

APPROVED BY  
 BUREAU OF EXPLOSIVES  
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# LOADING AND BRACING (TL & LTL) IN CLOSED OR OPEN TOP VAN TRAILERS OF 40MM CARTRIDGES PACKED 192 PER PA105 4-WAY ENTRY METAL SHIPPING AND STORAGE CONTAINER, UNITIZED TWO CONTAINERS PER UNIT LOAD

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THIS DOCUMENT INCLUDES OUTLOADING PROCEDURES FOR CONVENTIONAL TYPE TRAILERS AND FOR TRAILERS EQUIPPED WITH MECHANICAL BRACING DEVICES AS APPROVED BY THE BUREAU OF EXPLOSIVES, ASSOCIATION OF AMERICAN RAILROADS. CAUTION: PROCEDURES SHOWN HEREIN, FOR BOTH TYPES OF TRAILERS, ARE ONLY APPLICABLE FOR HIGH-WAY MOVEMENTS, NOT FOR CONTAINER/TRAILER-ON-FLAT-CAR MOVEMENTS.

**DO NOT SCALE**

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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. THE OUTLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE FOR THE PA105 METAL SHIPPING AND STORAGE CONTAINER UNITIZED TWO CONTAINERS PER UNIT LOAD. SEE THE PICTORIAL VIEW ON PAGE 3 FOR SIZE AND WEIGHT. REFER TO U.S. ARMY AMC DRAWING 19-48-4186-20PMT005 FOR UNITIZATION PROCEDURES FOR THE PA105 CONTAINERS.
- C. THE OUTLOADING PROCEDURES DEPICTED WITHIN THIS DOCUMENT ARE APPLICABLE FOR SHIPMENTS IN CONVENTIONAL TYPE VAN TRAILERS, AND FOR SHIPMENTS IN VAN TRAILERS EQUIPPED WITH VARIOUS TYPES OF SELF-CONTAINED MECHANICAL BRACING DEVICES (CROSS MEMBERS AND WALL MEMBERS) AND APPLY TO TRAILERS HAVING WOOD, OR WOOD AND METAL OR ALL METAL FLOORS. VAN TRAILERS WHICH ARE 40'-0" LONG BY 7'-6" WIDE (IN-SIDE DIMENSION) HAVE BEEN SHOWN. HOWEVER, THE PROCEDURES ARE ALSO APPLICABLE FOR TRAILERS WHICH ARE EIGHTY-NINE INCHES (89") THRU NINETY-NINE INCHES (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 (CONFIGURATION WISE AND STRENGTH WISE) FOR LOADS IN SHORTER OR LONGER VANS AND IN NARROWER OR WIDER VANS THAN SHOWN. THE SPECIFIED BRACING IS ADEQUATE FOR LOADS WEIGHING UP TO AND INCLUDING THE MAXIMUM WEIGHTS PERMITTED BY LAW.
- D. THE OUTLOADING PROCEDURES DEPICTED WITHIN THIS DOCUMENT FOR TRAILERS EQUIPPED WITH VARIOUS TYPES OF SELF-CONTAINED MECHANICAL BRACING DEVICES ARE LIMITED TO HIGHWAY MOVEMENTS ONLY. THE HEIGHT REQUIREMENTS SPECIFIED WITHIN THIS DRAWING FOR THE INSTALLATION OF CROSS MEMBERS ARE IDENTICAL WITH THOSE RECOMMENDED BY THE BUREAU OF EXPLOSIVES PAMPHLET 6C, AND APPENDICES THERETO. CAUTION: TRAILERS EQUIPPED WITH WALL MEMBERS WHICH DO NOT MEET THE LOCATION REQUIREMENTS MUST NOT BE USED.
1. PALLET UNITS SHOULD BE LOADED TIGHTLY AGAINST EACH OTHER AND/OR AGAINST INSTALLED CROSS MEMBERS. VOIDS LENGTHWISE WITHIN A LOAD SHOULD BE MINIMUM. CROSS MEMBERS MUST BE PLACED AGAINST THE LADING AS TIGHTLY AS THE WALL MEMBER LOCKING HOLE SPACING PERMITS. EACH CROSS MEMBER WILL BE INSTALLED WITH EACH END ATTACHED AS NEARLY AS POSSIBLE IN A "MATED" POSITION (AT EQUAL HEIGHTS, AND AT EQUAL DISTANCES FROM THE END OF THE TRAILER).
  2. CROSS MEMBERS IN EMPTY TRAILERS AND THOSE UNUSED IN LOADED TRAILERS MUST BE "SECURED" FOR SHIPMENT. COMPONENTS ASSIGNED TO EACH TRAILER MUST REMAIN THEREWITH EVEN THOUGH UNUSED DURING SOME SHIPMENTS.
  3. ONE (1) CROSS MEMBER WILL BE REQUIRED FOR EACH 10,000 POUNDS OF LADING, AND SHOULD NOT BE RELIED UPON TO RETAIN A GREATER WEIGHT. CROSS MEMBERS WILL NOT BE DOUBLED; THAT IS, TWO CROSS MEMBERS AT THE SAME HEIGHT LOCATION WILL NOT BE PLACED SIDE BY SIDE.
- E. SELECTION OF A VEHICLE TO BE USED TO TRANSPORT THE DESIGNATED ITEM MUST COMPLY WITH AR 55-355, CHAPTER 213, FOR EXPLOSIVES AND OTHER DANGEROUS ARTICLES, IN FULL.
- F. THE GROSS WEIGHT AND AXLE DISTRIBUTION OF WEIGHT FOR A LOAD WILL BE THE RESPONSIBILITY OF THE CARRIER. THE CARRIER WILL ADVISE THE SHIPPER OF THE APPLICABLE LOADING REQUIREMENTS, AND THE SHIPPER WILL LOAD ACCORDINGLY. THE TOTAL WEIGHT OF THE LADING, OF THE DUNNAGE, OF THE TRACTOR AND OF THE SEMI-TRAILER CARRYING THE LADING MUST NOT EXCEED THE MAXIMUM GROSS WEIGHT ALLOWED FOR THE STATE OR STATES THRU WHICH THE LOAD IS TO BE TRANSPORTED BY MOTOR CARRIER. LIKEWISE, THE GROSS WEIGHT ON A SINGLE OR TANDEM AXLE MUST NOT EXCEED THE MAXIMUM ALLOWABLE WEIGHT. IF THERE IS ANY DOUBT AS TO WHETHER THE TOTAL GROSS WEIGHT OR AXLE WEIGHT EXCEEDS THE MAXIMUM ALLOWED, WEIGHT SHOULD BE VERIFIED BY ACTUALLY WEIGHING THE LOADED VEHICLE.
- G. NOTICE: A SHIPMENT WILL BE POSITIONED IN THE TRAILER CONSISTENT WITH STATE WEIGHT LAWS. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE TRAILER TO BE LOADED OR THE QUANTITY TO BE SHIPPED. COMBINATIONS OF THE OUTLOADING PROCEDURES SPECIFIED MAY BE USED; HOWEVER, THE APPROVED METHODS SHOWN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING, AND STAYING OF THE DESIGNATED ITEMS.

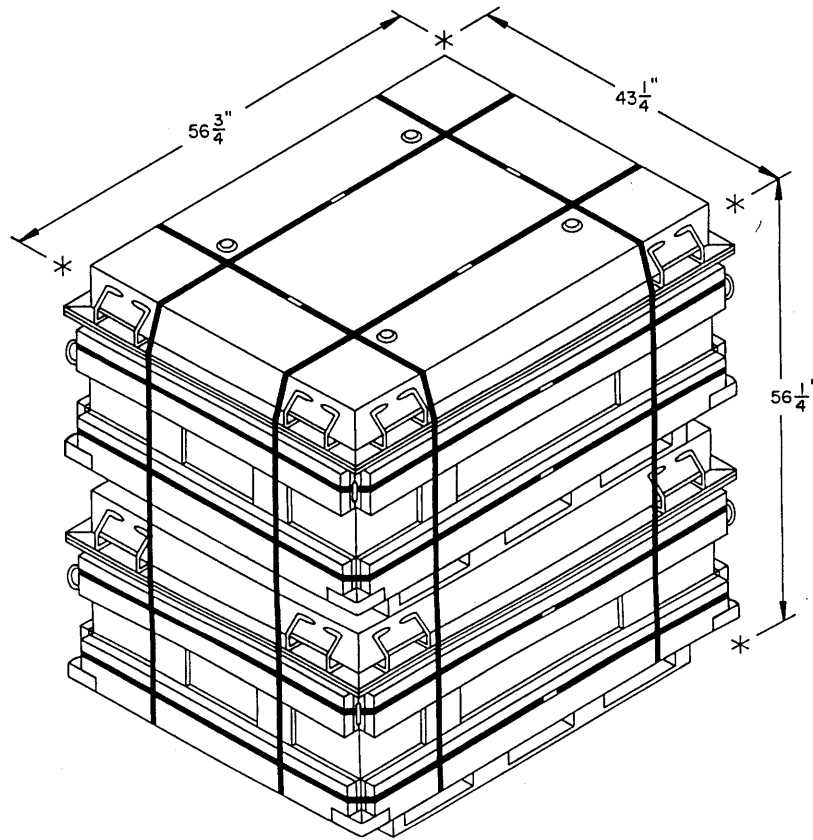
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## MATERIAL SPECIFICATIONS

- LUMBER -----: SEE TM 743-200-1, DUNNAGE LUMBER, FED SPEC MM-L-751.
- NAILS -----: COMMON, FED SPEC FF-N-105.
- STRAPPING STEEL --: CLASS I, TYPE I OR IV, HEAVY DUTY, FINISH A, B (GRADE 2), C; FED SPEC QQ-5-781.
- SEAL, STRAP -----: TYPE D, STYLE I, II, OR IV, CLASS H, FINISH B (GRADE 2); FED SPEC QQ-5-781.
- WIRE -----: FED SPEC QQ-W-461.
- TYGARD -----: POLYESTER YARN, 1,100 POUNDS 1 INCH OF WIDTH STRENGTH.
- ADHESIVE -----: TYGARD ADHESIVE.

