



LOADING & BRACING OF PALLETIZED AND SKIDDED UNIT (STRAPPED) LOADS OF BOXED AMMUNITION AND COMPONENTS IN VAN TYPE TRAILER FOR TRAILER-ON-FLAT-CAR (TOFC) SHIPMENT

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CAUTION:

GENERAL NOTES, PAGE 2, WILL BE THOROUGHLY READ PRIOR TO LOADING OPERATIONS.

DO NOT SCALE

LOADING & BRACING OF PALLETIZED AND SKIDDED UNIT (STRAPPED) LOADS OF BOXED AMMUNITION AND COMPONENTS IN VAN TYPE TRAILER FOR TRAILER-ON-FLAT-CAR (TOFC) SHIPMENT			
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CHECKED BY RHA/GWP	CONFORMS TO N.E.W.	APPROVED BY ORDER OF THE CHIEF OF ORDNANCE <i>James J. Hoctor</i> CHIEF OF ORDNANCE, U.S.A.	
ORDNANCE CORPS U.S.A.			
4 MAY 1961			
CLASS	DIVISION	DRAWING	FILE
19	48	4036	15PA1000

GENERAL NOTES

- A. LOADING AND BRACING PROCEDURES SHOWN HEREIN ARE APPLICABLE, FOR TRAILERS EQUIPPED WITH SPECIAL BULKHEAD BRACES AS PER ORDNANCE CORPS DRAWING 19-48-D-ORDJU-2440. TRAILER LOADS WILL ONLY BE SHIPPED ON THE APPROVED TYPE OF RAILROAD EQUIPMENT LISTED THEREIN.
- B. LOADS SHOWN HEREIN ARE TYPICAL ONLY AND ARE BASED ON VAN TYE TRAILERS HAVING 25'-0" CLEARANCE BETWEEN INSTALLED BULKHEAD BRACES X 7'-6" WIDE, INSIDE DIMENSIONS.
- C. THE NUMBER OF UNITS PER LOAD MAY BE INCREASED OR DECREASED IN ORDER TO MEET QUANTITIES TO BE SHIPPED REQUIREMENTS, PROVIDING TOTAL LADING WEIGHT DOES NOT EXCEED 40,000 POUNDS. ALSO, PORTIONS OF THE LADING OR PARTIAL LAYERS MAY BE SHIFTED FORE OR AFT TO MEET WEIGHT-DISTRIBUTION REQUIREMENTS.
- D. ALL STRAPPING WILL BE SEALED WITH TWO (2) SEALS AND TWO (2) CRIMPS PER SEAL.
- E. DO NOT NAIL GATES, SOLID FILL OR ANY OTHER PART OF THE BLOCKING SHOWN HEREIN TO THE TRAILER BULKHEAD AND SIDEWALLS OR FLOOR. ALL NAILING WILL BE ACCOMPLISHED WITHIN THE BLOCKING LUMBER.
- F. CARE SHOULD BE EXERCISED WHEN LOADS ARE BUILT (SELECTION OF UNITS PER LAYER, ETC) TO INSURE THE MINIMUM USAGE OF INTERNAL BLOCKING AND BRACING.
CAUTION: THE LADING MUST BE SOLIDLY BLOCKED FORE AND AFT TO PREVENT RELATIVE LONGITUDINAL MOVEMENT WITHIN THE LADING AND BETWEEN LADING AND TRAILER, AND IN ALL INSTANCES THREE (3) 2" X .050" STRAPS (STEEL BANDS) MUST BE USED BETWEEN THE SPECIAL TRAILER BULKHEADS.
- G. REAR BLOCKING REQUIREMENTS DEPICTED ON PAGES 4, 5, 6 AND 7 ARE BASED ON THE ASSUMPTION THAT THERE MUST BE A MINIMUM DISTANCE OF 15" REMAINING BETWEEN THE REAR UNITS OF THE LADING AND THE AFT BULKHEAD BOARDS TO FACILITATE THE PLACEMENT OF BULKHEAD UPRIGHT BRACES; HOWEVER, IF THE AVAILABLE MATERIALS HANDLING EQUIPMENT PERMITS OR THE TYPE OF SPECIAL BULKHEADS ARE SUCH THAT LESS THAN 15" IS REQUIRED FOR THEIR PLACEMENT, THE NUMBER OF LOWER LAYER UNITS SHOULD BE INCREASED AND EXTENDED AS MUCH AS POSSIBLE TOWARD THE REAR, TO REDUCE BLOCKING REQUIREMENTS AND TO BETTER SUIT WEIGHT DISTRIBUTION REQUIREMENTS. NOTE REAR BLOCKING, PAGE 4, IN ALL PROBABILITY THE UNITS MARKED "X" AND "Z" WILL REQUIRE SOME BLOCKING OTHER THAN BULKHEAD, AS SHOWN IN: SOLID FILL; HOWEVER, THE LOADING METHOD DEPICTED REQUIRES THE PLACEMENT OF OUTSIDE UPRIGHT BRACES PRIOR TO LOADING OF "X" AND "Z" UNITS, FOLLOWED BY PLACEMENT OF THE CENTER UPRIGHT BRACE.
- H. FLOOR LINE BLOCKING WILL NOT BE EMPLOYED TO BLOCK SKIDDED UNIT LOADS, AT LEAST THE FIRST LAYER WILL BE BLOCKED AS SHOWN ON PAGE 7, OR ALTERNATE THERETO (SOLID FILL). TWO FULL LAYER LOADS, AS SHOWN ON PAGE 6, CAN BE BLOCKED BY THE METHOD DEPICTED ON PAGE 7 WITH THE ADDITION OF PIECE ③ WHICH IS SHOWN ON PAGE 4. THIS LATTER METHOD DELETES PIECE ③ PAGE 6, AT LADING REAR.

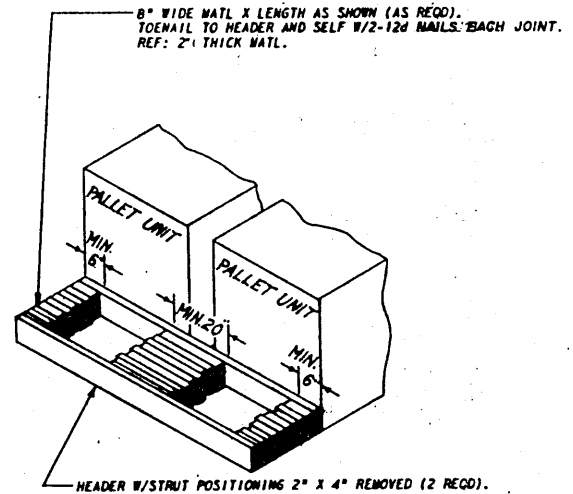
MATERIAL SPECIFICATIONS

LUMBER: SEE PARAGRAPH 5400, ORDM 3-4, VOL 2, DATED 15 APRIL 1956.

