BUREAU OF EXPLOSIVES

A, J. Prasmuck

BILITARY ABBIETARY

BATE 8/20/70

LOADING AND BRACING IN A VEHICLE EQUIPPED WITH A MECHANICAL BRACING SYSTEM OF 2.75 INCH ROCKET PACKED 25 PER PLYWOOD CLEATED BOX FOR CONTAINER/TRAILER-ON-FLAT-CAR (C/TOFC) SHIPMENT

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#### **GENERAL NOTES**

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AMCR 740-13, AND AUGMENTS TM 743-200-1 (CHAPTER 5.)
- B. THE OUTLOADING PROCEDURES SPECIFIED HEREIN ARE APPLICABLE TO THE 2.75 INCH ROCKET PACKED 25 PER PLYWOOD CLEATED BOX. SUBSEQUENT REFERENCE TO A CONTAINER HEREIN MEANS THE PLYWOOD CLEATED BOX WITH CONTENTS.
- C. FOR DETAILS OF THE SHORT CONTAINER, SEE DRAWING NO. 9235841.

D. FOR DETAILS OF THE LONG CONTAINER, SEE DRAWING NO. 9235840.

- E. THESE PROCEDURES, DEPICTING CONTAINERS LOADED IN TRAILERS WITHOUT BEING UNITIZED, ARE APPLICABLE TO ALL SHIPMENTS EXCEPT THOSE BOUND FOR WATER PORTS. CONTAINERS IN LOADS WHICH ARE DESTINED FOR WATER PORTS MUST BE UNITIZED IN A SIDE-BY-SIDE CONFIGURATION AS DETAILED ON PAGE 3. UNITIZATION WILL PROVIDE STACK STABILITY DURING STEVEDORING OPERATIONS AND WHILE ABOARD SHIP. THE UNITIZED CONFIGURATION PROCEDURES MAY ALSO BE USED FOR SHIPMENTS TO DESTINATIONS OTHER THAN WATER PORTS IF DESIRED. SEE PAGE 3 FOR UNITIZATION AND HANDLING GUIDANCE.
- F. THIS PROCEDURAL DRAWING IS APPLICABLE TO A TRAILER OR CONTAINER WHICH IS EQUIPPED WITH A MECHANICAL LOAD BRACING SYSTEM AS SPECIFIED WITHIN THE BUREAU OF EXPLOSIVES PAMPHLET NO. 6C AND APPENDICES THERETO. SUBSEQUENT REFERENCE TO A TRAILER THROUGHOUT THIS DOCUMENT MEANS A TRAILER OR CONTAINER. FOR TOFC AND/OR COFC SHIPMENTS, ONLY RAILCARS WHICH ARE SPECIFIED BY THE BUREAU OF EXPLOSIVE PAMPHLET NO. 6C, OR THE AFOREMENTIONED APPENDICES, WILL BE USED.
- C. THE LOADS AS SHOWN ARE BASED ON TRAILERS WHICH ARE 40'-0" LONG BY 7'-6" WIDE (INSIDE DIMENSION) WITH WOOD, OR WOOD AND METAL, OR METAL FLOORS. THE DELINEATED OUTLOADING PROCEDURES ARE ALSO APPLICABLE TO TRAILERS WHICH ARE EIGHTY-NINE INCHES (89") THROUGH NINETY-THREE INCHES (93") IN WIDTH.
- H. THE OUTLOADING PROCEDURES SPECIFIED ARE FOR TRAILERS EQUIPPED WITH VARIOUS TYPES OF SELF-CONTAINED MECHANICAL BRACING DEVICES. HOWEVER, CROSS MEMBER ATTACHMENT FACILITIES WITHIN THESE TRAILERS MUST PROVIDE FOR INSTALLATION OF LOAD BLOCKING CROSS MEMBERS AT THE HEIGHTS SPECIFIED HEREIN. CAUTION: TRAILERS EQUIPPED WITH FACILITIES WHICH DO NOT MEET THE LOCATION REQUIREMENTS MOST NOT BE USED. THE BASIC HEIGHT REQUIREMENTS SPECIFIED WITHIN THIS DRAWING FOR INSTALLATION OF CROSS MEMBERS ARE IDENTICAL WITH THOSE RECOMMENDED BY THE BUREAU OF EXPLOSIVES PAMPHLET 6C. AND APPENDICES THERETIO.
  - VOIDS WITHIN THE LENGTH OF A LOAD, EXCEPT AS SPECIFIED FOR THE LOAD SHOWN ON PAGE 6, MUST BE HELD TO A MINIMUM. CROSS MEMBERS MUST BE PLACED AGAINST THE LADING AS TIGHTLY AS THE HOLE SPACING IN THE CROSS MEMBER ATTACHMENT FACILITY PERMITS. ALSO, EACH CROSS MEMBER WILL BE INSTALLED WITH THE ENDS ATTACHED AS NEARLY AS POS-SIBLE IN "MATED" POSITIONS (AT EQUAL HEIGHTS AND AT EQUAL DIS-TANCES FROM THE END OF THE TRAILER).
  - CROSS MEMBERS IN EMPTY TRAILERS AND THOSE NOT USED IN LOADED TRAILERS MUST BE SECURED FOR SHIPMENT. COMPONENTS ASSIGNED TO EACH TRAILER MUST REMAIN THEREWITH EVEN THOUGH UNUSED DURING SOME SHIPMENTS.
  - A CROSS MEMBER WILL NOT BE RELIED UPON TO RETAIN MORE LADING ON EITHER SIDE THAN AS SHOWN WITHIN THE LOADS.
- J. THE GROSS WEIGHT AND AXLE DISTRIBUTION OF WEIGHT FOR A LOAD WILL BE THE RESPONSIBILITY OF THE CARRIER. THE CARRIER WILL ADVISE THE SHIPPER OF THE APPLICABLE LOADING REQUIREMENTS, AND THE SHIPPER WILL LOAD ACCORDINGLY.

