

APPROVED BY
 BUREAU OF EXPLOSIVES
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 DATE 4/25/86

LOADING AND BRACING (CL & LCL) IN BOX CARS OF PALLETIZED BULK EXPLOSIVES (SECURED ON PALLETS WITH STRETCH NET)

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CAUTION:
 CARS EQUIPPED WITH MECHANICAL BRACING DEVICES MUST NOT BE USED FOR SHIPMENT OF BULK EXPLOSIVES AS IT IS LIABLE TO SIFT OR BECOME LODGED IN THE MECHANISM OF THE LOADING AND BRACING DEVICE IN THE EVENT OF A CONTAINER FAILURE. CARS USED MUST HAVE LINED SIDEWALLS.

| REVISIONS | | | | DRAFTSMAN | ds | PROJ ENG | |
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| | | | | <i>ds</i> | | <i>RSW/NEW</i> | |
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DO NOT SCALE

GENERAL NOTES

(CONTINUED FROM LEFT)

- 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 SHIPMENT OF BULK EXPLOSIVES PACKED IN FIBERBOARD BOXES UNITIZED TO 35" X 45-1/2" PALLETS USING STRETCH NET MATERIAL.
- C. FOR DETAIL OF THE PALLETIZED UNIT SEE US ARMY DRAWING 19-48-4177/1-20PA1007 AND THE PALLET UNIT DETAIL ON PAGE 3.
- PALLET UNIT DIMENSIONS --- 37" LONG BY 45-3/4" WIDE BY 50" HIGH.
GROSS WEIGHT ----- 2,378 POUNDS (APPROX).
CUBE ----- 49.0 CU. FT. (APPROX).
- D. THE SELECTION OF RAIL CARS FOR THE TRANSPORT OF THE DESIGNATED ITEM IS THE RESPONSIBILITY OF THE CARRIER AND THE SHIPPER, IN ACCORDANCE WITH DOT/DOD REGULATIONS. EVERY EFFORT SHOULD BE MADE TO OBTAIN BOX CARS THAT DO NOT HAVE BOWED END WALLS; HOWEVER, CARS HAVING ONLY SLIGHTLY BOWED END WALLS CAN BE USED. CARS THAT HAVE ENDS THAT ARE BOWED MORE THAN TWO INCHES CAN BE USED; HOWEVER, DUNNAGE MUST BE INSTALLED TO "SQUARE" THE ENDS BEFORE LOADING A CAR.
- E. THE OUTLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE FOR CONVENTIONAL TYPE BOX CARS OF VARIOUS LENGTH AND WIDTH COMBINATIONS WITH WOOD OR NAILABLE METAL FLOORS AND EQUIPPED WITH CONVENTIONAL SLIDING AND/OR PLUG TYPE DOORS. CAUTION: CARS USED FOR SHIPMENT OF EXPLOSIVES PACKED IN FIBER BOARD BOXES MUST BE LINED. IF AN ALL-METAL CAR IS USED FOR A SHIPMENT, THE SHIPPER MUST LINE THE CAR WITH FIBERBOARD MATERIAL OR OTHER SUITABLE MATERIAL TO PREVENT CONTACT BETWEEN PALLET UNITS AND THE METAL SIDE AND END WALLS. NOTICE: THE SEVERAL OUTLOADING PROCEDURES THAT ARE SPECIFIED WITHIN THIS DRAWING HAVE BEEN DESIGNED FOR SPECIFIC PALLET UNIT CONFIGURATIONS OF TYPE C, SIZE 4 FIBERBOARD BOXES, FOR SPECIFIC BOX CARS BY SIZE, AND FOR SPECIFIC CARLOADING ARRANGEMENTS. ALTHOUGH THE DELINEATED PROCEDURES COVER SPECIFIC LOADS, THESE PROCEDURES CAN BE USED WITH SLIGHT MODIFICATION FOR SHIPPING OTHER THAN SPECIFIED LOAD ARRANGEMENTS, INCLUDING THE SHIPPING OF 4-HIGH AND 5-HIGH PALLET UNITS OF STRETCH NET SECURED TYPE C, SIZE 4 FIBERBOARD BOXES. IN A SENSE, THE LOADS AS SHOWN ARE TYPICAL IN NATURE, EVEN THOUGH THEY ARE DESIGNED FOR SPECIFIC LOADS. MOST OF THE REQUIRED MODIFICATIONS TO ADJUST AN OUTLOADING PROCEDURE ARE ADDRESSED ELSEWHERE WITHIN THIS DRAWING, SUCH AS IN THE "SPECIAL NOTES" SECTION THAT IS ADJACENT TO EACH SPECIFIC OUTLOADING PROCEDURE. REGARDLESS OF MODIFICATIONS IMPLEMENTED, THE SPECIFIED PRINCIPLES OF LOADING AND BRACING MUST BE APPLIED TO A MAXIMUM EXTENT.
- F. THE LOADS AS SHOWN ARE BASED ON CARS WHICH HAVE 10'-0" WIDE DOORS OF THE CONVENTIONAL SLIDING TYPE. THE DEPICTED OUTLOADING PROCEDURES ARE ALSO APPLICABLE TO CARS WHICH ARE EQUIPPED WITH PLUG DOORS. THE "DOORWAY AREA" WITHIN A CAR IS DEFINED AS THE CARGO SPACE THAT IS ADJACENT TO CONVENTIONAL TYPE AND/OR A PLUG TYPE DOORS. THE LENGTH OF A "DOORWAY AREA" CAN BE AS MUCH AS 24 FEET IN SOME CARS THAT ARE EQUIPPED WITH STAGGERED DOORS. CAUTION: DUNNAGE MATERIAL MUST NOT BE NAILED TO ANY PLUG DOOR, WHETHER AUXILIARY OR MAIN, EXCEPT TO A NAILING STRIP IF A DOOR IS SO EQUIPPED, FOR SECURING SUCH ITEMS AS GATE HOLD DOWNS OR DOORWAY SPANNER DUNNAGE. ALSO, SPECIAL PROVISIONS MUST BE IMPLEMENTED AS DIRECTED WITHIN THE "SPECIAL NOTES" SECTION WHICH IS IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS. ALSO, AFTER THE PLUG DOORS ON A CAR ARE CLOSED AND READY FOR THE INSTALLATION OF "CAR SEALS", A PIECE OF WIRE OF SUITABLE SIZE WILL BE USED IN ADDITION TO, AND IN CONJUNCTION WITH, EACH CAR SEAL USED TO "SEAL" THE CAR. THE WIRE WILL BE THREADED THROUGH THE HOLES IN THE DOOR LATCH ASSEMBLY ONE OR MORE TIMES, AND THE WIRE ENDS WILL BE TWISTED TOGETHER.
- G. OTHER TYPE OF LADING ITEMS MAY BE LOADED IN A CAR WHICH IS PARTIALLY LOADED WITH THE DESIGNATED ITEM, 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.
- H. NOTICE: WHEN POSITIONING UNITS IN A CAR, THEY SHOULD BE PLACED TIGHTLY AGAINST A CAR SIDEWALL AND/OR AGAINST A LATERALLY ADJACENT UNIT, AS APPLICABLE, AND ARE TO BE PRESSED TIGHTLY TOGETHER LENGTHWISE SO AS TO ACHIEVE A "TIGHT" LOAD. TO AID IN ACHIEVING TIGHTNESS LENGTHWISE IN A FULL LOAD, A LOAD-COMPRESSING JACK MAY BE EMPLOYED IN THE AREA OF THE CENTER GATES TO MOVE THE UNITS INTO THEIR FINAL SHIPPING POSITION. A HYDRAULIC JACK OR AN AIR BAG ACTIVATED DEVICE IS RECOMMENDED FOR THIS OPERATION. CAUTION: WHEN USING A JACK TO COMPACT A LOAD, SUITABLE PADDING TO PROTECT THE PALLET UNITS, SHOULD BE PLACED BETWEEN THE JACK AND THE LADING.

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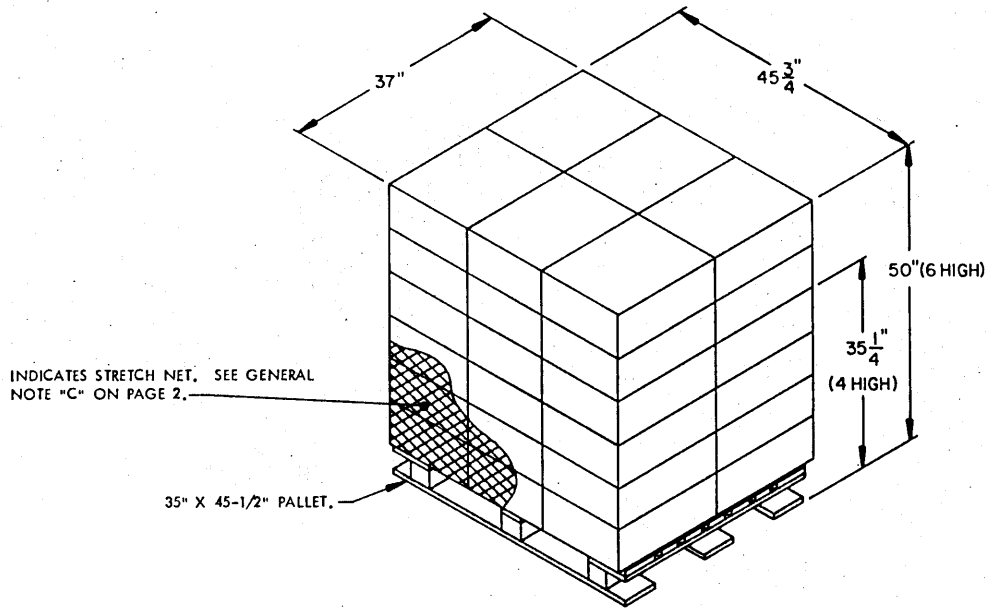
MATERIAL SPECIFICATIONS

| | |
|-------------|---|
| LUMBER | SEE TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751. |
| NAILS | FED SPEC FF-N-105; COMMON. |
| PLYWOOD | GROUP B OR C, GRADE C-D (EXTERIOR). FED SPEC NN-P-530. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER EXTERIOR GRADE MAY BE SUBSTITUTED. |
| VOID FILLER | FIBERBOARD, HANGER - 275 LB* (DOUBLE WALL), CELL SIZE- 7" OR LESS, INTERNATIONAL HONEYCOMB CORP (OR EQUAL) |
| WIRE | ANNEALED, BLACK; FED SPEC QQ-W-461. |

* BASIS WEIGHT PER 1,000 SQ. FT.

- J. IF THE CAR BEING USED FOR A SHIPMENT IS EQUIPPED WITH A NAILABLE METAL FLOOR AND A NAIL SIZE FOR FLOOR NAILING IS MARKED ON THE SIDEWALL OF THE CAR, THAT GUIDANCE SHOULD BE APPLIED FOR THE NAILING OF THE APPLICABLE DUNNAGE PIECES. IF THE NAIL SIZE IS NOT SPECIFIED IN THE CAR, 30# NAILS SHOULD BE USED IN LIEU OF THOSE SPECIFIED IN THE KEY NUMBERS. SEE GENERAL NOTE "L" ON THIS PAGE.
- K. EXCEPT FOR PLYWOOD, DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 1" X 4" MATERIAL IS ACTUALLY 3/4" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE.
- L. 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 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.
- M. LOAD-BLOCKING STRUTS WHICH ARE 48" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF HORIZONTAL AND VERTICAL STRUT BRACING. STRUT BRACING IS NOT REQUIRED IF THE STRUTS FOR THE LOAD BEING SHIPPED ARE SHORTER THAN 48".
- N. TO ACHIEVE A TIGHTLY BLOCKED LOAD, A STRUT WILL BE CUT SLIGHTLY LONGER THAN THE MEASURED DISTANCE BETWEEN THE STRUT BEARING AREAS ON THE TWO CENTER GATES. ONE END OF THE STRUT WILL BE POSITIONED AT ITS BEARING AREA JUST ABOVE THE STRUT LEDGER ON ONE GATE, THEN THE OTHER END, WHICH CAN BE SLIGHTLY BEVELED ON THE LOWER CORNER/EDGE, IF DESIRED, WILL BE DRIVEN DOWNWARD UNTIL IT CONTACTS THE STRUT LEDGER ON THE OTHER GATE. EACH END OF THE STRUT WILL BE TOENAILED TO THE ADJACENT CENTER GATE, AS SPECIFIED WITHIN THE KEY NUMBERS FOR A LOAD.
- O. PORTIONS OF THE BOX CARS DEPICTED WITHIN THIS PROCEDURAL DRAWING, SUCH AS SIDEWALLS, END WALLS, AND ROOFS, AND PORTIONS OF THE BLOCKING AND BRACING COMPONENTS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- P. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE BOX CAR BEING LOADED OR THE QUANTITY TO BE SHIPPED; HOWEVER, THE APPROVED METHODS SPECIFIED HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING, AND STAYING OF THE UNITS. NOTICE: A SHIPMENT WILL BE POSITIONED IN THE RAIL CAR IN COMPLIANCE WITH THE WEIGHT DISTRIBUTION REQUIREMENTS OF THE CAR. THE LOAD LIMIT OF A CAR MUST NOT BE EXCEEDED; LIKEWISE, THE LOAD IN ONE END OF A CAR MUST NOT EXCEED ONE-HALF OF THE LOAD LIMIT WHICH IS STENCILED ON THE OUTSIDE OF THE CAR.
- Q. IF AVAILABLE, VOID FILLER AS SPECIFIED WITHIN THE MATERIAL SPECIFICATIONS ON THIS PAGE MAY BE USED THROUGHOUT THIS DRAWING IN LIEU OF THE ANTI-SWAY BRACE ASSEMBLIES SPECIFIED. THE VOID FILLER WILL BE INSTALLED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
- R. WHEN REFERRING TO THE PALLET UNIT LENGTH OR WIDTH THE 35" DIMENSION OF THE PALLET BASE CONSTITUTES THE LENGTH AND THE 45-1/2" DIMENSION CONSTITUTES THE WIDTH.
- S. POWER DRIVEN STAPLES MAY BE USED AS ALTERNATIVE FASTENERS FOR NAILS WHEN CONSTRUCTING DUNNAGE ASSEMBLIES WHICH ARE TO BE USED IN THE DELINEATED BOX CAR 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.
- T. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENT MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4 MM AND ONE POUND EQUALS 0.454 KG.
- U. NOTICE: ALTHOUGH NONE OF THE DELINEATED CARLOADING PROCEDURES WITHIN THIS DRAWING SPECIFY METHODS THAT COVER MIXED-HEIGHT LOADS, MIXED-HEIGHT LOADS CAN BE SHIPPED. A BASIC OUTLOADING PROCEDURE WILL BE APPLIED FOR BLOCKING AND BRACING A MIXED-HEIGHT LOAD, PLUS THE FOLLOWING CRITERIA, AS APPLICABLE, WILL ALSO BE APPLIED.
1. WHEN SHIPPING A 2-TIER LOAD, THE LOWER-HEIGHT PALLET UNIT(S) WILL BE PLACED IN THE TOP TIER.
 2. THE PALLET UNITS THAT ARE ADJACENT TO THE CENTER GATES MUST ALL BE OF THE SAME HEIGHT (ALL OF THEM EITHER 6-LAYER OR 5-LAYER OR 4-LAYER PALLET UNITS.)
 3. REGARDING A 1-TIER LOAD OR A 2-TIER LOAD, A 4-LAYER PALLET UNIT WILL NOT BE LOADED IN A LOAD LONGITUDINALLY ADJACENT TO A 6-LAYER PALLET UNIT (A 4 IS ALRIGHT NEXT TO A 5 AND A 5 IS ALRIGHT NEXT TO A 6).
 4. WHEN SHIPPING A 1-TIER LOAD, EACH LOWER-HEIGHT PALLET UNIT THAT IS LONGITUDINALLY ADJACENT TO A HIGHER-HEIGHT PALLET UNIT WILL BE PLACED ON AN EMPTY PALLET. THE ADDITIONAL PALLET, WHICH WILL FUNCTION AS A "RISER", WILL BE STRAPPED TO THE LOWER-HEIGHT PALLET UNIT WITH TWO PIECES OF 1-1/4" WIDE BY .031" OR .035" THICK STEEL STRAPS.

