

APPROVED BY
BUREAU OF EXPLOSIVES

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DATE 5/5/93

LOADING AND BRACING (CL & LCL) IN BOXCARS OF ROCKET POD W/WARHEAD MINUS INJECTOR ASSEMBLY (RP(-)) FOR THE MULTIPLE LAUNCH ROCKET SYSTEM (MLRS) BINARY CHEMICAL WARHEAD

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U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY ARMAMENT, MUNITIONS AND
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GENERAL NOTES

(GENERAL NOTES CONTINUED)

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1, AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE OUTLOADING PROCEDURES CONTAINED HEREIN ARE APPLICABLE TO THE MULTIPLE LAUNCH ROCKET SYSTEM (MLRS) BINARY CHEMICAL WARHEAD (BCW) MINUS INJECTOR ASSEMBLY (IA) WHEN PACKED IN THE ROCKET POD CONTAINER (RP(-)). SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE RP(-) WITH THE WARHEAD ASSEMBLIES.
- C. FOR DETAIL OF THE ROCKET POD CONTAINER (RP(-)), SEE PAGE 4.
CONTAINER DIMENSIONS - - 13'-10" LONG X 41-1/2" WIDE
X 33" HIGH

GROSS WEIGHT - - - - - 3,968 POUNDS (APPROX)
- D. THE OUTLOADING PROCEDURES SPECIFIED HEREIN CAN ALSO BE UTILIZED FOR THE SHIPMENT OF THE RP(-)S WHEN THEY ARE LOADED WITH AN ITEM WHICH IS IDENTIFIED DIFFERENTLY BY NOMENCLATURE THAN THE ITEM DESIGNATED WITHIN THE DRAWING TITLE.
- E. THE OUTLOADING PROCEDURES DEPICTED WITHIN THIS DOCUMENT ARE APPLICABLE FOR SHIPMENTS IN CONVENTIONAL TYPE BOXCARS. SHIPMENT OF THE SPECIFIED ITEM IN BOXCARS EQUIPPED WITH LOAD DIVIDER BULKHEADS OR ANY OTHER MECHANICAL LOAD BRACING DEVICE IS NOT APPROVED.
- F. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF A NOMINAL SIZE, UNLESS OTHERWISE SPECIFIED. FOR EXAMPLE, 1" X 6" MATERIAL IS ACTUALLY 3/4" THICK BY 5-1/2" WIDE AND 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE.
- G. NOTICE: A STAGGERED NAILING PATTERN WILL BE USED WHENEVER 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 ENDWALL 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.
- H. PORTIONS OF THE BOXCARS DEPICTED WITHIN THIS PROCEDURAL DRAWING, SUCH AS SIDEWALLS, ENDWALLS, AND ROOFS, AND PORTIONS OF THE BLOCKING AND BRACING COMPONENTS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- J. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF ONE SEAL WITH TWO PAIR OF NOTCHES WILL BE USED TO SEAL THE JOINT WHEN A NOTCH-TYPE SEALER IS BEING USED. A MINIMUM OF TWO SEALS, BUTTED TOGETHER WITH TWO PAIR OF CRIMPS PER SEAL WILL BE USED TO SEAL THE JOINT WHEN A CRIMP-TYPE SEALER IS BEING USED. REFER TO THE "STRAP JOINT A" AND "STRAP JOINT B" DETAILS ON PAGE 3 FOR GUIDANCE.

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MATERIAL SPECIFICATIONS

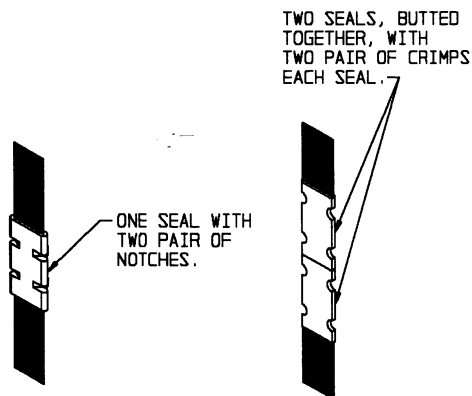
- LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.
- LUMBER, HARDWOOD - - : FED SPEC MM-L-736; TYPE II.
- NAILS - - - - - : FED SPEC FF-N-105; COMMON.
- STRAPPING, STEEL - - : ASTM D3953; FLAT STRAPPING, TYPE I OR 2, HEAVY DUTY, COATED FINISH (ORGANIC), ZINC-COATED (GRADE 2), OR UNCOATED.
- SEAL, STRAP - - - - : ASTM D3953; CLASS H, FINISH A, B (GRADE 2), OR C, TYPE D, STYLE I, II, OR IV.
- STAPLE, STRAP - - - : COMMERCIAL GRADE.
- WIRE, CARBON STEEL - - : ASTM A953; ANNEALED AT FINISH, BLACK OXIDE FINISH, .0800" DIA, GRADE 1006 OR BETTER.

- K. BOXCARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS HAVE BEEN SHOWN. HOWEVER, THE DEPICTED OUTLOADING PROCEDURES ARE ALSO APPLICABLE FOR CARS EQUIPPED WITH PLUG DOORS. CAUTION: DUNNAGE MATERIAL MUST NOT BE NAILED TO ANY PLUG DOOR, WHETHER MAIN OR AUXILIARY. 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 THRU THE HOLES IN THE DOOR LATCH ASSEMBLY ONE OR MORE TIMES, AND THE WIRE ENDS WILL BE TWISTED TOGETHER. ONLY CARS HAVING DOOR WIDTHS OF 14'-0" OR MORE WILL BE USED FOR THE SHIPMENT OF THE DEPICTED ITEM.
- L. THE SELECTION OF RAILCARS FOR THE TRANSPORT OF THE DESIGNATED ITEM IS THE RESPONSIBILITY OF THE ORIGINATING CARRIER AND THE SHIPPER. ONLY CARS WHICH HAVE "SOUND" FLOORS AND ARE IN OTHERWISE PROPER CONDITION, IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE REGULATORY DOCUMENT, WILL BE SELECTED. WHEN SELECTING RAILCARS, EVERY EFFORT SHOULD BE MADE TO OBTAIN BOXCARS THAT DO NOT HAVE BOWED ENDWALLS. CARS WITH BOWED ENDS CAN BE USED; HOWEVER, IF AN ENDWALL IS BOWED OUTWARD MORE THAN 2", EITHER FROM SIDE TO SIDE OR FROM FLOOR TO ROOF, FILL MATERIAL MUST BE NAILED TO THE BACK SIDE OF THE ENDWALL BULKHEAD TO PROVIDE ADDITIONAL CONTACT AREA BETWEEN THE BULKHEAD AND ENDWALL.
- M. THE NUMBER OF LADING ASSEMBLIES MAY BE ADJUSTED TO FIT THE SIZE OF THE BOXCAR 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 CONTAINERS. NOTICE: A SHIPMENT WILL BE POSITIONED IN THE RAILCAR IN COMPLIANCE WITH THE WEIGHT DISTRIBUTION REQUIREMENTS OF THE AAR.
- N. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH THE DESIGNATED ITEMS, 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.
- O. 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 TO THE NAILING OF ALL FLOORLINE BLOCKING PIECES TO THE CAR FLOOR. IF A NAIL SIZE IS NOT SPECIFIED IN THE CAR, 30d NAILS SHOULD BE USED IN LIEU OF THOSE SPECIFIED IN THE APPLICABLE KEY NUMBERS. SEE GENERAL NOTE "G" ON THIS PAGE.
- P. LOADS SHOWN WITHIN THIS DOCUMENT ARE TYPICAL. SINCE THE ACTUAL QUANTITY TO BE SHIPPED MAY NOT BE DEPICTED IN ANY OF THE LOAD VIEWS SHOWN HEREIN, A LOAD PLAN SHOULD BE DEVELOPED WHICH WILL BE THE MOST EFFICIENT AS TO THE AMOUNT OF DUNNAGE REQUIRED AND THE EASE OF LOADING FOR THE QUANTITY TO BE SHIPPED.
- Q. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.
- R. NOTICE: ALL LOADS SHOWN WITHIN THIS DRAWING ARE FOR USE WITH 50'-6" LONG BOXCARS. LONGER CARS CAN ALSO BE USED BY INCREASING THE LENGTH OF THE STRUTS AND APPLYING VERTICAL AND HORIZONTAL STRUT BRACING. SEE GENERAL NOTE "S" BELOW.
- S. LOAD BLOCKING STRUTS WHICH ARE 48" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF HORIZONTAL AND VERTICAL STRUT BRACING. THESE PIECES ARE NOT REQUIRED IF THE STRUTS FOR THE LOAD BEING SHIPPED ARE SHORTER THAN 48". THE LENGTH OF THE LOAD BLOCKING STRUTS SHOULD BE KEPT AS SHORT AS POSSIBLE. HOWEVER, IF A LOAD REQUIRES STRUTS WHICH ARE 8'-0" OR MORE IN LENGTH, IT WILL BE NECESSARY TO APPLY AN ADDITIONAL SET OF HORIZONTAL AND VERTICAL STRUT BRACING PIECES. STRUT BRACING SHOULD BE APPLIED SO AS TO PROVIDE NEARLY EQUAL SPACES BETWEEN THE BRACING PIECES AND THE CENTER GATES AND/OR BETWEEN ADJACENT STRUT BRACING PIECES. VERTICAL STRUT BRACING PIECES ARE TO BE 2" X 4" MATERIAL CUT TO A LENGTH TO EXTEND 2" ABOVE THE TOP STRUT. HORIZONTAL STRUT BRACING PIECES ARE TO BE 2" X 4" MATERIAL BY CAR WIDTH MINUS 1/2". HORIZONTAL PIECES WILL BE APPLIED ON EACH LAYER OF STRUTS. BOTH VERTICAL AND HORIZONTAL STRUT BRACING PIECES WILL BE NAILED TO THE STRUTS WITH 3-10d NAILS AT EACH JOINT.