## (GENERAL NOTES CONTINUED)

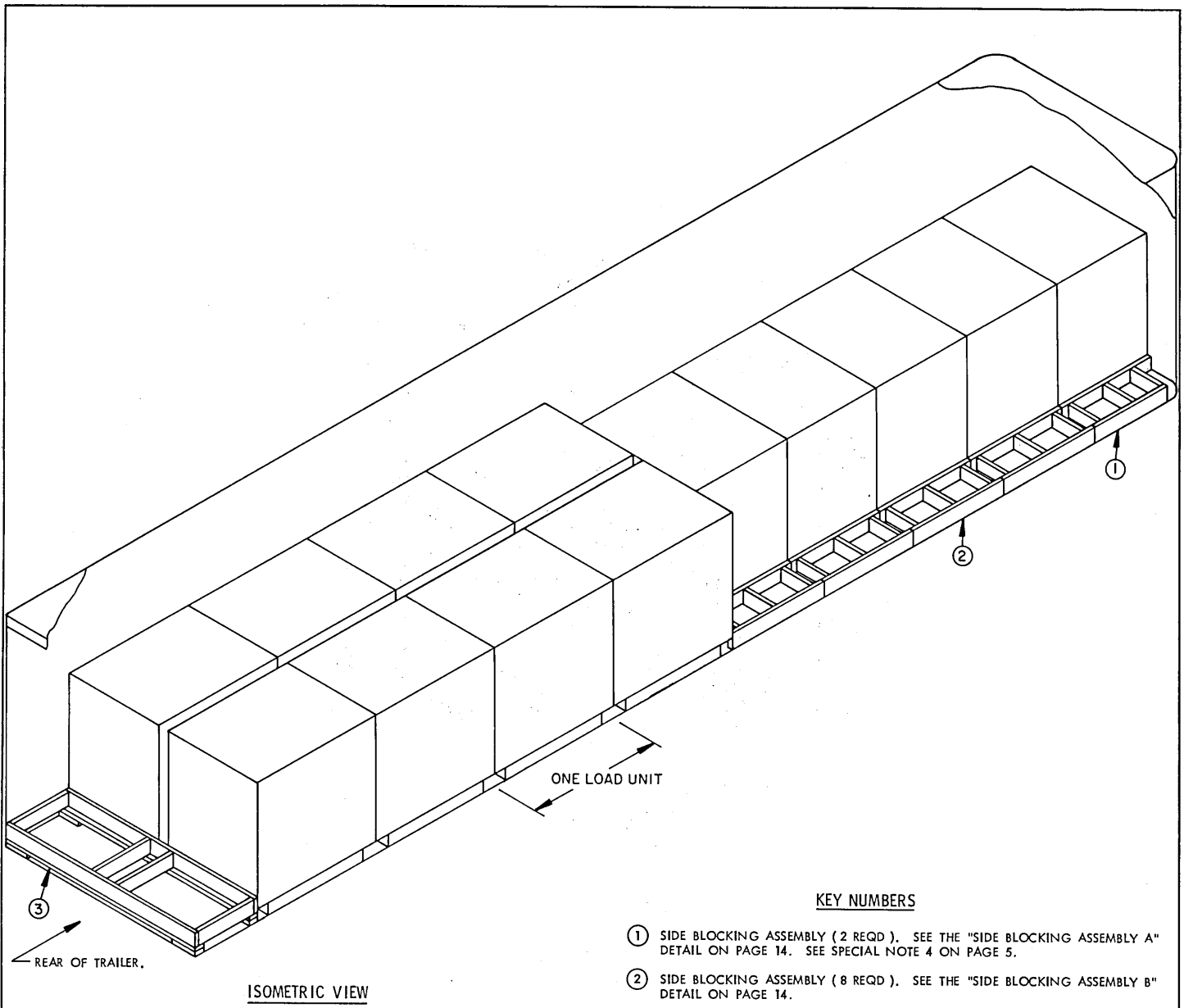
- H. THE "LOAD AS SHOWN" FOR MOST OF THE FULL LOADS DEPICTED HEREIN IS BASED ON AN APPROXIMATE LADING WEIGHT OF 42,000 POUNDS. THE SPECIFIED BLOCKING AND BRACING FOR THE FULL LOADS IS ADEQUATE FOR THE RETENTION OF HEAVIER LOADS, IF IT IS DESIRED TO INCREASE THE LADING WEIGHT.
- J. OTHER TYPES OF LADING ITEMS MAY BE LOADED INTO TRAILERS WHICH ARE PARTIALLY LOADED WITH PALLET UNITS OF 40MM CARTRIDGES, PROVIDING THE TOTAL LOAD IS COMPATIBLE, EXISTING DIRECTIVES ARE NOT VIOLATED, AND THE OTHER LADING ITEMS ARE BLOCKED AND BRACED TO EQUAL THE BLOCKING AND BRACING CRITERIA SPECIFIED HEREIN.
- K. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF TWO (2) SEALS, BUTTED TOGETHER, WITH TWO (2) PAIRS OF CRIMPS PER SEAL, MUST BE USED TO SEAL THE JOINT.
- L. DUNNAGE 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.
- 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 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. 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 TRAILER LOADS SHOWN THROUGHOUT THIS DRAWING. 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. PORTIONS OF THE TRAILERS, SUCH AS SIDEWALLS, END WALLS, AND ROOFS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- P. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.
- Q. 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.



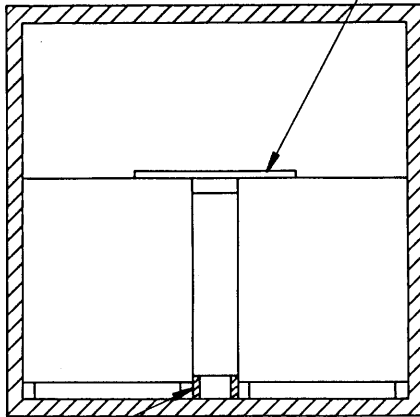
PALLET UNIT

2 CONTAINERS OF 40MM CARTRIDGES ( 192 PER CONTAINER ) @ 1,500 LBS --- 3,000 LBS ( APPROX )  
 DUNNAGE ----- 203 LBS

TOTAL WEIGHT----- 3,203 LBS ( APPROX )  
 CUBE ----- 79.9 CU FT ( APPROX )



TOP-OF-LOAD ANTI-SWAY BRACE. INSTALL BETWEEN ALL LATERALLY ADJACENT PALLET UNITS.



ANTI-SWAY BRACE. INSTALL BETWEEN ALL LATERALLY ADJACENT PALLET UNITS.

TYPICAL SECTION VIEW OF 8'-2" WIDE VAN

SPECIAL NOTES:

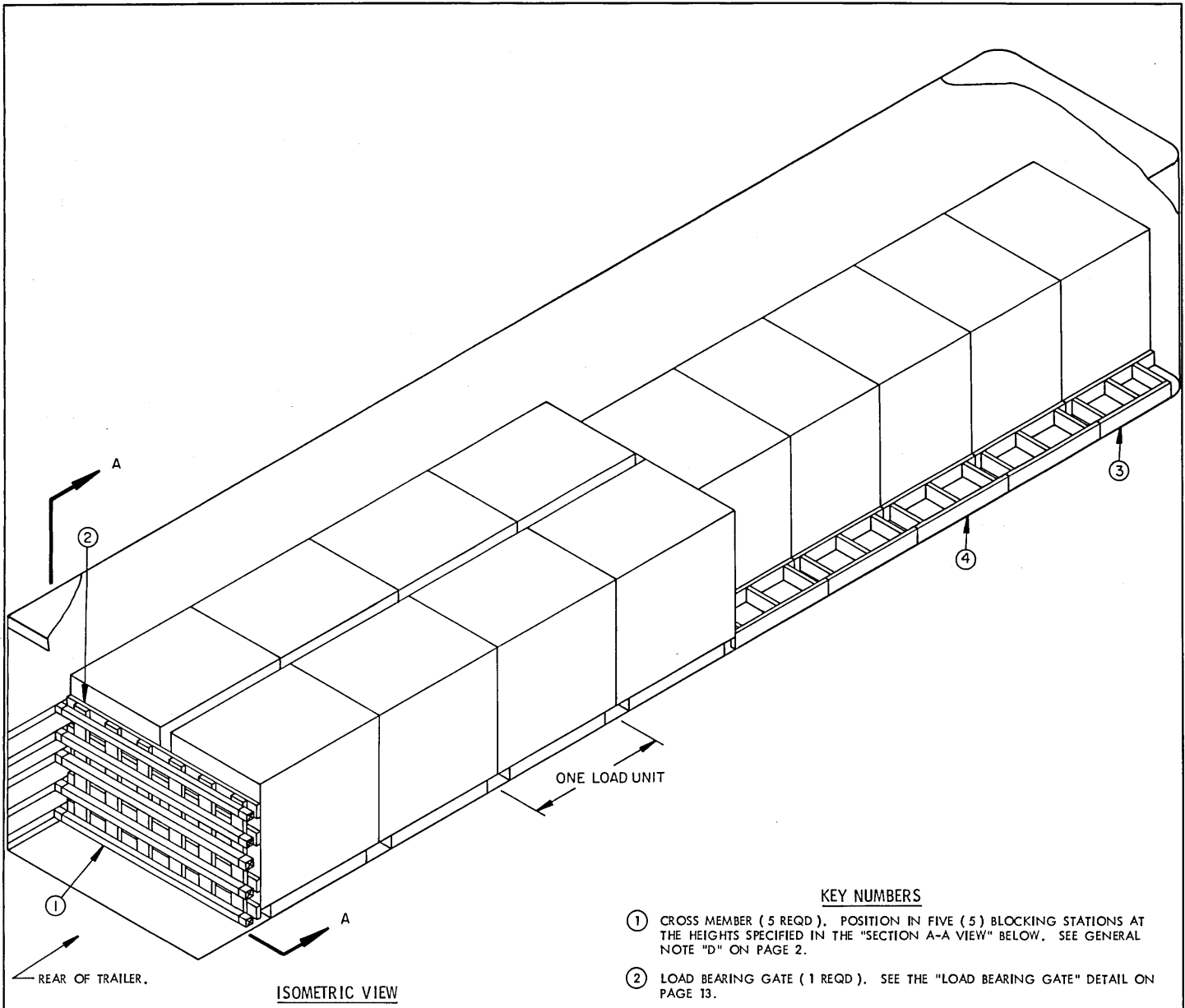
1. A 13-UNIT LOAD IS SHOWN IN A 40'-0" LONG BY 7'-7" WIDE (INSIDE DIMENSION) CONVENTIONAL TYPE VAN TRAILER. A WIDER OR NARROWER TRAILER MAY BE USED. SEE SPECIAL NOTE 2.
2. IF A TRAILER WHICH IS WIDER THAN 7'-9" IS FURNISHED FOR LOADING, ANTI-SWAY BRACES AND TOP-OF-LOAD ANTI-SWAY BRACES, AS DETAILED ON PAGE 13, MUST BE INSTALLED BETWEEN THE UNITS IN THE TWO-WIDE PORTION OF THE LOAD. SEE THE "TYPICAL SECTION VIEW OF 8'-2" WIDE VAN" AT LEFT FOR PROPER BLOCKING AND BRACING FOR WIDER THAN 7'-9" TRAILERS.
3. IF THE DISTANCE BETWEEN THE PALLET UNIT AT THE REAR OF THE TRAILER AND THE DOOR MEASURES 1-1/2" OR LESS, REAR BLOCKING IS NOT REQUIRED. IF THE VOID AT THE REAR OF THE LOAD IS GREATER THAN 1-1/2" BUT LESS THAN 9", USE "REAR BLOCKING ASSEMBLY B" AS DETAILED ON PAGE 12. IF THE VOID AT THE REAR OF THE LOAD IS 9" OR GREATER, USE THE "REAR BLOCKING ASSEMBLY A", PIECE MARKED ③ ON PAGE 4. SEE SPECIAL NOTE 5.
4. A TRAILER WITH ROUNDED CORNERS AT THE FORWARD END IS SHOWN IN THE LOAD VIEW. IF THE TRAILER BEING USED HAS SQUARE CORNERS, THE SIDE BLOCKING ASSEMBLY CLOSEST TO THE FORWARD END, "SIDE BLOCKING ASSEMBLY A", PIECE MARKED ①, MUST BE REPLACED WITH "SIDE BLOCKING ASSEMBLY B", PIECE MARKED ②.
5. TRAILERS EQUIPPED WITH ROLL-UP TYPE DOORS MAY BE USED; HOWEVER, SPECIAL REAR BLOCKING MUST BE INSTALLED IN CONVENTIONAL VAN TRAILERS. SEE THE "PROCEDURES FOR CONVENTIONAL VAN TRAILERS EQUIPPED WITH ROLL-UP TYPE DOORS" DETAIL ON PAGES 16 AND 17 FOR GUIDANCE. THE NAILED-HEADER METHOD IS SHOWN ON PAGE 15 AND THE TYGARD METHOD IS SHOWN ON PAGE 16. THE SPECIAL REAR BLOCKING FOR TRAILERS EQUIPPED WITH ROLL-UP TYPE DOORS MAY ALSO BE USED IN TRAILERS EQUIPPED WITH HINGED DOORS.

