NOTE "F" ON PAGE 30.

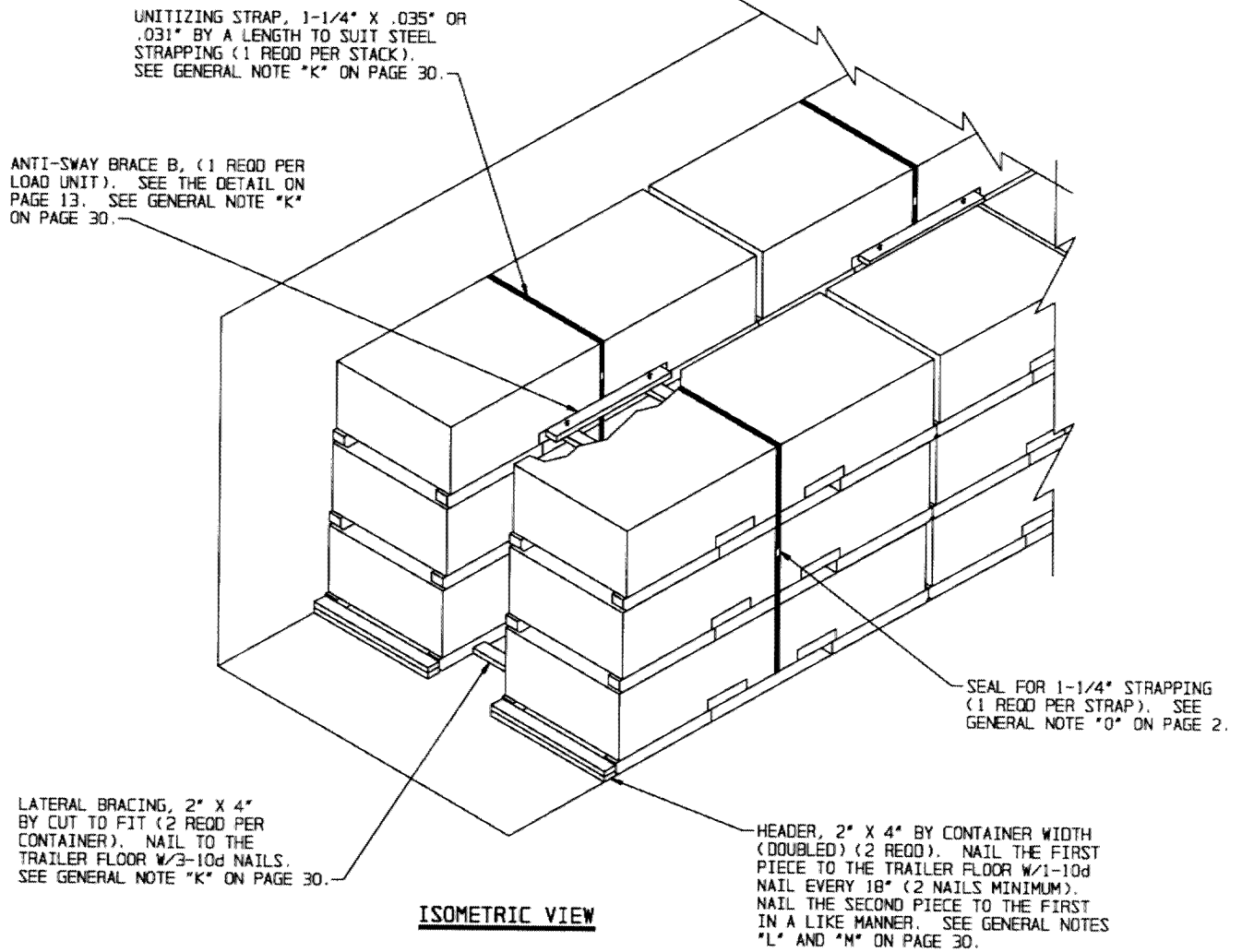


HEADER, 2" X 4" BY TRAILER WIDTH MINUS 1/2" (1 REQD). NAIL TO THE TRAILER FLOOR W/6-10d NAILS. SEE GENERAL NOTES "L" AND "M" ON PAGE 30.

ISOMETRIC VIEW

SPECIAL NOTE:

1. EACH REAR STACK IN EACH ROW MUST BE UNITIZED WITH ONE 1-1/4" STEEL STRAP. ALL STACKS IN FRONT OF THE REAR STACK NEED NOT BE UNITIZED.



SPECIAL NOTE:

1. CONTAINERS WITH A LENGTH GREATER THAN THE WIDTH OF A VAN TRAILER, AS SHOWN ABOVE, SHOULD BE MOVED ON FLATBED TRAILERS TO THE MAXIMUM EXTENT POSSIBLE. IF THEY ARE TO BE LOADED INTO A VAN TRAILER, HOWEVER, THE LOADING INSTALLATION MUST BE CERTAIN THAT THEY CAN BE SAFELY END HANDLED INTO AND OUT OF THE TRAILER. ALSO, ONLY APPROPRIATELY SIZED MATERIALS HANDLING EQUIPMENT WILL BE USED TO INSURE THAT THE CONTAINERS WILL NOT BE DAMAGED DURING HANDLING.

TYPICAL BLOCKING AND BRACING FOR FULL OR PARTIAL-LENGTH LOAD OF CONTAINERS POSITIONED LENGTHWISE IN A VAN TRAILER

UNITIZING STRAP, 1-1/4" X .035" OR .031"
BY A LENGTH TO SUIT STEEL STRAPPING
(1 REQD PER STACK). SEE GENERAL NOTE
"H" ON PAGE 30.