NAILS: COMMON, CEMENT-COATED, FED. SPEC. FF-N-105.

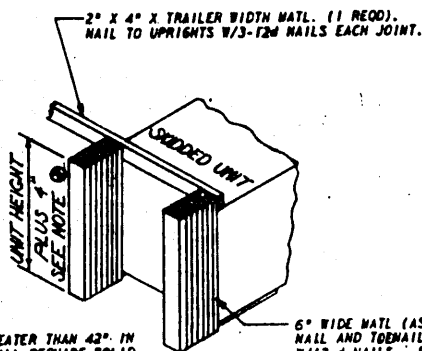
ALT: ANNULAR-RING TYPE NAIL OF SAME SIZE.

STRAPPING: STEEL: TYPE I, CLASS "A" OR "C", FED SPEC GG-S-781.



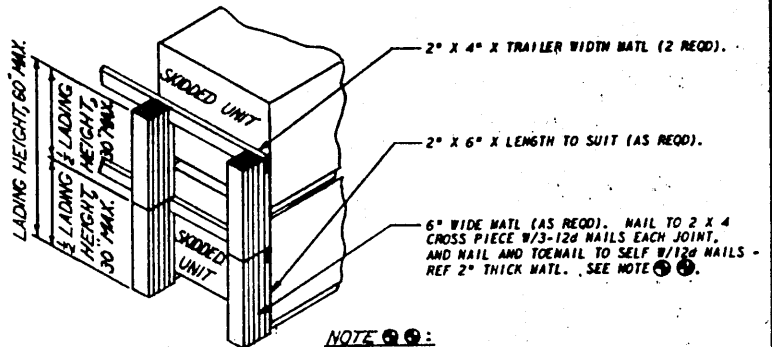
DETAIL "E"

FLOOR LINE SOLID FILL,
FOR PALLET UNIT LOADS.



DETAIL "G"

VERTICAL UPRIGHT SOLID FILL
FOR ONE UNIT HIGH SKIDDED
UNIT LOADS. SEE NOTE ①



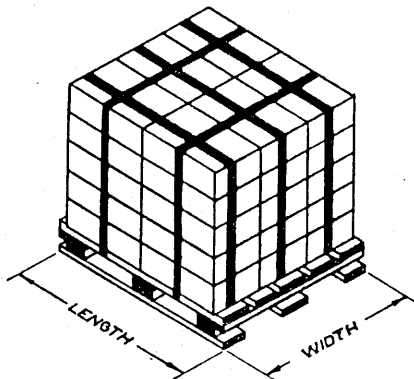
NOTE ① ②:

FOR OPEN TOP VANS, 6" WIDE SOLID FILL
MATERIAL CAN BE LADING HEIGHT, 60"
MAXIMUM. SEE T. C. GEORGE'S TARIFF
NO. 13 (ICC-REQ) 77.83J(h).

DETAIL "F"

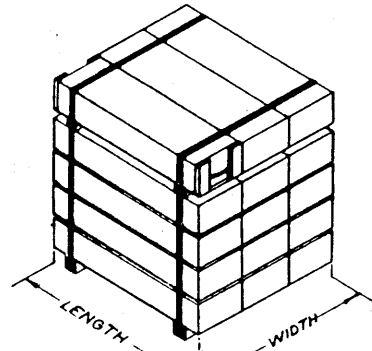
VERTICAL UPRIGHT SOLID FILL FOR
TWO UNIT HIGH OR ONE UNIT HIGH,
GREATER THAN 42" IN HEIGHT, SKIDDED
UNIT CLOSED VAN LOADS. SEE NOTE ① ②

NOTES AND MATERIAL SPECIFICATIONS, AND SOLID FILL DETAILS



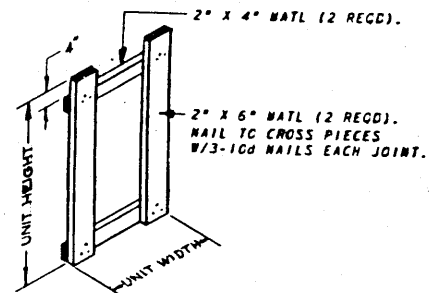
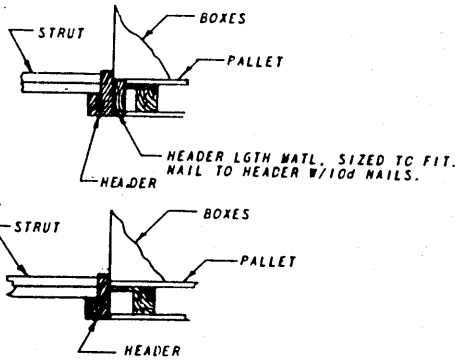
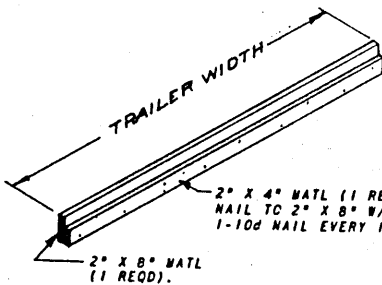
TYPICAL PALLETIZED UNIT

(REF: ORD CORPS DWG 19-48-4020-1-2-5-11PA1000)



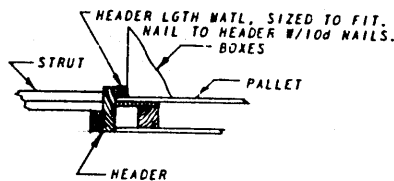
TYPICAL SKIDDED UNIT

(REF: ORD CORPS DWGS 19-48-4001-10P1000
19-48-4004-2PA1000C)

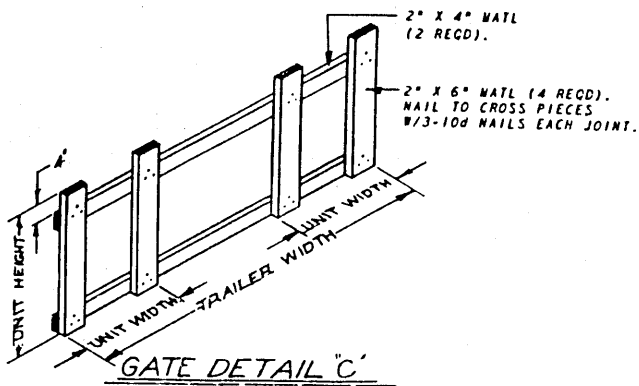


HEADER DETAIL "A"