(CONTINUED ON PAGE 3)

(GENERAL NOTES CONTINUED)

- T. 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 BEVELED ON THE LOWER CORNER 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, IN SUCH A MANNER SO THAT AS NEARLY AS PRACTICAL, EQUAL LENGTHS OF A NAIL ARE EMBEDDED IN THE STRUT AND IN THE VERTICAL PIECE OF THE CENTER GATE. SEE THE "BEVEL-CUT" DETAIL ON PAGE 6 FOR BEVELING INSTRUCTIONS AND THE "STRUT INSTALLATION" DETAIL ON THAT PAGE FOR A PICTORIAL VIEW SHOWING THE PROPER POSITIONING OF A BEVELED STRUT FOR INSTALLATION. NOTE THAT THE UPPER CORNER NEEDS TO BE BEVELED ONLY IF THE STRUTS ARE VERY SHORT. IF ONLY ONE END IS BEVEL-CUT, THE BEVELED EDGE WILL BE PLACED IN THE DOWNWARD POSITION SO THAT IT WILL ALLOW THE STRUT END TO SLIDE MORE FREELY DOWN THE FACE OF THE VERTICAL PIECE ON THE ADJACENT CENTER GATE AS THE STRUT IS DRIVEN DOWN INTO ITS FINAL BLOCKING POSITION.



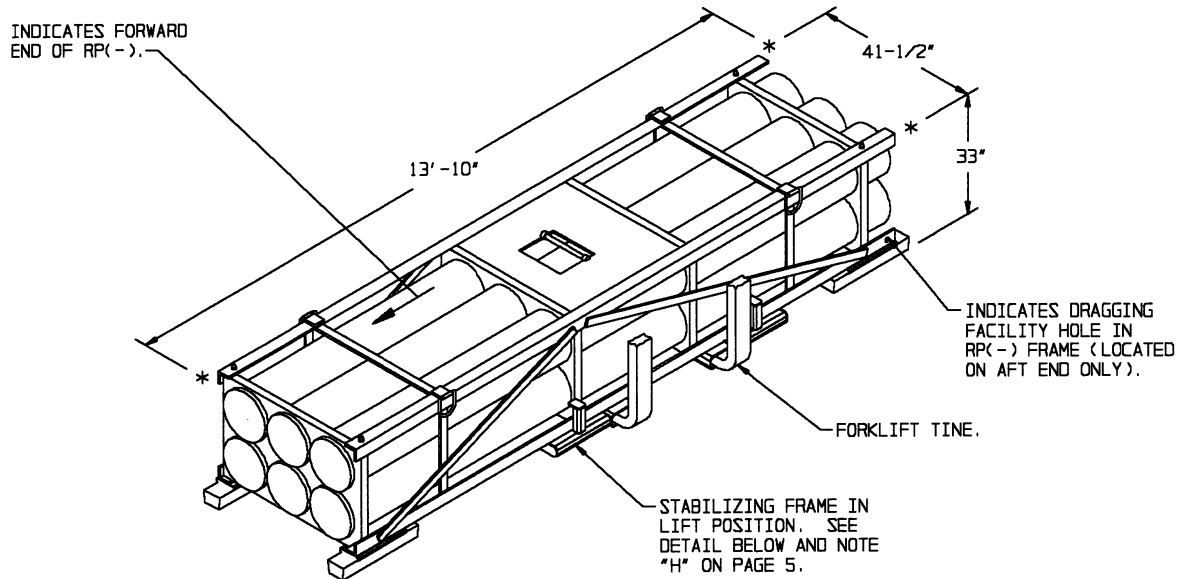
STRAP JOINT A

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

STRAP JOINT B

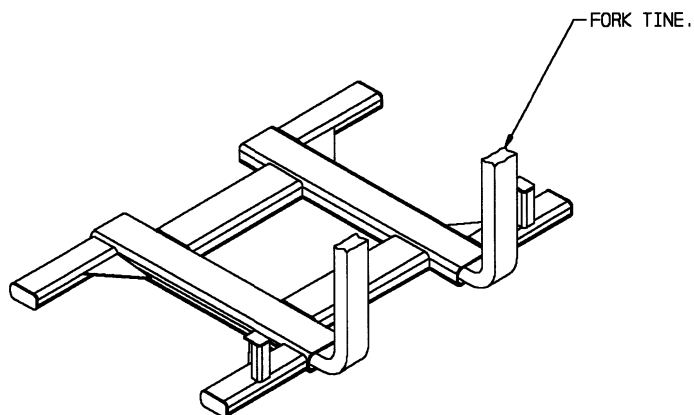
METHOD OF SECURING A STRAP JOINT WHEN USING A CRIMP-TYPE SEALER.

END-OVER-END LAP JOINT DETAILS



ROCKET/LAUNCH POD ASSEMBLY

SEE "SPECIAL HANDLING GUIDANCE" ON PAGE 5.



MLRS POD STABILIZING FRAME

REFER TO U.S. ARMY ARMAMENT MUNITIONS AND CHEMICAL COMMAND, DEFENSE AMMUNITION CENTER AND SCHOOL DRAWING NUMBER AC200000809 TO MANUFACTURE. SEE NOTE "H" ON PAGE 5. DRAWINGS MAY BE REQUESTED FROM DIRECTOR, U.S. ARMY DEFENSE AMMUNITION CENTER & SCHOOL, ATTN: SMCAC-DES, SAVANNA, IL 61074-9639.

SPECIAL HANDLING GUIDANCE

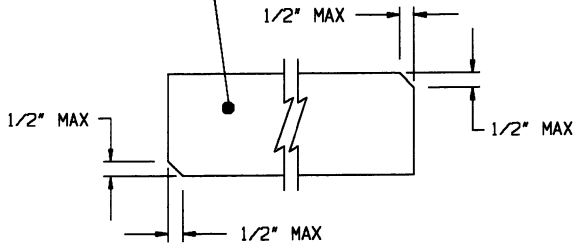
- A. MATERIALS HANDLING EQUIPMENT (MHE) IS INTENDED TO MEAN EQUIPMENT, SUCH AS FORKLIFT TRUCKS, CRANES, HAND TRUCKS, DOLLIES, ROLLER ASSEMBLIES, SLINGS, STABILIZER FRAMES, AND SPREADER BARS, THAT CAN BE USED TO HANDLE THE DEPICTED CONTAINERS.
- B. PRECAUTIONARY HANDLING TECHNIQUES NORMALLY EMPLOYED OR AS SPECIFIED FOR THE TYPE OF COMMODITY INVOLVED WILL BE OBSERVED.
- C. IF AVAILABLE MHE DOES NOT HAVE AN ALLOWABLE CAPACITY GREAT ENOUGH TO CARRY A STACK OF TWO RP(-)S (APPROXIMATELY 7,936 POUNDS) IN ONE LIFT, THEN THE RP(-)S MUST BE HANDLED INDIVIDUALLY. ONLY APPROVED AND APPROPRIATELY SIZED MHE WILL BE USED FOR THE HANDLING OF THE DEPICTED RP(-)S.
- D. PRIOR TO THE PLACEMENT OF AN RP(-) OR RP(-) STACK INTO A BOXCAR, ONE APPROPRIATELY SIZED FORKLIFT TRUCK MUST BE POSITIONED INSIDE OF THE CAR, AS SHOWN IN FIGURE 1 ON PAGE 7.
- E. IF THE RP(-)S ARE BEING HANDLED INDIVIDUALLY, A BOTTOM LAYER RP(-) MUST BE PLACED IN THE DOORWAY AREA OF THE CAR BY A SECOND PIECE OF MHE. A TOP LAYER RP(-) IS THEN BROUGHT IN AND POSITIONED DIRECTLY ON TOP OF THE BOTTOM LAYER RP(-). THE UPPER RP(-) SHOULD BE PLACED AS CLOSELY AS POSSIBLE IN VERTICAL ALIGNMENT WITH THE LOWER RP(-). THE TWO RP(-)S SHALL THEN BE UNITIZED USING TWO 1-1/4" X .035" OR .031" STEEL STRAPS PLACED AS SHOWN IN FIGURE 2 ON PAGE 7.
- F. IF AN RP(-) STACK IS BEING HANDLED AND POSITIONED INTO THE CAR, THE STACK MUST BE UNITIZED AS DESCRIBED IN FIGURE 2 ON PAGE 7 AND IN NOTE E ABOVE PRIOR TO ITS FINAL POSITIONING.
- G. WHEN AN RP(-) STACK IS BEING UNITIZED, CARE MUST BE EXERCISED WHEN TIGHTENING THE STRAPS TO INSURE THAT THE LONGITUDINAL FRAME MEMBERS OF THE ASSEMBLIES ARE NOT "PULLED IN" OR DEFORMED.
- H. IF HANDLING IS ACCOMPLISHED WITH A FORKLIFT TRUCK, THE TINES OF THE FORKLIFT ARE INSERTED INTO THE MLRS POD STABILIZING FRAME SHOWN IN THE DETAILS ON PAGE 4. THE FORKLIFT CARRIAGE IS TO BE CENTERED ON THE CENTER OF GRAVITY ON THE RP(-). NOTE: 1/4" SAFETY CHAINS ARE NOT SHOWN BUT WILL BE WELDED TO THE STABILIZING FRAME FOR SECUREMENT TO THE FORKLIFT CARRIAGE.