  NOTICE: A SHIPMENT WILL BE POSITICINED IN A TRAILER CONSISTENT WITH THE WEIGHT LAWS OF THE STATES THROUGH WHICH THE TRAILER WILL BE TRANSFORTED BY HIGHWAY (MOTOR CARRIER).
- K. THE APPROVED BLOCKING, BRACING, AND STAYING METHODS FOF THE LOADS SPECIFIED HEREIN MUST BE FOLLOWED. THE NUMBER OF UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE VEHICLE TO BE LOADED OR THE QUANTITY TO BE SHIPPED. FOR A LOAD QUANTITY OTHER THAN SPECIFIED, THE APPROVED METHODS MUST BE FOLLOWED AS CLOSELY AS POSSIBLE.

(CONTINUED AT RIGHT)

## MATERIAL SPECIFICATIONS

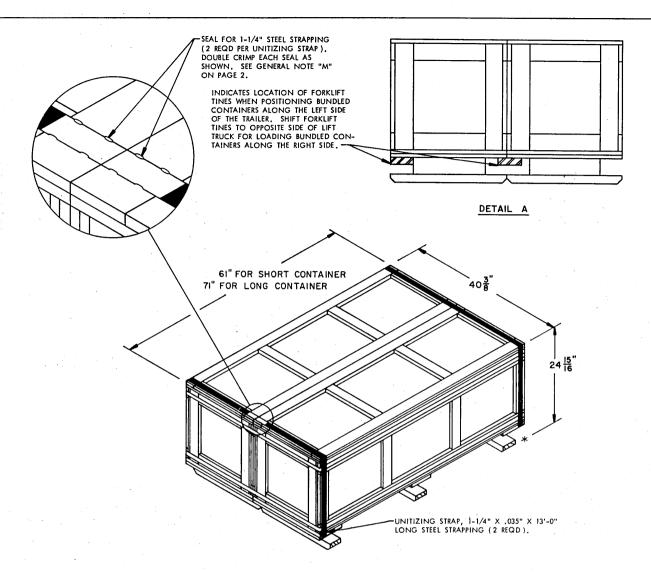
LUMBER : SEE TM 743-200-1, DUNNAGE LUMBER; FED SPEC MM-L-751.

NAILS -: COMMON, CEMENT COATED OR CHEMICALLY ETCHED; FED SPEC FF-N-105. ALT: ANNULAR-RING TYPE NAIL OF SAME SIZE.

WIRE -- : ANNEALED, BLACK, FED SPEC QQ-W-461.