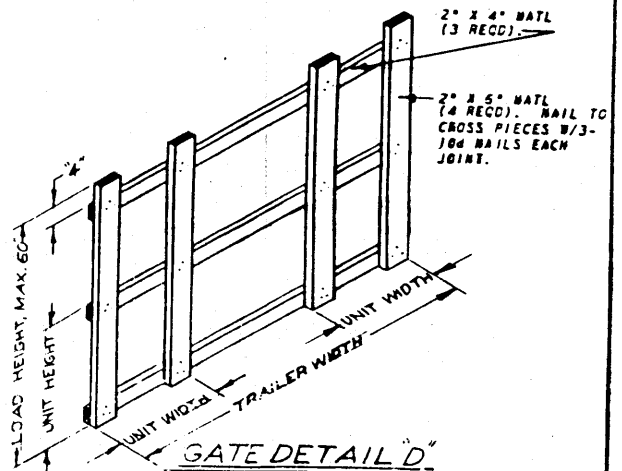
MIDDLE VIEW TO RIGHT DEPICTS IDEAL HEADER POSITION, NOT REQUIRING "FILL". TOP AND BOTTOM VIEWS DEPICT THE APPLICATION OF TYPICAL "FILL", WHICH PROVIDES A SOLID BEARING AREA BETWEEN HEADER AND LADING.



GATE DETAIL "B"

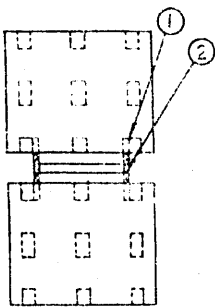


GATE DETAIL "C"



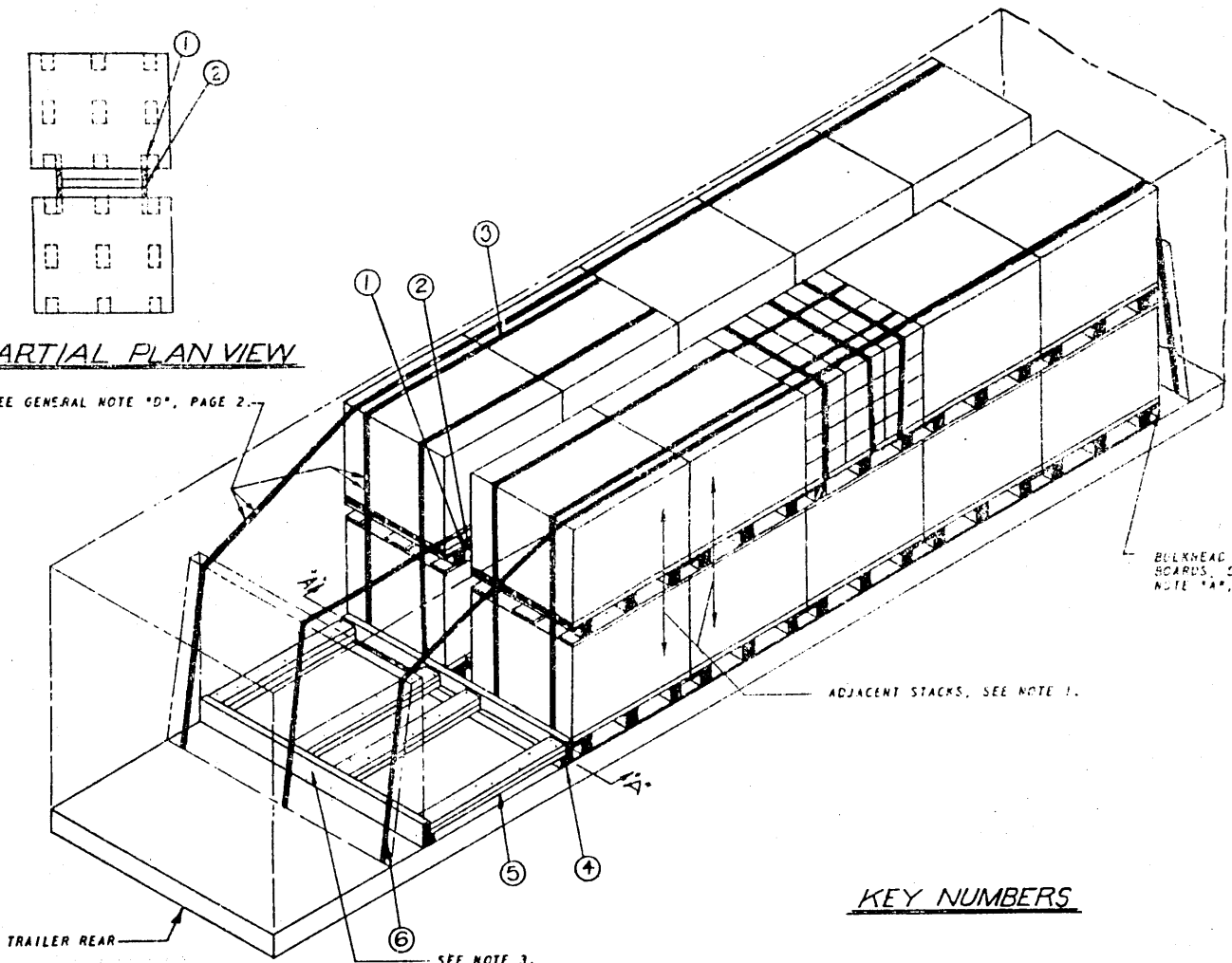
GATE DETAIL "D"

HEADER AND GATE DETAILS
AND TYPICAL UNITS



PARTIAL PLAN VIEW

SEE GENERAL NOTE "D", PAGE 2.



ISOMETRIC VIEW

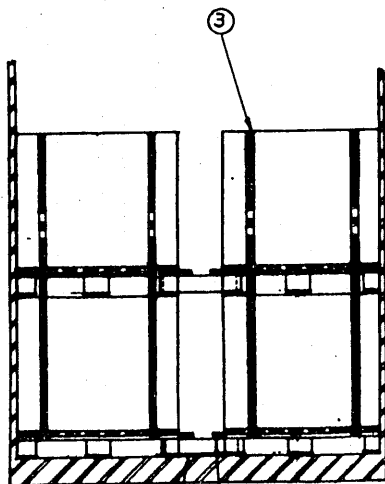
SEE NOTE 3.