(CONTINUED AT RIGHT)

(SPECIAL HANDLING GUIDANCE CONTINUED)

- J. THE DUNNAGE ASSEMBLIES AT THE END OF THE BOXCAR AND NEAR THE BOTTOM OF THE SIDEWALLS MUST BE POSITIONED PRIOR TO THE LOADING OF THE RP(-)S IN THE BOXCAR.
- K. UPON THE COMPLETION OF UNITIZING A TWO RP(-) STACK IN THE BOXCAR DOORWAY AREA OR THE PLACEMENT OF A TWO RP(-) STACK IN THE BOXCAR DOORWAY AREA, THE STACK CAN BE PUSHED INTO ITS FINAL POSITION BY THE FORKLIFT TRUCK ALREADY POSITIONED IN THE CAR. TO PUSH THE STACK INTO POSITION, THE FORKLIFT TRUCK WITH PUSH ASSEMBLY ATTACHED TO THE FORK TINES OR, WITH A 4" X 4" MATERIAL BUFFER BOARD ACROSS THE FORK TINES AND A 1" X 4" MATERIAL BUFFER BOARD PLACED ACROSS THE FORK TINES (TO INSURE THAT THE TINES DO NOT CONTACT THE BOTTOM OF THE LONGITUDINAL FRAME MEMBERS) CAN THEN LIFT THE END OF THE STACK AND PUSH IT INTO POSITION INSIDE THE CAR. SEE FIGURE 2 ON PAGE 7 FOR ADDITIONAL GUIDANCE.
- L. WHEN REMOVING A RP(-) OR RP(-) STACK FROM THE BOXCAR BY ATTACHING CHAINS TO THE FRAME AND DRAGGING THE RP(-) OR STACK TO THE DOORWAY AREA, CARE MUST BE TAKEN TO INSURE THAT THE PULL ANGLE OF EACH OF THE TWO CHAIN LEGS IS 60° OR GREATER. IF THE CHAIN IS ATTACHED SO THAT THE PULL ANGLE IS LESS THAN 60°, STRUCTURAL FAILURE OF THE RP(-) FRAME COULD OCCUR. SEE THE "TOW ANGLE" DETAIL ON PAGE 6. CHAINS WILL BE ATTACHED ONLY TO BOTTOM LAYER RP(-) AND SHACKLES WILL BE USED TO ATTACH THE DRAG CHAINS TO THE DRAGGING FACILITY HOLES. A FORKLIFT TRUCK IS TO BE USED FOR DRAGGING THE UNITS SO THAT THE TINES OF THE TRUCK CAN BE INSERTED A SHORT DISTANCE UNDER THE AFT END OF THE BOTTOM RP(-), AND THE RP(-) LIFTED ENOUGH TO JUST CLEAR THE CAR FLOOR BEFORE ACTUAL DRAGGING IS BEGUN. CAUTION: FORKLIFT TRUCK TINES MUST HAVE A 1" X 4" MATERIAL BUFFER BOARD PLACED ACROSS THEM SO THAT THEY DO NOT CONTACT THE BOTTOM SURFACE OF THE FRAME MEMBERS DURING THE DRAGGING OPERATION. NOTICE: WIRE ROPE CABLE MAY BE SUBSTITUTED FOR THE DRAG CHAINS SPECIFIED HEREIN.
- M. CAUTION: IF LIFTED WITH A SLING OR CRANE, THE RP(-) CONTAINER WILL EXPERIENCE A TILT OF 26°, WITH THE FORWARD END ELEVATED. THIS IS EXPECTED AND ALLOWABLE, DUE TO THE CENTER OF GRAVITY OF THE RP(-). EXERCISE EXTREME CARE TO PREVENT DAMAGE TO THE RP(-).

INDICATES A SIDE OF A 4" X 4" AS A TYPICAL STRUT.

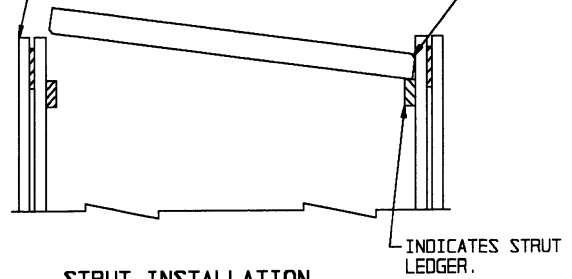


BEVEL-CUT

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

INDICATES A TYPICAL CENTER GATE.

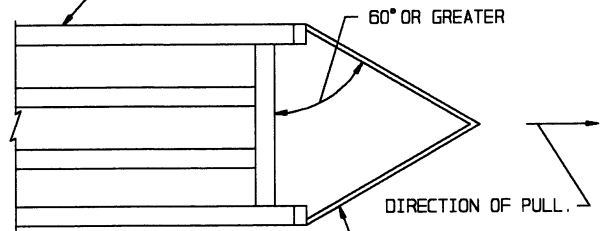
BEVEL CUT THIS CORNER ONLY IF STRUTS ARE VERY SHORT.



STRUT INSTALLATION

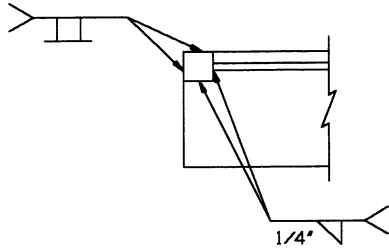
SEE GENERAL NOTE "T" ON PAGE 3 FOR ADDITIONAL STRUT INSTALLATION GUIDANCE.

INDICATES FRAMEWORK.



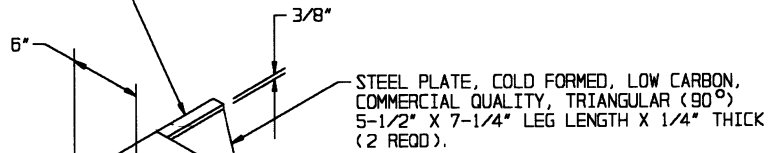
TOW ANGLE

(PARTIAL PLAN VIEW)

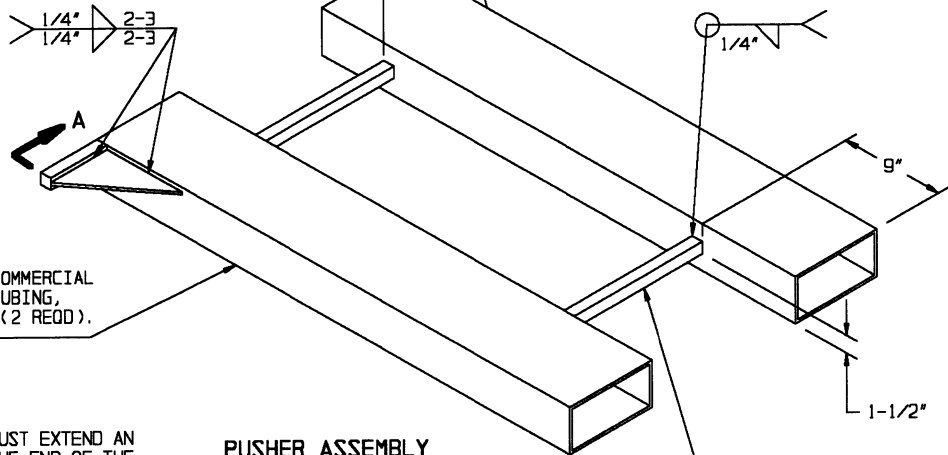


PARTIAL VIEW A

STEEL, BAR, HOT ROLLED, LOW CARBON, COMMERCIAL QUALITY, 1" X 1" X 5-1/2" (2 REQD).



STEEL, HOT ROLLED, LOW CARBON, COMMERCIAL QUALITY RECTANGULAR STRUCTURAL TUBING, 8" X 4" X 1/4" X 46" (REF) LONG (2 REQD). SEE NOTE BELOW.



PUSHER ASSEMBLY

NOTE: THE FORK TINES MUST EXTEND AN ADDITIONAL 13" BEYOND THE END OF THE PUSH ASSEMBLY. THE LENGTH OF THE 8" X 4" RECTANGULAR TUBING MAY BE VARIED AS NECESSARY TO ACCOMMODATE VARIOUS LENGTH FORK TINES.

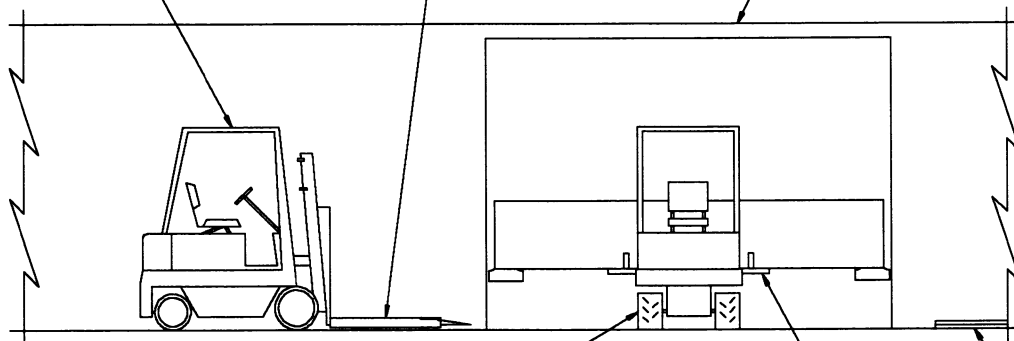
THIS END OF PUSH ASSEMBLY TO BEAR AGAINST UPRIGHT PORTION OF FORK TINES.

STEEL, BAR, HOT ROLLED, LOW CARBON, COMMERCIAL QUALITY, 1" X 1" X 14" LONG (2 REQD).