#### (GENERAL NOTES CONTINUED FROM LEFT)

- L. ONE AND ONE-QUARTER INCH (1-1/4") STEEL STRAPPING WILL BE USED TO UNITIZE CONTAINERS, AS SHOWN ON PAGE 3, WHEN SHIPMENTS ARE BEING MADE TO WATER PORTS. IT IS RECOMMENDED THAT CONTAINERS BE UNITIZED PRIOR TO PLACEMENT IN THE VAN. NOTICE: IN SOME INSTANCES CONTAINERS WILL ALREADY BE UNITIZED WHEN OFFERED FOR LOADING. THESE UNITIZED CONTAINERS SHOULD BE INSPECTED AND AS REQUIRED, LOOSE UNITIZING STEEL STRAPPING MUST BE REPLACED.
- M. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINI-MUM OF TWO (2) SEALS, BUTTED TOGETHER, WITH TWO (2) PAIR OF CRIMPS PER SEAL MUST BE USED. <u>CAUTION</u>: EXERCISE CARE DURING TENSIONING TO PREVENT DAMAGE TO THE CONTAINERS.
- N. OTHER TYPES OF LADING ITEMS MAY BE LOADED INTO TRAILERS WHICH ARE PARTIALLY LOADED WITH THE DEPICTED 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 HEREIN.
- O. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-5/8" THICK BY 3-5/8" WIDE.
- P. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTION WHICH IS IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHOD.
- Q. DO NOT NAIL BLOCKING SHOWN HEREIN TO THE TRAILER WALLS OR FLOOR; ALL NAILING WILL BE WITHIN THE DUNNAGE.
- R. PORTIONS OF THE TRAILER BODIES DEPICTED WITHIN THIS PROCEDURAL DRAWING, SUCH AS ONE OF THE SIDE WALLS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.



# UNITIZING DETAIL

TWO SHORT CONTAINERS = 1,520 LBS (APPROX).
TWO LONG CONTAINERS = 1,956 LBS (APPROX).
SEE GENERAL NOTE "E" ON PAGE 2.