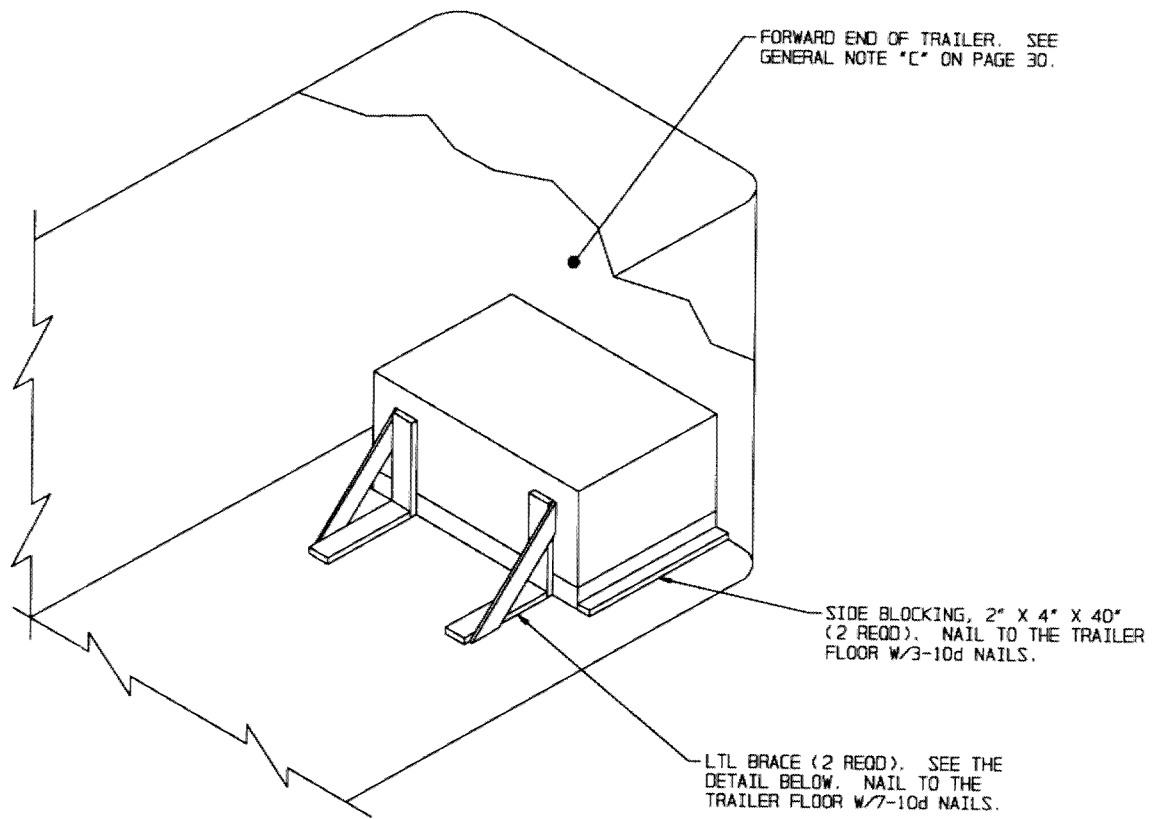
SEAL FOR 1-1/4" STRAPPING
(1 REQD PER STRAP). SEE
GENERAL NOTE "O" ON PAGE 2.

HEADER, 4" X 4" BY TRAILER
WIDTH MINUS 1/2" (2 REQD).

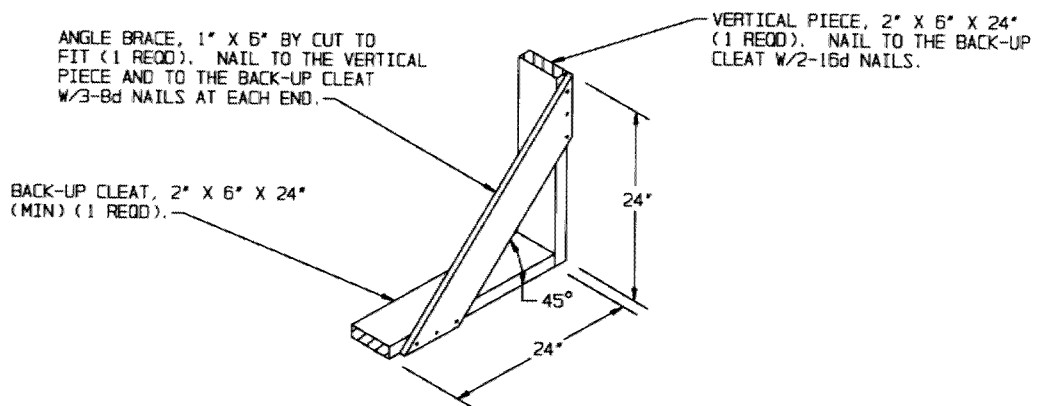
STRUT, 4" X 4" BY CUT TO FIT
(3 REQD). TOENAIL TO THE
HEADERS W/2-16d NAILS AT EACH
END. SEE GENERAL NOTES "L"
AND "M" ON PAGE 30.

ISOMETRIC VIEW

TYPICAL BLOCKING AND BRACING FOR FULL-LENGTH LOAD
OF CONTAINERS POSITIONED CROSSWISE IN A VAN TRAILER



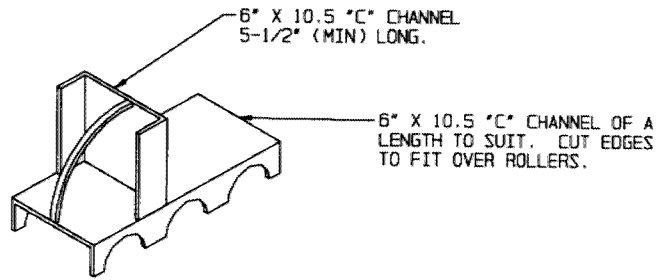
ISOMETRIC VIEW



LTL BRACE

EACH LTL BRACE WILL SUPPORT
3,000 POUNDS OF LOADING.