**BILL OF MATERIAL**

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	18.08	12.06
2" X 6"	131.77	131.77
NAILS	NO. REQD	POUNDS
10d (3")	226	3.48

LOAD AS SHOWN

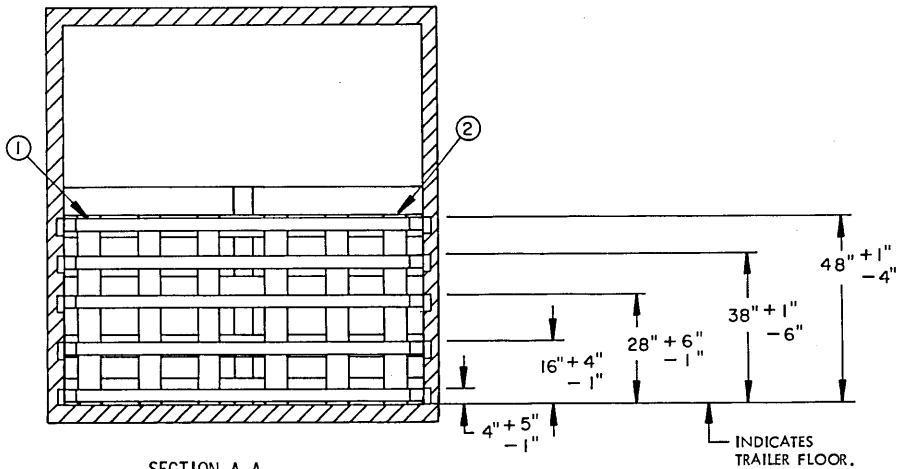
ITEM	QUANTITY	WEIGHT ( APPROX )
PALLET UNIT-----	13 -----	41,639 LBS
DUNNAGE-----	-----	292 LBS
TOTAL WEIGHT -----		41,931 LBS



ISOMETRIC VIEW

KEY NUMBERS

- ① CROSS MEMBER (5 REQD). POSITION IN FIVE (5) BLOCKING STATIONS AT THE HEIGHTS SPECIFIED IN THE "SECTION A-A VIEW" BELOW. SEE GENERAL NOTE "D" ON PAGE 2.
- ② LOAD BEARING GATE (1 REQD). SEE THE "LOAD BEARING GATE" DETAIL ON PAGE 13.
- ③ SIDE BLOCKING ASSEMBLY (2 REQD). SEE THE "SIDE BLOCKING ASSEMBLY A" DETAIL ON PAGE 14. SEE SPECIAL NOTE 3 ON PAGE 7.
- ④ SIDE BLOCKING ASSEMBLY (8 REQD). SEE THE "SIDE BLOCKING ASSEMBLY B" DETAIL ON PAGE 14. SEE SPECIAL NOTE 3 ON PAGE 7.



SPECIAL NOTES:

1. A 13-UNIT LOAD IS SHOWN IN A 40'-0" LONG BY 7'-7" WIDE ( INSIDE DIMENSION ) VAN TRAILER EQUIPPED WITH MECHANICAL BRACING DEVICES. TRAILERS OF OTHER DIMENSIONS MAY BE USED. SEE SPECIAL NOTE 2.
2. IF A TRAILER WHICH IS WIDER THAN 7'-9" IS FURNISHED FOR LOADING, "ANTI-SWAY BRACES" AND "TOP-OF-LOAD ANTI-SWAY BRACES", AS DETAILED ON PAGE 13, MUST BE INSTALLED BETWEEN THE UNITS IN THE TWO-WIDE PORTION OF THE LOAD. SEE THE "TYPICAL SECTION VIEW OF 8'-2" WIDE VAN" ON PAGE 5 FOR PROPER BLOCKING AND BRACING FOR WIDER THAN 7'-9" TRAILERS.
3. A TRAILER WITH ROUNDED CORNERS AT THE FORWARD END IS SHOWN IN THE LOAD VIEW. IF THE TRAILER BEING USED HAS SQUARE CORNERS, THE SIDE BLOCKING ASSEMBLY CLOSEST TO THE FORWARD END, "SIDE BLOCKING ASSEMBLY A", PIECE MARKED ③, MUST BE REPLACED WITH "SIDE BLOCKING ASSEMBLY B", PIECE MARKED ④.

**BILL OF MATERIAL**

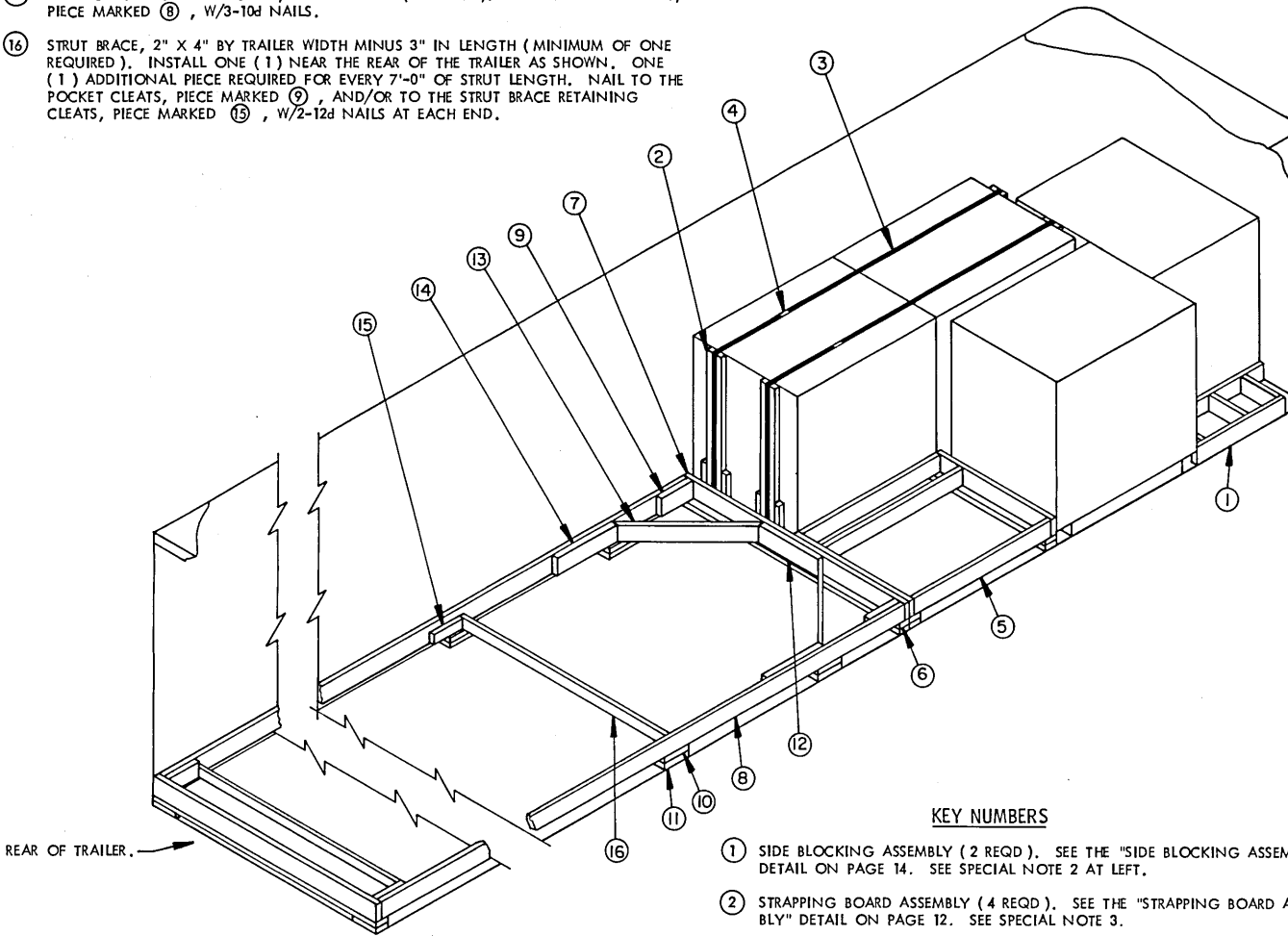
LUMBER	LINEAR FEET	BOARD FEET
2" X 6"	160.10	160.10
NAILS	NO. REQD	POUNDS
10d (3")	252	3.88
CROSS MEMBER -----		5 REQD