# UNITIZING AND HANDLING PROCEDURAL GUIDANCE

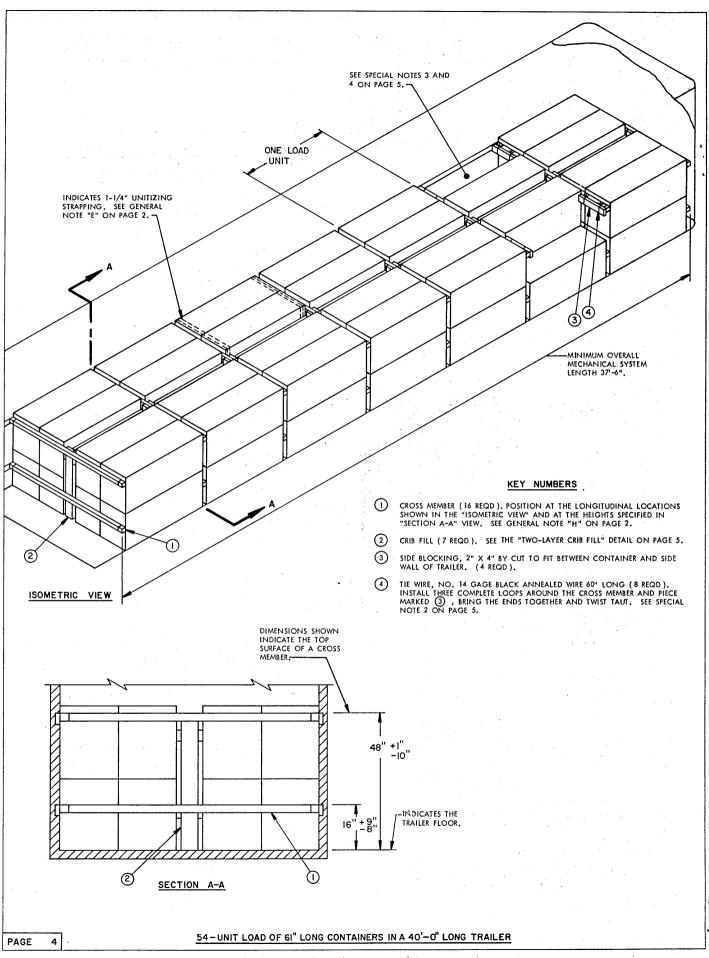
- 1. POSITIONING CONTAINERS FOR UNITIZING.
  - A. ALIGN TWO (2) CONTAINERS SIDE BY SIDE AS CLOSELY AS POSSIBLE.
- 2. INSTALLATION OF 1-1/4" X .Q5" UNITIZING STEEL STRAPPING. SEE GENERAL NOTES "L" AND "M" ON PAGE 2.
  - A. POSITION EACH UNITIZING STRAP AROUND THE CONTAINERS AS SHOWN. PLACE STRAPPING NEAR OUTSIDE OF END SKID AND SO THAT STRAPPING LAYS FLAT AND STRAIGHT WITH THE BODY SURFACES OF THE CONTINERS; I.E., VERTICAL ALONG THE SIDES AND STRAIGHT ACROSS THE TOP AND BOTTOM OF THE UNIT.
  - B. STRAPPING WILL BE FIRMLY TENSIONED, AND EACH END-OVER-END LAP JOINT WILL BE SEALED WITH TWO (2) DOUBLE CRIMPED STRAP SEALS AS SHOWN. THE LAP JOINT WILL BE MADE ACROSS THE TOP OF THE UNIT. DURING STRAP TENSIONING, CARE SHOULD BE EXERCISED TO ENSURE THAT THE CONTAINERS ARE NOT DAMAGED, BUT SO THAT THE STRAPPING CRUSHES SLIGHTLY INTO THE OUTSIDE EDGES OF THE CONTAINERS. EXCESS STRAPPING (STRAP ENDS) SHOULD BE CUT OFF OR BROKEN OFF NEAR THE JOINT SEALS.
- 3. CONTAINER OR CONTAINER UNIT HANDLING.
  - NOTÉS: (1) APPROVED MATERIALS HANDLING EQUIPMENT (MHE) IS SPECI-FIED IN OTHER DOCUMENTS. MHE IS INTENDED TO MEAN EQUIP-MENT SUCH AS FORKLIFT TRUCKS, CRANES, HAND TRUCKS, DOLLIES, ROLLER ASSEMBLIES, SLINGS, AND SPREADER BARS.

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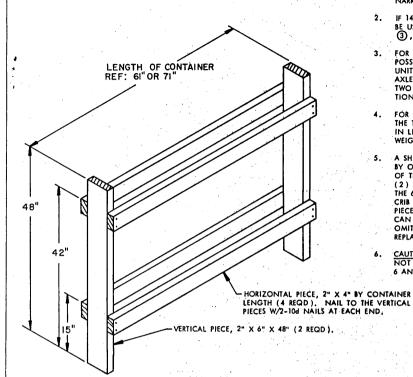
## ( UNITIZING AND HANDLING PROCEDURAL GUIDANCE CONTINUED FROM LEFT)

- (2) PRECAUTIONARY HANDLING TECHNIQUES NORMALLY EMPLOYED OR AS SPECIFIED FOR THE TYPE OF COMMODITY INVOLVED WILL BE ORSERVED.
- A. ONLY APPROVED AND APPROPRIATELY SIZED MATERIALS HANDLING EQUIPMENT WILL BE USED FOR HANDLING THE DEPICTED CONTAINERS.
- B. IF HANDLING IS ACCOMPLISHED WITH A FORKLIFT TRUCK, CARE MUST BE EXERCISED WHEN INSERTING FORKS UNDER A CONTAINER OR A CONTAINER UNIT TO PREVENT DAMAGE TO A CONTAINER BY THE FORK TINES OR THE FORKLIFT PACKAGE GUARD. THE CONTAINERS OR CONTAINER UNITS SHOULD BE HANDLED FROM A SIDE POSITION AS MUCH AS POSSIBLE. HOWEVER, WHEN LOADING INTO A TRAILER, CONTAINERS AND CONTAINER UNITS MUST BE HANDLED FROM AN END POSITION. SEE "DETAIL A" ABOVE FOR GUIDANCE IN PLACEMENT OF FORKLIFT TINES UNDER A CONTAINER UNIT.