INDICATES FORKLIFT TRUCK PRE-POSITIONED IN BOXCAR PRIOR TO LOADING OF RP(-)S.

INDICATES PUSH ASSEMBLY. SEE DETAIL ON PAGE 6.

INDICATES 50'-6" LONG CONVENTIONAL BOXCAR HAVING A MINIMUM DOOR OPENING WIDTH OF 14'-0".



INDICATES FORKLIFT TRUCK REQUIRED TO CARRY ASSEMBLY INTO THE BOXCAR.

INDICATES SIDE BLOCKING.

INDICATES MLRS POD STABILIZING FRAME. SEE THE DETAIL ON PAGE 4 AND NOTE "H" ON PAGE 5.

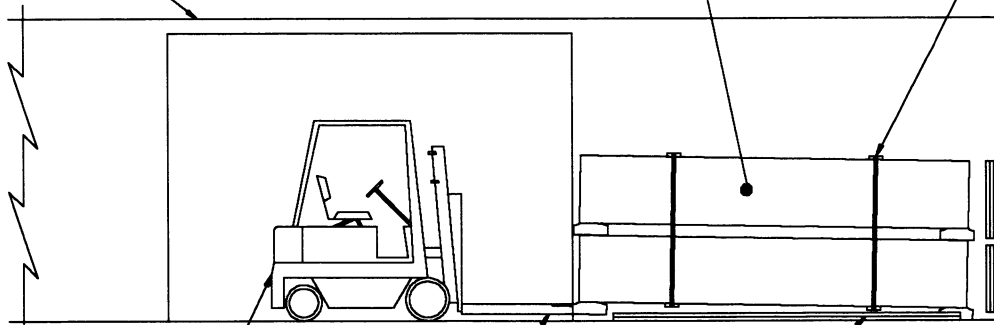
FIGURE 1

THIS VIEW DEPICTS THE LOADING OF ONE RP(-) (LOWER LAYER) INTO A BOXCAR BY A FORKLIFT TRUCK. NOTE OTHER FORKLIFT TRUCK PRE-POSITIONED IN BOXCAR PRIOR TO ASSEMBLY LOADING. NOTE: THE NEAR SIDEWALL AND DOOR OPENING HAVE NOT BEEN SHOWN FOR CLARITY PURPOSES.

INDICATES 50'-6" LONG CONVENTIONAL BOXCAR HAVING A MINIMUM DOOR OPENING WIDTH OF 14'-0".

INDICATES RP(-) STACK (COMPRISED OF ONE UPPER LAYER AND ONE LOWER LAYER RP(-)).

INDICATES UNITIZING STRAP AND STRAPPING BOARD. UNITIZING STRAPS MUST BE TENSIONED AND SEALED PRIOR TO PUSHING STACK INTO ITS FINAL POSITION.



INDICATES FORKLIFT TRUCK PRE-POSITIONED IN BOXCAR PRIOR TO LOADING OF RP(-)S.

INDICATES PUSH ASSEMBLY.

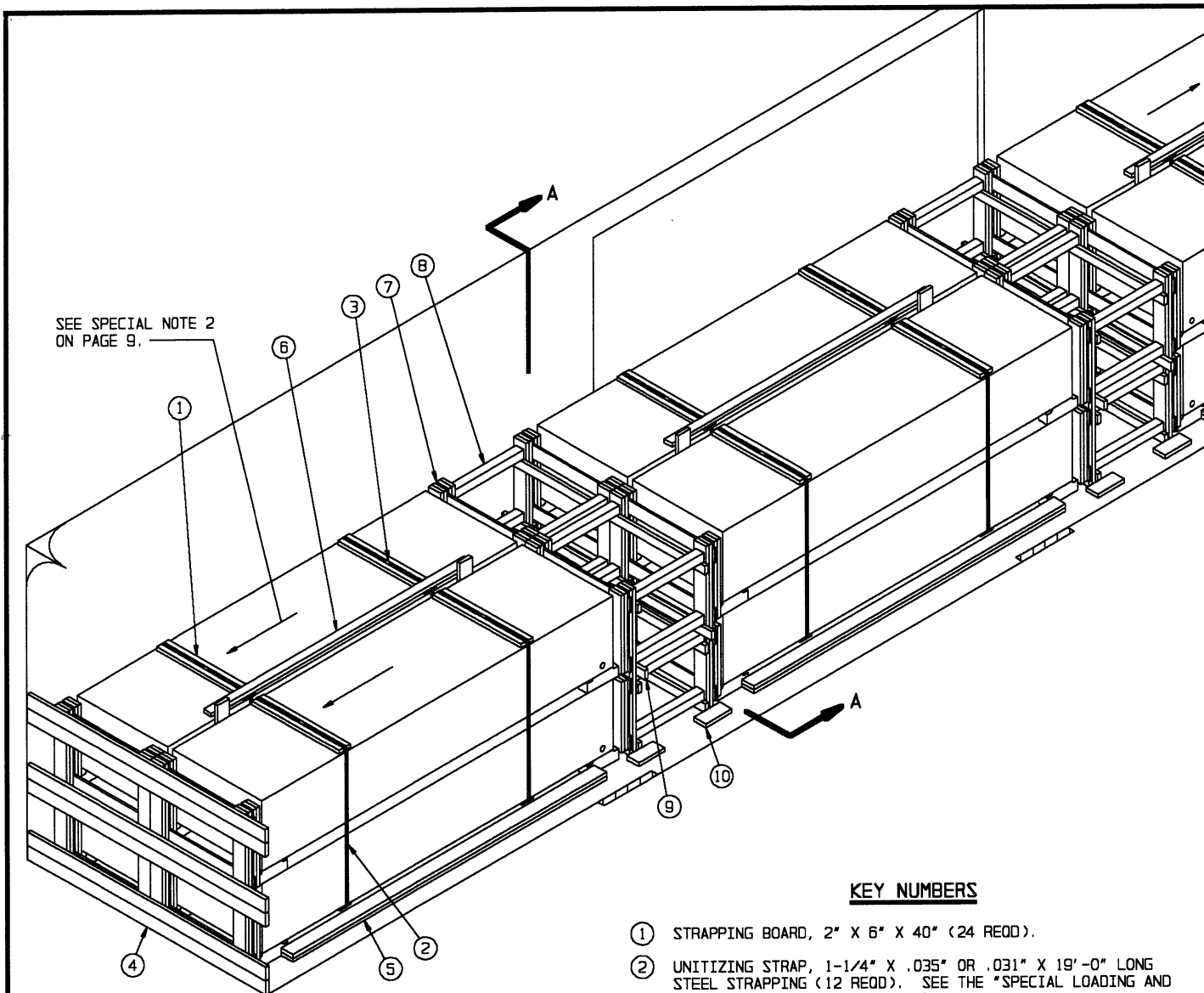
INDICATES SIDE BLOCKING.

INDICATES ENDWALL BULKHEAD.

FIGURE 2

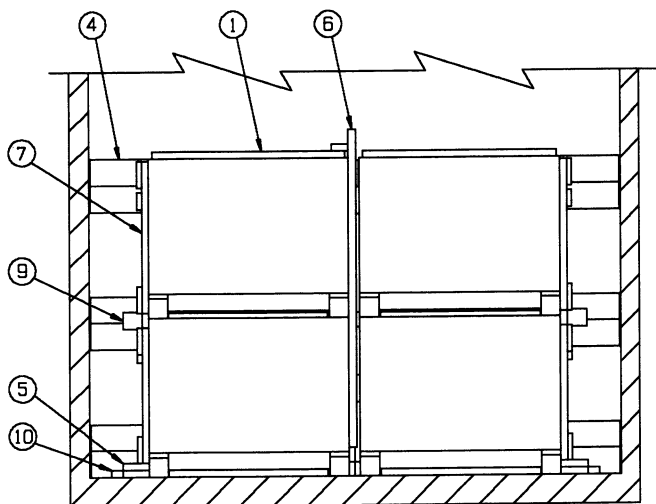
THIS VIEW DEPICTS PUSHING AN RP(-) STACK INTO ITS FINAL SHIPPING POSITION BY A PRE-POSITIONED FORKLIFT TRUCK. NOTE PUSH ASSEMBLY LOCATION DURING PUSHING OPERATION. NOTE: THE NEAR SIDEWALL AND DOOR OPENING HAVE NOT BEEN SHOWN FOR CLARITY PURPOSES.

SPECIAL LOADING AND UNLOADING GUIDANCE



SEE SPECIAL NOTE 2
ON PAGE 9.