LOAD AS SHOWN

<u>ITEM</u>	<u>QUANTITY</u>	<u>WEIGHT ( APPROX )</u>
PALLET UNIT-----	13-----	41,639 LBS
DUNNAGE -----		325 LBS
TOTAL WEIGHT -----		41,964 LBS

( KEY NUMBERS CONTINUED )

- 15 STRUT BRACE RETAINING CLEAT, 2" X 4" X 12" ( AS REQD ). NAIL TO A SIDE STRUT, PIECE MARKED 8 , W/3-10d NAILS.
- 16 STRUT BRACE, 2" X 4" BY TRAILER WIDTH MINUS 3" IN LENGTH ( MINIMUM OF ONE REQUIRED ). INSTALL ONE ( 1 ) NEAR THE REAR OF THE TRAILER AS SHOWN. ONE ( 1 ) ADDITIONAL PIECE REQUIRED FOR EVERY 7'-0" OF STRUT LENGTH. NAIL TO THE POCKET CLEATS, PIECE MARKED 9 , AND/OR TO THE STRUT BRACE RETAINING CLEATS, PIECE MARKED 15 , W/2-12d NAILS AT EACH END.



ISOMETRIC VIEW

KEY NUMBERS

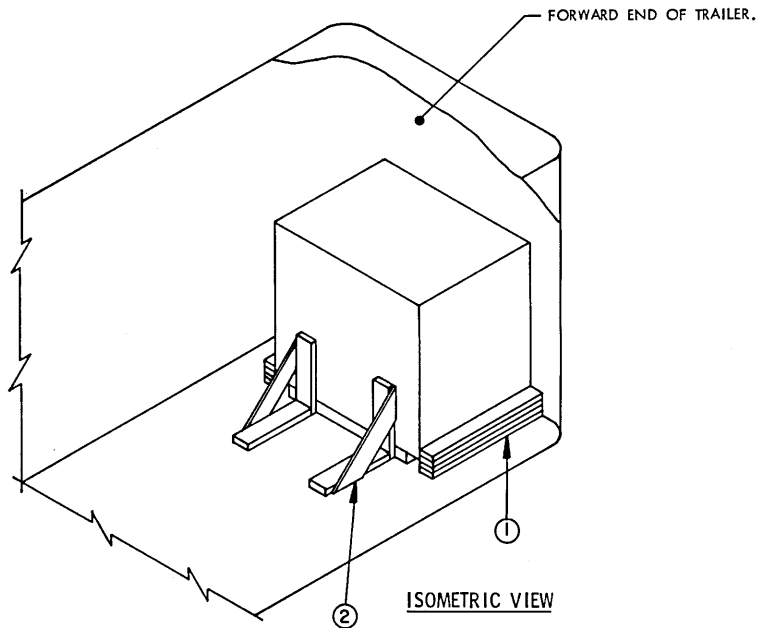
- 1 SIDE BLOCKING ASSEMBLY ( 2 REQD ). SEE THE "SIDE BLOCKING ASSEMBLY A" DETAIL ON PAGE 14. SEE SPECIAL NOTE 2 AT LEFT.
- 2 STRAPPING BOARD ASSEMBLY ( 4 REQD ). SEE THE "STRAPPING BOARD ASSEMBLY" DETAIL ON PAGE 12. SEE SPECIAL NOTE 3.
- 3 BUNDLING STRAP, 1-1/4" X .035" OR .031" X 29'-2" LONG STEEL STRAPPING ( 2 REQD ). INSTALL SO AS TO ENCIRCLE TWO ( 2 ) PALLET UNITS AS SHOWN.
- 4 SEAL FOR 1-1/4" STRAPPING ( 4 REQD, 2 PER STRAP ). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "K" ON PAGE 2.
- 5 SPACER ASSEMBLY ( 1 REQD ). SEE THE "SPACER ASSEMBLY A" DETAIL ON PAGE 14. NAIL TO A HEADER, PIECE MARKED 7 , W/2-10d NAILS. SEE GENERAL NOTES "M" AND "N" ON PAGE 2.
- 6 RISER, 2" X 4" BY TRAILER WIDTH MINUS 1/2" IN LENGTH ( 2 REQD ). NAIL TO THE HEADER, PIECE MARKED 7 , W/1-10d NAIL EVERY 12".
- 7 HEADER, 2" X 6" BY TRAILER WIDTH MINUS 1/2" IN LENGTH ( 2 REQD ).
- 8 SIDE STRUT, 2" X 6" BY CUT-TO-FIT BETWEEN THE FORWARD AND REAR HEADERS, PIECE MARKED 7 ( 2 REQD ). SEE SPECIAL NOTES 4 AND 5.
- 9 POCKET CLEAT, 2" X 6" X 12" ( 4 REQD ). NAIL TO A SIDE STRUT, PIECE MARKED 8 , W/3-10d NAILS. TOENAIL TO THE ADJACENT HEADER, PIECE MARKED 7 , W/3-12d NAILS.
- 10 FILLER PIECE, 2" X 4" X 9" ( AS REQD ). POSITION SO AS TO BE CENTERED UNDER THE JOINT OF THE DIAGONAL BRACE AND THE BACK-UP CLEAT, PIECES MARKED 13 AND 14 , AND/OR UNDER THE JOINT OF THE STRUT BRACE AND THE STRUT BRACE RETAINING CLEAT, PIECES MARKED 15 AND 16 . NAIL TO A SIDE STRUT, PIECE MARKED 8 , W/2-10d NAILS.
- 11 RISER, 2" X 4" X 9" ( AS REQD ). POSITION UNDER FILLER PIECE, PIECE MARKED 10 NAIL TO A FILLER PIECE, PIECE MARKED 10 , W/2-10d NAILS.
- 12 CENTER CLEAT, 2" X 6" X 24" ( 1 REQD ). NAIL TO A HEADER, PIECE MARKED 7 , W/6-10d NAILS.
- 13 DIAGONAL BRACE, 2" X 6" BY CUT-TO-FIT ( 2 REQD ). DOUBLE BEVEL EACH END WITH 45° CUTS. INSTALL AT A 45° ANGLE AS SHOWN AND TOENAIL TO THE ADJACENT HEADER AND SIDE STRUT, PIECES MARKED 7 AND 8 , W/2-16d NAILS AT EACH END.
- 14 SIDE CLEAT, 2" X 6" X 24" ( 2 REQD ). NAIL TO A SIDE STRUT, PIECE MARKED 8 , W/8-10d NAILS.

( CONTINUED AT LEFT ABOVE )

SPECIAL NOTES:

1. A 4-UNIT LOAD IS SHOWN IN A 7'-6" WIDE ( INSIDE DIMENSION ) CONVENTIONAL VAN TRAILER. TRAILERS OF OTHER WIDTHS CAN BE USED.
2. A TRAILER WITH ROUNDED CORNERS AT THE FORWARD END IS SHOWN IN THE LOAD VIEW. IF THE TRAILER BEING USED HAS SQUARE CORNERS, EACH "SIDE BLOCKING ASSEMBLY A", PIECE MARKED 1 , MUST BE REPLACED WITH A "SIDE BLOCKING ASSEMBLY B", AS DETAILED ON PAGE 14.
3. IF A TRAILER WHICH IS WIDER THAN 7'-9" IS FURNISHED FOR LOADING, "ANTI-SWAY BRACES" AND "TOP-OF-LOAD ANTI-SWAY BRACES", AS DETAILED ON PAGE 13, MUST BE INSTALLED BETWEEN THE UNITS IN THE TWO-WIDE PORTION OF THE LOAD. SEE THE "TYPICAL SECTION VIEW OF 8'-2" WIDE VAN" ON PAGE 5 FOR PROPER BLOCKING AND BRACING FOR WIDER THAN 7'-9" TRAILERS.
4. THE "K-BRACE" BLOCKING, SHOWN AS PIECES MARKED 6 THRU 16 IS ADEQUATE FOR RETAINING A MAXIMUM LTL LOAD OF 20,000 POUNDS.
5. TRAILERS EQUIPPED WITH ROLL-UP TYPE DOORS MAY BE USED; HOWEVER, SPECIAL REAR BLOCKING MUST BE INSTALLED. SEE THE "PROCEDURES FOR CONVENTIONAL VAN TRAILERS EQUIPPED WITH ROLL-UP TYPE DOORS" ON PAGES 16 AND 17 FOR GUIDANCE. A NAILED-HEADER METHOD AND A TYGARD METHOD ARE SHOWN. NOTE THAT THE SPECIAL REAR BLOCKING FOR TRAILERS EQUIPPED WITH ROLL-UP TYPE DOORS MAY ALSO BE USED IN TRAILERS EQUIPPED WITH HINGED DOORS, AND MAY BE USED IN LIEU OF PIECES MARKED 6 THRU 16 WHICH APPLY TO TRAILERS HAVING NON-NAIABLE FLOORS.



