

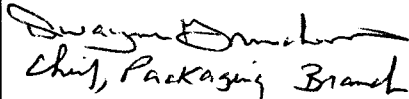

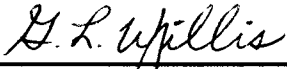

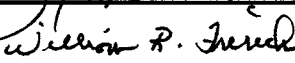
ATACMS

LOADING AND BRACING (CL & LCL) IN KOREAN GONDOLA CARS OF GUIDED MISSILE LAUNCHING ASSEMBLY (GMLA) FOR THE ARMY TACTICAL MISSILE SYSTEM

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U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY AVIATION AND MISSILE COMMAND  Chief, Packaging Branch	CAUTION: VERIFY PRIOR TO USE AT WWW.DAC.ARMY.MIL/DET THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 16.			DO NOT SCALE				OCTOBER 2002					
	ENGINEER OR TECHNICIAN	BASIC REV.	WALTER GORDON										
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND  U.S. ARMY DEFENSE AMMUNITION CENTER	TRANSPORTATION ENGINEERING DIVISION												
	VALIDATION ENGINEERING DIVISION				TESTED	CLASS	DIVISION	DRAWING	FILE				
	ENGINEERING DIRECTORATE				19	48	8226	GM5AT3					

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 SHOWN HEREIN ARE APPLICABLE FOR SHIPMENTS IN KOREAN GONDOLA CARS WHICH ARE 42'-9" (13,030MM) LONG BY 9'-5" (2,870MM) WIDE BY 52" (1,336MM) HIGH (INSIDE DIMENSIONS). THE PROCEDURES MAY BE ADJUSTED TO SUIT CARS OF OTHER SIZES.
- C. THE OUTLOADING PROCEDURES CONTAINED HEREIN ARE APPLICABLE TO THE ARMY TACTICAL MISSILE SYSTEM (ATACMS) COMPLETE ROUND WHEN PACKED IN THE GUIDED MISSILE LAUNCHING ASSEMBLY (GMLA). SUBSEQUENT REFERENCE TO ASSEMBLY HEREIN MEANS THE GMLA WITH MISSILE COMPONENTS.
- D. FOR DETAILS OF THE GMLA, SEE THE DETAIL AND CHART ON PAGE 3.
- E. THE GMLA IS AN EXPLOSIVE ITEM. THE OUTLOADING PROCEDURES SPECIFIED HEREIN CAN ALSO BE UTILIZED FOR THE SHIPMENT OF THE ASSEMBLIES WHEN THEY ARE LOADED WITH AN ITEM WHICH IS IDENTIFIED DIFFERENTLY BY NOMENCLATURE THAN THE ITEM DESIGNATED WITHIN THE DRAWING TITLE.
- F. 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.
- G. THE NUMBER OF ASSEMBLIES MAY BE ADJUSTED TO FIT THE SIZE OF THE GONDOLA CAR BEING LOADED OR THE QUANTITY TO BE SHIPPED; HOWEVER, THE APPROVED METHODS CONTAINED HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING, AND STAYING OF THE ASSEMBLIES. NOTICE: A SHIPMENT WILL BE POSITIONED IN THE RAILCAR IN COMPLIANCE WITH WEIGHT DISTRIBUTION REQUIREMENTS.
- H. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN A CAR WHICH IS 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.
- J. 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.
- K. NAILS USED FOR FABRICATING DUNNAGE ASSEMBLIES MUST BE OF A LENGTH TO PENETRATE TWO-THIRDS OF THE THICKNESS OF THE SECOND BOARD, WHILE PREVENTING THE NAIL POINT FROM COMPLETELY PENETRATING THE DUNNAGE ASSEMBLY. THE NAIL POINT IS TO BE CONCEALED WITHIN THE DUNNAGE ASSEMBLY, EXCEPT WHEN STATED OTHERWISE IN THE CONSTRUCTION DETAILS, TO PREVENT POSSIBLE DAMAGE TO THE LADING.