UNITIZATION AND HANDLING PROCEDURES



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### SPECIAL NOTES:

- 1. A 54-UNIT LOAD IS SHOWN IN A 40'-0" LONG BY 7'-6" WIDE (INSIDE DIMENSION) TRAILER WHICH IS EQUIPPED WITH A MECHANICAL LOAD BLOCKING SYSTEM THAT CONTAINS AT LEAST SIXTEEN (16) CROSS MEMBERS AND HAS A SYSTEM LENGTH OF AT LEAST 37'-6". A NARROWER OR WIDER TRAILER CAN BE USED.
- 2. IF 14 GAGE BLACK ANNEALED WIRE IS NOT AVAILABLE, 8 GAGE MAY
  BE USED IN LIEU THEREOF FOR SECURING THE SIDE BLOCKING, PIECE MARKED

  (3), TO A CROSS MEMBER.
- 3. FOR OVER-THE-HIGHWAY SHIPMENTS IN "WESTERN" TYPE TRAILERS, IT MAY BE POSSIBLE TO LOAD ONE (1) ADDITIONAL CONTAINER IN THE SECOND LOAD UNIT WITHOUT EXCEEDING STATE LAW AXLE WEIGHT LIMITATIONS. ACTUAL AXLE LOADING SHOULD BE VERIFIED BY WEIGHING THE COMPLETED LOAD. OMIT TWO (2) PIECES MARKED (3) AND FOUR (4) PIECES MARKED (4) IF AN ADDITIONAL CONTAINER IS SHIPPED.
- 4. FOR OVER-THE-HIGHWAY SHIPMENTS IN A "STANDARD FIXED" TYPE TRAILER, THE TWO (2) OMITTED CONTAINERS MUST BE LEFT OUT OF THE FOURTH BAY IN LIEU OF FROM THE SECOND BAY AS DEPICTED, IN ORDER TO OBTAIN PROPER WEIGHT DISTRIBUTION.
- 5. A SHIPMENT OF ONE (1) LESS CONTAINER THAN SHOWN CAN BE ACCOMPLISHED BY OMITTING A CONTAINER FROM ONE OF THE LOAD UNITS NEAR THE CENTER OF THE TRAILER LENGTH AND INSTALLING PIECES MARKED ③ AND ④. TWO (2) LESS CONTAINERS CAN BE SHIPPED BY OMITTING THE TOP LAYER FROM THE 6-CONTAINER LOAD UNIT AND REPLACING THE ADJACENT TWO-LAYER CRIB FILL WITH A ONE-LAYER CRIB FILL. SEE THE DETAIL ON PAGE 7. OMIT PIECES MAKED ③ AND ④. MULTIPLES OF EIGHT (8) LESS CONTAINERS CAN BE ACCOMPLISHED BY OMITTING ENTIRE LOAD UNITS. A LAYER CAN BE OMITTED FROM A LOAD UNIT TO ADJUST A LOAD BY FOUR (4) CONTAINERS; REPLACE THE ADJACENT TWO-LAYER CRIB FILL WITH A ONE-LAYER CRIB FILL.
- 6. CAUTION: THE OUTLOADING PROCEDURES ON PAGE 4 AND ON THIS PAGE MUST NOT BE UTILIZED FOR SHIPMENT OF THE 71" LONG CONTAINERS, REFER TO PAGES 6 AND 7 FOR THE APPLICABLE PROCEDURES.

# TWO-LAYER CRIB FILL

NOTE:
THE WIDTH OF THE CRIB FILL MUST BE ADJUSTED
TO FILL THE VOID ACROSS THE WIDTH OF THE
TRAILER. THIS CAN BE ACCOMPLISHED BY ADJUSTING THE THICKNESS OF THE HORIZONTAL PIECES.
DUE TO CONTAINER WIDTH VARIATIONS AND/OR
TRAILER WIDTH VARIATIONS THE VOID ACROSS THE
WIDTH OF THE TRAILER MUST BE FIELD CHECKED
DURING OUTLOADING OPERATIONS TO ASSURE
THAT A MAXIMUM VOID OF ONE INCH (1") IS
NOT EXCEEDED.