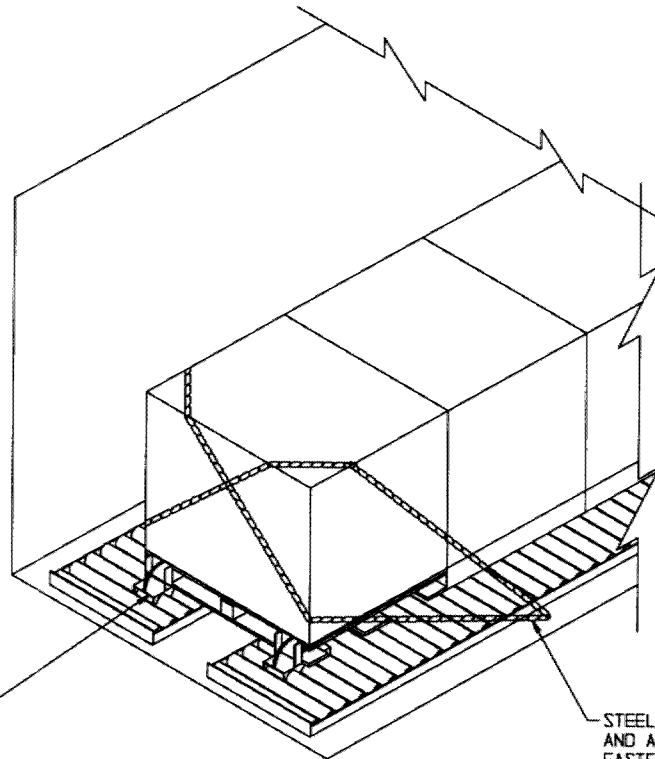
**TYPICAL BLOCKING AND BRACING FOR SMALL QUANTITIES
OF PALLET UNITS OR SKIDDED UNITS IN A VAN TRAILER**



SCOTCH

SPECIAL NOTE:

1. THE BLOCKING METHOD DEPICTED ON THIS PAGE IS CURRENTLY BEING USED BY ANNISTON ARMY DEPOT. THIS METHOD IS CONSIDERED TYPICAL, THEREFORE, OTHER MEANS OF INSURING THAT THE PALLET UNITS OR SKIDDED UNITS DO NOT MOVE REARWARD DURING TRANSPORT ARE ALSO ACCEPTABLE.



SCOTCH (2 REQD). SEE THE
DETAIL ABOVE. HARDWOOD
WEDGES INSERTED BETWEEN
ROLLERS MAY BE USED AS
AN ALTERNATIVE.

STEEL CHAIN. EXTEND OVER
AND AROUND PALLET UNIT AND
FASTEN TO CHAIN AT OTHER SIDE.

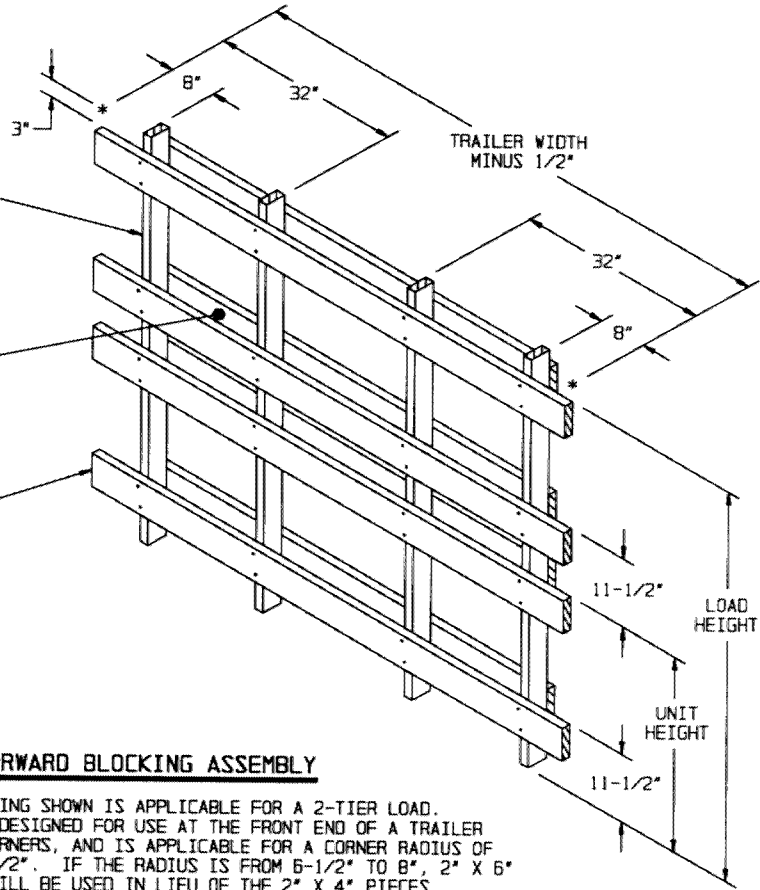
ISOMETRIC VIEW

TYPICAL BLOCKING AND BRACING OF PALLET UNITS AND/OR
SKIDDED UNITS IN A VAN TRAILER EQUIPPED WITH A ROLLER CONVEYOR SYSTEM

VERTICAL PIECE, 2" X 4" BY LOAD HEIGHT PLUS 3" (4 REQD). NOTE THAT FOR LOADS WHICH EXTEND TO A HEIGHT OF LESS THAN 4" FROM THE TRAILER ROOF, THE VERTICAL PIECES MUST BE CUT OFF SUFFICIENTLY TO PROVIDE AT LEAST 1" CLEARANCE.