KEY NUMBERS

- ① 2" X 4" X EXCESS SPACE PLUS 6" (20 REQD). SEE SECTION "A-A" AND PARTIAL PLAN FOR POSITION.
- ② 2" X 4" X 27" (20 REQD). NAIL EACH END TO ① W/2-12d NAILS. SEE SECTION "A-A" FOR POSITION.
- ③ STRAPPING, STEEL, 2" X .050" X LENGTH TO SUIT (4 REQD). SEE NOTE J.
- ④ HEADER, (2 REQD). SEE DETAIL "A", PAGE 3.
- ⑤ STRUTS, 2" X 6" X CUT TO FIT, DOUBLED (4 REQD). LAMINATE W/1-10d NAIL EVERY 6" AND TOENAIL TO ④ W/3-12d NAILS EACH END.
- ⑥ STRAPPING, STEEL, 2" X .050" X LENGTH TO SUIT (3 REQD).

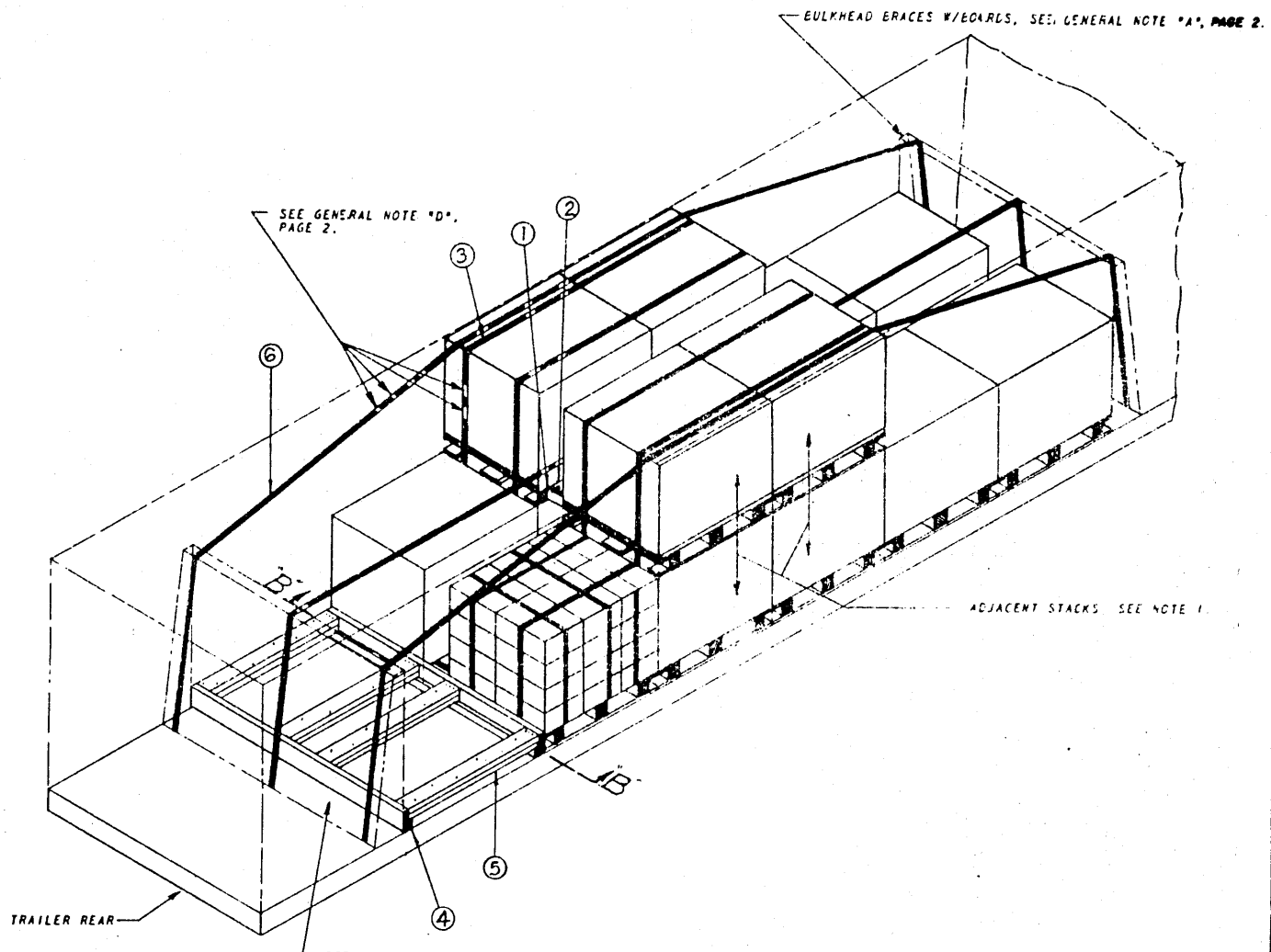
NOTES:

- 1. PIECE ③ WILL BE APPLIED TO UNITIZE A MINIMUM OF ONE UNIT IN EACH STACK TO A UNIT DIRECTLY BELOW (2 UNIT BUNDLE) OR APPLIED TO UNITIZE A MAXIMUM OF TWO UNITS IN ADJACENT STACKS TO THE TWO UNITS DIRECTLY BELOW (4 UNITS BUNDLE). FOUR UNIT BUNDLE SHOWN ABOVE.
- 2. IF SPACE TO BE BLOCKED AT REAR OF LOAD IS LESS THAN 18". SOLID FILL TYPE BLOCKING CAN BE USED. SEE DETAIL "E", PAGE 2.
- 3. IN ALL INSTANCES WHEREIN HEADER AND STRUT TYPE BLOCKING IS EMPLOYED, AS SHOWN, BULKHEAD BOARDS MUST BE DOUBLED AT THE BOTTOM BULKHEAD BOARD LOCATION BY USE OF ONE EXCESS UPPER BULKHEAD BOARD.