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	166	111
2" X 6"	56	56
NAILS	NO. REQD	POUNDS
10d (3")	112	1-3/4

# LOAD AS SHOWN

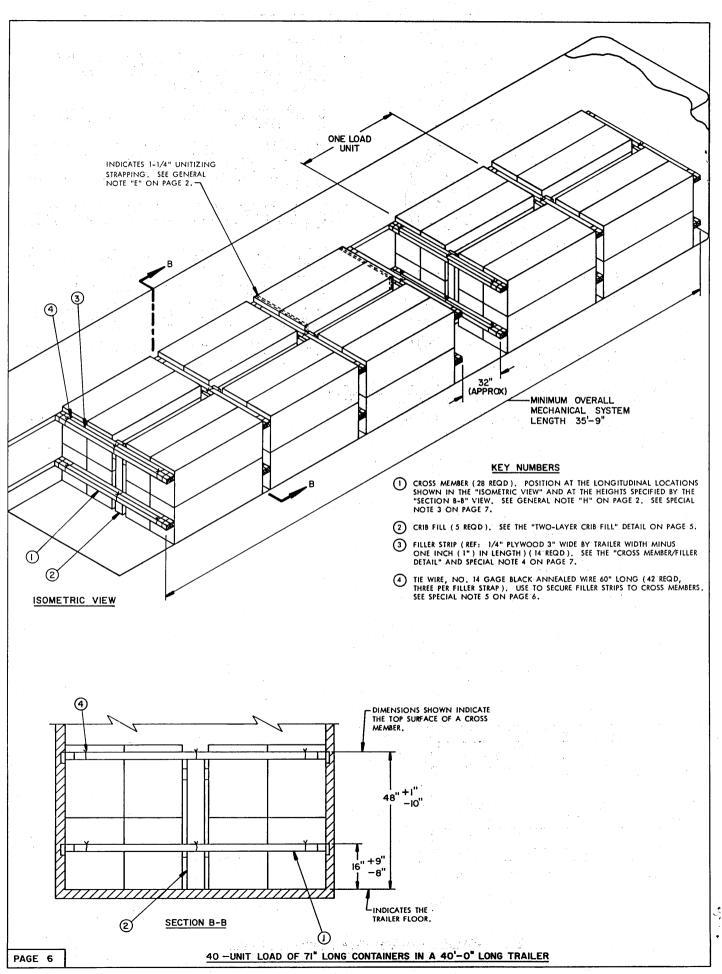
| TEM QUANTITY WEIGHT (APPROX )

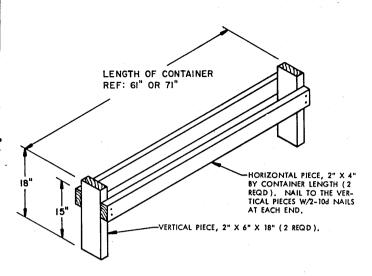
SHORT CONTAINER ------ 54 ------ 41,904 LBS

DUNNAGE ------- 420 LBS

TOTAL WEIGHT ------ 42,324 LBS

54-UNIT LOAD OF 61" LONG CONTAINERS IN A 40'-0" LONG TRAILER





# ONE-LAYER CRIB FILL

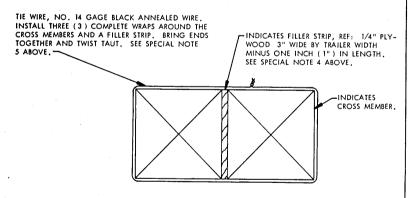
#### NOTE:

THE WIDTH OF THE CRIB FILL MUST BE ADJUSTED TO FILL THE VOID ACROSS THE WIDTH OF THE TRAILER. THIS CAN BE ACCOMPLISHED BY ADJUSTING THE THICKNESS OF THE HORIZONTAL PIECES. DUE TO CONTAINER WIDTH VARIATIONS AND/OR TRAILER WIDTH VARIATIONS THE VOID ACROSS THE WIDTH OF THE TRAILER MUST BE FIELD CHECKED DURING OUTLOADING OPERATIONS TO ASSURE THAT A MAXIMUM VOID OF ONE INCH (1") IS NOT EXCEEDED.