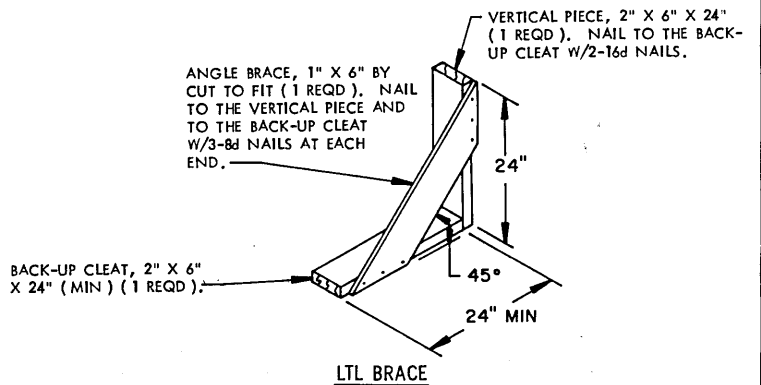


**SPECIAL NOTES:**

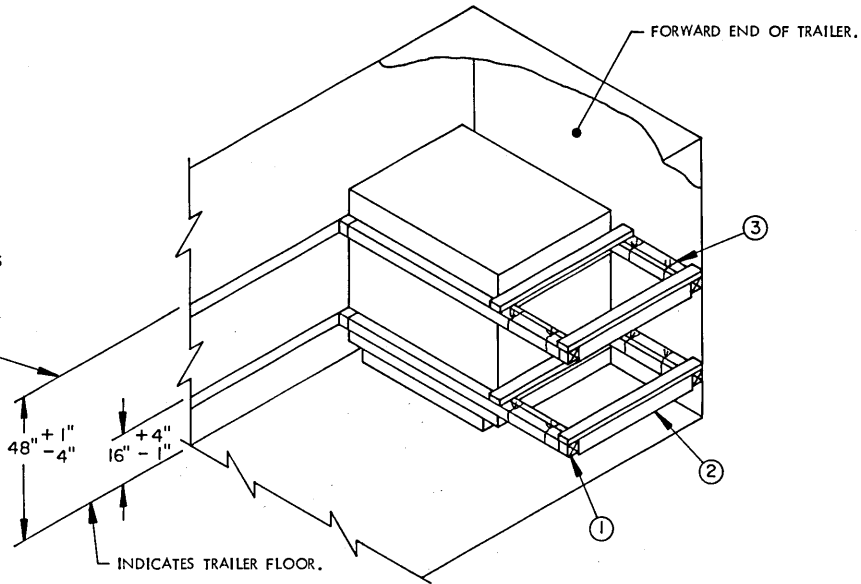
1. A 7'-6" WIDE (INSIDE DIMENSIONS) CONVENTIONAL VAN TRAILER WHICH HAS A NAILABLE FLOOR IS SHOWN. TRAILERS OF OTHER WIDTHS CAN BE USED.
2. THE POSITIONING OF A UNIT IS OPTIONAL. IF THE TRAILER BEING USED HAS A SQUARE FRONT, THE PALLET UNIT MAY BE LOCATED IN THE CORNER OF THE TRAILER.
3. EACH LTL BRACE AS APPLIED FOR LONGITUDINAL BRACING WILL SUPPORT 2,000 POUNDS OF LADING; HOWEVER, NOT LESS THAN TWO (2) BRACES WILL BE USED AGAINST EACH PALLET UNIT ACROSS THE WIDTH OF THE TRAILER.

**KEY NUMBERS**

- ① SIDE BLOCKING, 2" X 4" X 43-1/4" (QUADRUPLED) (2 REQD). NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/6-12d NAILS. NAIL THE SECOND, THIRD AND FOURTH PIECES IN A LIKE MANNER. SEE GENERAL NOTE "M" ON PAGE 2.
- ② LTL BRACE (2 REQD). SEE THE "LTL BRACE" DETAIL BELOW. NAIL TO THE TRAILER FLOOR W/7-10d NAILS. SEE SPECIAL NOTE 3 AT LEFT.



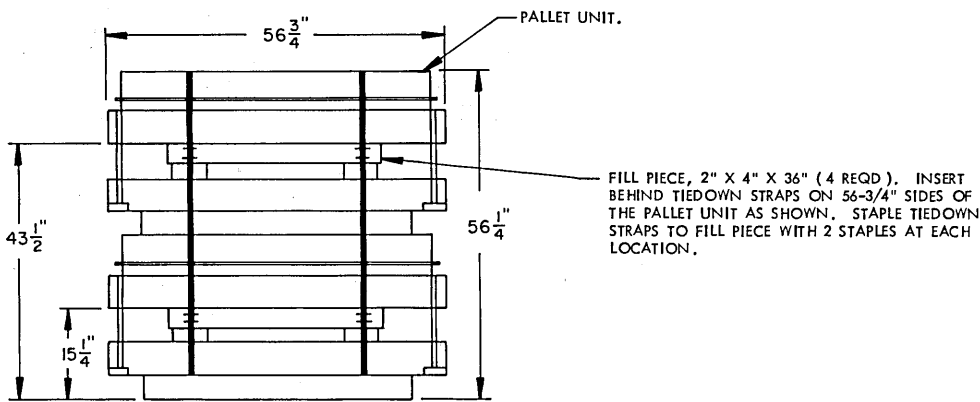
THESE DIMENSIONED HEIGHTS SPECIFY THE DISTANCES THE TOP SURFACE OF A CROSS MEMBER IS TO BE ABOVE THE TRAILER FLOOR.



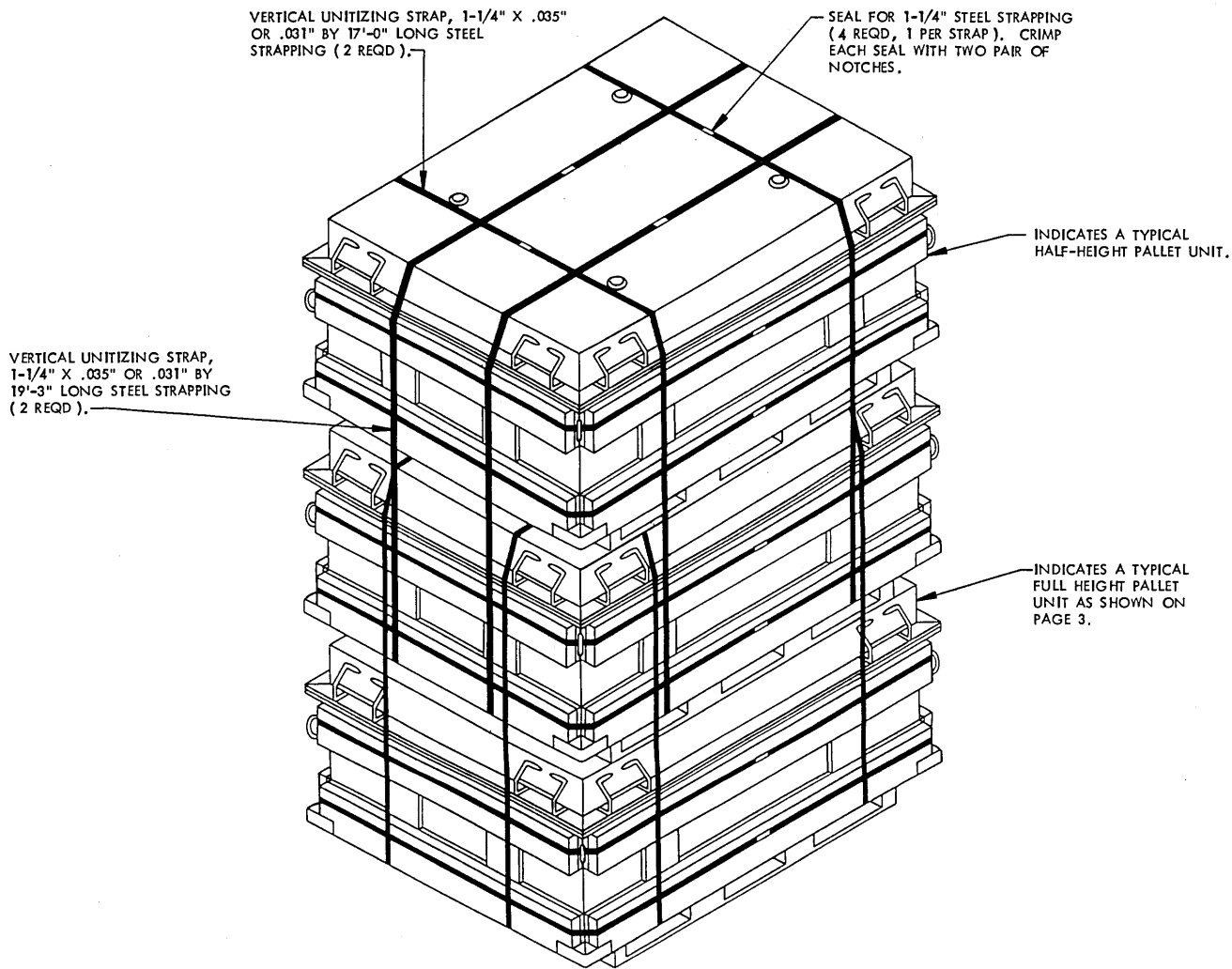
ISOMETRIC VIEW

**KEY NUMBERS**

- ① CROSS MEMBER ( 4 REQD ). POSITION AT THE HEIGHTS AS SPECIFIED BY THE ISOMETRIC VIEW ABOVE. SEE GENERAL NOTE "D" ON PAGE 2.
- ② SPACER ASSEMBLY ( 2 REQD ). SEE THE "SPACER ASSEMBLY B" DETAIL ON PAGE 14.
- ③ TIE WIRE, NO. 14 GAGE WIRE 30" LONG ( 8 REQD ). INSTALL TO FORM A COMPLETE LOOP AROUND THE CROSS MEMBER AND THE ANTI-SWAY BRACE. 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.