- L. 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 LAMINATING DUNNAGE. 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, INTO, OR RIGHT BESIDE A NAIL IN A LOWER PIECE.
- M. WHEN STEEL STRAPPING IS SEALED IN 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 USED. REFER TO THE "STRAP JOINT A" AND "STRAP JOINT B" DETAILS ON PAGE 16.
- N. PORTIONS OF THE GONDOLA CARS DEPICTED WITHIN THIS PROCEDURAL DRAWING, SUCH AS SIDEWALLS AND ENDWALLS HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- O. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS. ATTENTION IS ALSO DIRECTED TO THE "SPECIAL HANDLING GUIDANCE" ON PAGES 4 AND 5.
- P. THE PROCEDURES DEPICTED WITHIN THIS DRAWING ARE BASED ON THE USE OF "ENGLISH UNITS". IN MOST CASES, ENGLISH SPECIFICATIONS ARE GIVEN FIRST WITH THE APPROPRIATE METRIC CONVERSION (SI UNITS) GIVEN ADJACENT IN PARENTHESES. WHERE THE METRIC CONVERSION IS NOT GIVEN, CHART NO. 1, LUMBER SIZE CONVERSION, AND CHART NO. 2, NAIL SIZE CONVERSION, MAY BE USED. SI UNITS GIVEN THROUGHOUT THIS DRAWING ARE MINIMUM REQUIREMENTS. THE METRIC CONVERSION FOR LUMBER WIDTH AND HEIGHT RESULTS IN ACTUAL METRIC DIMENSIONS, NOT NOMINAL. ALL LUMBER LENGTHS ARE ACTUAL LENGTHS. WHERE THE METRIC CONVERSION IS NOT GIVEN, IT MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454 KG.

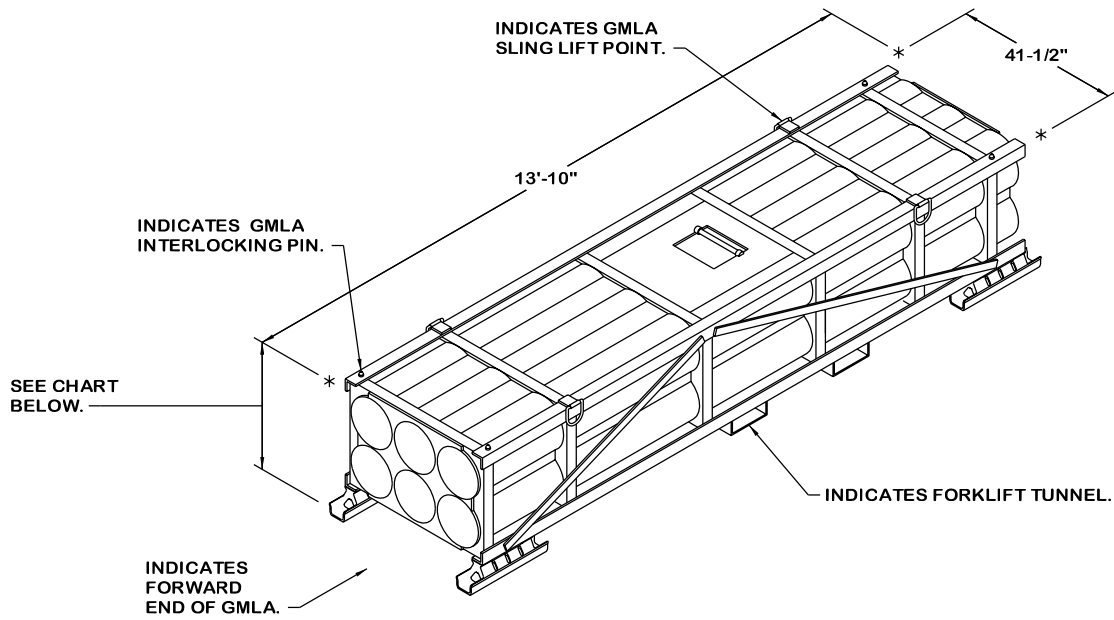
(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

- LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
- NAILS - - - - - : ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).
- STRAPPING, STEEL - - : ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH A, B (GRADE 2), OR C.
- SEAL, STRAP - - - - : ASTM D3953; CLASS H, FINISH A, B (GRADE 2), OR C, DOUBLE NOTCH TYPE, STYLE I, II, OR IV.
- WIRE, CARBON STEEL - : ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, .0800" (2MM) DIA, GRADE 1006 OR BETTER.
- STAPLE, STRAP - - - : COMMERCIAL GRADE.
- ANTI-CHAFING MATERIAL - - - - - : MIL-PRF-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.