(CONTINUED ON PAGE 3)



PALLET UNIT

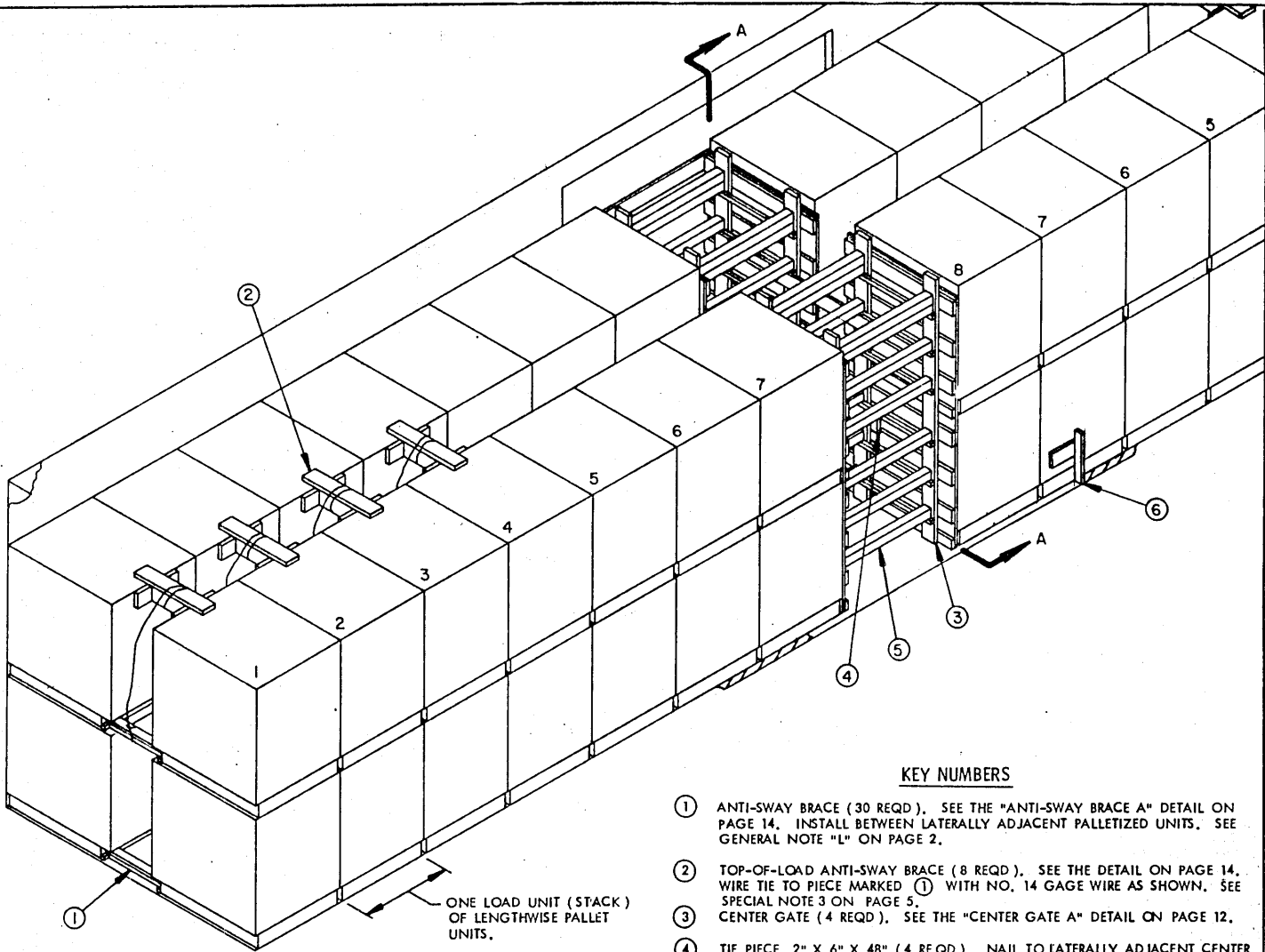
*GROSS WEIGHT (6-HIGH) ----- 2,378 LBS (APPROX).
 CUBE ----- 49.0 CU FT.

* WEIGHT SHOWN IS BASED ON A PALLET UNIT CONSISTING OF 36 BOXES OF EXPLOSIVES AT 64 LBS PER BOX. LOADS SHOWN WITHIN THIS DRAWING ARE BASED ON VARIOUS BOX WEIGHTS WHICH WILL DEPEND ON TYPE OF EXPLOSIVES BEING SHIPPED. TYPICAL BOX WEIGHTS VARY FROM 49 TO 64 POUNDS. REFER TO THE SPECIAL NOTES FOR EACH LOAD SHOWN FOR WEIGHTS, SIZES, AND NUMBER OF BOXES PER PALLET UNIT.

(GENERAL NOTES CONTINUED)

5. WHEN SHIPPING A 2-TIER LOAD, EACH HIGHER-HEIGHT PALLET UNIT THAT IS UNDER A LOWER-HEIGHT PALLET UNIT AND WHICH IS LONGITUDINALLY ADJACENT TO A STACK OF TWO HIGHER-HEIGHT PALLET UNITS WILL BE PLACED ON AN EMPTY PALLET. THE ADDITIONAL PALLET, WHICH WILL FUNCTION AS A "RISER", WILL BE STRAPPED TO THE HIGHER-HEIGHT PALLET UNIT WITH TWO PIECES OF 1-1/4" WIDE BY .031" OR .035" THICK STEEL STRAPS.

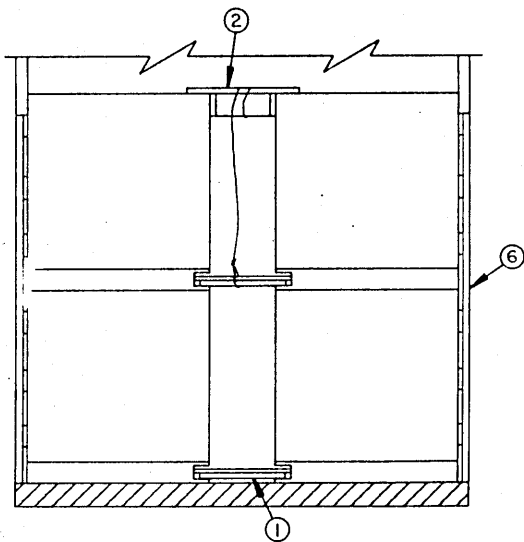
6. WHEN SHIPPING A 2-TIER MIXED-HEIGHT LOAD AND NAILED WOODEN "SWAY BRACING" IS REQUIRED, THE LOAD MUST BE BUILT SO THAT THE 2-HIGH UNITS THAT ARE LATERALLY ADJACENT TO EACH OTHER ARE IDENTICAL IN CONFIGURATION. THIS REQUIREMENT IS NECESSARY SO THAT THE SWAY BRACING AT THE BASE AND AT THE TOP OF THE SECOND TIER PALLET UNITS CAN BE PROPERLY INSTALLED. THIS CRITERION IS NOT A REQUIREMENT IF "VOID FILLER" TYPE SWAY BRACING IS BEING USED.



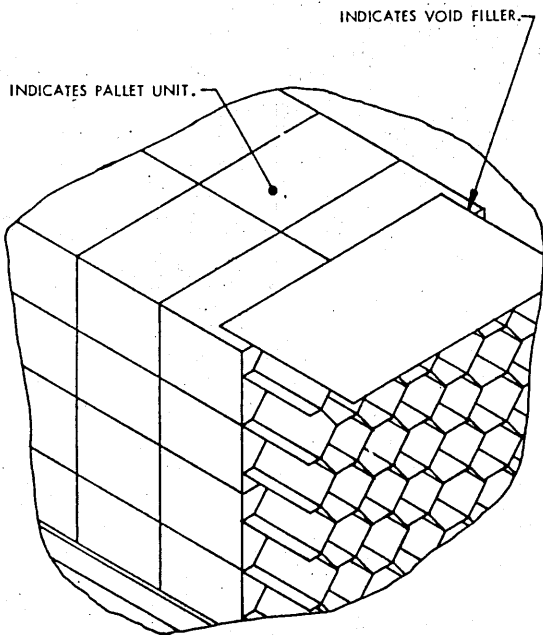
ISOMETRIC VIEW

KEY NUMBERS

- ① ANTI-SWAY BRACE (30 REQD). SEE THE "ANTI-SWAY BRACE A" DETAIL ON PAGE 14. INSTALL BETWEEN LATERALLY ADJACENT PALLETIZED UNITS. SEE GENERAL NOTE "L" ON PAGE 2.
- ② TOP-OF-LOAD ANTI-SWAY BRACE (8 REQD). SEE THE DETAIL ON PAGE 14. WIRE TIE TO PIECE MARKED ① WITH NO. 14 GAGE WIRE AS SHOWN. SEE SPECIAL NOTE 3 ON PAGE 5.
- ③ CENTER GATE (4 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 12.
- ④ TIE PIECE, 2" X 6" X 48" (4 REQD). NAIL TO LATERALLY ADJACENT CENTER GATES W/3-10d NAILS AT EACH END. INSTALL BELOW 2ND AND 4TH STRUT LEDGERS FROM TOP OF GATES.
- ⑤ STRUT, 4" X 4" BY CUT TO FIT (REF: 44") (28 REQD). NOTE THAT THE TOP LAYER CONSISTS OF DOUBLED STRUTS. TOENAIL TO PIECES MARKED ③ W/2-16d NAILS AT EACH END. SEE GENERAL NOTES "M" AND "N" ON PAGE 2. SEE SPECIAL NOTE 4 ON PAGE 5.
- ⑥ DOORWAY PROTECTION (2 REQD). SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 15. SEE SPECIAL NOTE 5 ON PAGE 5.



SECTION A-A



TYPICAL INSTALLATION OF VOID FILLER

IF VOID FILLER IS AVAILABLE, IT MAY BE USED IN LIEU OF ANTI-SWAY BRACE ASSEMBLIES. SEE GENERAL NOTE "Q" ON PAGE 2.

SPECIAL NOTES:

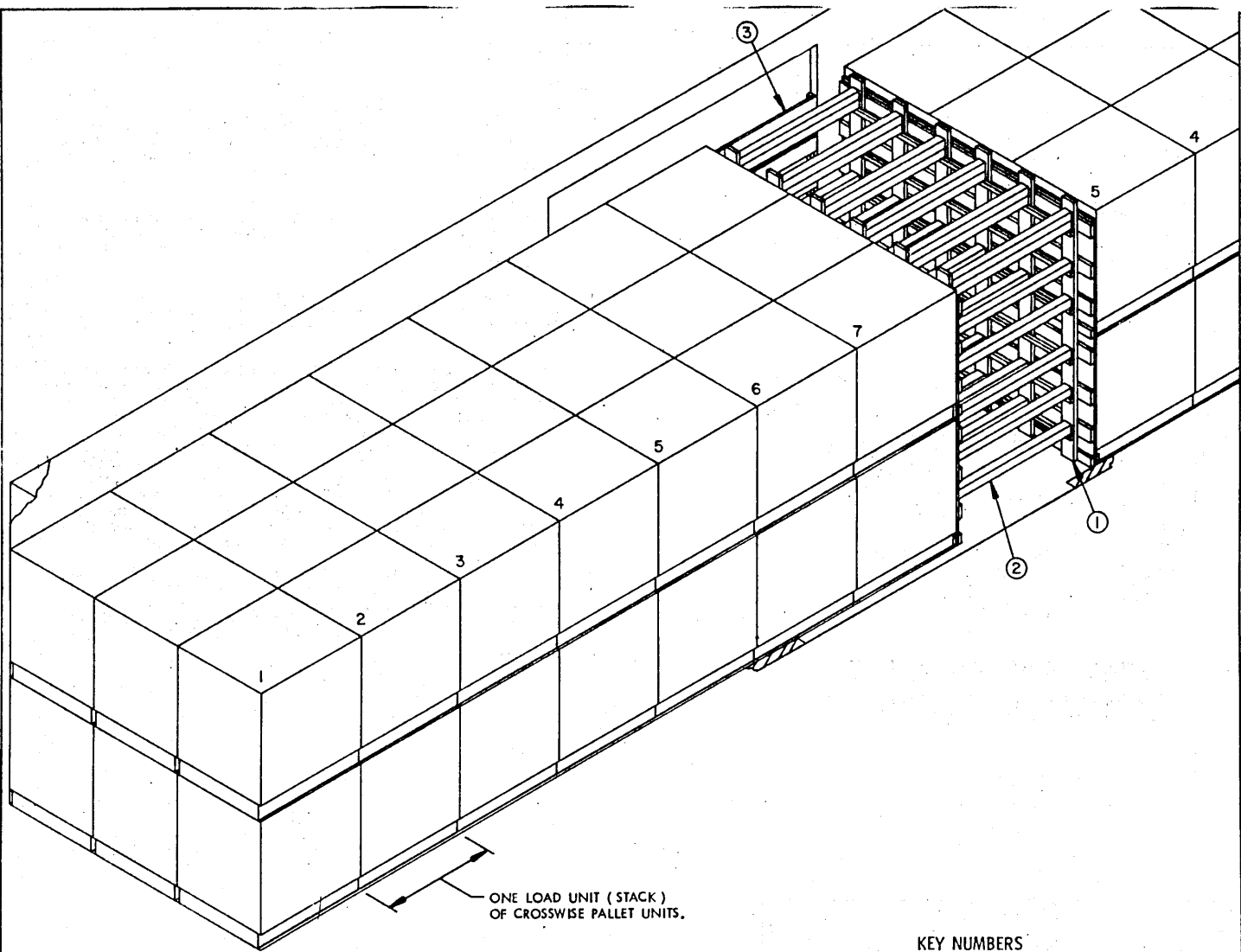
1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED. CARS HAVING DOOR OPENINGS LESS THAN 10 FEET WIDE ARE NOT RECOMMENDED. CARS WITH STAGGERED DOORS ARE NOT RECOMMENDED EITHER.
2. THE PALLETIZED UNIT SHOWN IN THE LOAD ON PAGE 4 IS BASED ON A 36-BOX UNIT AT 64 POUNDS PER BOX FOR A TOTAL WEIGHT OF 2,378 POUNDS PER PALLET UNIT. THE HEIGHT OF THE PALLET UNIT SHOWN IS APPROXIMATELY 50".
3. TOP-OF-LOAD ANTI-SWAY BRACES MUST BE INSTALLED IN EACH END OF A CAR. FOUR (4) BRACES ARE REQUIRED IN EACH END OF A 50'-6" LONG CAR AND FIVE (5) BRACES WILL BE REQUIRED IF A 60'-8" LONG CAR IS USED.
4. SIX (6) LOAD-BLOCKING 4" X 4" STRUTS FOR EACH ROW/TIER ARE ADEQUATE FOR RETAINING EIGHT (8) PALLET UNITS HAVING A WEIGHT OF NOT MORE THAN 2,378 POUNDS EACH. IF A 60'-8" LONG BY 9'-2" WIDE CAR IS USED, THE SAME PROCEDURES MAY BE USED WITH THE EXCEPTION THAT 4" X 6" STRUTS OR LAMINATED 4" X 4" AND 2" X 4" STRUTS WILL BE USED IN LIEU OF 4" X 4" STRUTS AS SPECIFIED. THE LOAD WILL CONSIST OF 40 PALLET UNITS IN ONE END OF THE CAR AND 32 LOAD UNITS IN THE OPPOSITE END. THIS WILL INCREASE THE QUANTITY SHIPPED TO 72 PALLET UNITS FOR A WEIGHT OF APPROXIMATELY 171,216 POUNDS. IF A LOAD IS SHIPPED WITH FOUR LESS PALLET UNITS THAN IN THE LOAD AS SHOWN, ONE SET OF STRUT BRACING WHICH IS SHOWN AS PIECES MARKED (3) AND (4) ON PAGE 8 MUST BE USED TO BRACE THE LOAD-BLOCKING STRUTS.
5. DOORWAY PROTECTION IS REQUIRED FOR ALL THE LOAD UNITS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OF A CAR OR WHICH EXTEND INTO THE DOORWAY BY ONE-HALF OR MORE OF THE UNIT LENGTH. IN LIEU OF THE SPECIFIED DOORWAY PROTECTION, ONE OF THE "ALTERNATIVE DOORWAY PROTECTION" METHODS DELINEATED ON PAGE 22 MAY BE USED, IF DESIRED.