PALLET DETAIL



SECUREMENT OF A PARTIAL PALLET UNIT  
ON TOP OF A FULL PALLET UNIT

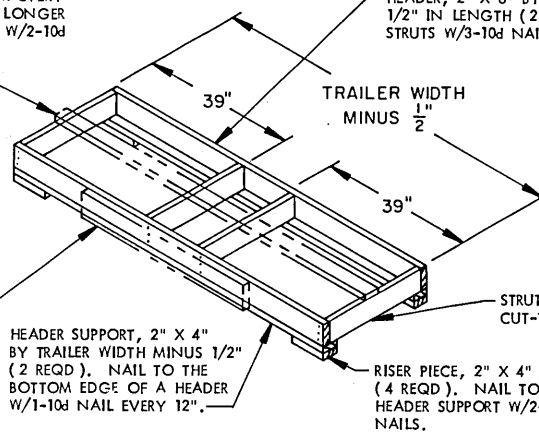
SPECIAL NOTES:

1. THE VIEW SHOWN ABOVE DEPICTS A PARTIAL PALLET UNIT POSITIONED ON TOP OF A FULL-HEIGHT PALLET UNIT AND UNITIZED WITH TWO VERTICAL UNITIZING STRAPS. PLACEMENT WITHIN THE LOAD IS OPTIONAL EXCEPT THAT IT WILL NOT BE POSITIONED WITHIN A GROUP WHICH IS BUNDLED TOGETHER.
2. SHIPMENT OF PALLET UNITS SHOULD CONSIST OF FULL-HEIGHT AND FULL-LAYER UNITS TO THE MAXIMUM EXTENT POSSIBLE. HOWEVER, THE END OF A LOT, OR THE QUANTITY OF ITEMS NEEDED TO FILL A REQUISITION, MAY NECESSITATE THE SHIPMENT OF ONE OR MORE LESS-THAN-FULL PALLET UNITS WITHIN A LOAD. THE PROCEDURES ON THIS PAGE ARE PRESENTED AS GUIDANCE IN THE SHIPMENT OF THESE PARTIAL UNITS.
3. THE "SHIPMENT OF A PARTIAL PALLET UNIT" PROCEDURES ON THIS PAGE ARE APPLICABLE FOR LOADS IN CONVENTIONAL TYPE VAN TRAILERS AND TRAILERS EQUIPPED WITH MECHANICAL BRACING DEVICES.

STRUT BRACING, 2" X 4" BY TRAILER WIDTH MINUS 1/2" IN LENGTH (1 REQD FOR EVERY 7'-0" OF STRUT LENGTH FOR STRUTS LONGER THAN 7'-0"). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.

HEADER, 2" X 6" BY TRAILER WIDTH MINUS 1/2" IN LENGTH (2 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.

IF THE TRAILER IS EQUIPPED WITH REAR CORNER POSTS, INSTALL SOLID FILL, 6" WIDE BY 48" LONG BY THE THICKNESS REQUIRED TO FILL THE EXCESS SPACE BETWEEN THE REAR BLOCKING ASSEMBLY AND THE TRAILER DOORS WHEN THEY ARE CLOSED. NAIL TO THE REAR BLOCKING ASSEMBLY W/4 APPLICABLY SIZED NAILS.



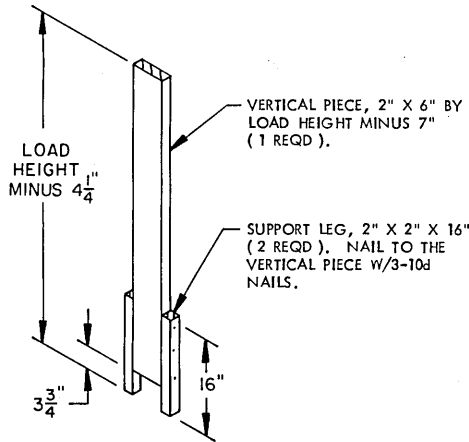
HEADER SUPPORT, 2" X 4" BY TRAILER WIDTH MINUS 1/2" (2 REQD). NAIL TO THE BOTTOM EDGE OF A HEADER W/1-10d NAIL EVERY 12".

STRUT, 2" X 6" BY CUT-TO-FIT (4 REQD).

RISER PIECE, 2" X 4" X 9" (4 REQD). NAIL TO THE HEADER SUPPORT W/2-10d NAILS.

**REAR BLOCKING ASSEMBLY A**

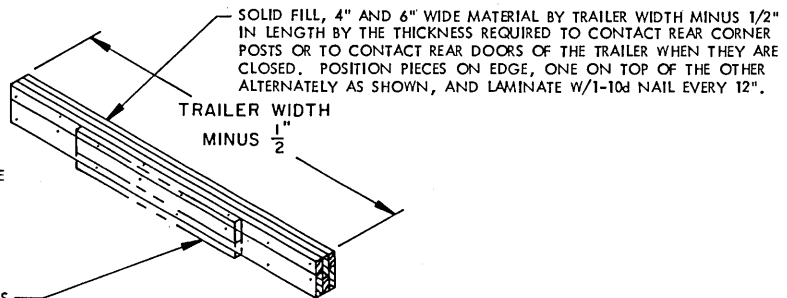
THE ASSEMBLY IS DESIGNED FOR USE AT THE REAR OF THE LOAD IN A CONVENTIONAL VAN TRAILER WHEN THE EXCESS SPACE BETWEEN THE LADING AND THE TRAILER DOORS IS 9" OR GREATER.



VERTICAL PIECE, 2" X 6" BY LOAD HEIGHT MINUS 7" (1 REQD).

SUPPORT LEG, 2" X 2" X 16" (2 REQD). NAIL TO THE VERTICAL PIECE W/3-10d NAILS.

**STRAPPING BOARD ASSEMBLY**

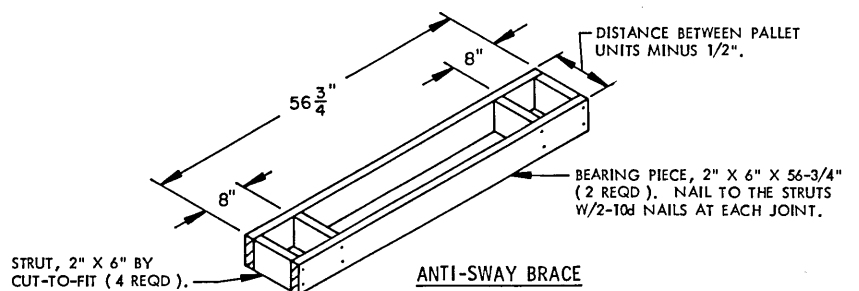
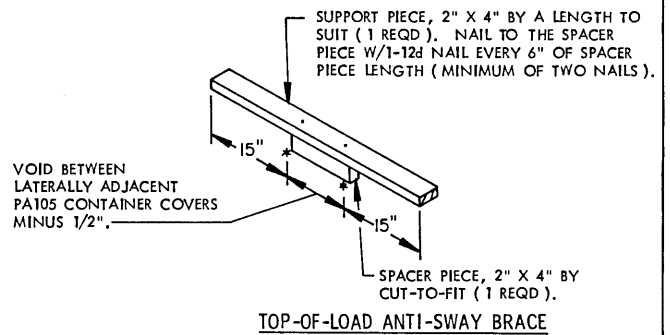
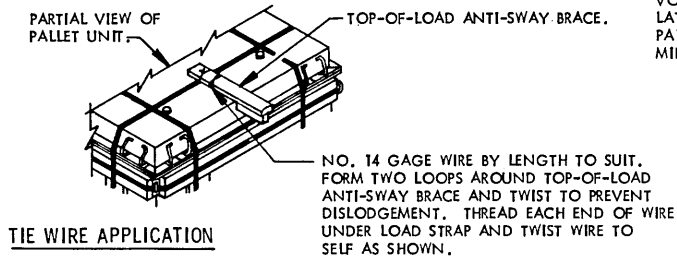
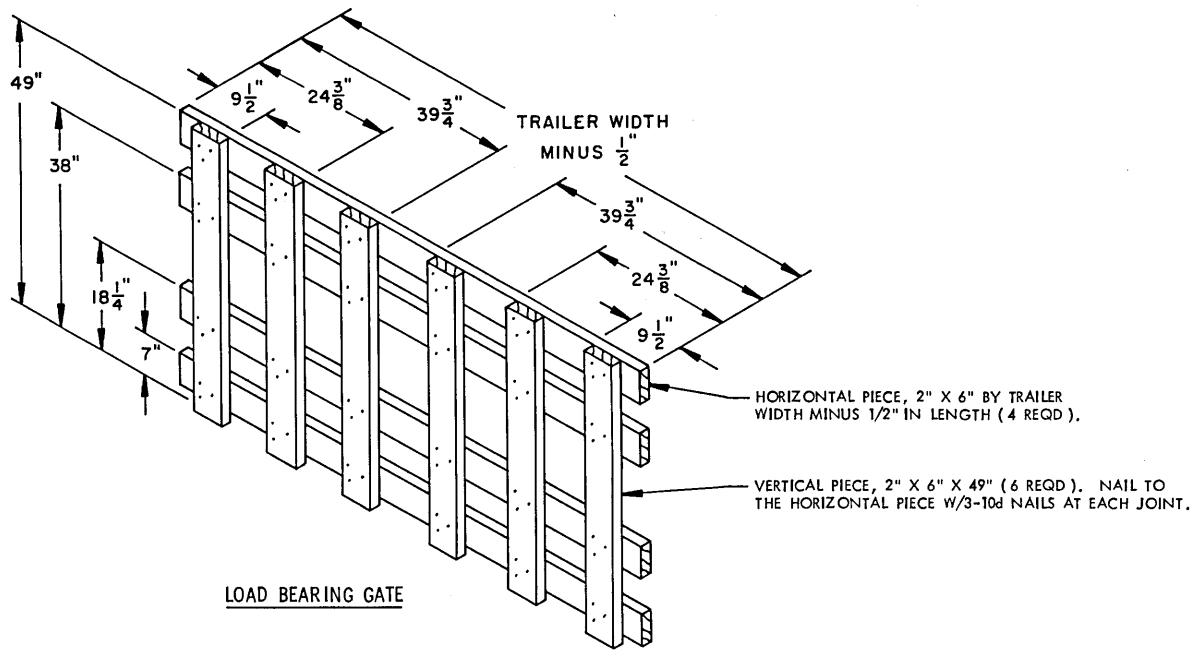


IF TRAILER IS EQUIPPED WITH REAR CORNER POSTS, INSTALL SOLID FILL, 4" AND 6" WIDE BY 48" LONG BY THE THICKNESS REQUIRED TO FILL THE EXCESS SPACE BETWEEN THE REAR BLOCKING AND THE REAR DOORS OF THE TRAILER WHEN THEY ARE CLOSED. POSITION PIECES ON EDGE, ONE ON TOP OF THE OTHER AS SHOWN, AND NAIL TO THE REAR BLOCKING W/4 APPLICABLY SIZED NAILS.