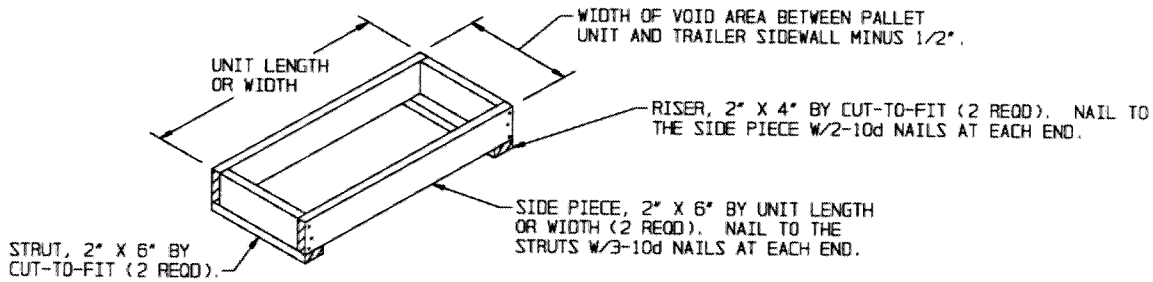
LATERAL PIECE, 2" X 6" BY TRAILER WIDTH MINUS 16-1/2" (2 REQD PER TIER). ALIGN VERTICALLY WITH THE LOAD BEARING PIECES AND NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

LOAD BEARING PIECE, 2" X 6" BY TRAILER WIDTH MINUS 1/2" IN LENGTH (2 REQD PER TIER). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.



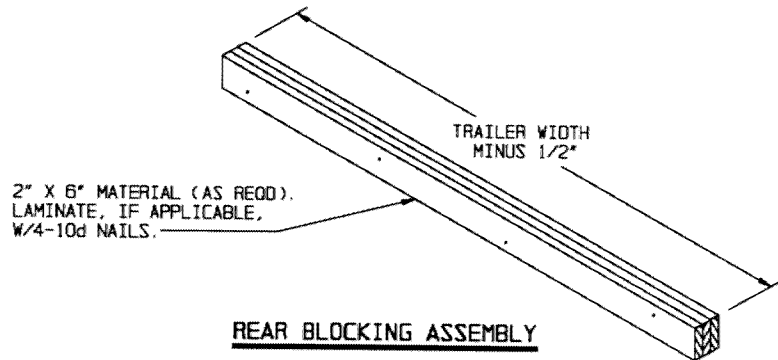
FORWARD BLOCKING ASSEMBLY

THE FORWARD BLOCKING SHOWN IS APPLICABLE FOR A 2-TIER LOAD. THIS ASSEMBLY IS DESIGNED FOR USE AT THE FRONT END OF A TRAILER HAVING ROUNDED CORNERS, AND IS APPLICABLE FOR A CORNER RADIUS OF NOT MORE THAN 6-1/2". IF THE RADIUS IS FROM 6-1/2" TO 8", 2" X 6" VERTICAL PIECES WILL BE USED IN LIEU OF THE 2" X 4" PIECES.



SIDE FILL ASSEMBLY

SEE GENERAL NOTE "H" ON PAGE 30.



REAR BLOCKING ASSEMBLY

SEE GENERAL NOTE "L" ON PAGE 30.