BILL OF MATERIAL

| LUMBER | LINEAR FEET | BOARD FEET |
|---|-------------|------------|
| 1" X 4" | 125 | 42 |
| 1" X 6" | 120 | 60 |
| 2" X 2" | 257 | 86 |
| 2" X 3" | 36 | 18 |
| 2" X 4" | 162 | 108 |
| 2" X 6" | 214 | 214 |
| 4" X 4" | 103 | 138 |
| NAILS | NO. REQD | POUNDS |
| 6d (2") | 652 | 4 |
| 10d (3") | 600 | 9 |
| 12d (3-1/4") | 32 | 1/2 |
| 16d (3-1/2") | 112 | 2-1/2 |
| PLYWOOD, 1/2" X 48" X 8"----- 4 SHEETS REQD ----- | | 176 LBS |
| WIRE, NO. 14 GAGE ----- 96' REQD ----- | | 1-1/2 LBS |

LOAD AS SHOWN

| ITEM | QUANTITY | WEIGHT (APPROX) |
|--------------------|----------|----------------------|
| PALLET UNIT ----- | 60 ----- | 142,680 LBS |
| DUNNAGE ----- | ----- | 1,521 LBS |
| TOTAL WEIGHT ----- | | 144,201 LBS (APPROX) |



ISOMETRIC VIEW

ONE LOAD UNIT (STACK)
OF CROSSWISE PALLET UNITS.

KEY NUMBERS

- ① CENTER GATE (2 REQD). SEE THE "CENTER GATE B" DETAIL ON PAGE 13. SEE GENERAL NOTE "L" ON PAGE 2.
- ② STRUT, 4" X 4" BY CUT TO FIT (REF: 48") (42 REQD). NOTE THAT THE TOP LAYER CONSISTS OF DOUBLED STRUTS. TOENAIL TO PIECES MARKED ① W/2-16d NAILS AT EACH END. SEE GENERAL NOTES "M" AND "N" ON PAGE 2 AND SPECIAL NOTE 3 ON PAGE 7.
- ③ DOORWAY PROTECTION (2 REQD). SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 15. SEE SPECIAL NOTE 4 ON PAGE 7.

SPECIAL NOTES:

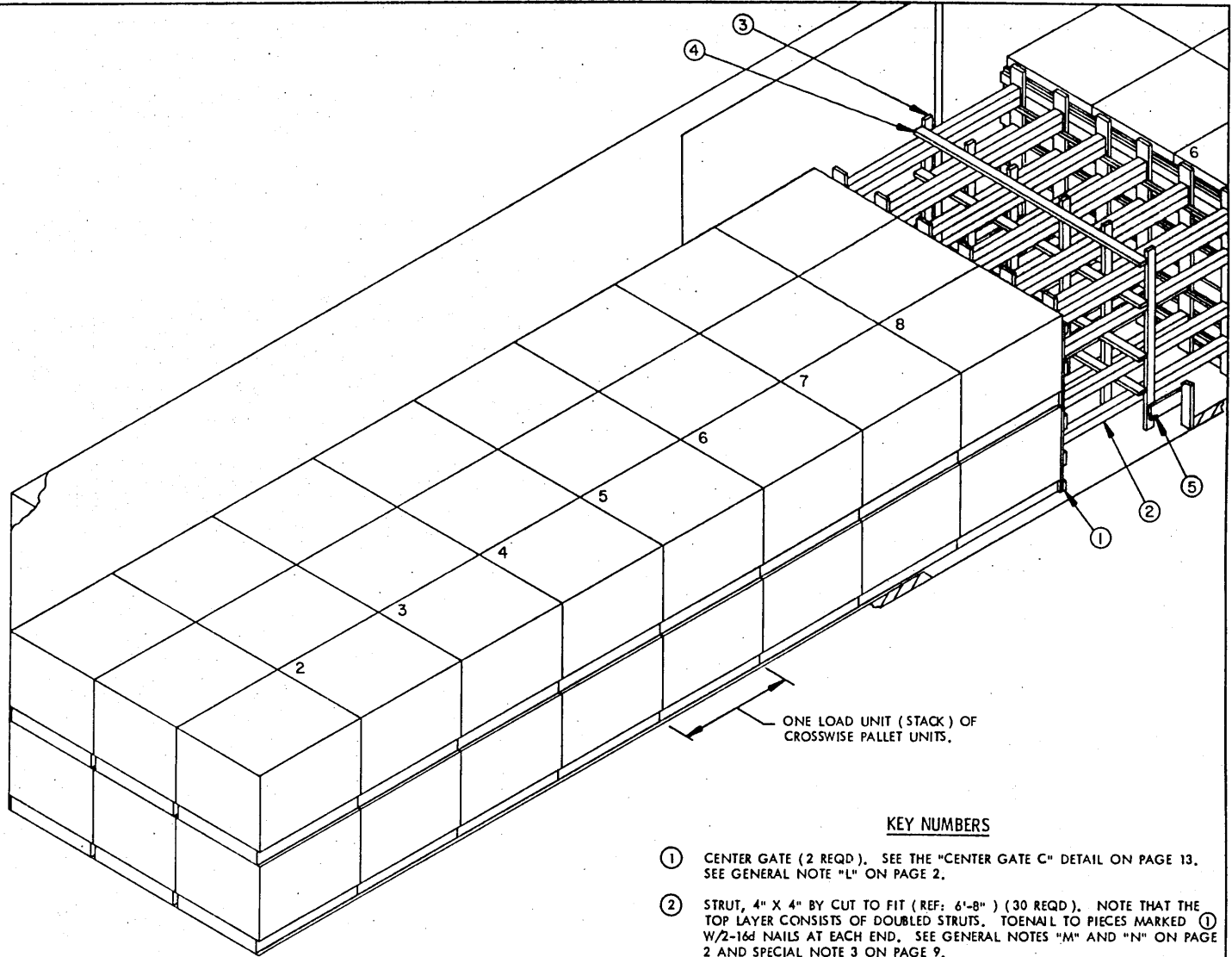
1. A 50'-6" LONG BY 9'-6" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. WIDER CARS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED. CARS HAVING DOOR OPENINGS THAT ARE LESS THAN 10 FEET WIDE ARE NOT RECOMMENDED FOR USE. CARS WITH STAGGERED DOORS ARE NOT RECOMMENDED EITHER. ALSO, THE LOADING PATTERN AS SHOWN SHOULD NOT BE USED IF A LONGER CAR THAN SHOWN IS TO BE USED.
2. THE PALLETIZED UNIT SHOWN IN THE LOAD ON PAGE 6 IS BASED ON A 36-BOX UNIT AT 54 POUNDS PER BOX FOR A TOTAL WEIGHT OF 2,018 POUNDS PER PALLET UNIT. THE HEIGHT OF THE PALLET UNIT SHOWN IS APPROXIMATELY 50".
3. SIX (6) LOAD-BLOCKING 4" X 4" STRUTS FOR EACH ROW/TIER ARE ADEQUATE FOR RETAINING NINE (9) PALLET UNITS HAVING A WEIGHT OF NOT MORE THAN 2,018 POUNDS EACH OR SEVEN (7) PALLET UNITS HAVING A WEIGHT OF NOT MORE THAN 2,378 POUNDS EACH. IF A LOAD IS SHIPPED WITH SIX LESS PALLET UNITS THAN IN THE LOAD AS SHOWN, TWO SETS OF STRUT BRACING WHICH IS SHOWN AS PIECES MARKED ③ AND ④ ON PAGE 8 MUST BE USED TO BRACE THE LOAD-BLOCKING STRUTS. IF A LOAD IS TO BE REDUCED BY MORE THAN SIX PALLET UNITS, A LOADING PATTERN DIFFERENT FROM THE ONE SHOWN ON PAGE 6 SHOULD BE SELECTED FOR THE LOAD.
4. DOORWAY PROTECTION IS REQUIRED FOR ALL THE LOAD UNITS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OF A CAR OR WHICH EXTEND INTO THE DOORWAY BY ONE-HALF OR MORE OF THE UNIT WIDTH. IN LIEU OF THE SPECIFIED DOORWAY PROTECTION, ONE OF THE "ALTERNATIVE DOORWAY PROTECTION" METHODS DELINEATED ON PAGE 22 MAY BE USED, IF DESIRED.

BILL OF MATERIAL

| LUMBER | LINEAR FEET | BOARD FEET |
|--|-------------|------------|
| 1" X 6" | 120 | 60 |
| 2" X 2" | 101 | 34 |
| 2" X 3" | 36 | 12 |
| 2" X 4" | 38 | 26 |
| 2" X 6" | 214 | 214 |
| 4" X 4" | 168 | 224 |
| NAILS | NO. REQD | POUNDS |
| 6d (2") | 296 | 1-3/4 |
| 10d (3") | 400 | 6 |
| 12d (3-1/4") | 32 | 1/2 |
| 16d (3-1/2") | 168 | 3-1/2 |
| PLYWOOD, 1/2" ----- 152 SQ FT REQD ----- 205 LBS | | |

LOAD AS SHOWN

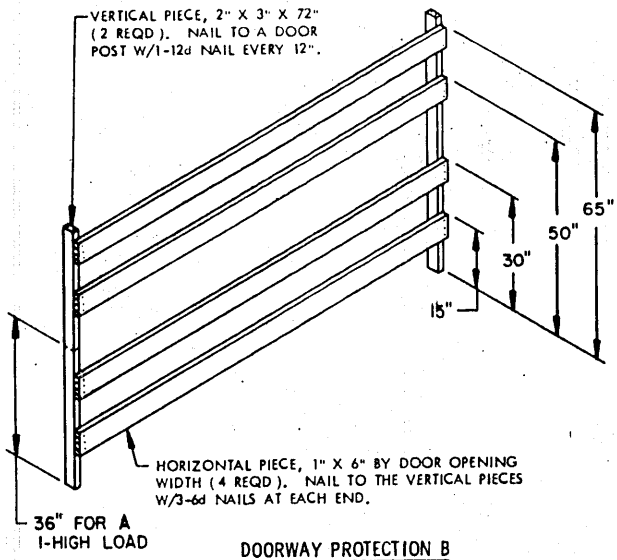
| ITEM | QUANTITY | WEIGHT (APPROX) |
|--------------------|----------|-----------------|
| PALLET UNIT ----- | 72 ----- | 145,296 LBS |
| DUNNAGE ----- | | 1,357 LBS |
| TOTAL WEIGHT ----- | | 146,653 LBS |



ISOMETRIC VIEW

KEY NUMBERS

- ① CENTER GATE (2 REQD). SEE THE "CENTER GATE C" DETAIL ON PAGE 13. SEE GENERAL NOTE "L" ON PAGE 2.
- ② STRUT, 4" X 4" BY CUT TO FIT (REF: 6'-8") (30 REQD). NOTE THAT THE TOP LAYER CONSISTS OF DOUBLED STRUTS. TOENAIL TO PIECES MARKED ① W/2-16d NAILS AT EACH END. SEE GENERAL NOTES "M" AND "N" ON PAGE 2 AND SPECIAL NOTE 3 ON PAGE 9.
- ③ VERTICAL STRUT BRACING, 2" X 4" X 72" (6 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT. SEE GENERAL NOTE "M" ON PAGE 2. SEE SPECIAL NOTE 4 ON PAGE 9.
- ④ HORIZONTAL STRUT BRACING, 2" X 4" BY CAR WIDTH .MINUS 13" (4 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.
- ⑤ DOORWAY PROTECTION (2 REQD). SEE THE "DOORWAY PROTECTION B" DETAIL ON PAGE 9. SEE SPECIAL NOTE 5 ON PAGE 9.