SECTION A-A

TYPICAL PALLETIZED LOAD



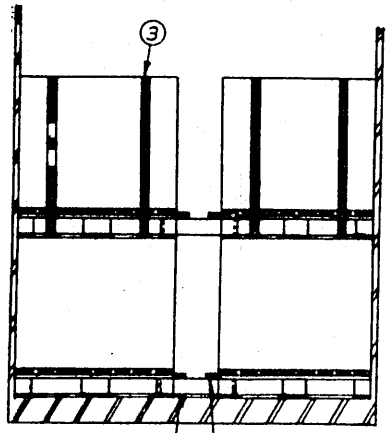
ISOMETRIC VIEW

KEY NUMBERS

- ① 2" X 4" X EXCESS SPACE PLUS 6" (14 REQD). SEE PARTIAL PLAN, PAGE 4, AND SECTION "B-B" FOR POSITION.
- ② 2" X 4" X 27" (14 REQD). NAIL EACH END TO ① W/2-12d NAILS. SEE SECTION "B-B" FOR POSITION.
- ③ STRAPPING, STEEL, 2" X .050" X LENGTH TO SUIT (4 REQD). SEE NOTE 1.
- ④ HEADER (2 REQD). SEE DETAIL "A", PAGE 3. SEE NOTE 2.
- ⑤ STRUTS, 2" X 6" X CUT TO FIT, DOUBLED (4 REQD). LAMINATE W/1-10d NAIL EVERY 6" AND TOENAIL TO ④ W/3-12d NAILS EACH END.
- ⑥ STRAPPING, STEEL, 2" X .050" X LENGTH TO SUIT (3 REQD).

NOTES:

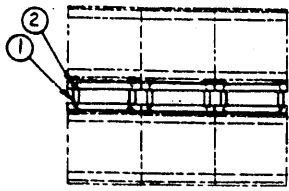
- 1. PIECE ③ WILL BE APPLIED TO UNITIZE A MINIMUM OF ONE PARTIAL LAYER UNIT IN EACH STACK TO A UNIT DIRECTLY BELOW (2 UNIT BUNDLE) OR APPLIED TO UNITIZE A MAXIMUM OF TWO PARTIAL LAYER UNITS IN ADJACENT STACKS TO THE TWO UNITS DIRECTLY BELOW (4 UNIT BUNDLE) BOTH FORE AND AFT OF A PARTIAL LAYER, EXCEPT FOR INSTANCES WHEREIN THE FORWARD PARTIAL LAYER UNITS ARE POSITIONED DIRECTLY AGAINST THE BULKHEAD AND THE PARTIAL LAYER IS TWO OR MORE UNITS LONG, IN WHICH CASE THE FORWARD PIECE ③'S CAN BE ELIMINATED.
- 2. IF SPACE TO BE BLOCKED AT REAR OF LOAD IS LESS THAN 18". SOLID FILL TYPE BLOCKING CAN BE USED. SEE DETAIL "E", PAGE 2.
- 3. IN ALL INSTANCES WHEREIN HEADER AND STRUT TYPE FLOOR LINE BLOCKING IS EMPLOYED, AS SHOWN, BULKHEAD BOARDS MUST BE DOUBLED AT THE BOTTOM BULKHEAD BOARD LOCATION BY USE OF ONE EXCESS UPPER BULKHEAD BOARD.



SECTION "B-B"

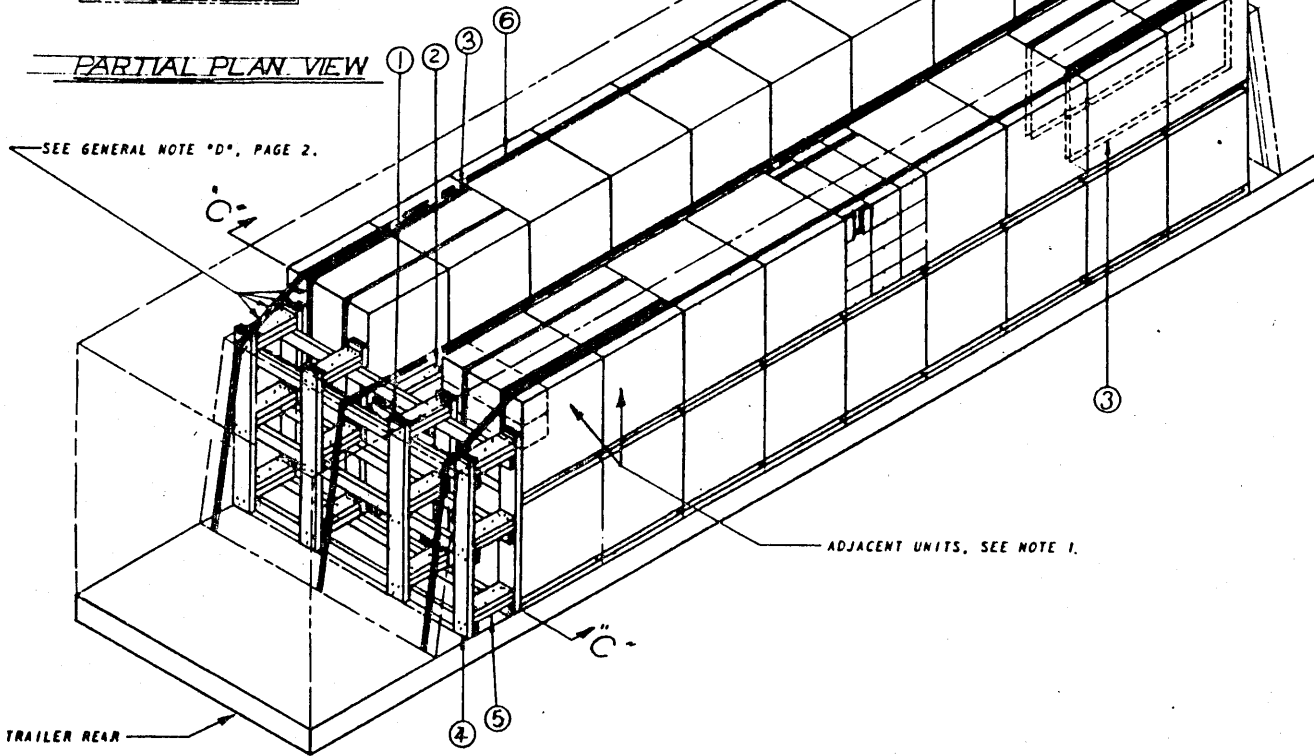
TYPICAL PALLETIZED LOAD (PARTIAL 2ND LAYER)

BULKHEAD BRACES W/BOARDS, SEE GENERAL NOTE "A", PAGE 2.



PARTIAL PLAN VIEW

SEE GENERAL NOTE "D", PAGE 2.