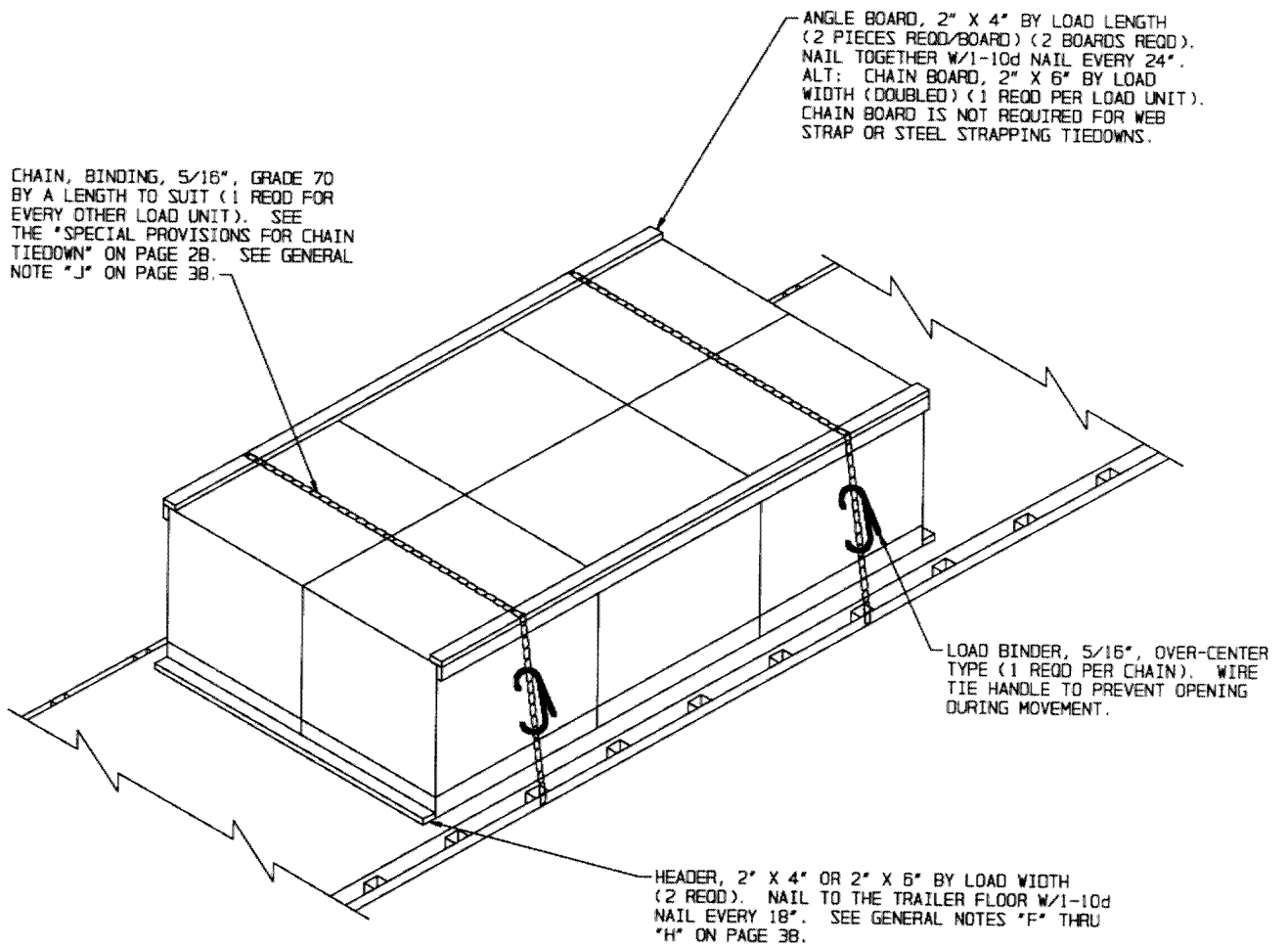
DETAILS

GENERAL NOTES FOR FLATBED TRAILERS

(GENERAL NOTES CONTINUED)

- A. THE UNLOADING PROCEDURES DEPICTED ON PAGES 38 THRU 43 ARE APPLICABLE FOR MOVEMENTS ON FLATBED TRAILERS AND APPLY TO TRAILERS HAVING WOOD, OR WOOD AND METAL FLOORS. TRAILERS HAVING ALL-METAL FLOORS MUST NOT BE USED. TRAILERS WHICH ARE 40'-0" LONG BY 8'-0" WIDE HAVE BEEN SHOWN. HOWEVER, THE PROCEDURES ARE ALSO APPLICABLE FOR TRAILERS WHICH ARE OF OTHER LENGTHS, FROM 28'-0" LONG TO 48'-0" LONG, AND OF OTHER WIDTHS, INCLUDING 8'-6" WIDE. STAKE-BODY TRUCKS AND STAKE-BODY SEMITRAILERS MAY ALSO BE USED, HOWEVER, THE SIDE RACKS MUST NOT BE RELIED UPON TO RESTRAIN AMMUNITION FROM MOVEMENT; THE LADING MUST BE TIED DOWN. STRADDLE-LIFT TRAILERS ARE ALSO ACCEPTABLE FOR USE.
- B. FLATBED TRAILERS SHOULD BE USED FOR THE LOADING OF LONG CONTAINERS AND OTHER LARGE ITEMS. FLATBED TRAILERS MAY ALSO BE USED FOR PALLET UNITS AND SKIDDED UNITS OF AMMUNITION AND EXPLOSIVES.
- C. PALLET UNITS AND SKIDDED UNITS MAY BE LOADED ON A FLATBED TRAILER WITH EITHER DIMENSION ACROSS THE TRAILER. IF PALLET UNITS OR SKIDDED UNITS ARE SO WIDE THAT THEY COVER UP THE STAKE POCKETS ON THE TRAILER, THE UNITS MUST BE LOADED WITH THE OTHER DIMENSION ACROSS THE TRAILER OR IN A 1-WIDE CONFIGURATION.
- D. A SINGLE ROW LOADING PATTERN SHOULD BE POSITIONED DOWN THE CENTER OF THE FLATBED WIDTH. WHEN LOADING PALLET UNITS OR SKIDDED UNITS IN A DOUBLE ROW CONFIGURATION, THE UNITS SHOULD BE LOADED SO THE JOINT BETWEEN THE ROWS IS ON THE CENTER OF THE TRAILER WIDTH.
- E. SIDE BLOCKING SHOULD NOT BE REQUIRED, UNLESS IT IS NECESSARY IN ORDER TO KEEP STRONG POINTS OF LONGITUDINALLY ADJACENT UNITS IN ALIGNMENT.
- F. IF DESIRED, A PERMANENT HEADER MAY BE INSTALLED AT THE FRONT OF THE TRAILER. THIS WILL CONSIST OF A 6" X 8" BY TRAILER WIDTH TIMBER BOLTED TO THE TRAILER FRAME AND/OR FLOOR WITH FIVE 1/2" CARRIAGE BOLTS OF A LENGTH TO SUIT. NOTE THAT A NAILED REAR HEADER WILL ALSO BE REQUIRED. SEE GENERAL NOTE "G" BELOW.
- G. FOR THOSE TRAILERS NOT EQUIPPED WITH A PERMANENTLY INSTALLED HEADER AT THE FRONT, NAILED HEADERS MUST BE INSTALLED AT THE FRONT OF THE LOAD. NAILED HEADERS MUST ALSO BE APPLIED AT THE REAR OF A LOAD. THE HEADERS SHOULD BE THE WIDTH OF THE LADING, OR TRAILER WIDTH, AS REQUIRED. THE HEADERS SHOULD BE OF A NUMBER OF LAYERS AS SPECIFIED BY THE "HEADER REQUIREMENTS" DETAIL ON PAGE 15. THE FIRST THICKNESS OF A HEADER SHOULD BE NAILED TO THE TRAILER FLOOR W/1-10d NAIL EVERY 18", USING NOT LESS THAN TWO NAILS. EACH ADDITIONAL THICKNESS OF A HEADER WILL BE NAILED TO THE FIRST W/1-20d NAIL EVERY 18", AGAIN WITH A MINIMUM OF TWO NAILS.
- H. EXCEPT FOR THOSE CONTAINERS WHICH REQUIRE A TRIPLED HEADER FOR BRACING IN ACCORDANCE WITH THE "HEADER REQUIREMENTS" DETAIL ON PAGE 15, A LAMINATED HEADER ASSEMBLY WITH COMMERCIAL WEB STRAPPING MAY BE USED AT EACH END OF A LOAD IN LIEU OF EITHER A PERMANENTLY INSTALLED HEADER OR THE NAILED HEADERS. SEE THE DETAIL ON PAGE 43 AND THE LOAD VIEW ON PAGE 40.
- J. ALL ITEMS MUST BE SECURED TO THE TRAILER BED. ONE TIEDOWN IS ADEQUATE FOR A LOAD UNIT UNLESS THE CONTAINER IS OVER 8'-0" LONG, THEN TWO TIEDOWNS SHOULD BE USED. THE FOLLOWING TIEDOWN MATERIAL MAY BE USED FOR LOAD SECUREMENT.
1. WEB STRAP TIEDOWN ASSEMBLIES MAY BE USED, ONE FOR EACH 7,000 POUNDS OF LADING. SEE THE "SPECIAL PROVISIONS FOR WEB STRAP TIEDOWN" ON PAGE 29.
 2. STEEL STRAPPING, 1-1/4" X .035" OR .031" MAY BE USED, ONE FOR EACH 7,000 POUNDS OF LADING.
 3. STEEL STRAPPING, 2" X .050" OR .044" MAY BE USED, ONE FOR EACH 15,000 POUNDS OF LADING.
 4. STEEL CHAIN, 5/16" OR LARGER, ALONG WITH APPROPRIATE SIZED LOAD BINDERS, MAY BE USED, ONE FOR EACH 7,000 POUNDS OF LADING. SEE THE "SPECIAL PROVISIONS FOR CHAIN TIEDOWN" ON PAGE 28. LADING MUST BE PROTECTED FROM DAMAGE BY THE CHAIN. DOUBLED 2" X 6" MATERIAL SHOULD BE USED UNDER THE CHAIN FOR PALLET UNITS, SKIDDED UNITS, AND WOODEN CRATES. REJECT RUBBER-LINED FIRE HOSE CAN BE USED UNDER THE CHAIN FOR ROUND OR SQUARE METAL CONTAINERS.