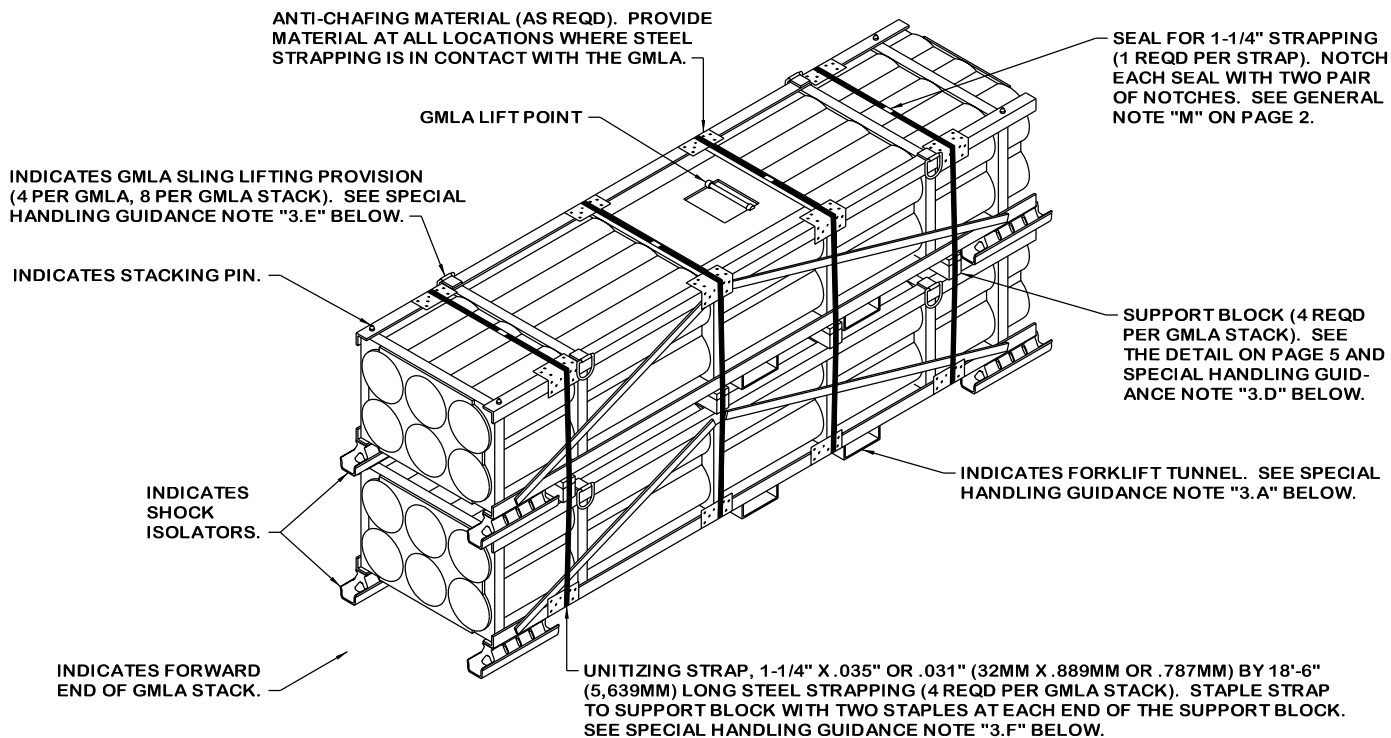
CHART NO. 1	
LUMBER SIZE CONVERSION	
ENGLISH UNITS	METRIC CONVERSION
1" X 4"	19MM X 89MM
1" X 6"	19MM X 140MM
1" X 8"	19MM X 184MM
2" X 4"	38MM X 89MM
2" X 6"	38MM X 140MM
2" X 8"	38MM X 184MM
4" X 4"	89MM X 89MM