ISOMETRIC VIEW



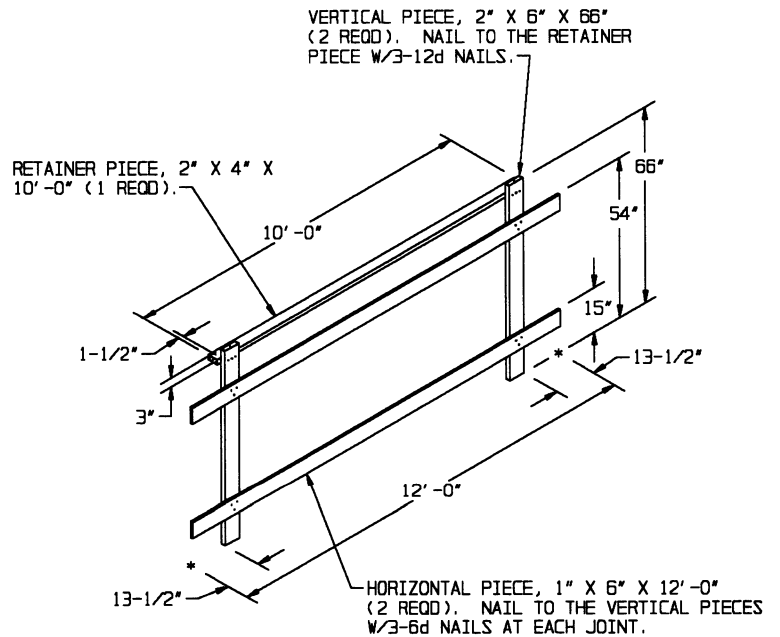
SECTION A-A

KEY NUMBERS

- ① STRAPPING BOARD, 2" X 6" X 40" (24 REQD).
- ② UNITIZING STRAP, 1-1/4" X .035" OR .031" X 19'-0" LONG STEEL STRAPPING (12 REQD). SEE THE "SPECIAL LOADING AND UNLOADING GUIDANCE" ON PAGE 7.
- ③ SEAL FOR 1-1/4" STRAPPING (12 REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.
- ④ ENDWALL BULKHEAD (2 REQD). SEE THE DETAIL ON PAGE 15.
- ⑤ SIDE BLOCKING, 2" X 6" X 12'-0" (DOUBLED) (6 REQD). LOCATE SO AS TO BE CENTERED ALONG THE LENGTH OF THE RP(-) AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/20-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE THE "SPECIAL HANDLING GUIDANCE" ON PAGE 5 AND SPECIAL NOTE 4 ON PAGE 9.
- ⑥ ANTI-CHAFING ASSEMBLY A (3 REQD). SEE THE DETAIL ON PAGE 9. INSTALL PRIOR TO FINAL POSITIONING OF SECOND STACK IN EACH LOAD BAY. WIRE TIE TO FIRST STACK AT FOUR LOCATIONS WITH 18" LENGTHS OF NO. 14 GAGE WIRE.
- ⑦ CENTER GATE (4 REQD). SEE THE DETAIL ON PAGE 16.
- ⑧ STRUT, 4" X 4" BY CUT-TO-FIT (32 REQD). TOENAIL TO CENTER GATES W/2-16d NAILS AT EACH END.
- ⑨ STRUT LEDGER, 2" X 4" X 8'-0" (4 REQD). POSITION ON SECOND LEVEL OF STRUTS AND NAIL TO THE CENTER GATE VERTICAL PIECES W/3d-10d NAILS AT EACH JOINT.
- ⑩ SIDE BLOCKING FOR CENTER GATES, 2" X 6" X 12" (8 REQD). NAIL TO THE CAR FLOOR W/2-16d NAILS.

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOXCAR EQUIPPED WITH 14'-0" WIDE DOOR OPENINGS IS SHOWN. BOXCARS OF OTHER DIMENSIONS AND BOXCARS HAVING WIDER DOOR OPENINGS CAN BE USED.
2. STACKS OF RP(-)S POSITIONED NEAREST THE ENDS OF THE BOXCAR MUST BE POSITIONED WITH THEIR AFT ENDS TOWARD THE CENTER OF THE CAR. POSITIONING IN THIS MANNER WILL ALLOW ACCESS TO THE DRAGGING FACILITY HOLE DURING UNLOADING OPERATIONS.
3. MINIMUM "THRU" OR STAGGERED DOOR OPENING WIDTH IS 14'-0".
4. A WIDER OR NARROWER BOXCAR CAN BE USED FOR SHIPPING THE DEPICTED LOAD BY ADJUSTING THE DISTANCE FROM THE SIDEWALL TO THE INSIDE OF THE SIDE BLOCKING PIECES, PIECES MARKED (S).
5. THE SPECIFIED BLOCKING AND BRACING PROCEDURES APPLICABLE TO A 12 RP(-) LOAD ARE ALSO APPLICABLE TO AN EIGHT RP(-) LOAD TO BE PLACED IN A 40'-6" LONG BY 8'-6" WIDE BOXCAR. FOR ADDITIONAL GUIDANCE SEE GENERAL NOTE "S" ON PAGE 2. QUANTITIES OF DUNNAGE WILL BE ADJUSTED AS REQUIRED.
6. FOR SHIPMENT OF A LOAD WHICH CONTAINS LESS RP(-)S THAN WHAT IS SHOWN, SEE THE PROCEDURES CONTAINED ON PAGES 10 THRU 15.

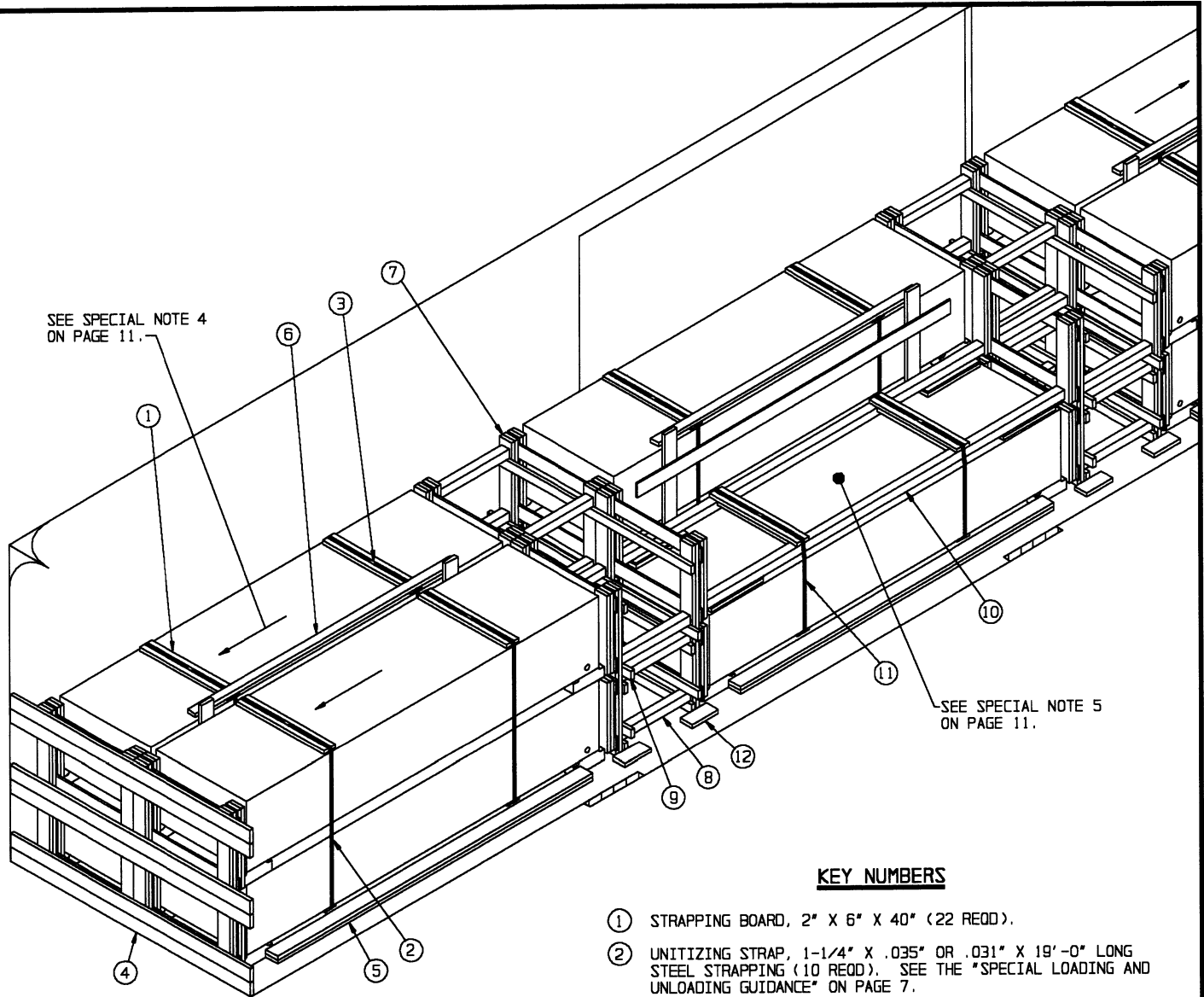


ANTI-CHAFING ASSEMBLY A

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
MLRS RP(-)	12	47,616 LBS
DUNNAGE		2,396 LBS
TOTAL WEIGHT		50,012 LBS (APPROX)

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	332	166
2" X 4"	152	101
2" X 6"	677	677
2" X 6" (OAK)	119	119
4" X 4"	78	104
NAILS	NO. REQD	POUNDS
6d (2")	612	3-3/4
10d (3")	1024	15-3/4
12d (3-1/4")	18	1/2
16d (3-1/2")	384	8-1/2
STEEL STRAPPING, 1-1/4" --- 228' REQD		33 LBS
SEAL FOR 1-1/4" STRAPPING --- 12 REQD		NIL
WIRE, NO. 14 GAGE --- 18' REQD		NIL