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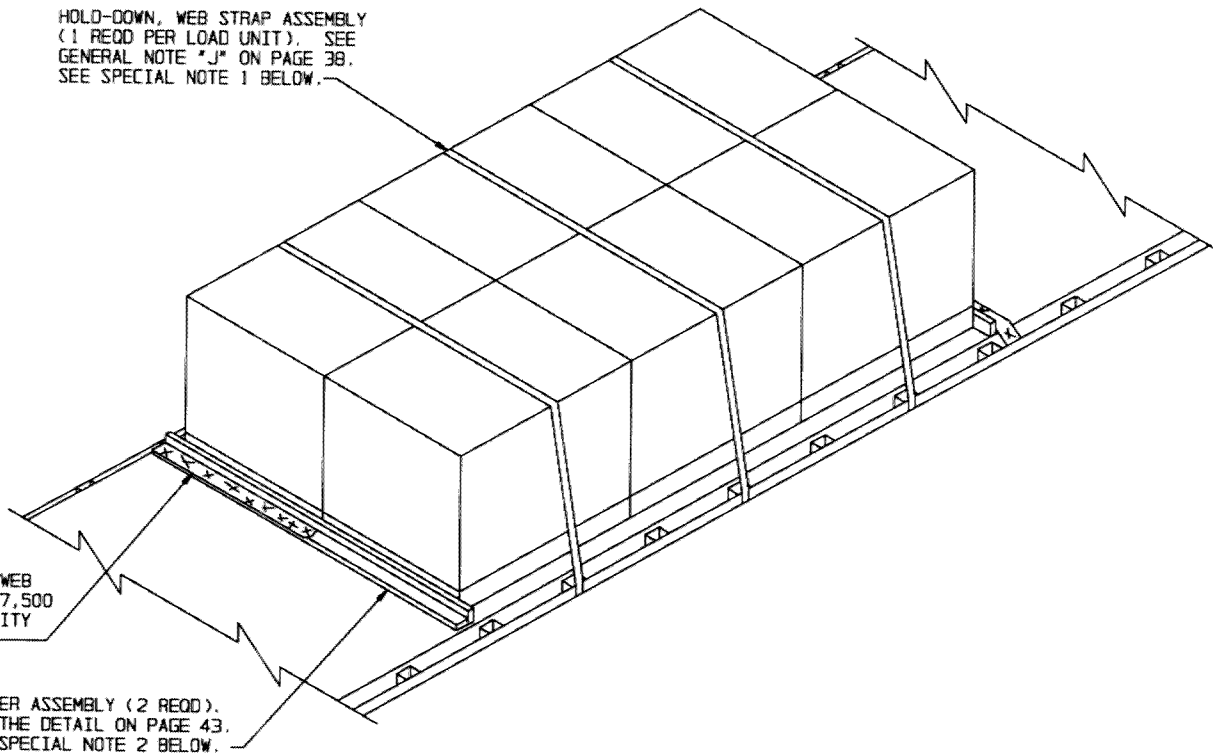
ISOMETRIC VIEW

TYPICAL BLOCKING AND BRACING OF
PALLET UNITS AND/OR SKIDDED UNITS ON A FLATBED TRAILER

HOLD-DOWN, WEB STRAP ASSEMBLY
(1 REQD PER LOAD UNIT). SEE
GENERAL NOTE "J" ON PAGE 39.
SEE SPECIAL NOTE 1 BELOW.

COMMERCIAL WEB
STRAPPING, 7,500
POUND CAPACITY
(2 REQD).