CHART NO. 2				
NAIL SIZE CONVERSION				
SIZE	LENGTH		DIAMETER	
	ENGLISH	METRIC	ENGLISH	METRIC
6d	2"	51MM	.113"	2.870MM
10d	3"	76MM	.148"	3.759MM
12d	3-1/4"	82MM	.148"	3.759MM
16d	3-1/2"	89MM	.162"	4.115MM
20d	4"	102MM	.192"	4.877MM



GUIDED MISSILE LAUNCHING ASSEMBLY
(GMLA)

GROSS WEIGHT, DIMENSIONS, AND CUBE OF GUIDED MISSILE LAUNCHING ASSEMBLIES							
NSN	DODIC	TYPE	LENGTH	WIDTH	HEIGHT	WEIGHT (LBS)	CUBE (CU FT)
1427-00-000-0195	PL81	BLOCK I	13' -10"	41-1/2"	32-5/8"	5,105	129.7
1427-01-274-3904	PL81	BLOCK I	13' -10"	41-1/2"	32-5/8"	4,814	129.7
1427-01-386-3113	PL81	BLOCK I	13' -10"	41-1/2"	32-5/8"	5,111	129.7
1427-01-398-6538	PL38	BLOCK IA	13' -10"	41-1/2"	33-3/4"	4,640	134.6
1427-01-463-0001	PL38	BLOCK IA	13' -10"	41-1/2"	33-3/4"	4,640	134.6
1427-01-439-8639	PL47	BLOCK II	13' -10"	41-1/2"	33-3/4"	4,985	134.6
1427-01-481-1620	N/A	TACMS 2K	13' -10"	41-1/2"	33-3/4"	4,985	134.6
1427-01-480-8516	PL65	IA UNITARY	13' -10"	41-1/2"	33-3/4"	4,682	134.6



ISOMETRIC VIEW

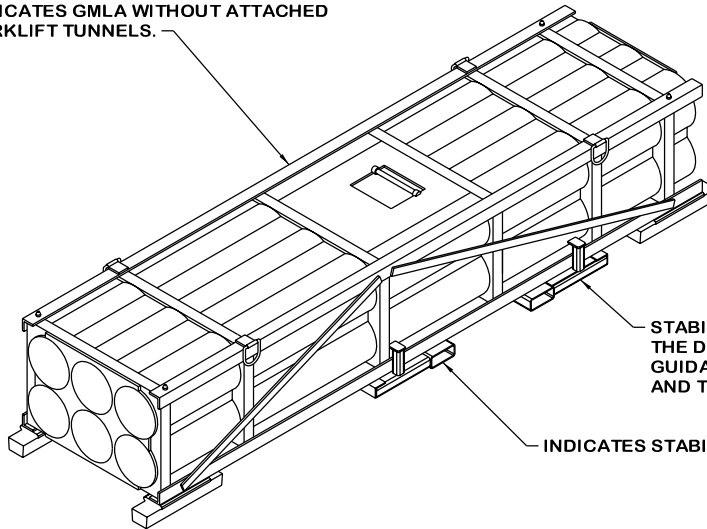
SPECIAL HANDLING GUIDANCE

(SPECIAL HANDLING GUIDANCE CONTINUED)