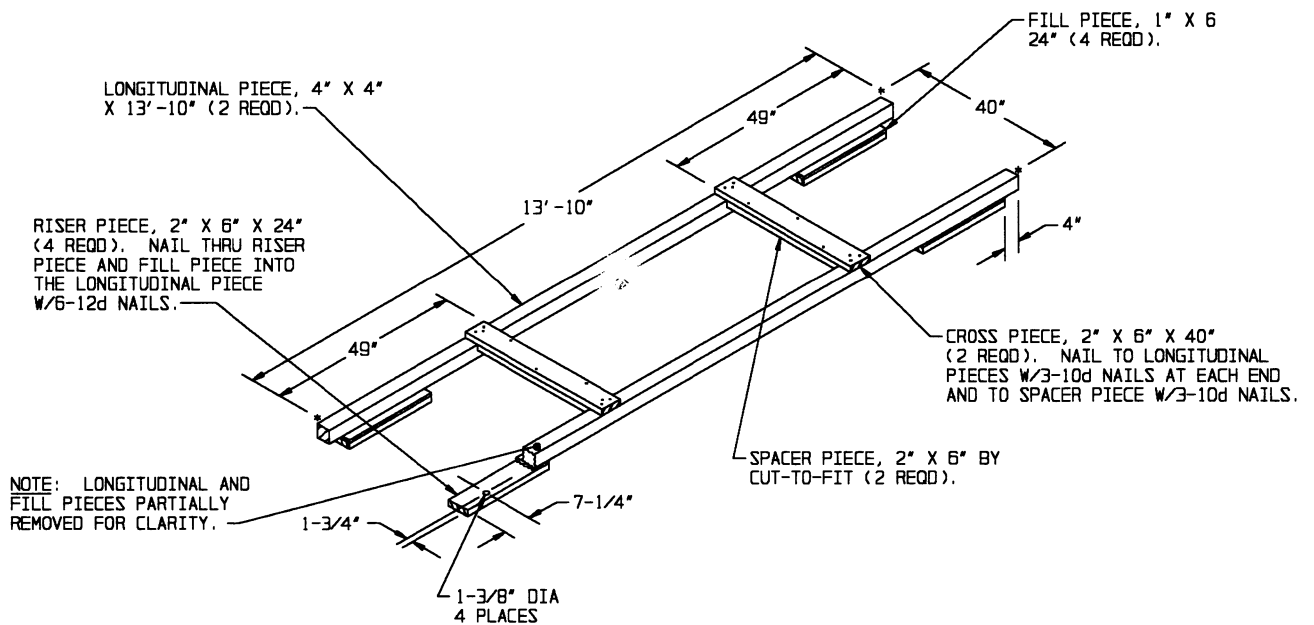
ISOMETRIC VIEW

KEY NUMBERS

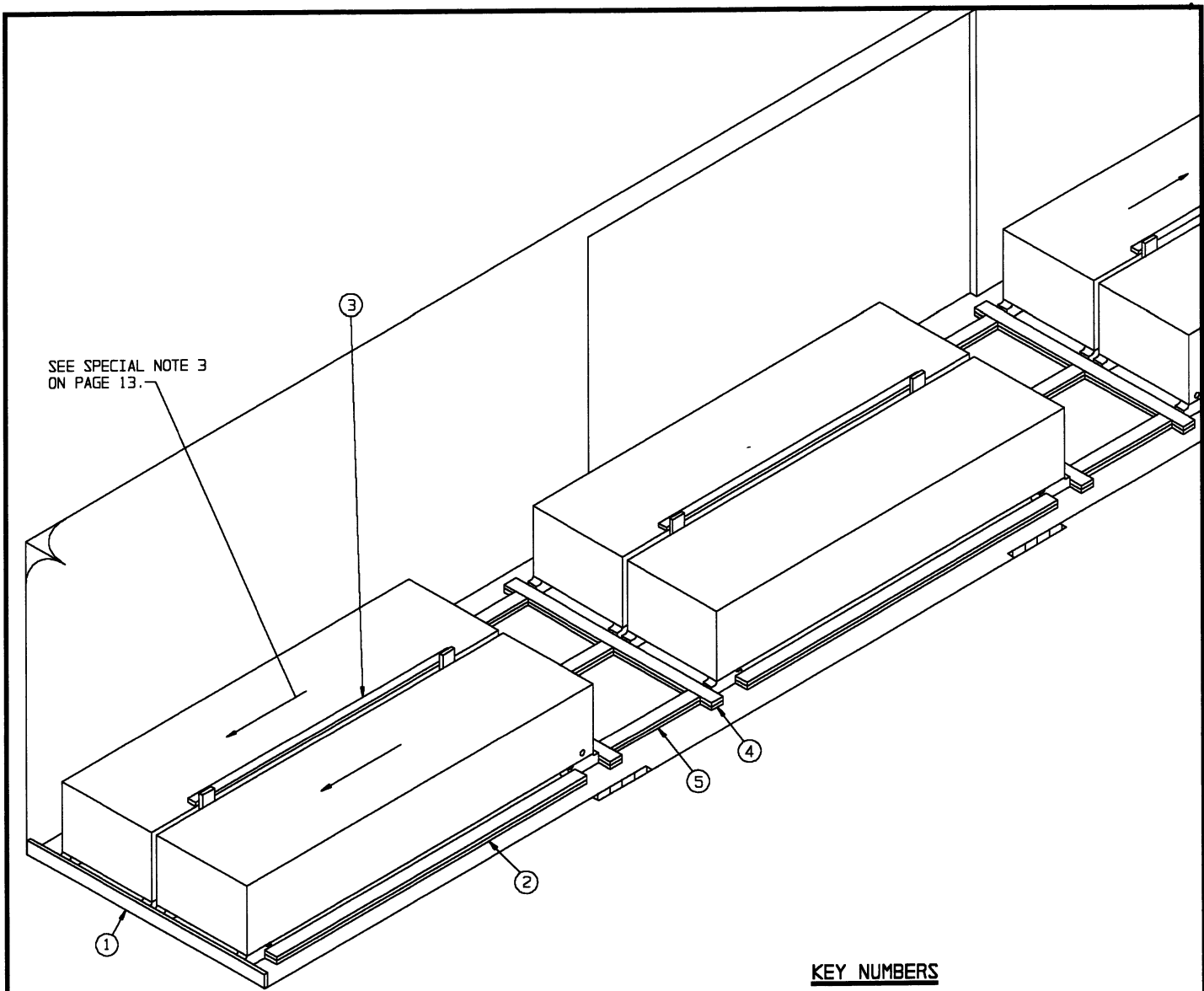
- ① STRAPPING BOARD, 2" X 6" X 40" (22 REQ).
- ② UNITIZING STRAP, 1-1/4" X .035" OR .031" X 19'-0" LONG STEEL STRAPPING (10 REQ). SEE THE "SPECIAL LOADING AND UNLOADING GUIDANCE" ON PAGE 7.
- ③ SEAL FOR 1-1/4" STRAPPING (12 REQ, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.
- ④ ENDWALL BULKHEAD (2 REQ). SEE THE DETAIL ON PAGE 15 AND SPECIAL NOTE 5 ON PAGE 11.
- ⑤ SIDE BLOCKING, 2" X 6" X 12'-0" (DOUBLED) (6 REQ). LOCATE SO AS TO BE CENTERED ALONG THE LENGTH OF THE RP(-) AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/20-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE THE "SPECIAL HANDLING GUIDANCE" ON PAGE 5 AND SPECIAL NOTE 2 ON PAGE 11.
- ⑥ ANTI-CHAFING ASSEMBLY A (3 REQ). SEE THE DETAIL ON PAGE 9. INSTALL PRIOR TO FINAL POSITIONING OF SECOND STACK IN EACH LOAD BAY. WIRE TIE TO FIRST STACK AT FOUR LOCATIONS WITH 18" LENGTHS OF NO. 14 GAGE WIRE.
- ⑦ CENTER GATE (4 REQ). SEE THE DETAIL ON PAGE 16.
- ⑧ STRUT, 4" X 4" BY CUT-TO-FIT (28 REQ). TOENAIL TO CENTER GATES W/2-16d NAILS AT EACH END.
- ⑨ STRUT LEDGER, 2" X 4" X 8'-0" (8 REQ). POSITION ON TOP OF LOWER STRUTS AND NAIL TO THE CENTER GATE W/3-10d NAILS AT EACH JOINT.
- ⑩ FILLER ASSEMBLY (1 REQ). SEE THE DETAIL ON PAGE 11.
- ⑪ FILLER ASSEMBLY STRAP, 1-1/4" X .035" OR .031" X 14'-6" LONG STEEL STRAPPING (2 REQ).
- ⑫ SIDE BLOCKING FOR CENTER GATES, 2" X 6" X 12" (8 REQ). NAIL TO THE CAR FLOOR W/2-16d NAILS.

SPECIAL NOTES:

1. A 9'-2" WIDE CONVENTIONAL BOXCAR HAVING ONE RP(-) OMITTED FROM THE TOP LAYER IS SHOWN.
2. A WIDER OR NARROWER BOXCAR CAN BE USED FOR SHIPPING THE DEPICTED LOAD, BY ADJUSTING THE DISTANCE FROM THE SIDEWALL TO THE INSIDE OF THE SIDE BLOCKING PIECES, PIECES MARKED (5).
3. WHEN A BOXCAR IS LOADED WITH THREE LOAD BAYS, THE OMITTED RP(-) PROCEDURES SHOULD BE APPLIED IN THE CENTER LOAD BAY OF THE CAR.
4. STACKS OF RP(-)S POSITIONED NEAREST TO THE ENDS OF THE BOXCAR MUST BE POSITIONED WITH THEIR AFT ENDS TOWARDS THE CENTER OF THE CAR, TO ALLOW ACCESS TO THE DRAGGING FACILITY HOLE DURING UNLOADING OPERATIONS.
5. WHEN A BOXCAR LOAD AS DEPICTED ON PAGE 10 IS TO BE SHIPPED WITH ONE RP(-) OMITTED, THE LATERAL CENTERLINE OF THE LOAD MUST BE SHIFTED 2" FROM THE CENTERLINE OF THE BOXCAR. BY SHIFTING THE LOAD 2" TOWARDS THE SIDE WITH THE OMITTED RP(-), THE BOXCAR WILL BE BALANCED WEIGHTWISE. NOTE ALSO THAT THE LOCATION OF THE VERTICAL DUNNAGE PIECES ON THE ENDWALL BULKHEADS MUST BE SHIFTED 2" TOWARD THE SIDE WITH THE OMITTED RP(-).