HEADER ASSEMBLY (2 REQD).
SEE THE DETAIL ON PAGE 43.
SEE SPECIAL NOTE 2 BELOW.



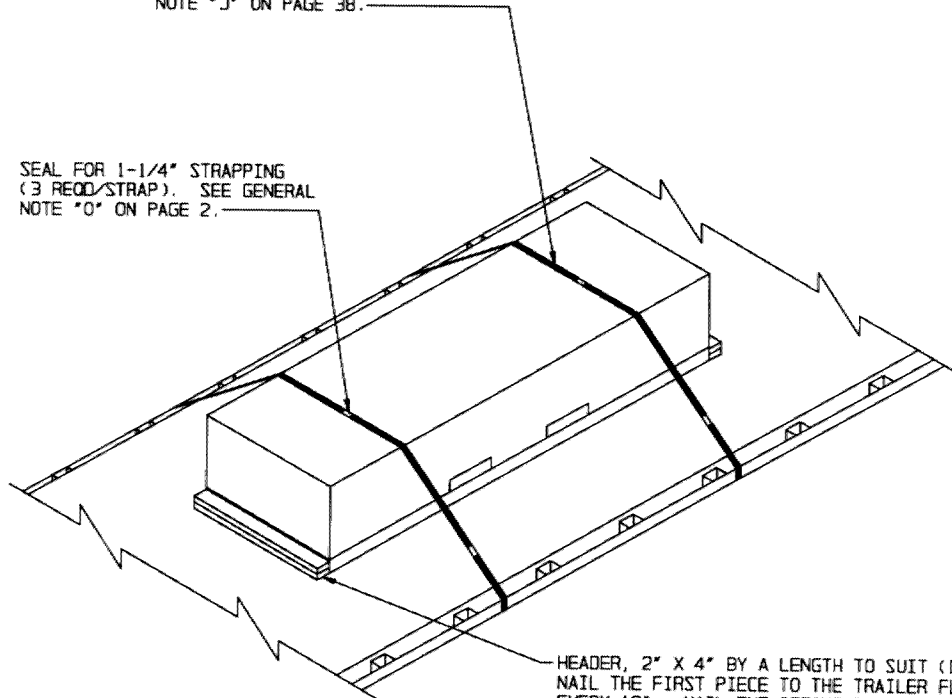
ISOMETRIC VIEW

SPECIAL NOTES:

1. IF STAKE POCKETS DO NOT ALIGN PROPERLY WITH THE PALLET UNITS OF SKIDDED UNITS, AN ANGLE BOARD MAY BE EMPLOYED. SEE PAGE 39 FOR GUIDANCE. THE USE OF AN ANGLE BOARD WILL ALSO ALLOW A REDUCTION IN THE NUMBER OF HOLD-DOWNS.
2. IF GOVERNMENT ISSUED WEB STRAP TIEDOWN ASSEMBLIES SUCH AS ARE USED FOR SECUREMENT OF LOADS ON TACTICAL TYPE VEHICLES ARE TO BE USED, THE HEADER ASSEMBLY MAY NOT BE REQUIRED. INSTALL THE WEB STRAP TIEDOWN ASSEMBLIES TO EXTEND OVER THE BOTTOM DECK BOARDS OF PALLETS, OR OVER THE ENDS OF SKIDS ON CONTAINERS HAVING PROTRUDING SKIDS. HEADER ASSEMBLIES WILL NEED TO BE USED IF WEB STRAP TIEDOWN ASSEMBLIES CANNOT BE PROPERLY INSTALLED TO PROVIDE FOR LONGITUDINAL LOAD RETENTION.

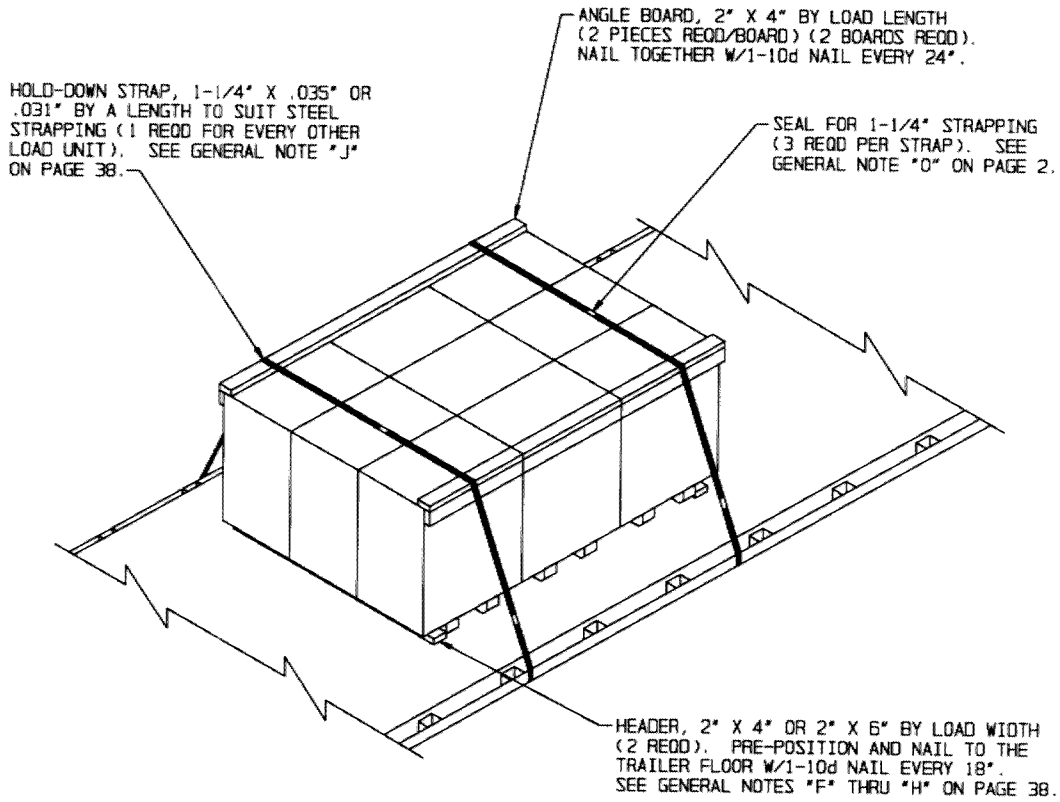
HOLD-DOWN STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT STEEL STRAPPING (2 REOD PER CONTAINER OVER 8'-0" LONG, 1 REOD FOR A CONTAINER 8'-0" LONG OR LESS). SEE GENERAL NOTE "J" ON PAGE 38.