1. PREPARE GMLAs FOR A DOUBLE-LAYER LOAD PRIOR TO OUTLOADING BY UNITIZING TWO ASSEMBLIES AS DEPICTED IN THE ISOMETRIC VIEW ABOVE.
2. MHE NOTES.
 - A. MATERIALS HANDLING EQUIPMENT (MHE) IS INTENDED TO MEAN EQUIPMENT, SUCH AS FORKLIFT TRUCKS, CRANES, HAND TRUCKS, DOLLIES, ROLLER ASSEMBLIES, SLINGS, AND SPREADER BARS, THAT CAN BE USED TO HANDLE THE DEPICTED GMLAs.
 - B. PRECAUTIONARY HANDLING TECHNIQUES NORMALLY EMPLOYED OR AS SPECIFIED FOR THE TYPE OF COMMODITY INVOLVED WILL BE OBSERVED.
 - C. ONLY APPROVED AND APPROPRIATELY SIZED MHE WILL BE USED FOR THE HANDLING OF THE DEPICTED GMLAs.
3. GMLA HANDLING AND STACKING FOR OUTLOADING PURPOSES.
 - A. WHEN HANDLING A SINGLE GMLA THAT DOES NOT HAVE ATTACHED FORKLIFT TUNNELS, THE STABILIZING FRAME MUST BE USED. SEE THE STABILIZING FRAME DETAILS ON PAGE 5.
 - B. THE FORWARD END OF AN UPPER GMLA SHALL BE PLACED OVER THE FORWARD END OF A LOWER GMLA WHEN POSITIONING THE GMLAs IN A STACK.
 - C. WHEN STACKING GMLAs, ENSURE THAT THE STACKING PINS OF A LOWER GMLA ARE ENGAGED IN THE SHOCK ISOLATORS OF THE UPPER GMLA.
 - D. PLACE THE SUPPORT BLOCKS IN THE LOCATIONS AS SHOWN IN THE ISOMETRIC VIEW ABOVE. ENSURE THAT SUPPORT BLOCKS ARE LOCATED NEAR THE STRONG POINTS OF THE ASSEMBLIES; i.e., NEAR THE ASSEMBLY FRAME VERTICAL BRACES.
 - E. FOR A DOUBLE-LAYER LOAD, ENSURE THAT THE SLING LIFTING PROVISIONS OF THE GMLA ARE IN THE DOWN POSITION, AS SHOWN IN THE ISOMETRIC VIEW ABOVE, BEFORE THE UNITIZING STRAPS ARE TIGHTENED AND SEALED.
 - F. WHEN A GMLA STACK IS BEING UNITIZED, CARE MUST BE EXERCISED WHEN TIGHTENING THE STRAPS TO ENSURE THAT THE ALUMINUM FRAME MEMBERS OF THE GMLAs ARE NOT "PULLED IN" OR DEFORMED.
4. GMLA STACK HANDLING.
 - A. IF AVAILABLE MHE DOES NOT HAVE AN ALLOWABLE CAPACITY GREAT ENOUGH TO CARRY A STACK OF TWO GMLAs (APPROXIMATELY 10,200 POUNDS) IN ONE LIFT, THEN THE INDIVIDUAL GMLAs MUST BE MOVED TO A LOCATION NEAR THE GONDOLA FOR UNITIZATION AND SLING LIFTING.
 - B. IF THE LOWER GMLA IN A STACK DOES NOT HAVE ATTACHED FORKLIFT TUNNELS, THE STABILIZING FRAME MUST BE USED WHEN MOVING THE STACK WITH A FORKLIFT TRUCK. SEE THE STABILIZING FRAME DETAILS ON PAGE 5.
 - C. A GMLA STACK MUST BE UNITIZED AS DEPICTED IN THE ISOMETRIC VIEW ABOVE BEFORE SLING LIFTING OF THE STACK CAN OCCUR.
 - D. SLING LIFTING A GMLA STACK WILL BE ACCOMPLISHED IN ACCORDANCE WITH APPROVED PROCEDURES. THE GMLA STACK MUST BE SLING LIFTED USING BOTH UPPER AND LOWER GMLA SLING LIFTING PROVISIONS. FOR GUIDANCE ON SLING LIFTING A STACK CONSISTING OF TWO GMLAs, SEE THE "ARMY MISSILE SYSTEMS ENCLOSURE ASSEMBLY LAUNCH PODS (EALP), TWO CONTAINERS" PROCEDURE IN FM 10-450-4.
5. GMLA LOADING PROCEDURES.
 - A. FOR A DOUBLE-LAYER LOAD, GMLAs MAY BE SLING LIFTED INTO THE GONDOLA CAR SINGLY, BUT DUE TO THE DIFFICULTY IN PROPERLY ALIGNING AND CORRECTLY UNITIZING A STACK AFTER IT HAS BE LOADED, IT IS NOT RECOMMENDED.
 - B. SEQUENTIAL LOADING PROCEDURES FOR A 12-GMLA LOAD ARE PROVIDED ON PAGE 7.

(CONTINUED AT RIGHT)

INDICATES GMLA WITHOUT ATTACHED FORKLIFT TUNNELS.