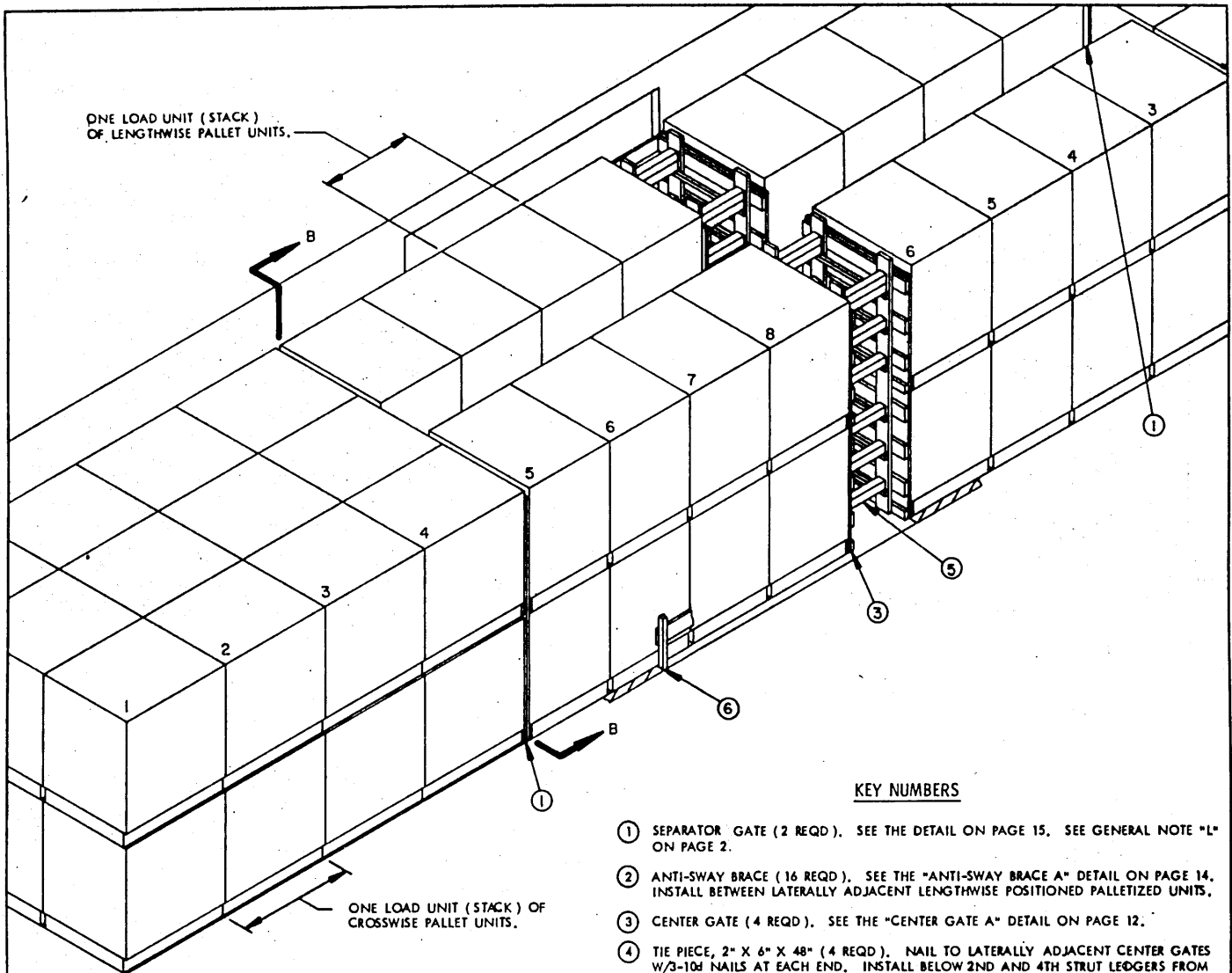
SPECIAL NOTES:

1. A 60'-8" LONG BY 9'-6" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. WIDER CARS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED. CARS HAVING DOOR OPENINGS THAT ARE LESS THAN 10 FEET WIDE ARE NOT RECOMMENDED FOR USE. CARS WITH STAGGERED DOORS ARE NOT RECOMMENDED EITHER.
2. THE PALLETIZED UNIT SHOWN IN THE LOAD ON PAGE 8 IS BASED ON A 24-BOX UNIT AT 64 POUNDS PER BOX FOR A TOTAL WEIGHT OF 1,608 POUNDS PER PALLET UNIT. THE HEIGHT OF THE UNIT SHOWN IS APPROXIMATELY 35-1/4".
3. FOUR (4) LOAD-BLOCKING STRUTS FOR EACH ROW/TIER ARE ADEQUATE FOR RETAINING EIGHT (8) PALLET UNITS HAVING A WEIGHT OF NOT MORE THAN 1,608 POUNDS EACH.
4. VERTICAL AND HORIZONTAL STRUT BRACING IS REQUIRED WHEN STRUTS ARE LONGER THAN 48". SEE GENERAL NOTE "M" ON PAGE 2. THE SET OF STRUT BRACING PIECES (MARKED ③ AND ④) IS NOT REQUIRED IF SIX MORE PALLET UNITS THAN THE QUANTITY SHOWN ARE LOADED INTO A CAR FOR SHIPMENT. IF SIX MORE PALLET UNITS ARE LOADED INTO A CAR, THEY ARE TO BE PLACED SO THAT THE FINISHED LOAD HAS 8 LOAD UNITS IN ONE END OF THE CAR (AS SHOWN ON PAGE 8) AND 7 LOAD UNITS IN THE OTHER END OF THE CAR. THE CAPACITY OF THE CAR (WEIGHTWISE) THAT IS BEING USED AND THE QUANTITY OF PALLET UNITS TO BE SHIPPED WILL CONTROL THE LOAD CONFIGURATION; HOWEVER, 90 PALLET UNITS INSTEAD OF 84 SHOULD BE LOADED FOR SHIPMENT WHENEVER POSSIBLE WHEN USING THE PROCEDURES SPECIFIED ON THIS PAGE AND ON PAGE 8. NOTE THAT IF LESS THAN 84 PALLET UNITS ARE TO BE SHIPPED, A LOADING PATTERN DIFFERENT FROM THE ONE SHOWN ON PAGE 8 SHOULD BE SELECTED FOR THE LOAD.
5. DOORWAY PROTECTION IS REQUIRED FOR ALL THE LOAD UNITS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OF A CAR OR WHICH EXTEND INTO THE DOORWAY BY ONE-HALF OR MORE OF THE UNIT WIDTH. IN LIEU OF THE SPECIFIED DOORWAY PROTECTION, ONE OF THE "ALTERNATIVE DOORWAY PROTECTION" METHODS DELINEATED ON PAGE 22 MAY BE USED, IF DESIRED.

| BILL OF MATERIAL | | |
|---|-------------|------------|
| LUMBER | LINEAR FEET | BOARD FEET |
| 1" X 6" | 80 | 40 |
| 2" X 2" | 68 | 23 |
| 2" X 3" | 28 | 14 |
| 2" X 4" | 89 | 60 |
| 2" X 6" | 148 | 148 |
| 4" X 4" | 225 | 300 |
| NAILS | NO. REQD | POUNDS |
| 6d (2") | 188 | 1 |
| 10d (3") | 232 | 3-1/2 |
| 12d (3-1/4") | 24 | 1/2 |
| 16d (3-1/2") | 120 | 2-1/2 |
| PLYWOOD, 1/2" ----- 114 SQ FT REQD ---- 157 LBS | | |

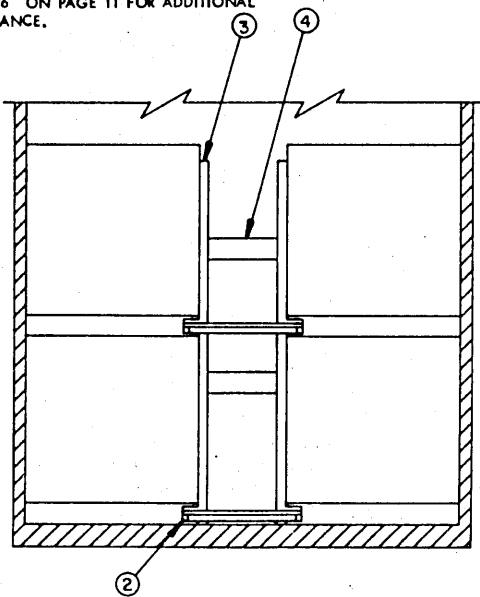
LOAD AS SHOWN

| ITEM | QUANTITY | WEIGHT (APPROX) |
|--------------------|----------|-----------------|
| PALLET UNIT ----- | 84 ----- | 135,072 LBS |
| DUNNAGE ----- | | 1,335 LBS |
| TOTAL WEIGHT ----- | | 136,407 LBS |



ISOMETRIC VIEW

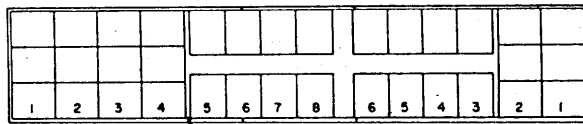
SEE THE PLAN VIEW AND SPECIAL NOTES 3 AND 6 ON PAGE 11 FOR ADDITIONAL GUIDANCE.



SECTION B-B

KEY NUMBERS

- ① SEPARATOR GATE (2 REQD). SEE THE DETAIL ON PAGE 15. SEE GENERAL NOTE "L" ON PAGE 2.
- ② ANTI-SWAY BRACE (16 REQD). SEE THE "ANTI-SWAY BRACE A" DETAIL ON PAGE 14. INSTALL BETWEEN LATERALLY ADJACENT LENGTHWISE POSITIONED PALLETIZED UNITS.
- ③ CENTER GATE (4 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 12.
- ④ TIE PIECE, 2" X 6" X 48" (4 REQD). NAIL TO LATERALLY ADJACENT CENTER GATES W/3-10d NAILS AT EACH END. INSTALL BELOW 2ND AND 4TH STRUT LEADERS FROM TOP OF GATES.
- ⑤ STRUT, 4" X 4" BY CUT TO FIT (REF. 27") (28 REQD). NOTE THAT THE TOP LAYER CONSISTS OF DOUBLED STRUTS. TOENAIL TO PIECES MARKED ③ W/2-16d NAILS AT EACH END. SEE GENERAL NOTES "M" AND "N" ON PAGE 2. SEE SPECIAL NOTE 4 ON PAGE 11.
- ⑥ DOORWAY PROTECTION (2 REQD). SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 15. SEE SPECIAL NOTE 5 ON PAGE 11.



INDICATES SPALE WHERE SEPARATOR GATE WILL BE POSITIONED.

PLAN VIEW

DUNNAGE HAS NOT BEEN SHOWN FOR CLARITY PURPOSES.

SPECIAL NOTES:

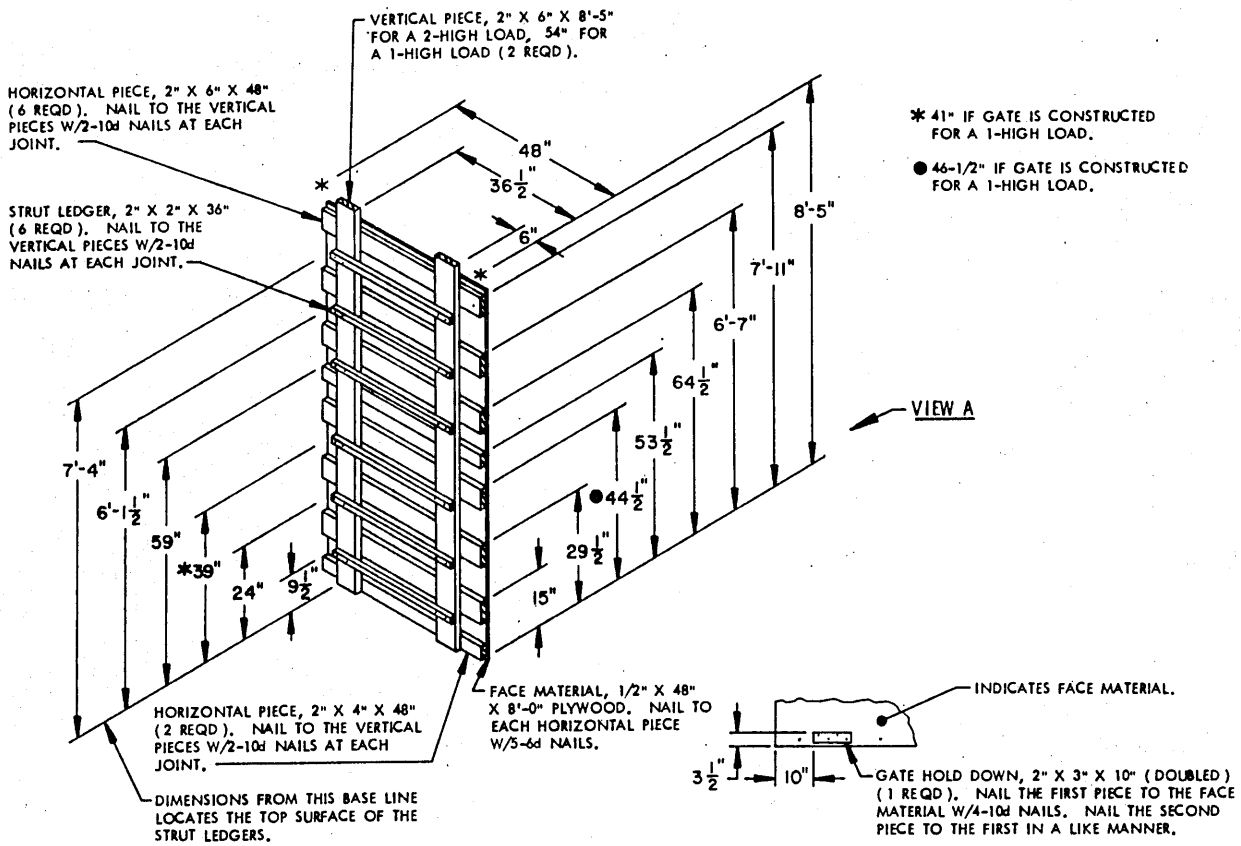
1. A 50'-6" LONG BY 9'-6" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. WIDER CARS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS MAY BE USED. CARS HAVING DOOR OPENINGS THAT ARE LESS THAN 10 FEET WIDE ARE NOT RECOMMENDED FOR USE. CARS WITH STAGGERED DOORS ARE NOT RECOMMENDED EITHER.
2. THE PALLETIZED UNIT SHOWN IN THE LOAD ON PAGE 10 IS BASED ON A 36-BOX UNIT AT 59 POUNDS PER BOX FOR A TOTAL WEIGHT OF 2,198 POUNDS PER PALLET UNIT. THE HEIGHT OF THE PALLET UNIT SHOWN IS APPROXIMATELY 50".
3. THE PLAN VIEW AT THE LEFT HAS BEEN PROVIDED TO SHOW THE POSITIONING OF THE PALLET UNITS IN A CAR. DUNNAGE HAS INTENTIONALLY NOT BEEN SHOWN. REFER TO THE ISOMETRIC VIEW AND KEY NUMBERS ON PAGE 10. THE LOADING PATTERN AS SHOWN CAN BE ADJUSTED AS REQUIRED TO SUIT THE QUANTITY AND/OR LOAD BY WEIGHT THAT IS TO BE SHIPPED IN A CAR (LESS CROSSWISE UNITS AND MORE LENGTHWISE UNITS, FOR EXAMPLE).
4. SIX (6) LOAD-BLOCKING 4" X 4" STRUTS FOR EACH ROW/TIER ARE ADEQUATE FOR RETAINING TEN (10) PALLET UNITS HAVING A WEIGHT OF NOT MORE THAN 2,198 POUNDS EACH. IF A LOAD IS SHIPPED WITH FOUR OR SIX LESS PALLET UNITS THAN IN THE LOAD AS SHOWN, A SET OF STRUT BRACING WHICH IS SHOWN AS PIECES ③ AND ④ ON PAGE 8 MUST BE USED TO BRACE THE LOAD-BLOCKING STRUTS. IF A LOAD IS TO BE REDUCED BY MORE THAN FOUR OR SIX PALLET UNITS, THE LOADING PATTERN SHOULD BE ADJUSTED AS PERMITTED BY SPECIAL NOTE 3 ABOVE.
5. DOORWAY PROTECTION IS REQUIRED FOR ALL THE LOAD UNITS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OF A CAR OR WHICH EXTEND INTO THE DOORWAY BY ONE-HALF OR MORE OF THE UNIT LENGTH. IN LIEU OF THE SPECIFIED DOORWAY PROTECTION, ONE OF THE "ALTERNATIVE DOORWAY PROTECTION" METHODS DELINEATED ON PAGE 22 MAY BE USED, IF DESIRED.
6. IF DESIRED OR IF NECESSARY TO CONFORM WITH REQUIREMENTS SET FORTH BY GENERAL NOTE "P" ON PAGE 2, THE CENTER BLOCKING (CENTER GATES AND STRUTS) CAN BE SHIFTED ONE "LOAD UNIT" TOWARD THE "HEAVY" END OF THE LOAD. THIS WILL NECESSITATE THE SHIFTING OF THE 4-PALLET STACK MARKED AS "STACK B" TOWARD THE "LIGHT" END OF THE LOAD.