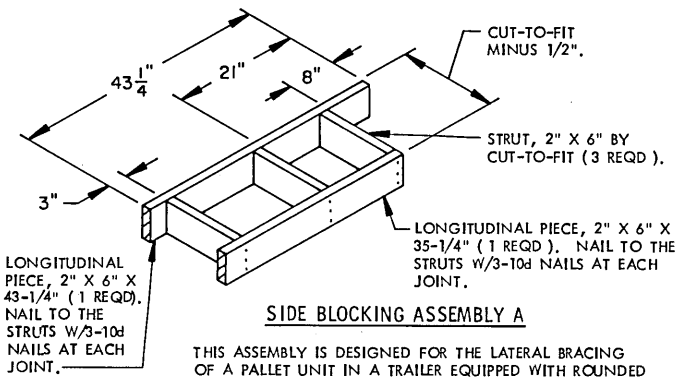
SOLID FILL, 4" AND 6" WIDE MATERIAL BY TRAILER WIDTH MINUS 1/2" IN LENGTH BY THE THICKNESS REQUIRED TO CONTACT REAR CORNER POSTS OR TO CONTACT REAR DOORS OF THE TRAILER WHEN THEY ARE CLOSED. POSITION PIECES ON EDGE, ONE ON TOP OF THE OTHER ALTERNATELY AS SHOWN, AND LAMINATE W/1-10d NAIL EVERY 12".

**REAR BLOCKING ASSEMBLY B**

THIS ASSEMBLY IS DESIGNED FOR USE AT THE REAR OF THE LOAD IN A CONVENTIONAL VAN TRAILER WHEN THE EXCESS SPACE BETWEEN THE LADING AND THE TRAILER DOORS IS LESS THAN 9" BUT AT LEAST 1-1/2".

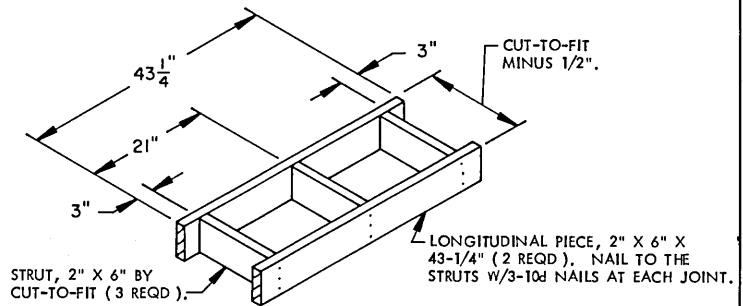


THIS ANTI-SWAY BRACE IS DESIGNED FOR USE ON THE FLOOR BETWEEN LATERALLY ADJACENT PALLET UNITS. NOTE THAT AN ASSEMBLY NEED NOT BE CONSTRUCTED FOR A TIGHT FIT; UP TO ONE-HALF INCH (1-1/2") SPACE IS PERMITTED.

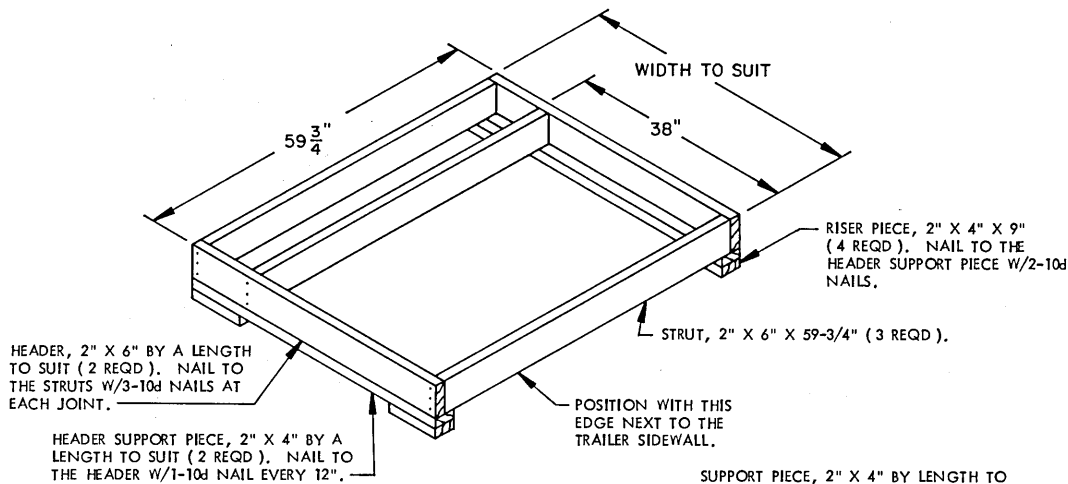


**SIDE BLOCKING ASSEMBLY A**

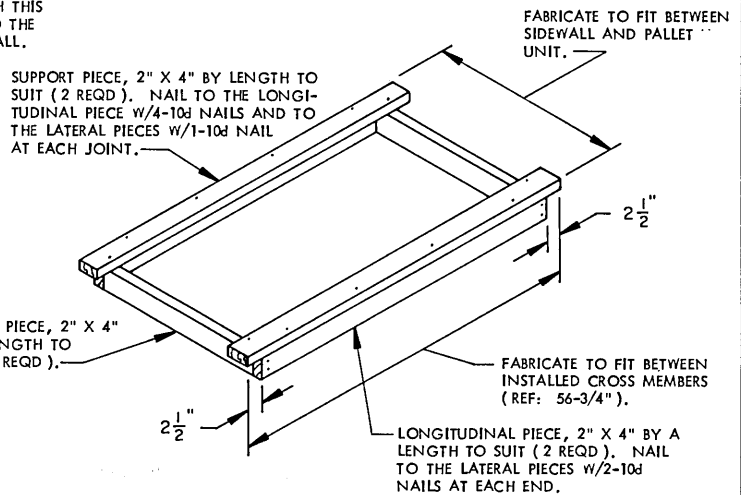
THIS ASSEMBLY IS DESIGNED FOR THE LATERAL BRACING OF A PALLET UNIT IN A TRAILER EQUIPPED WITH ROUNDED CORNERS AT THE FORWARD END.



**SIDE BLOCKING ASSEMBLY B**

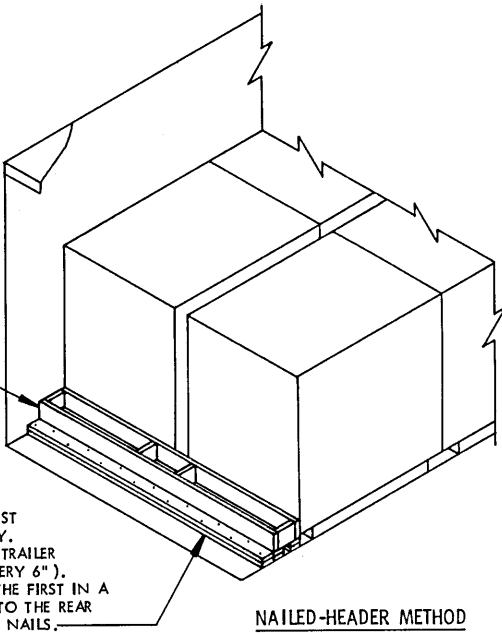


**SPACER ASSEMBLY A**



**SPACER ASSEMBLY B**

THIS ASSEMBLY IS DESIGNED FOR THE LATERAL BRACING OF A PALLET UNIT IN A TRAILER EQUIPPED WITH MECHANICAL BRACING DEVICES.



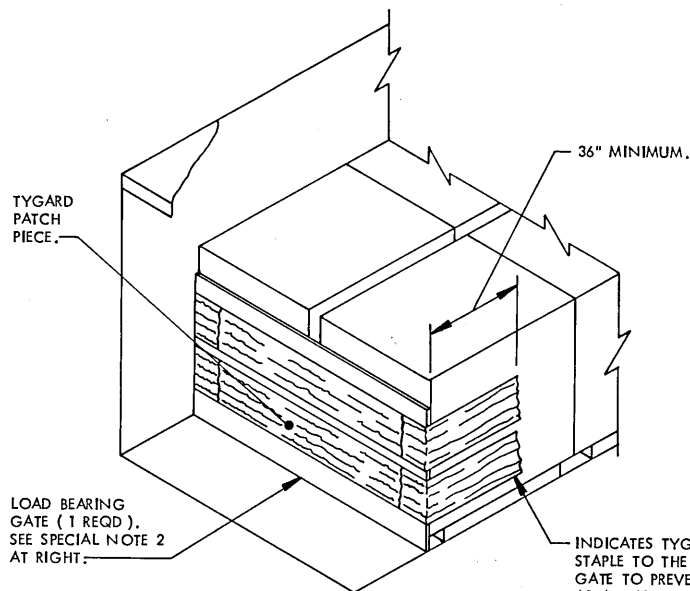
REAR BLOCKING ASSEMBLY (1 REQD). SEE SPECIAL NOTE 2 BELOW.

HEADER, 2" X 4" BY TRAILER WIDTH MINUS 1/2" IN LENGTH (DOUBLED) (1 REQD). POSITION AGAINST THE REAR BLOCKING ASSEMBLY. NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/15-10d NAILS (1 EVERY 6"). NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER AND TOENAIL TO THE REAR BLOCKING ASSEMBLY W/4-10d NAILS.