STABILIZING FRAME IN LIFT POSITION. SEE THE DETAIL BELOW. SEE SPECIAL HANDLING GUIDANCE NOTE "3.A" AND "4.B" ON PAGE 4 AND THE SPECIAL NOTES BELOW.

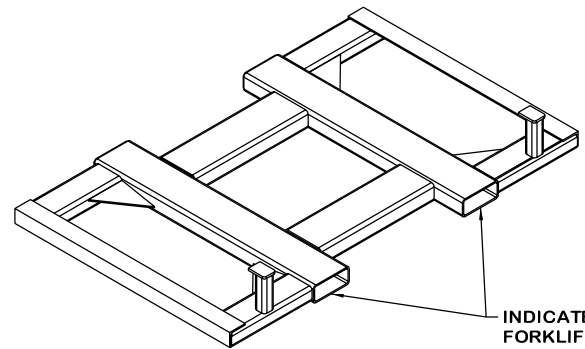
INDICATES STABILIZING FRAME FORKLIFT TUNNEL.

GMLA WITH STABILIZING FRAME

NOTE THAT THE STABILIZING FRAME IS ONLY REQUIRED FOR THOSE GMLAs WITHOUT FORKLIFT TUNNELS.

SPECIAL NOTES:

1. WHEN USING THE STABILIZING FRAME, THE FORKLIFT CARRIAGE IS TO BE CENTERED ON THE BALANCE MARKS ON THE GMLA. SECURE THE STABILIZING FRAME TO THE FORKLIFT CARRIAGE WITH THE 1/4 INCH SAFETY CHAINS (NOT SHOWN).
2. FOR FABRICATION OF THE STABILIZING FRAME, REFER TO DAC DRAWING AC200000809. THE DRAWING CAN BE OBTAINED AT THE DAC WEBSITE: [HTTP://WWW.DAC.ARMY.MIL/DET](http://www.dac.army.mil/det).



INDICATES FORKLIFT TUNNELS.

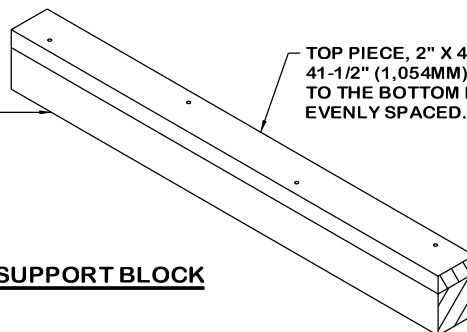
STABILIZING FRAME

SEE SPECIAL NOTE 2 AT LEFT.