BILL OF MATERIAL

| LUMBER | LINEAR FEET | BOARD FEET |
|---|-------------|------------|
| 1" X 4" | 105 | 35 |
| 1" X 6" | 120 | 60 |
| 2" X 2" | 171 | 57 |
| 2" X 3" | 36 | 18 |
| 2" X 4" | 91 | 61 |
| 2" X 6" | 180 | 180 |
| 4" X 4" | 63 | 84 |
| NAILS | NO. REQD | POUNDS |
| .6d (2") | 504 | 3 |
| 10d (3") | 376 | 5-3/4 |
| 12d (3-1/4") | 32 | 1/2 |
| 16d (3-1/2") | 112 | 2-1/2 |
| PLYWOOD, 1/2" X 48" X 8'-0" ----- 8 SHEETS REQD --- 352 LBS | | |

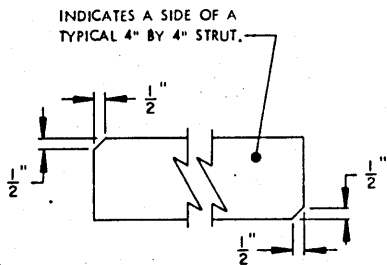
LOAD AS SHOWN

| ITEM | QUANTITY | WEIGHT (APPROX) |
|-------------|----------|----------------------------|
| PALLET UNIT | 68 | 149,464 LBS |
| DUNNAGE | | 1,354 LBS |
| | | TOTAL WEIGHT - 150,818 LBS |

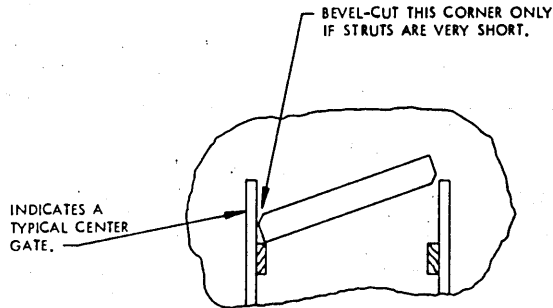


CENTER GATE A

VIEW A



BEVEL CUTTING THE STRUTS AS SPECIFIED WILL FACILITATE INSTALLING THE STRUTS WITH A "DRIVE FIT". CAUTION: DO NOT BEVEL A CORNER MORE THAN ONE-HALF INCH (1/2").



SEE GENERAL NOTES "M" AND "N" ON PAGE 2 FOR ADDITIONAL STRUT INSTALLATION GUIDANCE.

- * 41" IF GATE IS CONSTRUCTED FOR A 1-HIGH LOAD.
- 46-1/2" IF GATE IS CONSTRUCTED FOR A 1-HIGH LOAD.

VERTICAL PIECE, 2" X 6" X 8'-5" FOR A 2-HIGH LOAD, 54" FOR A 1-HIGH LOAD (6 REQD).

HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH MINUS 1" (6 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

DIMENSIONS FROM THIS BASE LINE LOCATES THE TOP SURFACE OF THE STRUT LEDGERS.

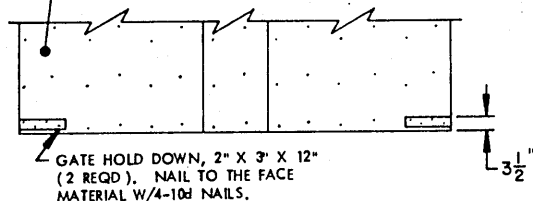
STRUT LEDGER, 2" X 2" BY CAR WIDTH MINUS 13" (6 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

HORIZONTAL PIECE, 2" X 4" BY CAR WIDTH MINUS 1" (2 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

GATE HOLD-DOWN. SEE "VIEW B" AT THE LEFT.

FACE MATERIAL, 1/2" X 48" X 8'-0" (2 REQD) AND 1/2" X 17" X 8'-0" (1 REQD) PLYWOOD. NAIL TO THE HORIZONTAL PIECES W/1-6d NAIL EVERY 8".

INDICATES FACE MATERIAL.



VIEW B

- * 26-1/2" IF GATE IS CONSTRUCTED FOR A 1-HIGH LOAD.
- 32" IF GATE IS CONSTRUCTED FOR A 1-HIGH LOAD.

HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH MINUS 1" (4 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

DIMENSIONS FROM THIS BASE LINE LOCATES THE TOP SURFACE OF THE STRUT LEDGERS.

STRUT LEDGER, 2" X 2" BY CAR WIDTH MINUS 13" (4 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

VERTICAL PIECE, 2" X 6" X 72" FOR A 2-HIGH LOAD, 42" FOR A 1-HIGH LOAD (6 REQD).

HORIZONTAL PIECE, 2" X 4" BY CAR WIDTH MINUS 1" (1 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

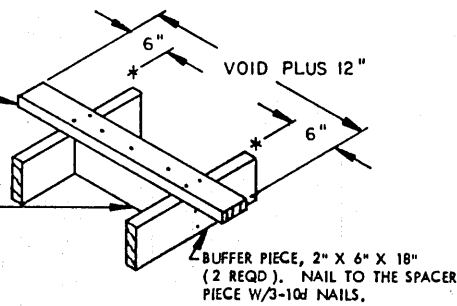
GATE HOLD-DOWN. SEE "VIEW B" ON THIS PAGE FOR SPECIFICATIONS.

FACE MATERIAL, 1/2" X 48" X 72" (2 REQD) AND 1/2" X 17" X 72" (1 REQD) PLYWOOD. NAIL TO THE HORIZONTAL PIECES W/1-6d NAIL EVERY 8".

CENTER GATE C

SUPPORT PIECE, 2" X 4" BY A LENGTH TO SUIT (1 REQD). NAIL TO THE SPACER PIECE W/4-10d NAILS AND TO THE BUFFER PIECES W/2-10d NAILS AT EACH JOINT.

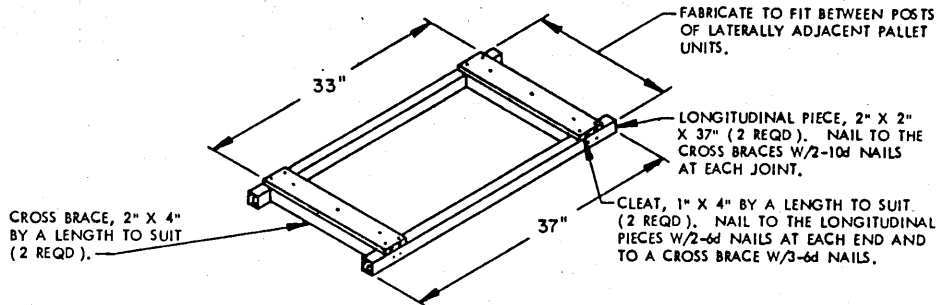
SPACER PIECE, 2" X 6" BY A LENGTH TO SUIT (1 REQD).



TOP-OF-LOAD ANTI-SWAY BRACE

SEE NOTE * BELOW.

* WHEN FABRICATING AND/OR INSTALLING ANY OF THE SPECIFIED "SWAY BRACING" ASSEMBLIES, IT IS PERMITTED TO HAVE A LOOSE FIT BETWEEN AN ASSEMBLY AND THE PALLET UNITS BEING BRACED. THE LOOSENESS OF THE FIT SHOULD BE SUCH THAT NOT MORE THAN ONE INCH OF UNBLOCKED VOID IS ALLOWED.

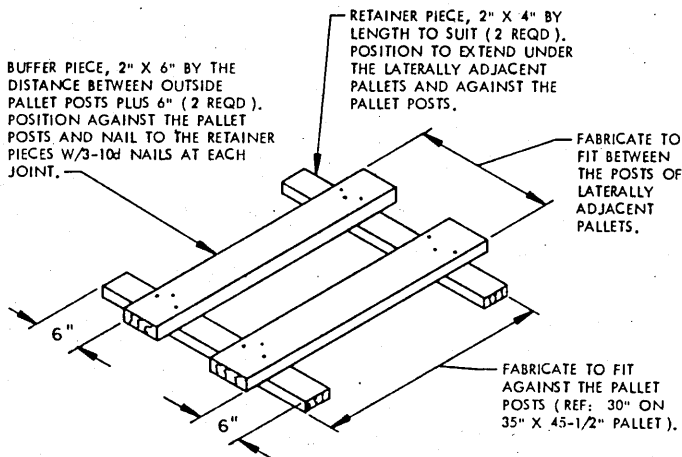


ANTI-SWAY BRACE A

SEE NOTE * ABOVE.

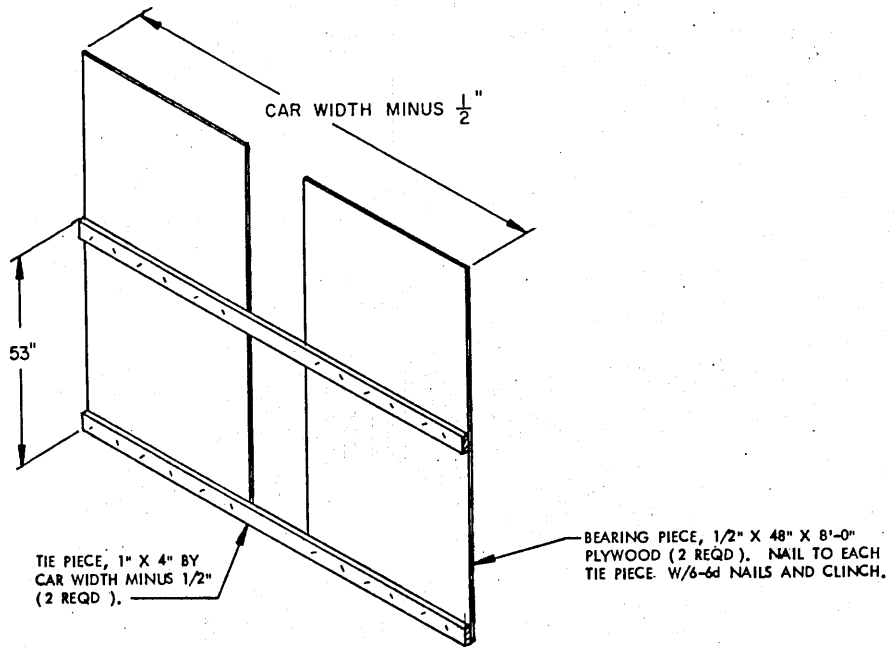
SPECIAL NOTES:

1. THE ANTI-SWAY BRACE B IS FOR USE BETWEEN PALLET UNITS THAT ARE LOADED 2-WIDE AND POSITIONED WITH THE PALLET WIDTH PARALLEL TO THE CAR SIDEWALL.
2. THE ASSEMBLY MUST BE FABRICATED IN PLACE BETWEEN PALLETS.
 - A. POSITION THE FIRST RETAINER PIECE BETWEEN THE CENTER PALLET POST AND THE PALLET POST WHICH IS FURTHEST AWAY. THE RETAINER PIECE IS TO SPAN THE VOID BETWEEN LATERALLY ADJACENT PALLETS.
 - B. POSITION THE SECOND RETAINER PIECE AGAINST THE INSIDE OF THE NEAREST PALLET POST SO AS TO SPAN THE VOID BETWEEN LATERALLY ADJACENT PALLETS.
 - C. POSITION THE FIRST BUFFER PIECE AGAINST THE PALLET POSTS AND EXTENDING 3" BEYOND THE FURTHEST RETAINER PIECE. NAIL TO THE RETAINER PIECE W/3-10d NAILS. POSITION THE SECOND BUFFER PIECE AGAINST THE PALLET POSTS ON THE OPPOSITE SIDE AND EXTENDING 3" BEYOND THE FURTHEST RETAINER PIECE. NAIL TO THE RETAINER PIECE W/3-10d NAILS.
 - D. PUSH THE PARTIAL ASSEMBLY FORWARD UNTIL THE FIRST RETAINER PIECE CONTACTS THE PALLET POST ON THE FAR SIDE OF THE PALLET. NAIL THE BUFFER PIECES TO THE SECOND RETAINER PIECE W/3-10d NAILS AT EACH JOINT.



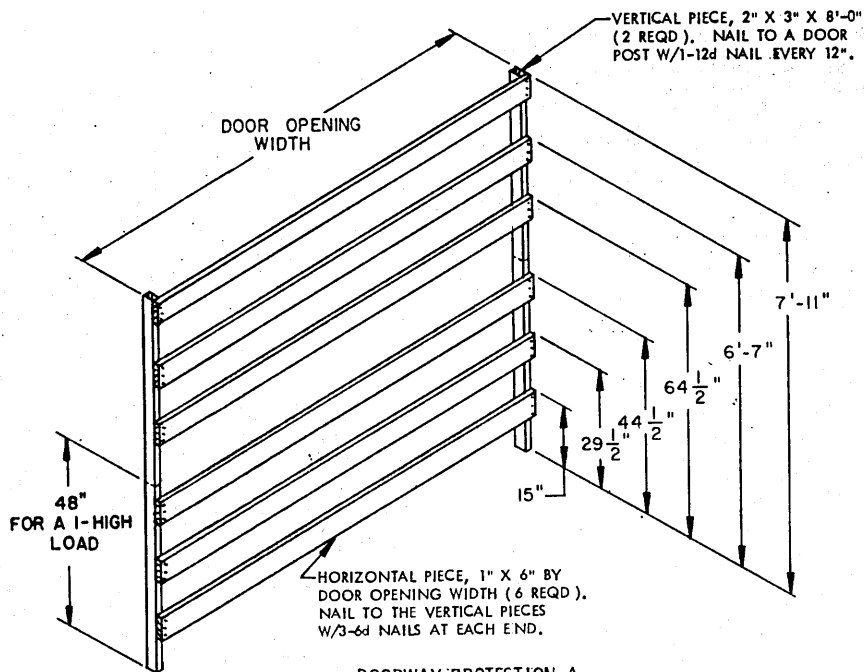
ANTI-SWAY BRACE B

SEE SPECIAL NOTES TO THE RIGHT AND NOTE * ABOVE.