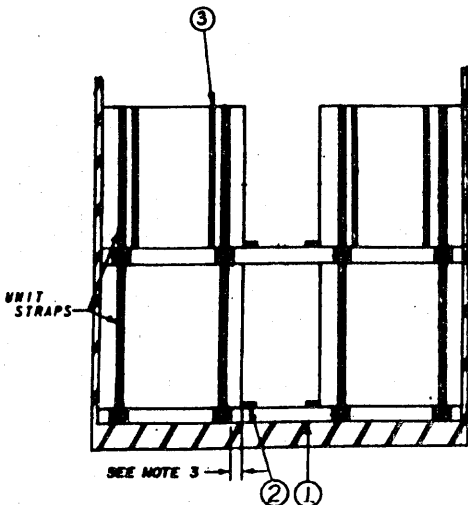
ISOMETRIC VIEW

KEY NUMBERS

- ① 2" X 4" X CUT TO FIT (36 REQD). SEE PARTIAL PLAN VIEW AND SECTION "C-C" FOR POSITION.
- ② 2" X 4" X UNIT LENGTH (36 REQD). NAIL TO ① W/2-12d NAILS EACH JOINT. SEE SECTION "C-C" FOR POSITION.
- ③ STRAPPING, STEEL, 1 1/2" X .035" X LENGTH TO SUIT (8 REQD). SEE NOTE 1.
- ④ GATE (2 REQD). SEE DETAIL "D", PAGE 3.
- ⑤ STRUTS, 2" X 6" X CUT TO FIT, DOUBLED (12 REQD). LAMINATE W/1-16d NAIL EVERY 6" TO NAIL TO ④ W/3-12d NAILS EACH END.
- ⑥ STRAPPING, STEEL, 2" X .050" X LENGTH TO SUIT (3 REQD).

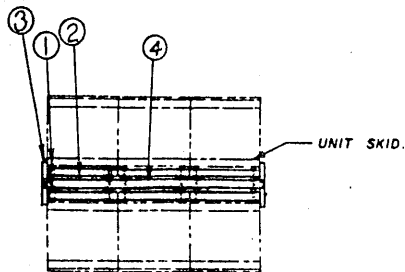
NOTES:

- 1. PIECE ③ WILL ONLY BE USED WHEN LADING EXCEEDS GATE HEIGHT BY ONE BDH HEIGHT OR MORE, AS SHOWN ABOVE. PIECE ③ WILL BE APPLIED TO ENCIRCLE ONLY TOP LAYER UNITS, AND A MINIMUM AND A MAXIMUM OF TWO ADJACENT UNITS WILL BE BUNDLED, FORE AND AFT, AS SHOWN.
- 2. IF SPACE TO BE BLOCKED AT REAR OF LOAD IS LESS THAN 18", SOLID FILL TYPE BLOCKING CAN BE USED. SEE DETAIL "F", PAGE 2. TWO SOLID FILL UPRIGHTS MUST BE USED TO BLOCK AGAINST EACH UNIT ACROSS WIDTH OF TRAILER.
- 3. PIECES ① & ② ARE ONLY REQUIRED IF EXCESS LATERAL SPACE EXCEEDS THE DISTANCE FROM THE SIDE OF A UNIT TO THE OUTSIDE EDGE OF THE 4" X 4" SKID OF THAT UNIT. SEE SECTION "D-D". IF THE PIECES ARE OMITTED, THE EXCESS SPACE SHOULD BE EVENLY DISTRIBUTED BETWEEN STACKS, AND STACKS AND TRAILER SIDE WALLS, AND NOT ACCUMULATED AT THE CENTER OF THE TRAILER.

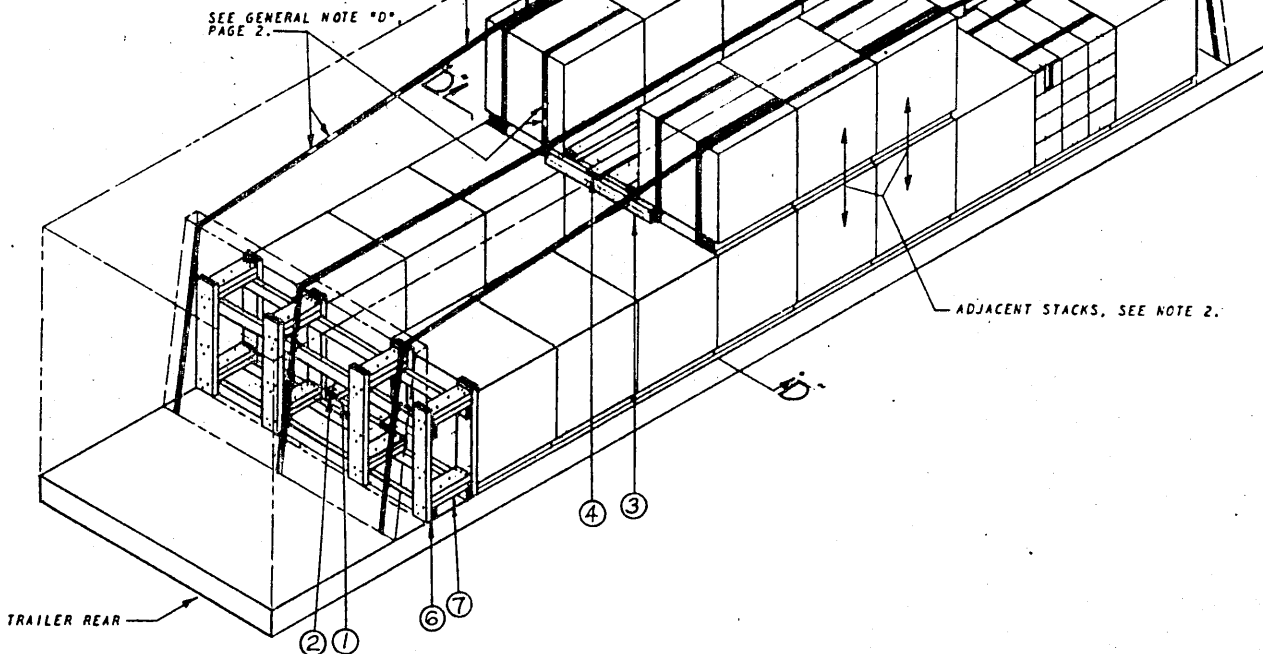


SECTION "C-C"

TYPICAL SKIDDED UNIT LOAD (2-WIDE)