NAILED-HEADER METHOD

SPECIAL NOTES:

1. THE NAILED-HEADER METHOD OF REAR BLOCKING DEPICTED ABOVE CAN ONLY BE USED IN TRAILERS HAVING A NAILABLE FLOOR AREA BETWEEN THE LADING AND THE METAL THRESHOLD, OR A THRESHOLD PLATE IF THE TRAILER IS SO EQUIPPED, OF AT LEAST FOURTEEN INCHES (14").
2. REAR BLOCKING ASSEMBLY "A" IS SHOWN FOR A TYPICAL INSTALLATION. THE REAR BLOCKING ASSEMBLY WHICH IS SPECIFIED WITHIN THE KEY NUMBERS FOR THE ITEM BEING LOADED WILL BE USED AT THE REAR OF THE LOAD. CONSTRUCT THE ASSEMBLY USING 6" (MINIMUM) LONG STRUTS.
3. THE NAILED-HEADER METHOD OF REAR BLOCKING IS ADEQUATE FOR THE RETENTION OF THE MAXIMUM WEIGHT LOAD.
4. THE NAILED-HEADER METHOD, ALTHOUGH DESIGNED ESPECIALLY FOR TRAILERS HAVING ROLL-UP TYPE DOORS, MAY ALSO BE USED IN TRAILERS EQUIPPED WITH HINGED DOORS.



INDICATES TYGARD MATERIAL, STAPLE TO THE LOAD BEARING GATE TO PREVENT SAGGING. AS AN ALTERNATIVE, A 1" X 4" BY LOAD HEIGHT PIECE MAY BE NAILED THRU THE TYGARD MATERIAL INTO THE LOAD BEARING GATE. CAUTION: PLACE 1" X 4" SO AS TO BE ALIGNED WITH THE VOID BETWEEN THE ROWS.

### TYGARD METHOD

#### RECOMMENDED EQUIPMENT/INSTALLATION PROCEDURES

##### EQUIPMENT REQUIRED

PAINT ROLLER, LATEX  
 PAINT ROLLER PAN  
 TENSIONING ROD/TOOL  
 PRESSURE ROLLER  
 RATCHET WRENCH ( 12" TO 15" HANDLE )  
 OPEN END OR BOX WRENCH ( 12" TO 15" HANDLE )  
 SCISSORS OR KNIFE  
 TYGARD ( 15" WIDE ROLL )  
 TYGARD ADHESIVE

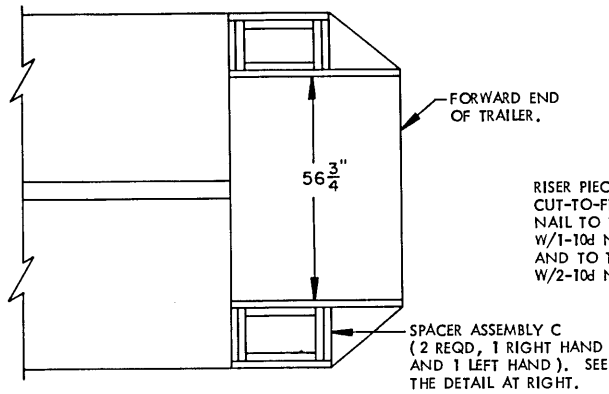
##### BASIC INSTALLATION GUIDANCE

1. CUT TO LENGTH THE REQUIRED NUMBER OF TYGARD PIECES ( FROM 2 TO 8 DEPENDING UPON THE LOAD CONFIGURATION ) FOR ATTACHMENT TO THE TRAILER SIDEWALL. PIECES WILL BE OF A LENGTH AS REQUIRED TO PROVIDE PROPER BONDING TO THE TRAILER SIDEWALL AND TO EXTEND 60" ACROSS THE REAR OF THE LOAD. ALSO, CUT 72" LONG "PATCH" PIECES OF TYGARD MATERIAL, ONE FOR EACH SET OF TWO PIECES PREVIOUSLY CUT.
2. PRIOR TO POSITIONING OF THE PALLETS IN THE REARMOST LOAD UNIT, APPLY TYGARD ADHESIVE TO THE PROPER PORTIONS OF THE TRAILER SIDEWALLS AND TO THE CORD SIDE OF A CORRESPONDING LENGTH OF EACH OF THE TYGARD PIECES THAT ARE TO BE ATTACHED TO THE SIDEWALLS OF THE TRAILER. ALLOW TIME FOR THE ADHESIVE TO "CURE" BEFORE PLACING A STRIP OF TYGARD ONTO A SIDEWALL ( ADHESIVE WILL FEEL ALMOST DRY WHEN TOUCHED ). NOTE: APPLICATION OF TYGARD IS SIMILAR TO THE APPLICATION OF "FORMICA".
3. APPLY THE TYGARD PIECES TO EACH SIDEWALL OF THE TRAILER SO THAT THE PIECES ARE PARALLEL OR NEARLY PARALLEL TO THE FLOOR. ROLL THE TYGARD WITH THE PRESSURE ROLLER TO ENSURE PROPER BONDING IS ACHIEVED. TEMPORARILY SECURE THE LOOSE ENDS TO THE TRAILER SIDEWALL OR TO AN OPEN HINGED TYPE DOOR OR TO THE OUTSIDE WALL, AS APPLICABLE.
4. POSITION THE PALLETS OF THE REARMOST LOAD UNIT INTO THE TRAILER AND INSTALL THE SPECIFIED ANTI-SWAY BRACES OR CRIB FILL, AS APPLICABLE.
5. UNDO THE PREVIOUSLY SECURED LOOSE ENDS AND BRING A SET OF TWO PIECES TOGETHER ACROSS THE REAR OF THE LOAD. POSITION THE TENSIONING ROD SO THAT THE LOOSE ENDS OF THE TYGARD MATERIAL EXTEND THRU THE SLOT IN ROD. USING THE TWO WRENCHES, ROLL UP THE TYGARD TO TENSION IT ACROSS REAR OF THE LOAD. POSITION A WRENCH SO AS TO MAINTAIN THE TENSION IN THE TYGARD PIECES. CUT OFF AND DISCARD EXCESS MATERIAL FROM ONE PIECE OF THE TYGARD.
6. APPLY TYGARD ADHESIVE TO THE TENSIONED TYGARD PIECES AND ALSO TO THE CORD SIDE OF THE PREVIOUSLY CUT "PATCH" PIECE. APPLY THE "PATCH" AND ROLL WITH THE PRESSURE ROLLER TO ENSURE PROPER BONDING.

#### SPECIAL NOTES:

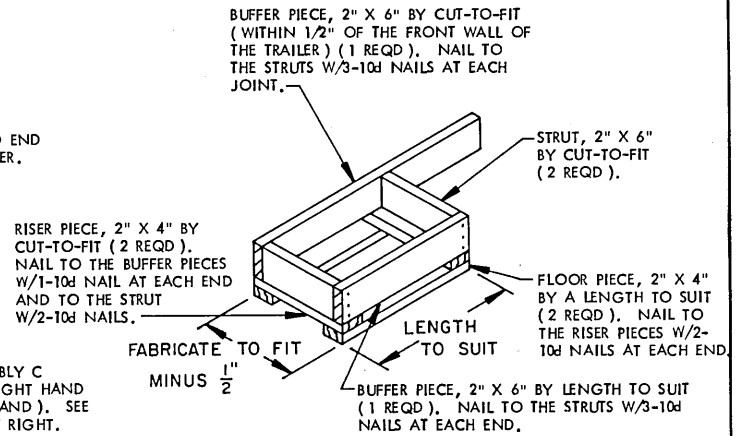
1. THE TYGARD METHOD OF REAR BLOCKING DEPICTED AT LEFT CAN ONLY BE USED IN TRAILERS WHICH HAVE REASONABLE SMOOTH AND ADEQUATELY SECURED SIDEWALL PANELS IN THE AREA WHERE THE TYGARD MATERIAL IS TO BE APPLIED.
2. THE LOAD BEARING GATE WILL CONSIST OF A 48" HIGH BY TRAILER WIDTH MINUS 1/2" LONG PIECE OF 1/2" PLYWOOD. THE GATE MUST BE INSTALLED AT THE REAR OF THE LOAD TO PROVIDE A SMOOTH SURFACE FOR THE TYGARD MATERIAL TO EXTEND AROUND.
3. THE TYGARD MATERIAL AND THE ADHESIVE FOR ATTACHING IT ARE COMMERCIAL PRODUCTS. FOR A SOURCE OF SUPPLY, CONTACT WALNUT INDUSTRIES, INC., 1344 ADAMS ROAD, P.O. BOX "E", BENSALEM, PA 19020-0860, PHONE 1-800-523-6536. APPLICATION INSTRUCTIONS AND GUIDANCE CAN ALSO BE OBTAINED FROM THAT OFFICE.
4. THE TYGARD METHOD, ALTHOUGH ESPECIALLY FOR TRAILERS HAVING ROLL-UP TYPE DOORS, MAY ALSO BE USED IN TRAILERS EQUIPPED WITH HINGED DOORS.
5. **NOTICE:** IF THE AREA OF A SIDEWALL WHERE THE TYGARD SHOULD BE ATTACHED IS ROUGH AND/OR BROKEN, THE APPLICABLE PIECE ( S ) OF TYGARD CAN BE LENGTHENED A SUITABLE AMOUNT AND ATTACHED TO THE SIDEWALL AHEAD OF THE INDICATED PREFERRED LOCATION.





ALTERNATIVE FORWARD LOADING PATTERN

THIS PROCEDURE IS APPLICABLE TO THE LOADING OF ONE (1) PALLET UNIT IN THE FORWARD END OF A CONVENTIONAL VAN TRAILER HAVING LARGE ANGLED FRONT CORNERS (REF: 18"). THE PROCEDURES MAY ALSO BE USED IN TRAILERS HAVING SQUARE CORNERS, OR ROUNDED FRONT CORNERS, OR ANGLED CORNERS OF ANOTHER SIZE.



SPACER ASSEMBLY C

THIS ASSEMBLY IS DESIGNED FOR LATERAL BRACING OF A SINGLE PALLET UNIT WHICH IS TURNED 90° FROM THE NORMAL LOADING ORIENTATION AND POSITIONED IN THE FRONT OF AN ANGLED-CORNER CONVENTIONAL VAN TRAILER AS SHOWN IN THE "ALTERNATIVE FORWARD LOADING PATTERN" VIEW AT LEFT. RIGHT HAND AND LEFT HAND SPACER ASSEMBLIES ARE REQUIRED.