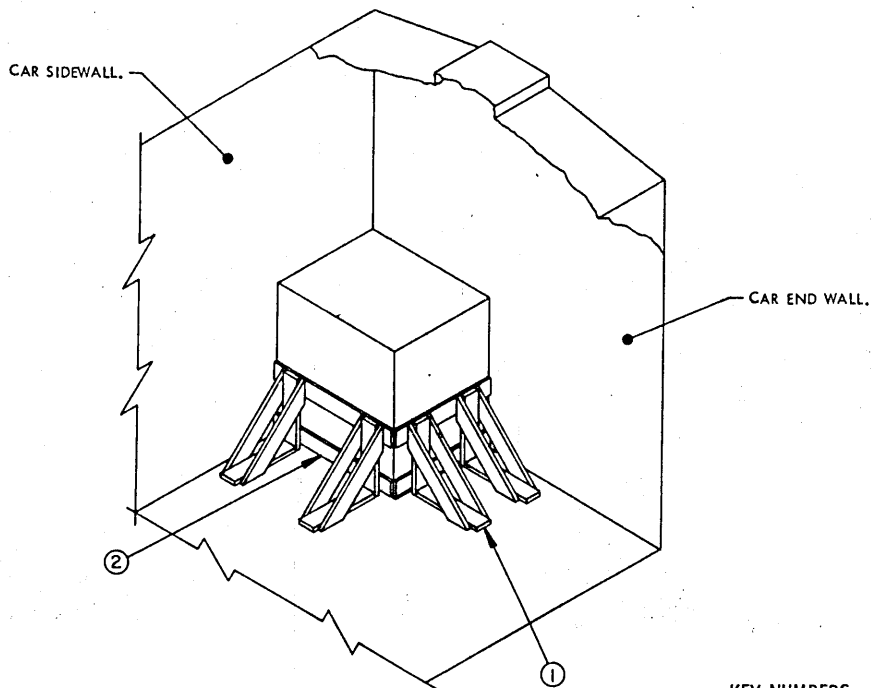
SEPARATOR GATE

THE HEIGHT OF THE UPPER "TIE PIECE" MUST BE ADJUSTED AS REQUIRED WHEN SHIPPING 4-LAYER AND 5-LAYER PALLET UNITS. WHEN SHIPPING A 1-TIER LOAD, THE UPPER "TIE PIECE" WILL BE POSITIONED SO AS TO BE ABOVE THE LOAD. ALSO WHEN SHIPPING A 1-TIER LOAD THE HEIGHT OF PLYWOOD PIECES WILL BE REDUCED TO MATCH THE HEIGHT OF THE LOAD BEING SHIPPED.



DOORWAY PROTECTION A

WHEN SHIPPING 4-LAYER AND 5-LAYER PALLET UNITS, THE HEIGHT OF THE HORIZONTAL PIECES WILL BE ADJUSTED ACCORDINGLY AND AS REQUIRED SO THAT THESE PIECES WILL PROVIDE PROPER BLOCKING, AND BLOCKING THAT IS EVENLY SPACED ON THE HEIGHTS OF THE PALLET UNITS.



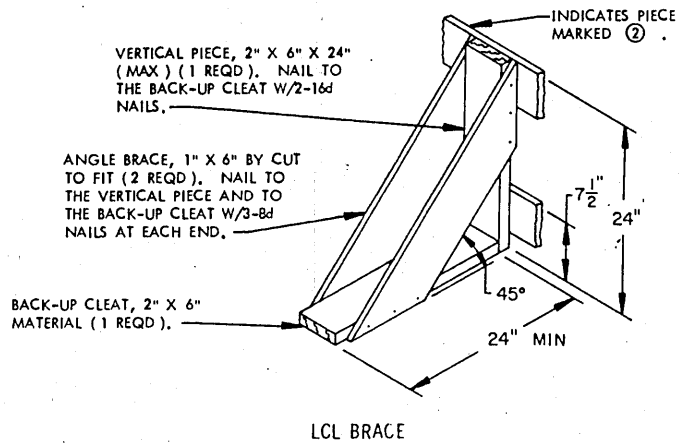
ISOMETRIC VIEW

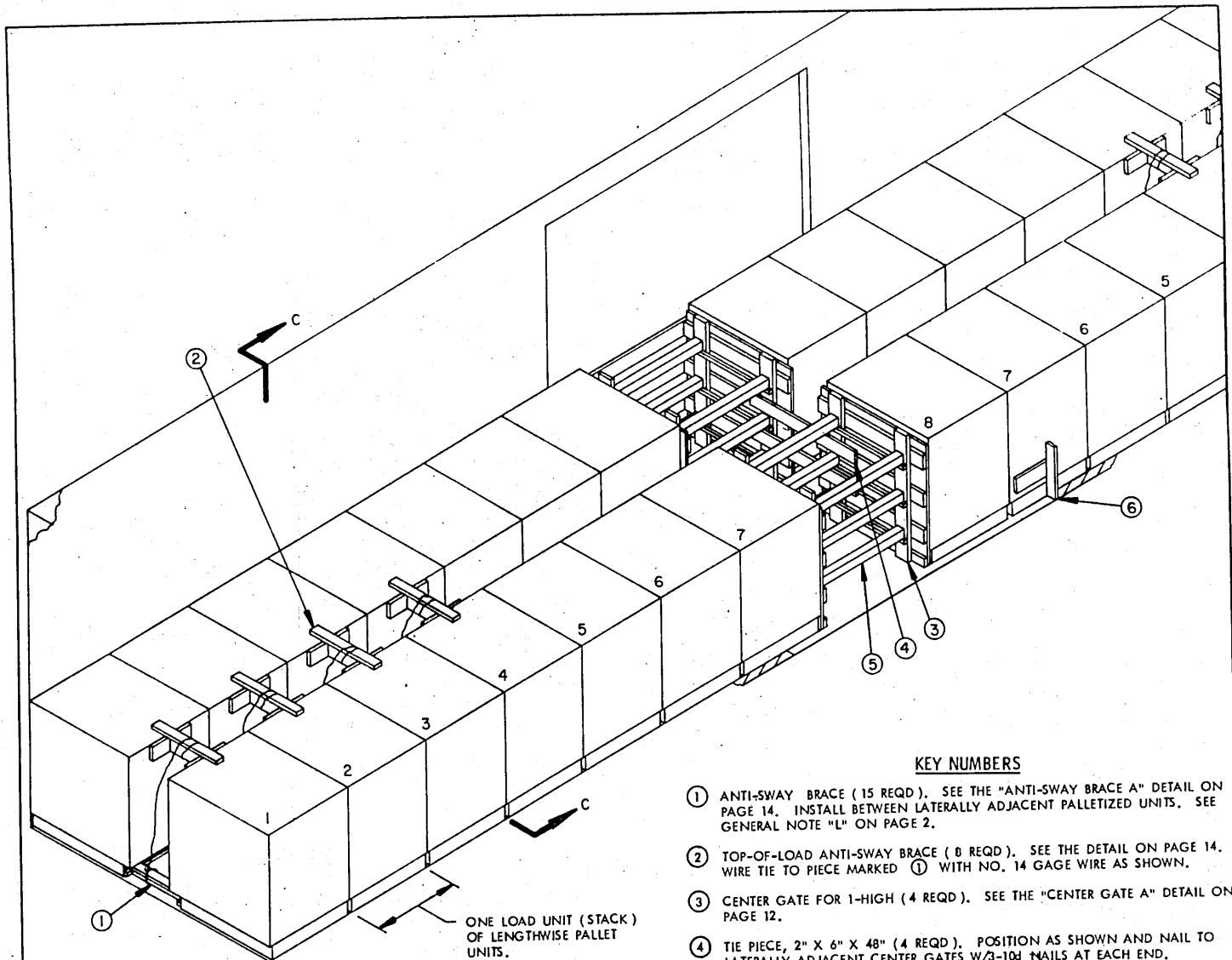
SPECIAL NOTES:

1. AN 8'-6" WIDE CONVENTIONAL TYPE BOX CAR HAVING A WOOD OR NAILABLE METAL FLOOR IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED.
2. THE TYPICAL PALLETIZED UNIT SHOWN IS BASED ON A 36-BOX UNIT AT 64 POUNDS PER BOX. THIS PROCEDURE IS APPLICABLE TO ANY SIZE OR WEIGHT PALLET UNIT OF BULK EXPLOSIVES PACKED IN FIBERBOARD BOXES.
3. EACH LCL BRACE AS APPLIED FOR LONGITUDINAL BRACING WILL RETAIN 2,000 POUNDS OF LADING. A MINIMUM OF TWO (2) BRACES MUST BE USED FOR LONGITUDINAL BRACING. EACH LCL BRACE AS APPLIED FOR LATERAL BRACING WILL SUPPORT 3,000 POUNDS OF LADING. A MINIMUM OF TWO (2) BRACES IS REQUIRED. FOR EXAMPLE, IF TWO PALLET UNITS AS DESCRIBED WITHIN SPECIAL NOTE 2 ABOVE ARE TO BE SHIPPED, THREE LCL BRACES BLOCKING AGAINST LONGITUDINAL MOVEMENT AND TWO BRACES BLOCKING AGAINST LATERAL MOVEMENT ARE REQUIRED. NOTE THAT FOR MULTI-LENGTH LOADS, NO LESS THAN ONE LCL BRACE WILL BE USED PER PALLET FOR LATERAL BLOCKING (A 3-LONG LOAD REQUIRES THREE LCL BRACES FOR LATERAL BLOCKING). SEE PAGE 20 FOR ADDITIONAL GUIDANCE.

KEY NUMBERS

- ① LCL BRACE (4 REQD). SEE THE DETAIL BELOW. NAIL EACH LONGITUDINAL BRACE TO THE CAR FLOOR W/7-16d NAILS AND NAIL EACH LATERAL BRACE TO THE CAR FLOOR W/3-16d NAILS. SEE GENERAL NOTE "L" ON PAGE 2.
- ② BEARING PIECE, 1" X 6" BY UNIT LENGTH OR WIDTH (4 REQD, 2 EACH DIMENSION). 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 BELOW FOR LOCATION GUIDANCE.





ISOMETRIC VIEW

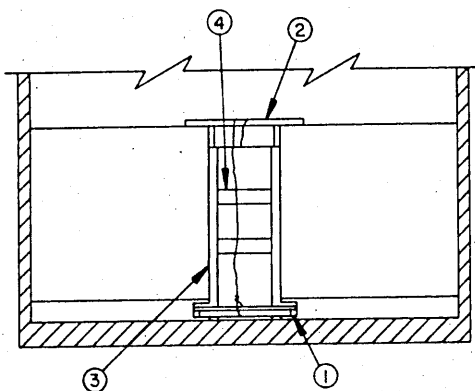
ONE LOAD UNIT (STACK OF LENGTHWISE PALLET UNITS).

KEY NUMBERS

- ① ANTI-SWAY BRACE (15 REQD). SEE THE "ANTI-SWAY BRACE A" DETAIL ON PAGE 14. INSTALL BETWEEN LATERALLY ADJACENT PALLETIZED UNITS. SEE GENERAL NOTE "L" ON PAGE 2.
- ② TOP-OF-LOAD ANTI-SWAY BRACE (8 REQD). SEE THE DETAIL ON PAGE 14. WIRE TIE TO PIECE MARKED ① WITH NO. 14 GAGE WIRE AS SHOWN.
- ③ CENTER GATE FOR 1-HIGH (4 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 12.
- ④ TIE PIECE, 2" X 6" X 48" (4 REQD). POSITION AS SHOWN AND NAIL TO LATERALLY ADJACENT CENTER GATES W/3-10d NAILS AT EACH END.
- ⑤ STRUT, 4" X 4" BY CUT TO FIT (REF: 44") (12 REQD). TOENAIL TO PIECES MARKED ③ W/2-16d NAILS AT EACH END. SEE GENERAL NOTES "M" AND "N" ON PAGE 2. SEE SPECIAL NOTE 5 BELOW.
- ⑥ DOORWAY PROTECTION FOR 1-HIGH (2 REQD). SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 15. IN LIEU OF THE SPECIFIED DOORWAY PROTECTION, ONE OF THE "ALTERNATIVE DOORWAY PROTECTION" METHODS DELINEATED ON PAGE 22 MAY BE USED IF DESIRED.