PARTIAL PLAN VIEW



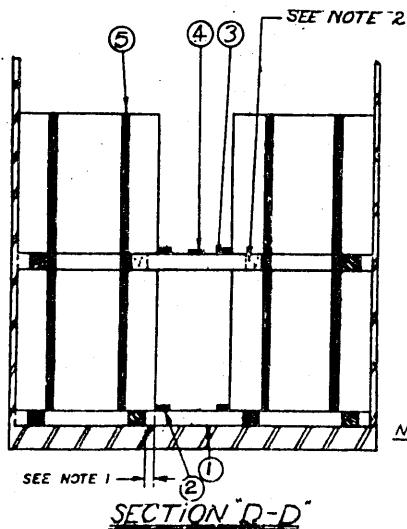
ISOMETRIC VIEW

KEY NUMBERS

- ① 2" X 4" X CUT TO FIT (24 REQD). SEE PARTIAL PLAN VIEW AND SECTION "D-D" FOR POSITION. SEE NOTE 1.
- ② 2" X 4" X UNIT LENGTH (24 REQD). NAIL TO ① W/2-12d NAILS EACH JOINT. SEE SECTION "D-D" FOR POSITION. SEE NOTE 1.
- ③ 2" X 4" X PIECE ① LENGTH PLUS 8" (2 REQD). SEE PARTIAL PLAN VIEW AND SECTION "D-D" FOR POSITION. SEE NOTES 1 AND 2.
- ④ 1" X 4" X PARTIAL LAYER LENGTH PLUS 4" (1 REQD). NAIL TO ③ W/2-6d NAILS EACH END AND TO PIECE ① W/1-6d NAIL. SEE NOTE 1.
- ⑤ STRAPPING, STEEL, 2" X .050" X LENGTH TO SUIT (8 REQD). SEE NOTE 2.
- ⑥ GATE (2 REQD). SEE DETAIL "C", PAGE 3.
- ⑦ STRUTS, 2" X 6" X CUT TO FIT, DOUBLED (8 REQD). LAMINATE W/1-10d NAIL EVERY 6", AND TOENAIL TO ⑥ W/3-12d NAILS EACH END.
- ⑧ STRAPPING, STEEL, 2" X .050" X LENGTH TO SUIT (3 REQD).

NOTES:

- 1. PIECES ①, ②, ③ AND ④ ARE ONLY REQUIRED IF EXCESS LATERAL SPACE EXCEEDS THE DISTANCE FROM THE SIDE OF A UNIT TO THE OUTSIDE EDGE OF THE 4" X 4" SKID OF THAT UNIT. SEE SECTION "D-D". IF THE PIECES ARE OMITTED, THE EXCESS SPACE SHOULD BE EVENLY DISTRIBUTED BETWEEN STACKS, AND STACKS AND TRAILER SIDE WALLS, AND NOT ACCUMULATED AT THE CENTER OF THE TRAILER.
- 2. IF THE FORWARD PARTIAL LAYER UNITS, ARE POSITIONED DIRECTLY AGAINST THE BULKHEAD, OMIT ONE PIECE ③ AND NAIL THE OTHER PIECE ③ AT BOTH ENDS TO THE 4" X 4" UNIT SKIDS W/3-12d NAILS - AVOID NAILING THRU UNIT STRAP.
- 3. PIECE ⑤ WILL BE APPLIED TO UNITIZE A MINIMUM OF ONE PARTIAL LAYER UNIT IN EACH STACK TO A UNIT DIRECTLY BELOW (2 UNIT BUNDLE) OR APPLIED TO UNITIZE A MAXIMUM OF TWO PARTIAL LAYER UNITS IN ADJACENT STACKS TO THE TWO UNITS DIRECTLY BELOW (4 UNIT BUNDLE) BOTH FORE AND AFT OF THE PARTIAL LAYER, EXCEPT FOR INSTANCES WHEREIN THE FORWARD PARTIAL LAYER UNITS ARE POSITIONED DIRECTLY AGAINST THE BULKHEAD AND THE PARTIAL LAYER IS TWO OR MORE UNITS LONG, IN WHICH CASE THE FORWARD PIECE ⑤'S CAN BE ELIMINATED, PROVIDING THE TOP LAYER BOXES OF THE UNITS ARE BLOCKED OR PARTIALLY BLOCKED BY THE BULKHEAD BOARDS.

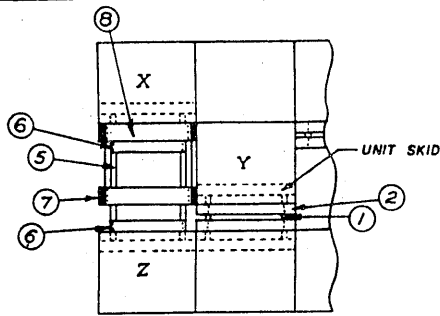


SECTION "D-D"

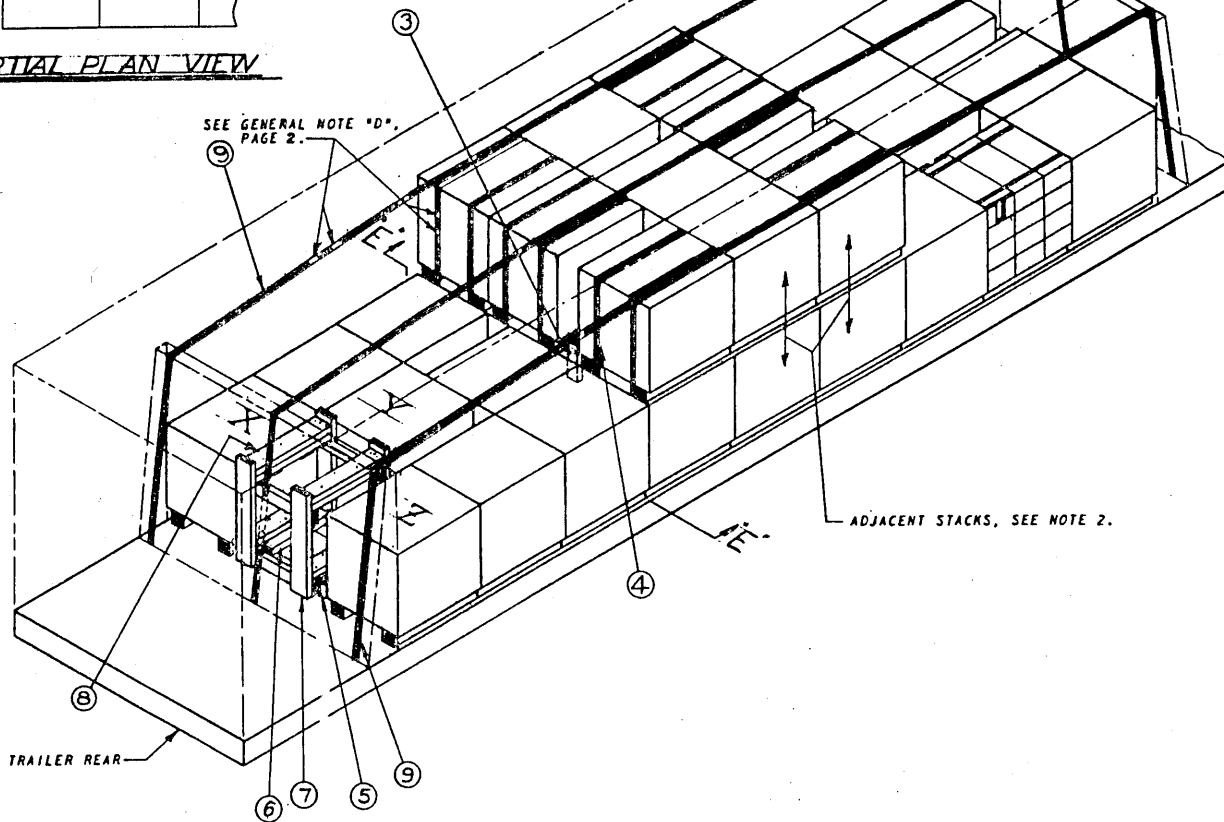
NOTES (CONT'D)