FILLER ASSEMBLY



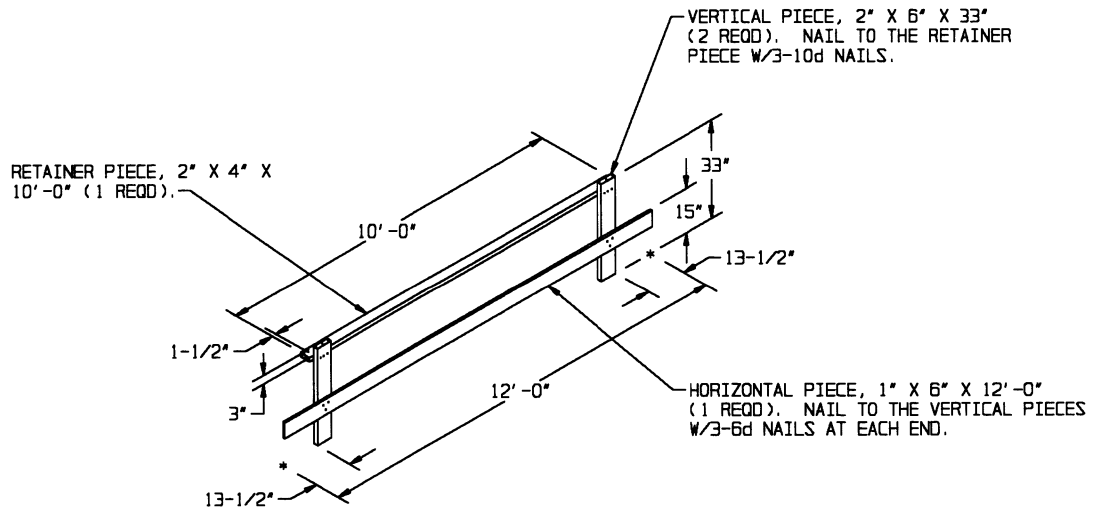
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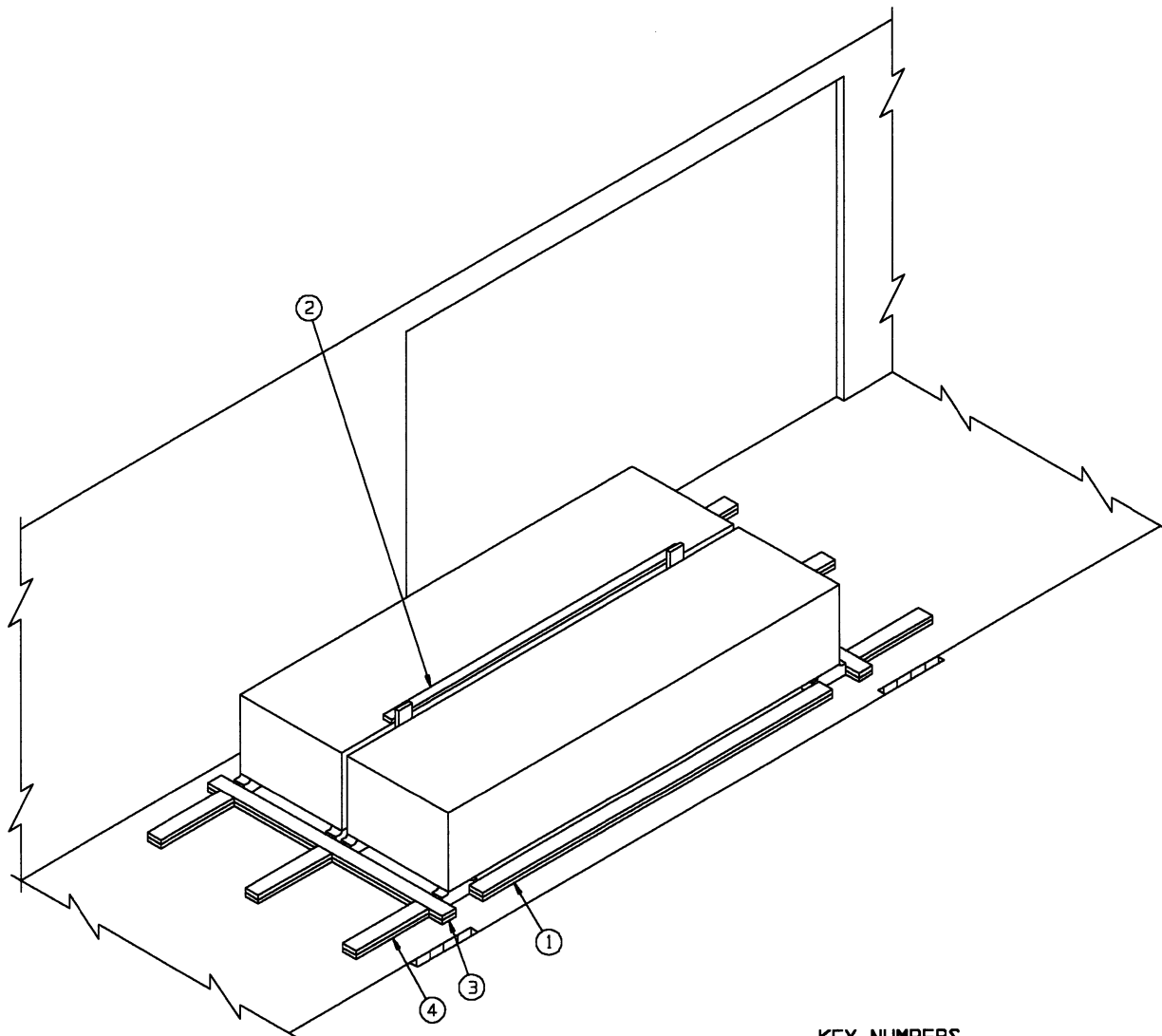
- ① ENDWALL BULKHEAD, 2" X 6" BY CAR WIDTH MINUS 1/2" (2 REQD). NAIL TO THE ENDWALL W/6-8d NAILS.
- ② SIDE BLOCKING, 2" X 6" X 12'-0" (DOUBLED) (6 REQD). LOCATE SO AS TO BE CENTERED ALONG THE LENGTH OF THE RP(-) AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/18-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE THE "SPECIAL HANDLING GUIDANCE" ON PAGE 5 AND SPECIAL NOTE 5 ON PAGE 13.
- ③ ANTI-CHAFING ASSEMBLY B (3 REQD). SEE THE DETAIL ON PAGE 13. INSTALL PRIOR TO FINAL POSITIONING OF SECOND ASSEMBLY IN EACH LOAD BAY. WIRE TIE TO FIRST ASSEMBLY AT TWO LOCATIONS WITH 18" LENGTHS OF NO. 14 GAUGE WIRE.
- ④ HEADER, 2" X 6" X 8'-0" (DOUBLED) (4 REQD). LOCATE SO AS TO BE CENTERED ON THE RP(-)'s SKIDS AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/12-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/12-40d NAILS.
- ⑤ BACK-UP CLEAT, 2" X 6" BY CUT-TO-FIT (DOUBLED) (6 REQD). LOCATE AS SHOWN AND NAIL FIRST PIECE TO CAR FLOOR W/7-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/7-40d NAILS.

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOXCAR EQUIPPED WITH 14'-0" WIDE DOOR OPENINGS IS SHOWN. BOXCARS OF OTHER DIMENSIONS AND BOXCARS HAVING WIDER DOOR OPENINGS CAN BE USED.
2. THE PROCEDURES SHOWN ARE ONLY FOR USE IN BOXCARS HAVING WOODEN OR NAILABLE METAL FLOORS.
3. ASSEMBLIES POSITIONED NEAREST TO THE ENDS OF THE BOXCAR MUST BE POSITIONED WITH THEIR AFT ENDS TOWARD THE CENTER OF THE CAR. POSITIONING IN THIS MANNER WILL ALLOW ACCESS TO THE DRAGGING FACILITY HOLE LOCATED IN THE AFT END OF THE RP(-), SINCE THIS ACCESS IS REQUIRED DURING UNLOADING OPERATIONS.
4. MINIMUM "THRU" OR STAGGERED DOOR OPENING WIDTH IS 14'-0".
5. A WIDER OR NARROWER BOXCAR CAN BE USED FOR SHIPPING THE DEPICTED LOAD BY ADJUSTING THE DISTANCE FROM THE SIDEWALL TO THE INSIDE OF THE SIDE BLOCKING PIECES, PIECES MARKED (2).