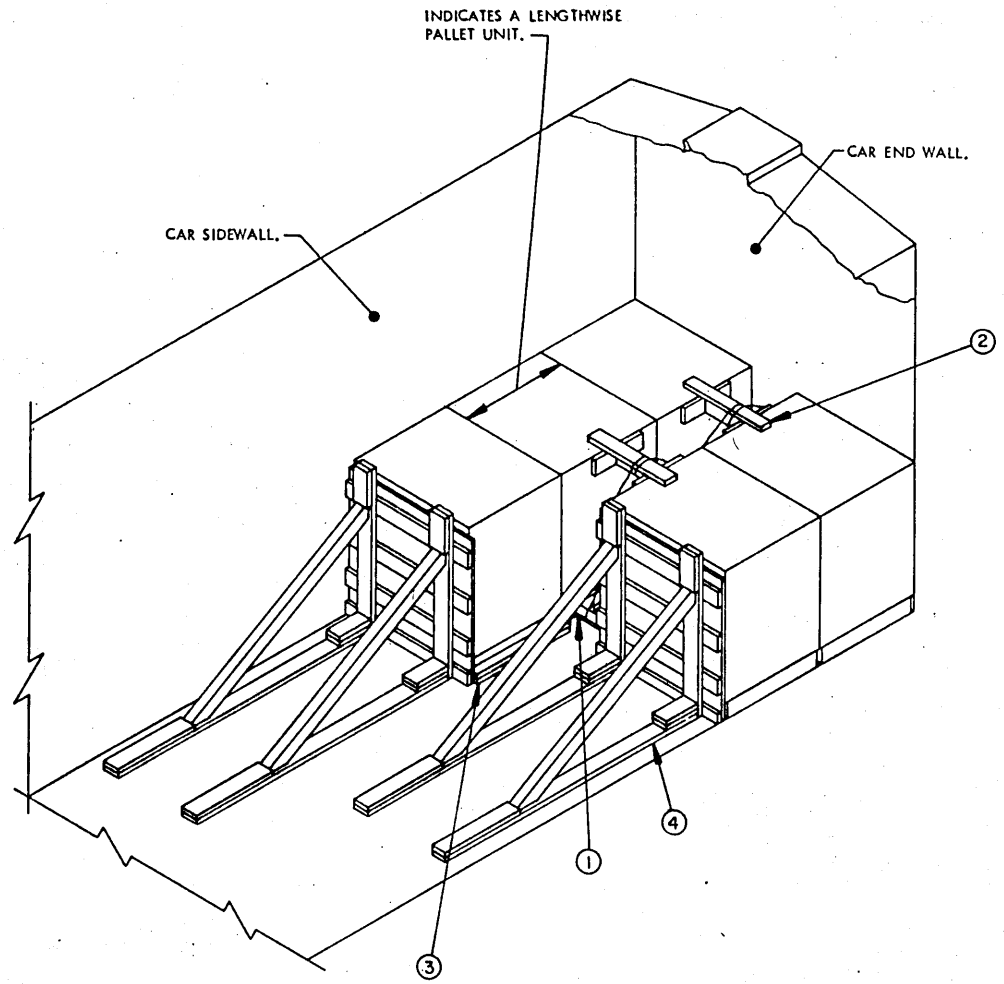
SPECIAL NOTES:

- 1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.
- 2. THE TYPICAL PALLETIZED UNIT SHOWN IN THE ABOVE LOAD IS BASED ON A 36-BOX UNIT WITH A HEIGHT OF APPROXIMATELY 50". THE ABOVE PROCEDURE WITH SLIGHT MODIFICATIONS TO CENTER GATES AND DOORWAY PROTECTION IS ALSO APPLICABLE TO A 4-LAYER OR 5-LAYER PALLET UNIT. REFER TO PAGES 8 AND 9 FOR A 4-LAYER PALLET UNIT.
- 3. SIX (6) LOAD BLOCKING STRUTS FOR EACH ROW ARE ADEQUATE FOR RETAINING EIGHT PALLET UNITS HAVING A WEIGHT OF NOT MORE THAN 2,378 POUNDS EACH.
- 4. DOORWAY PROTECTION IS REQUIRED FOR ALL THE LOAD UNITS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OF A CAR OR WHICH EXTEND INTO THE DOORWAY BY ONE-HALF OR MORE OF THE UNIT LENGTH.
- 5. IF A LOAD IS SHIPPED WITH TWO LESS PALLET UNITS THAN IN THE LOAD AS SHOWN, A SET OF STRUT BRACING WHICH IS SHOWN AS PIECES MARKED ③ AND ④ ON PAGE 8 MUST BE USED TO BRACE THE LOAD-BLOCKING STRUTS. IF A LOAD IS TO BE REDUCED BY MORE THAN TWO PALLET UNITS, A DIFFERENT LOADING PATTERN SHOULD BE SELECTED FROM THOSE DELINEATED HEREIN.



SECTION C-C

TYPICAL LCL (30-UNIT LOAD)



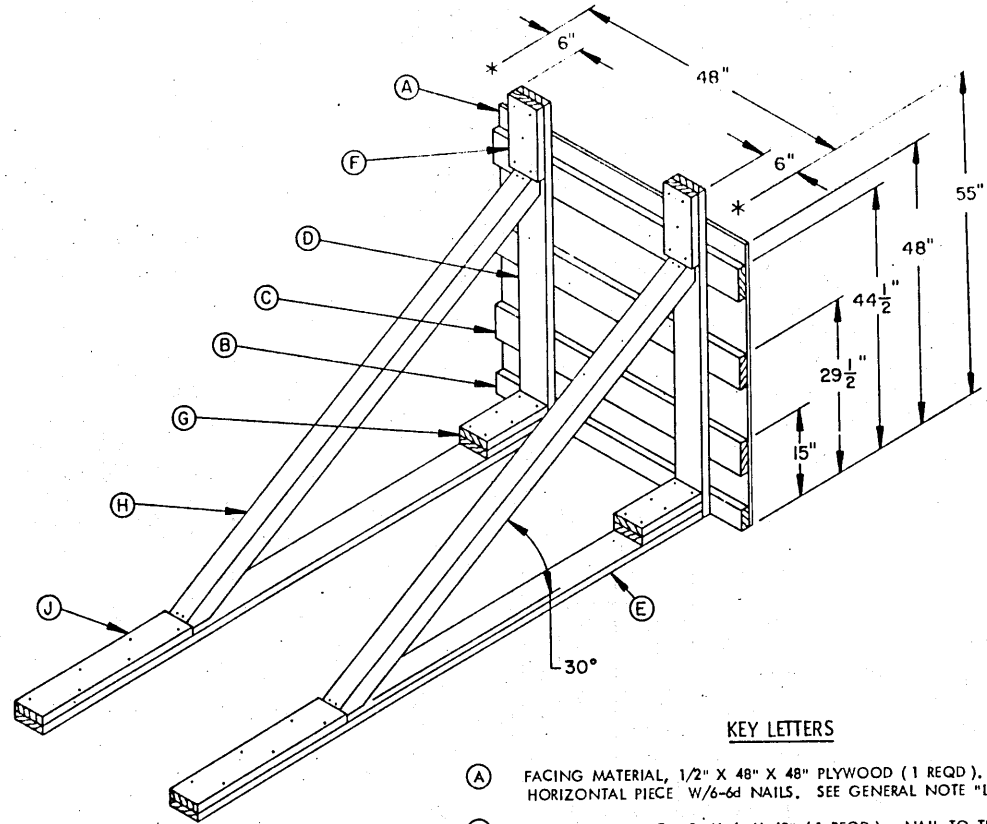
SPECIAL NOTES:

1. A 9'-2" WIDE CONVENTIONAL TYPE BOX CAR HAVING A WOOD OR NAILABLE METAL FLOOR IS SHOWN. CARS OF OTHER DIMENSIONS MAY BE USED.
2. THE TYPICAL PALLETIZED UNIT SHOWN IN THE ABOVE LOAD IS BASED ON A 36-BOX UNIT WITH A HEIGHT OF APPROXIMATELY 50". THE ABOVE PROCEDURE IS ALSO APPLICABLE TO OTHER PALLET UNITS LESS THAN 50" HIGH. WHEN SHIPPING 4-LAYER OR 5-LAYER PALLET UNITS, THE HEIGHT OF THE KNEE BRACE ASSEMBLY AND THE LENGTH OF THE 4" X 4" PIECES MARKED AS (H) PIECES WILL BE REDUCED PROPORTIONALLY TO MATCH THE HEIGHT OF THE PALLET UNITS BEING SHIPPED.
3. A KNEE BRACE WILL BE USED FOR EACH ROW OF PALLET UNITS. ONE (1) KNEE BRACE ASSEMBLY IS ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF 8,500 POUNDS.
4. ALTHOUGH THE UNITS SHOWN ABOVE HAVE BEEN LOADED LENGTHWISE IN THE CAR, UNITS CAN ALSO BE LOADED CROSSWISE, WHICH WILL PERMIT A 3-WIDE LOAD IN A 9'-6" WIDE OR WIDER CAR. NOTE THAT A KNEE BRACE ASSEMBLY IS REQUIRED FOR EACH ROW OF PALLET UNITS; HOWEVER, PIECES MARKED (1) AND (2) ARE NOT REQUIRED IN A 3-WIDE LOAD. ALSO WHEN SHIPPING A 3-WIDE LCL ARRANGEMENT, THE WIDTH AND/OR LENGTH OF PIECES MARKED (A), (B), AND (C) OF THE KNEE BRACE ASSEMBLIES WILL HAVE TO BE REDUCED TO APPROXIMATELY 36 INCHES.

ISOMETRIC VIEW

KEY NUMBERS

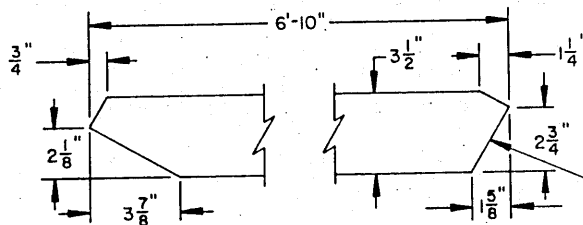
- (1) ANTI-SWAY BRACE (2 REQD). SEE THE "ANTI-SWAY BRACE A" DETAIL ON PAGE 14. INSTALL BETWEEN LATERALLY ADJACENT PALLET UNITS. SEE GENERAL NOTE "L" ON PAGE 2.
- (2) TOP-OF-LOAD ANTI-SWAY BRACE (2 REQD). SEE THE DETAIL ON PAGE 14. WIRE TIE TO PIECE MARKED (1) WITH NO. 14 GAGE WIRE AS SHOWN.
- (3) SIDE BLOCKING, 2" X 4" X 36" (DOUBLED) (1 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/5-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- (4) KNEE BRACE ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 19 FOR CONSTRUCTION SPECIFICATIONS AND NAILING REQUIREMENTS.



KNEE BRACE ASSEMBLY

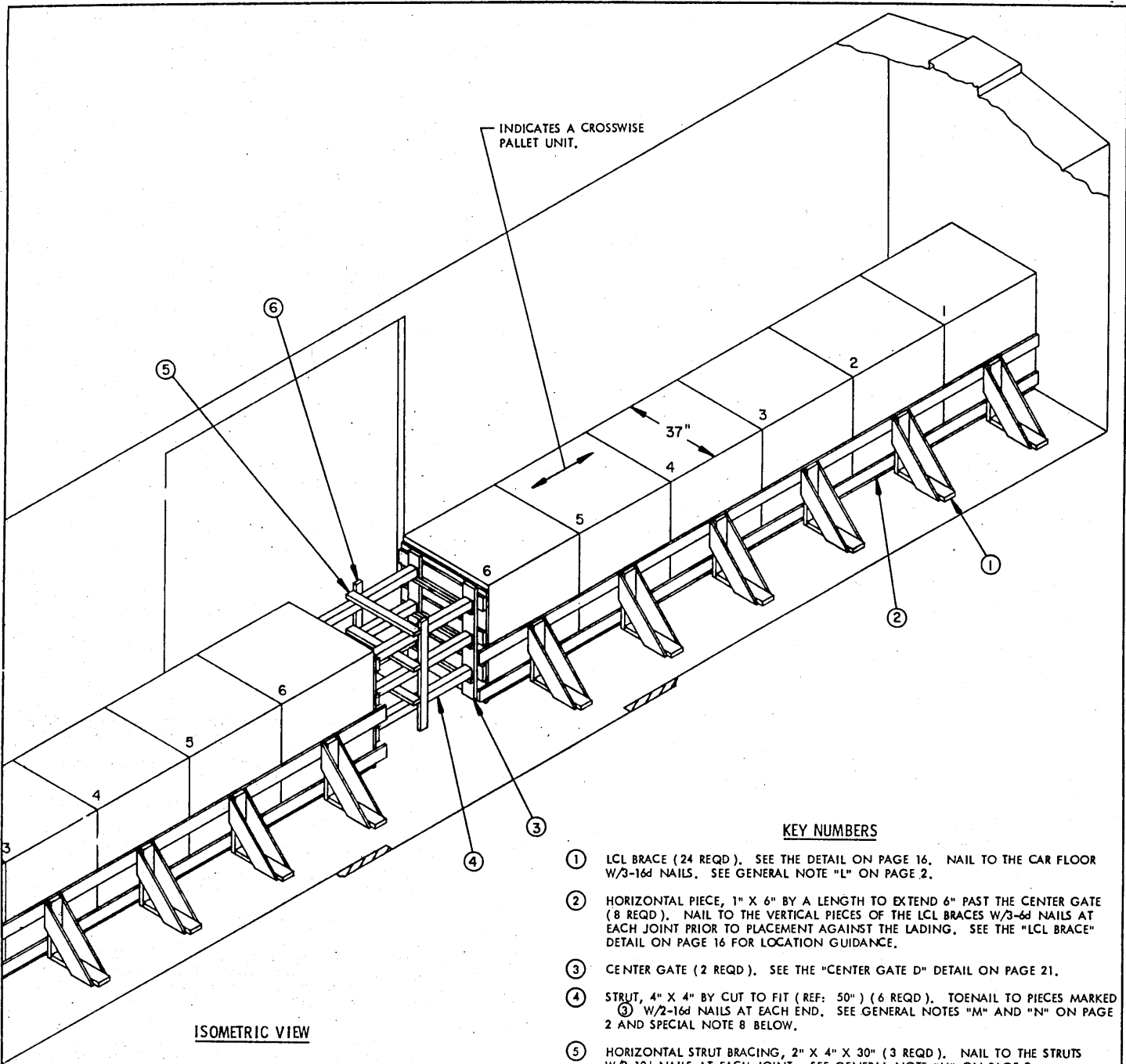
KEY LETTERS

- (A) FACING MATERIAL, 1/2" X 48" X 48" PLYWOOD (1 REQD). NAIL TO EACH HORIZONTAL PIECE W/6-6d NAILS. SEE GENERAL NOTE "L" ON PAGE 2.
- (B) HORIZONTAL PIECE, 2" X 4" X 48" (1 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.
- (C) HORIZONTAL PIECE, 2" X 6" X 48" (3 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.
- (D) VERTICAL PIECE, 2" X 6" X 55" (2 REQD).
- (E) FLOOR CLEAT, 2" X 6" X 8'-4-3/4" (2 REQD). ALIGN WITH A VERTICAL PIECE AND NAIL TO THE CAR FLOOR W/1-16d NAIL EVERY 8".
- (F) HOLD-DOWN CLEAT, 2" X 6" X 12" (2 REQD). NAIL TO A VERTICAL PIECE W/5-10d NAILS.
- (G) POCKET CLEAT, 2" X 6" X 12" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE FLOOR CLEAT, PIECE MARKED (E), W/4-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER AND TOENAIL IT TO THE VERTICAL PIECE, PIECE MARKED (D), W/2-16d NAILS.
- (H) BRACE, 4" X 4" X 6'-10" (2 REQD). SEE THE DETAIL AT THE LEFT FOR BEVEL CUTS REQUIRED. TOENAIL TO THE VERTICAL PIECE AND TO THE FLOOR CLEAT, PIECES MARKED (D) AND (E), W/2-16d NAILS AT EACH END.
- (J) BACK-UP CLEAT, 2" X 6" X 30" (2 REQD). NAIL TO THE FLOOR CLEAT, PIECE MARKED (E), W/6-40d NAILS.