- 4. IF SPACE TO BE BLOCKED AT REAR OF LOAD IS LESS THAN 18", SOLID FILL TYPE BLOCKING CAN BE USED. SEE DETAIL "G", PAGE 2. TWO SOLID FILL UPRIGHTS MUST BE USED TO BLOCK AGAINST EACH UNIT ACROSS WIDTH OF TRAILER.

TYPICAL SKIDDED UNIT LOAD (PARTIAL 2ND LAYER, 2-WIDE)



PARTIAL PLAN VIEW



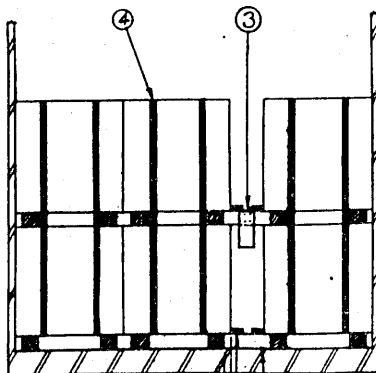
ISOMETRIC VIEW

KEY NUMBERS

- ① 2" X 4" X CUT TO FIT (22 REQD). SEE PARTIAL PLAN VIEW AND SECTION "E-E" FOR POSITION. SEE NOTE 1.
- ② 2" X 4" X UNIT LENGTH (22 REQD). NAIL TO ① W/2-12d NAILS EACH JOINT. SEE SECTION "E-E" FOR POSITION. SEE NOTE 1.
- ③ 2" X 4" X 12" (2 REQD). NAIL TO ① W/3-10d NAILS. SEE SECTION "E-E" FOR POSITION. SEE NOTE 1.
- ④ STRAPPING, STEEL, 2" X .050" X LENGTH TO SUIT (12 REQD). SEE NOTE 2.
- ⑤ 2" X 4" X CUT TO FIT BETWEEN SKIDS OF OPPOSITE UNITS (2 REQD). SEE PARTIAL PLAN VIEW FOR POSITION. SEE NOTE 1.
- ⑥ 2" X 4" X CUT TO FIT (2 REQD). NAIL TO ⑤ W/2-12d NAILS EACH END. SEE NOTE 1.
- ⑦ GATE (2 REQD). SEE DETAIL "B", PAGE 3. SEE NOTE 3.
- ⑧ STRUTS, 2" X 5" X CUT TO FIT, DOUBLED (4 REQD). LAMINATE W/1-10d NAIL EVERY 6" AND TOENAIL TO ⑦ W/3-12d NAILS EACH END.
- ⑨ STRAPPING, STEEL, 2" X .050" X LENGTH TO SUIT (3 REQD).

NOTES:

- 1. PIECES ①, ②, ③, ⑤ AND ⑥ ARE ONLY REQUIRED IF EXCESS LATERAL SPACE EXCEEDS THE DISTANCE FROM THE SIDE OF A UNIT TO THE OUTSIDE EDGE OF THE 4x4 SKID OF THAT UNIT. SEE SECTION "E-E". IF THE PIECES ARE OMITTED, THE EXCESS SPACE SHOULD BE EVENLY DISTRIBUTED BETWEEN STACKS, AND STACKS AND TRAILER SIDE WALLS, AND NOT ACCUMULATED AT STAGGERED LOCATIONS AS SHOWN ABOVE.
- 2. PIECE ④ WILL BE APPLIED TO UNITIZE A MINIMUM OF ONE PARTIAL LAYER UNIT IN EACH STACK TO A UNIT DIRECTLY BELOW (2 UNIT BUNDLE) OR APPLIED TO UNITIZE A MAXIMUM OF TWO PARTIAL LAYER UNITS IN ADJACENT STACKS TO THE TWO UNITS DIRECTLY BELOW (4 UNIT BUNDLE) BOTH FORE AND AFT OF A PARTIAL LAYER, EXCEPT FOR INSTANCES WHEREIN THE FORWARD PARTIAL LAYER UNITS ARE POSITIONED DIRECTLY AGAINST THE BULKHEAD AND THE PARTIAL LAYER IS TWO OR MORE UNITS LONG, IN WHICH CASE THE FORWARD PIECE ④'S CAN BE ELIMINATED, PROVIDING THE TOP LAYER BOXES OF THE UNITS ARE BLOCKED OR PARTIALLY BLOCKED BY THE BULKHEAD BOARDS.
- 3. IF SPACE TO BE BLOCKED AT REAR OF LOAD IS LESS THAN 18", SOLID FILL TYPE BLOCKING CAN BE USED. SEE DETAIL "G", PAGE 2. TWO SOLID FILL UPRIGHTS MUST BE USED TO BLOCK AGAINST EACH UNIT ACROSS WIDTH OF TRAILER.



SECTION "E-E"

TYPICAL SKIDDED UNIT LOAD (PARTIAL 2ND LAYER, 3 WIDE)