#### SPECIAL NOTES:

- A 40-UNIT LOAD IS SHOWN IN A 40'-0" LONG BY 7'-6" WIDE (INSIDE DIMEN-SION) TRAILER WHICH IS EQUIPPED WITH A MECHANICAL LOAD BLOCKING SYSTEM.
- 2. THE LOADING PATTERN SHOWN WILL PROVIDE ACCEPTABLE WEIGHT DISTRIBUTION IN ANY TYPE TRAILER. HOWEVER, FOR OVER-THE-HIGHWAY MOVEMENTS, BETTER WEIGHT DISTRIBUTION CAN BE PROVIDED IN "WESTERN" TYPE TRAILERS IF THE THREE REARWAD LOAD UNITS ARE POSITIONED NEARER THE REAR DOORS, POSITIONING NEAR THE REAR DOORS CANNOT BE ACCOMPLISHED IN "STANDARD FIXED" TYPE TRAILERS WITHOUT OVERLOADING THE REAR TANDEMS.
- 3. TWENTY-EIGHT (28) CROSS MEMBERS ARE REQUIRED WHEN CONTAINERS ARE LOADED IN ACCORDANCE WITH THE DEPICTED LOADING PATTERN. ONLY TWENTY-FOUR (24) CROSS MEMBERS WILL BE REQUIRED IF THE CONTAINERS ARE LOADED WITHOUT THE 32" VOID WITHIN THE LOAD. FOR OVER-THE-HIGHWAY SHIPMENTS IN "STANDARD FIXED" TYPE TRAILERS THE LOAD MUST BE POSITIONED NEAR THE FRONT OF THE TRAILER, FOR SHIPMENTS IN "WESTERN" TYPE TRAILERS THE LOAD MUST BE POSITIONED NEAR THE REAR, IN ORDER TO COMPLY WITH WEIGHT DISTRIBUTION REQUIREMENTS.
- 4. A ONE-QUARTER INCH (1/4") PLYWOOD FILLER STRIP HAS BEEN SPECIFIED FO° THE DEPICTED LOAD. HOWEVER, IF THE VOID BETWEEN A PAIR OF LONGITUDINALLY ADJACENT CROSS MEMBERS IS GREATER THAN 1/4", FILLER MATERIAL OF A THICKNESS WHICH WILL COMPLETELY FILL THE VOID MUST BE USED. SEE THE "CROSS MEMBER/FILLER DETAIL" BELOW.
- 5. NO. 8 GAGE BLACK ANNEALED WIRE MAY BE USED IN LIEU OF NO. 14 GAGE FOR SECURING A FILLER STRIP TO THE CROSS MEMBERS.
- 6. A SHIPMENT OF ONE (1) LESS CONTAINERS THAN SHOWN CAN BE ACCOMPLISHED BY OMITTING AN OUTWARD CONTAINER FROM ONE OF THE LOAD
  UNITS NEAR THE CENTER OF THE TRAILER LENGTH AND INSTALLING LATERAL
  BRACING AS SHOWN BY PIECES MARKED ③ AND ④ ON PAGE 4. TWO (2)
  LESS CONTAINERS CAN BE SHIPPED BY INSTALLING THOSE PIECES MARKED ③
  AND ④ AT EACH SIDE OF A LOAD UNIT. MULTIPLES OF EIGHT (8) LESS
  CONTAINERS CAN BE ACCOMPLISHED BY OMITTING ENTIRE LOAD UNITS. A
  LAYER CAN BE OMITTED FROM A LOAD UNIT TO ADJUST A LOAD BY FOUR (4)
  CONTAINERS; REPLACE THE ADJACENT TWO-LAYER CRIB FILL WITH A ONE-LAYER
  CRIB FILL. SEE THE DETAIL AT 1 FET
- 7. NOTE: THE OUTLOADING PROCEDURES ON PAGE 6 AND ON THIS PAGE SHOULD NOT BE UTILIZED FOR SHIPMENT OF THE 61" LONG CONTAINERS; REFER TO PAGES 4 AND 5 FOR THE PREFERRED PROCEDURES.

BILL OF MATERIAL			
LUMBER	LINEAR FEET	BOARD FEET	
2" X 4" 2" X 6"	119 40	80 40	
NAILS	NO. REQD	POUNDS	
10d (3")	80	1-1/4	



CROSS MEMBER/FILLER DETAIL

# LOAD AS SHOWN

40-UNIT LOAD OF 71" LONG CONTAINERS IN A 40'-0" LONG TRAILER