SEAL FOR 1-1/4" STRAPPING (3 REOD/STRAP). SEE GENERAL NOTE "O" ON PAGE 2.



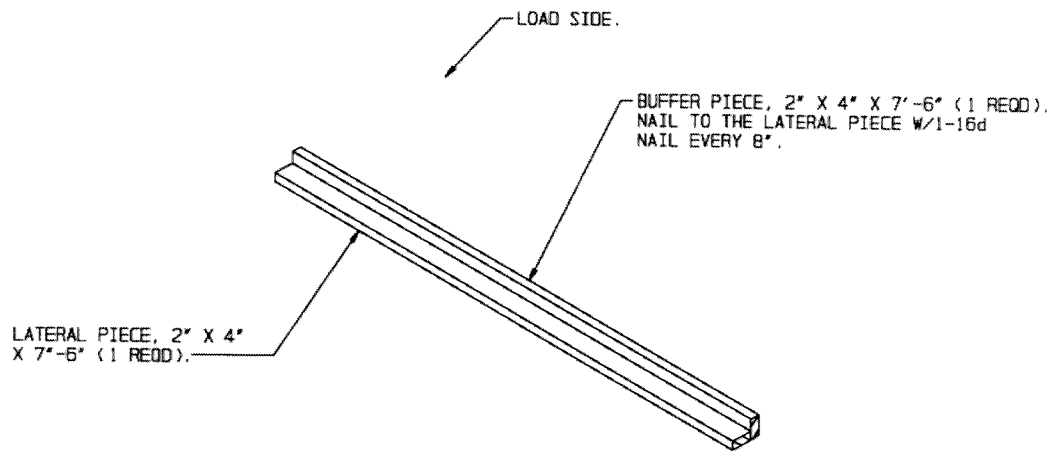
HEADER, 2" X 4" BY A LENGTH TO SUIT (DOUBLED) (2 REOD). NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/1-10d NAIL EVERY 18". NAIL THE SECOND PIECE TO THE FIRST W/1-20d NAIL EVERY 18". SEE GENERAL NOTES "F" THRU "H" ON PAGE 38.

ISOMETRIC VIEW

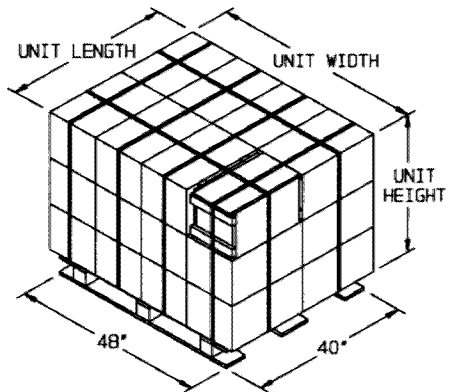


ISOMETRIC VIEW

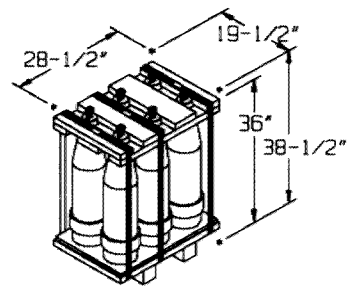
TYPICAL BLOCKING AND BRACING OF SEPARATE
LOADING PROJECTILES ON A FLATBED TRAILER



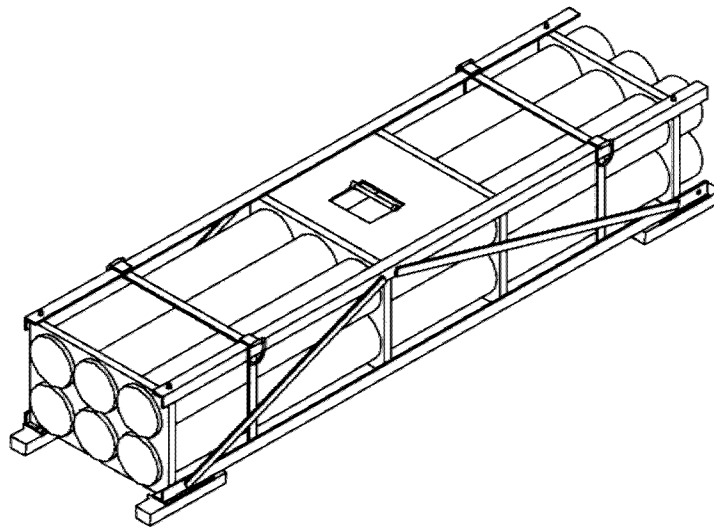
HEADER ASSEMBLY



TYPICAL PALLET UNIT
 (40" X 48" PALLET)



TYPICAL SEPARATE LOADING PROJECTILE PALLET
 (8" SLP, 6 PER SMALL PALLET)



TYPICAL LARGE MISSILE CONTAINER
 (ATACMS MISSILE/LAUNCH POD ASSEMBLY)