ANTI-CHAFING ASSEMBLY B



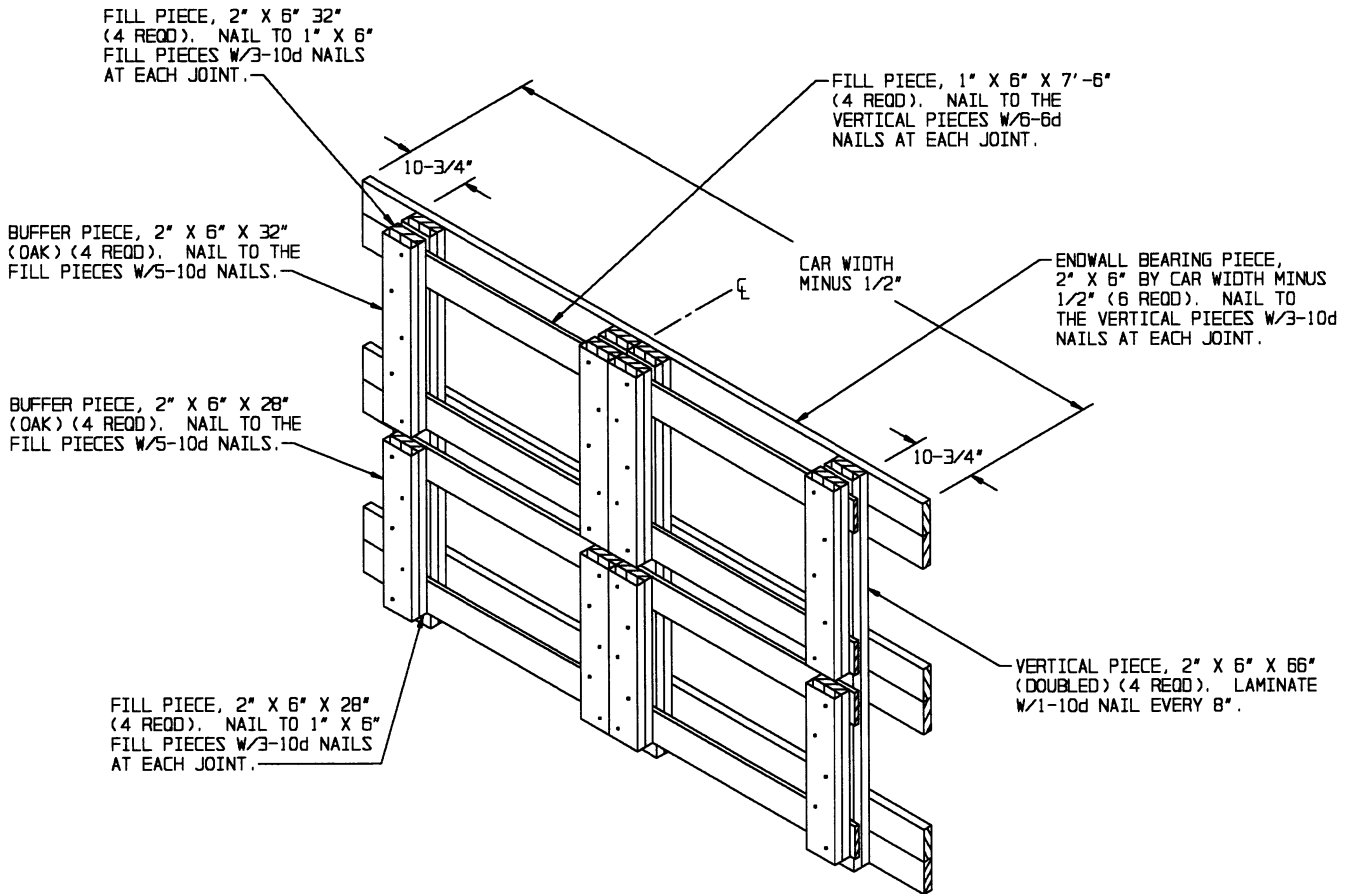
ISOMETRIC VIEW

KEY NUMBERS

- ① SIDE BLOCKING, 2" X 6" X 12'-0" (DOUBLED) (2 REOD). LOCATE SO AS TO BE CENTERED ALONG THE LENGTH OF THE RP(-) AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/14-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE THE "SPECIAL HANDLING GUIDANCE" ON PAGE 5.
- ② ANTI-CHAFING ASSEMBLY B (1 REOD). SEE THE DETAIL ON PAGE 13. INSTALL PRIOR TO FINAL POSITIONING OF SECOND RP(-). WIRE TIE TO FIRST ASSEMBLY AT TWO LOCATIONS WITH 18" LENGTHS OF NO. 14 GAUGE WIRE.
- ③ HEADER, 2" X 6" X 8'-0" (DOUBLED) (2 REOD). LOCATE SO AS TO BE CENTERED ON THE RP(-)'S SKIDS AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/12-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/12-40d NAILS.
- ④ BACK-UP CLEAT, 2" X 6" X 30" (6 REOD). LOCATE AS SHOWN AND NAIL FIRST PIECE TO CAR FLOOR W/6-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/6-40d NAILS.

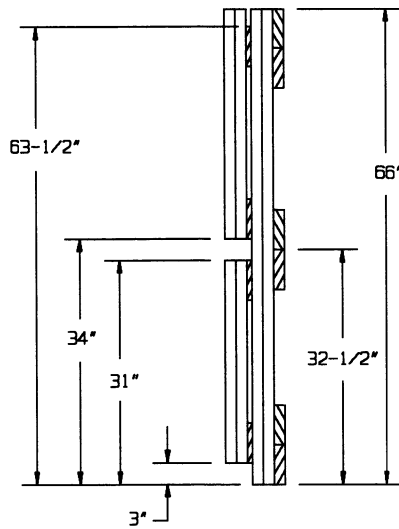
SPECIAL NOTES:

- 1. A 9'-2" WIDE CONVENTIONAL TYPE BOXCAR EQUIPPED WITH 14'-0" WIDE DOOR OPENINGS IS SHOWN. BOXCARS OF OTHER WIDTHS AND BOXCARS HAVING WIDER DOOR OPENINGS CAN BE USED.
- 2. THE PROCEDURES SHOWN ARE ONLY FOR USE IN BOXCARS HAVING WOODEN OR NAILABLE METAL FLOORS.
- 3. IF THE RP(-)'S ARE POSITIONED NEAR THE CAR END RATHER THAN IN THE DOORWAY AREA, THE RP(-)'S MUST BE POSITIONED WITH THEIR AFT ENDS TOWARDS THE CENTER OF THE CAR. POSITIONING IN THIS MANNER WILL ALLOW ACCESS TO THE DRAGGING FACILITY HOLE LOCATED IN THE AFT END OF THE ASSEMBLY, SINCE THIS ACCESS IS REQUIRED DURING UNLOADING OPERATIONS.
- 4. MINIMUM "THRU" OR STAGGERED DOOR OPENING WIDTH IS 14'-0".
- 5. A WIDER OR NARROWER BOXCAR CAN BE USED FOR SHIPPING THE DEPICTED LOAD BY ADJUSTING THE DISTANCE FROM THE SIDEWALL TO THE INSIDE OF THE SIDE BLOCKING PIECES, PIECES MARKED ①.



ENDWALL BULKHEAD

NOTE: DIMENSIONS SHOWN ON THIS DETAIL ARE BASED ON A BOXCAR HAVING A WIDTH OF 9'-2". FOR BOXCARS OF OTHER SIZES, THE DIMENSIONS WILL CHANGE ACCORDINGLY.



END VIEW

FILL PIECE, 2" X 6" X 31-1/2"
(4 REQD). NAIL TO 1" X 6"
FILL PIECES W/3-10d NAILS
AT EACH JOINT.

FILL PIECE, 1" X 6" X 7'-6"
(4 REQD). NAIL TO THE
VERTICAL PIECES W/6-6d
NAILS AT EACH JOINT.

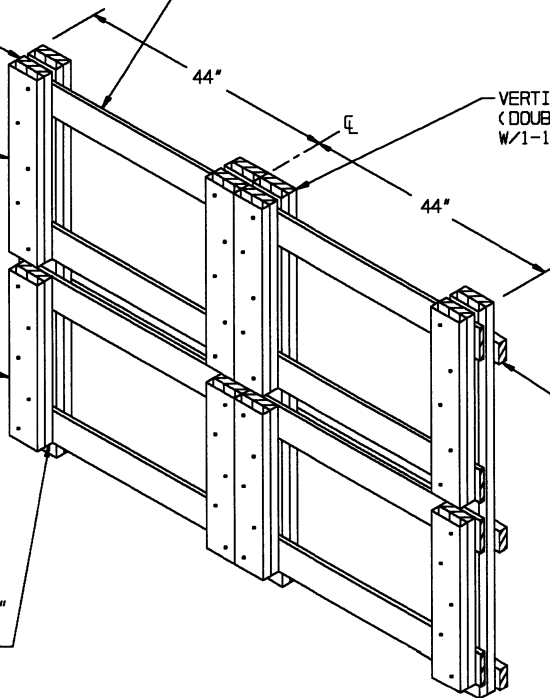
BUFFER PIECE, 2" X 6" X 31-1/2"
(OAK) (4 REQD). NAIL TO THE
FILL PIECES W/5-10d NAILS.

VERTICAL PIECE, 2" X 6" X 65-1/2"
(DOUBLED) (4 REQD). LAMINATE
W/1-10d NAIL EVERY 8".

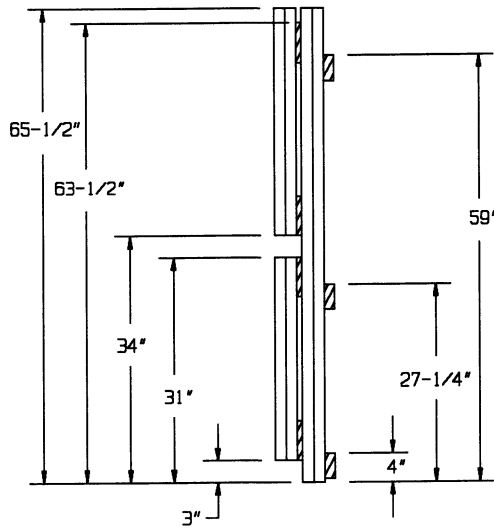
BUFFER PIECE, 2" X 6" X 28"
(OAK) (4 REQD). NAIL TO THE
FILL PIECES W/5-10d NAILS.

STRUT LEDGER, 2" X 4" X 7'-6"
(3 REQD). NAIL TO THE VERTICAL
PIECES W/2-10d NAILS AT EACH JOINT.

FILL PIECE, 2" X 6" X 28"
(4 REQD). NAIL TO 1" X 6"
FILL PIECES W/3-10d NAILS
AT EACH JOINT.



CENTER GATE



END VIEW