BRACE

THE BRACE MUST BE INSTALLED SO THIS BEARING SURFACE WILL BE IN CONTACT WITH THE VERTICAL PIECE MARKED (D)



ISOMETRIC VIEW

KEY NUMBERS

- ① LCL BRACE (24 REQD). SEE THE DETAIL ON PAGE 16. NAIL TO THE CAR FLOOR W/3-16d NAILS. SEE GENERAL NOTE "L" ON PAGE 2.
- ② HORIZONTAL PIECE, 1" X 6" BY A LENGTH TO EXTEND 6" PAST THE CENTER GATE (8 REQD). NAIL TO THE VERTICAL PIECES OF THE LCL BRACES W/3-6d NAILS AT EACH JOINT PRIOR TO PLACEMENT AGAINST THE LADING. SEE THE "LCL BRACE" DETAIL ON PAGE 16 FOR LOCATION GUIDANCE.
- ③ CENTER GATE (2 REQD). SEE THE "CENTER GATE D" DETAIL ON PAGE 21.
- ④ STRUT, 4" X 4" BY CUT TO FIT (REF: 50") (6 REQD). TOENAIL TO PIECES MARKED ③ W/2-16d NAILS AT EACH END. SEE GENERAL NOTES "M" AND "N" ON PAGE 2 AND SPECIAL NOTE 8 BELOW.
- ⑤ HORIZONTAL STRUT BRACING, 2" X 4" X 30" (3 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT. SEE GENERAL NOTE "M" ON PAGE 2.
- ⑥ VERTICAL STRUT BRACING, 2" X 4" X 45" (2 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.

(SPECIAL NOTES CONTINUED FROM LEFT)

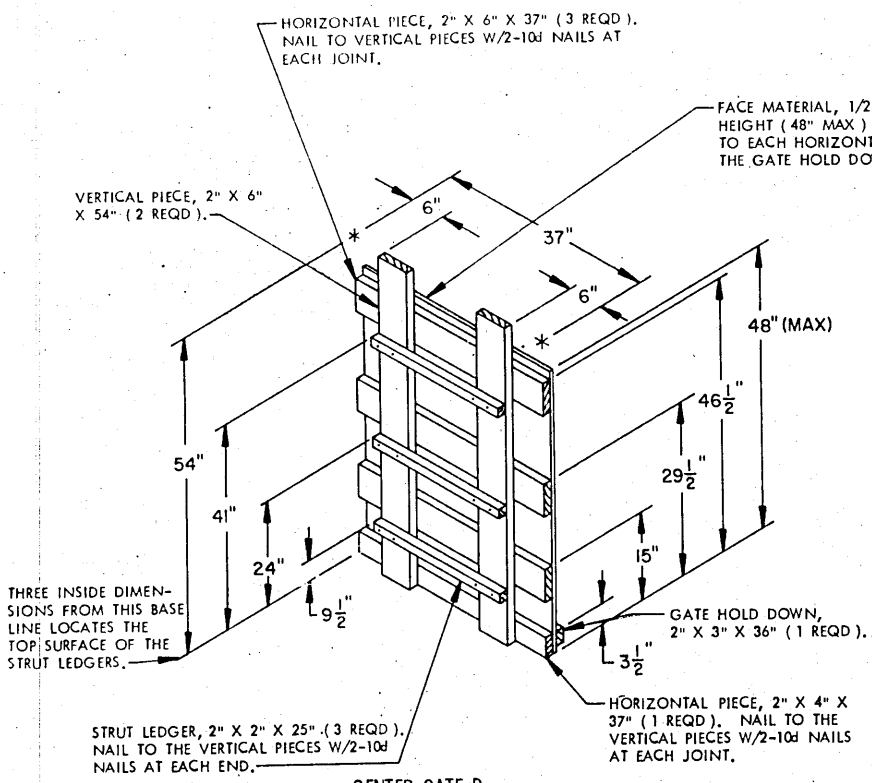
SPECIAL NOTES:

- 1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOORS CAN BE USED.
- 2. THE TYPICAL PALLETIZED UNIT SHOWN IS BASED ON A 36-BOX UNIT AT 64 POUNDS PER BOX FOR A TOTAL WEIGHT OF 2,378 POUNDS PER PALLET UNIT. THE HEIGHT OF THE UNIT SHOWN IS APPROXIMATELY 50". THESE PROCEDURES ARE ALSO APPLICABLE TO PALLET UNITS OF OTHER WEIGHTS AND HEIGHTS.
- 3. EACH LCL BRACE AS APPLIED FOR LATERAL BRACING WILL SUPPORT 3,000 POUNDS OF LADING. A MINIMUM OF ONE (1) BRACE WILL BE USED AT EACH SIDE OF EACH PALLET UNIT.
- 4. ALTHOUGH THE ABOVE LOAD DEPICTS SIX PALLET UNITS IN EACH END OF A CAR, LOADING MAY BE EASIER IF THE LOADING PATTERN IS CHANGED TO FIVE PALLETS IN ONE END OF THE CAR AND SEVEN PALLETS IN THE OTHER END, AS WOULD BE THE CASE IN CARS WITH DOORS LESS THAN 10'-0" WIDE.
- 5. AN "LCL" LOAD OF THIRTEEN (13) PALLET UNITS MAY BE SHIPPED IN A SIMILAR MANNER TO THE ABOVE LOAD. THE STRUTS AND STRUT BRACING PIECES WILL NOT BE REQUIRED BUT SOLID FILL OF 2" X 6" X 66" MATERIAL WILL BE USED BETWEEN THE CENTER GATES. SEE THE "SOLID FILL BLOCKING" DETAIL ON PAGE 21.

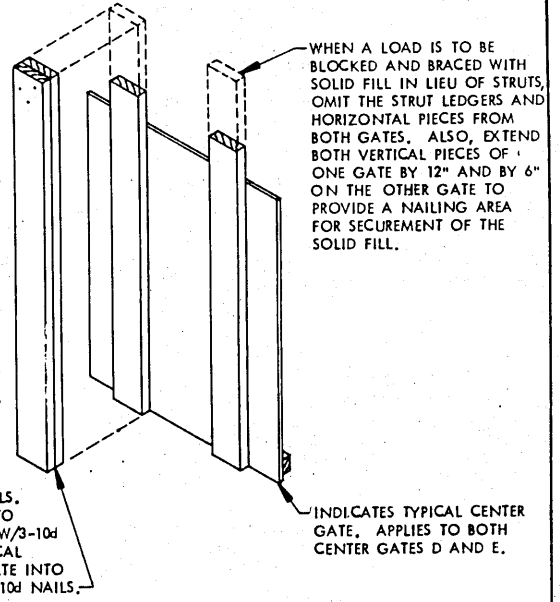
- 6. THE METHOD SHOWN ABOVE CAN ALSO BE USED WHEN PALLET UNITS ARE LOADED LENGTHWISE IN A CAR. CENTER GATE "E" WILL BE USED INSTEAD OF CENTER GATE "D".
- 7. THE METHOD SHOWN ABOVE CAN ALSO BE USED WHEN SHIPPING 4-HIGH AND 5-HIGH PALLET UNITS. WHEN SHIPPING A DIFFERENT HEIGHT UNIT, IT WILL BE NECESSARY TO ADJUST THE HEIGHTS FOR THE HORIZONTAL PIECES AND THE STRUT LEDGER PIECES ON THE CENTER GATES TO PROVIDE FOR PROPER ALIGNMENT OF THE INSTALLED STRUTS WITH THE PALLET UNITS BEING SHIPPED.
- 8. SIX (6) 4" X 4" LOAD-BLOCKING STRUTS AS SHOWN ARE APPLICABLE FOR BLOCKING EIGHT (8) PALLET UNITS (IN ONE END OF A CAR) NOT WEIGHING MORE THAN 2,378 POUNDS EACH.

(CONTINUED AT RIGHT)

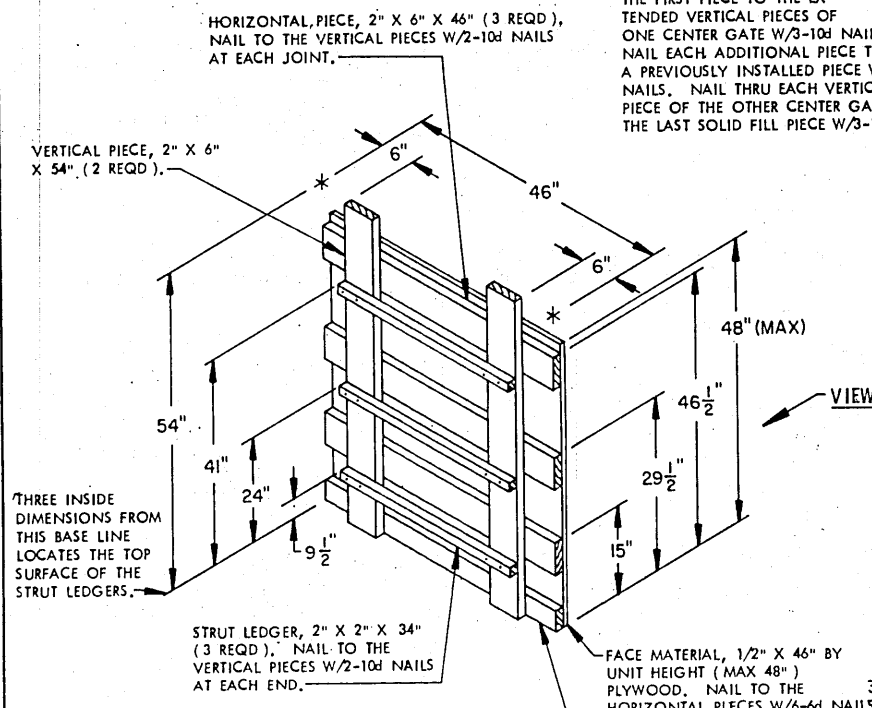
TYPICAL LCL USING 1-WIDE LOADING METHOD



CENTER GATE D
(FOR USE WITH PALLET UNITS LOADED CROSSWISE IN THE CAR).

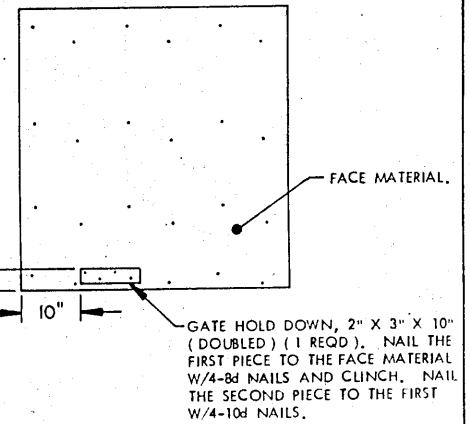


SOLID FILL BLOCKING



CENTER GATE E
(FOR USE WITH PALLET UNITS LOADED LENGTHWISE IN THE CAR).

VIEW A



VIEW A

HORIZONTAL PIECE, 1" X 6" BY DOOR OPENING WIDTH (6 REQD). NAIL TO THE VERTICAL PIECES W/3-6d NAILS AT EACH END. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 15 FOR HEIGHT LOCATIONS.

VIEW B

VERTICAL PIECE, 2" X 3" BY A LENGTH TO SUIT (2 REQD).

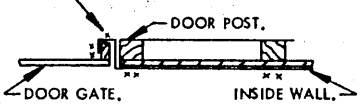
INDICATES DOOR OPENING.
INDICATES CAR SIDEWALL.

INDICATES KRAFT PAPER (6 LAYERS) OF A SUITABLE SIZE TO COMPLETELY COVER ALL STEEL STRAPPING. (2 PIECES REQD). SECURE TO INSIDE CAR WALL WITH STAPLES OR SHORT, LARGE-HEADED NAILS.

INDICATES CAR SIDEWALL.
INDICATES FLOOR OF CAR.

DOORWAY PROTECTION GATE STRAP, 1-1/4" X .035" X 36" (REF) NAIL-ON TYPE STEEL STRAPPING (12 REQD FOR A 2-TIER LOAD, 6 REQD FOR A 1-TIER LOAD). NAIL TO GATE AND CAR SIDEWALL AS SHOWN BY THE "VIEW B" SKETCH BELOW. NOTE THAT TYPE 1 STRAPPING MAY BE PUNCHED FOR NAILING IF TYPE 2 STRAPPING IS NOT AVAILABLE.

INDICATES LOCATIONS OF 7 (MIN) 4d NAILS PER STRAP.



VIEW B

THIS VIEW DEPICTS THE LOCATION OF THE NAILS FOR SECURING THE DOORWAY PROTECTION GATE STRAP. NOTE THAT THE STRAPS MUST BE APPLIED TO THE CAR SIDE WALL PRIOR TO POSITIONING THE ADJACENT UNITS.

ALTERNATIVE DOORWAY PROTECTION A

THIS METHOD OF DOORWAY PROTECTION IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS WHEN THE DOOR POSTS ARE STEEL WITHOUT NAILING HOLES. HEAVY KRAFT PAPER MUST BE USED TO COVER THAT PART OF THE STRAPPING WHICH IS NAILED TO A CAR SIDEWALL. THE VIEW SHOWN ABOVE IS FOR A TWO-TIER LOAD.

SEAL FOR 1-1/4" STRAP (2 REQD PER STRAP). DOUBLE CRIMP EACH SEAL WITH TWO PAIR OF CRIMPS.

INDICATES DOOR OPENING.
INDICATES CAR SIDEWALL.

DOORWAY PROTECTION STRAP, 1-1/4" X .035" STEEL STRAPPING BY DOOR OPENING WIDTH PLUS 8'-0" IN LENGTH (2 REQD PER TIER). INSTALL FROM TWO (2) PIECES. THREAD ONE END THRU A STRAP ANCHOR PLATE AS SHOWN BY THE "APPLICATION OF STRAPPING TO STRAP ANCHOR PLATE" DETAILS BELOW. NAIL STRAP ANCHOR PLATE TO CAR SIDEWALL W/4-6d SIGNODE NUMBER 225 MICROLOCK NAILS (OR EQUAL).

INDICATES KRAFT PAPER (6 LAYERS) OF A SUITABLE SIZE TO COMPLETELY COVER ALL STEEL STRAPPING WHICH IS AGAINST A CAR SIDEWALL (2 PIECES REQD). SECURE TO INSIDE CAR WALL WITH STAPLES OR SHORT, LARGE-HEADED NAILS.

VIEW A

INDICATES STRAP ANCHOR PLATE.

DOOR SPANNER
"END OF STRAP."

ISOMETRIC VIEW

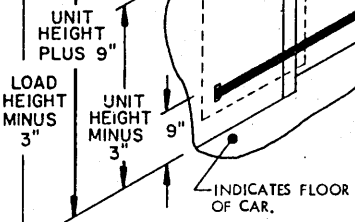
VIEW A

APPLICATION OF STRAPPING TO STRAP ANCHOR PLATE

THESE VIEWS DEPICT THE PROPER THREADING OF A DOORWAY PROTECTION STRAP THRU AN ANCHOR PLATE.

ALTERNATIVE DOORWAY PROTECTION B

THIS METHOD OF DOORWAY PROTECTION IS ESPECIALLY APPLICABLE FOR USE IN CARS EQUIPPED WITH PLUG TYPE DOORS, BUT CAN BE USED IN CARS THAT HAVE CONVENTIONAL SLIDING DOORS. IF THE CAR IS EQUIPPED WITH SPECIAL ANCHOR RODS IN THE CAR DOOR POSTS, THE DOORWAY PROTECTION STRAPS MAY BE SECURED TO THESE RODS IN LIEU OF ATTACHING TO THE CAR SIDEWALL WITH STRAP ANCHOR PLATES. THE VIEW SHOWN ABOVE IS FOR A TWO-TIER LOAD.



DOORWAY PROTECTION