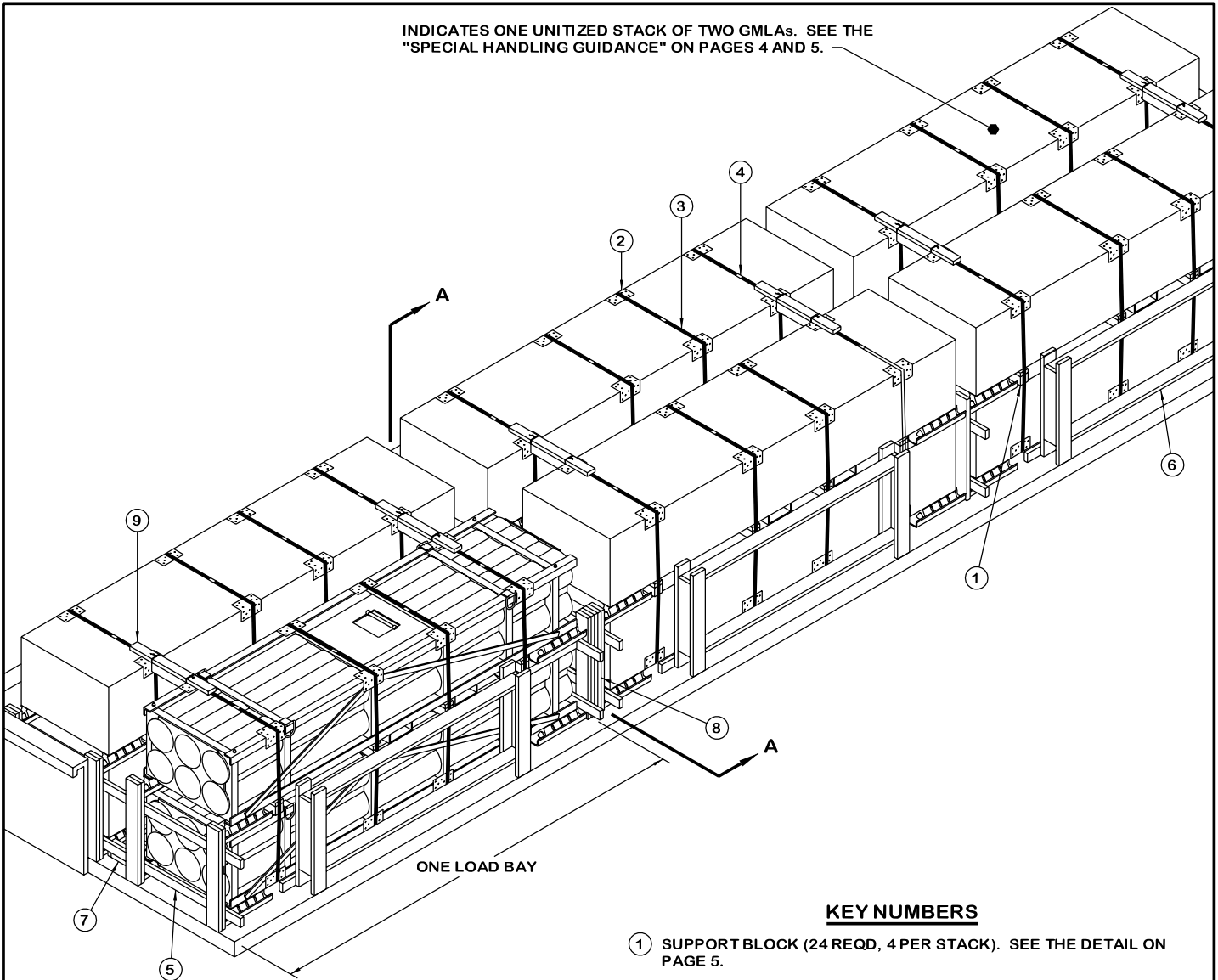
BOTTOM PIECE, 4" X 4"
(89MM X 89MM) X 41-1/2"
(1,054MM) (1 REQD).

TOP PIECE, 2" X 4" (38MM X 89MM) X
41-1/2" (1,054MM) (1 REQD). LAMINATE
TO THE BOTTOM PIECE W/4-10d NAILS
EVENLY SPACED.

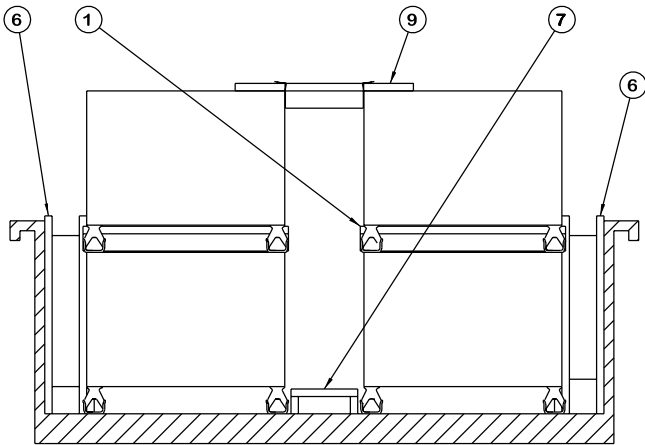
SUPPORT BLOCK



INDICATES ONE UNITIZED STACK OF TWO GMLAs. SEE THE "SPECIAL HANDLING GUIDANCE" ON PAGES 4 AND 5.



ISOMETRIC VIEW



SECTION A-A

STEEL STRAPPING, PIECES MARKED ③, AND END GATES, PIECES MARKED ⑤, OMITTED FOR CLARITY.

KEY NUMBERS

- ① SUPPORT BLOCK (24 REQD, 4 PER STACK). SEE THE DETAIL ON PAGE 5.
- ② ANTI-CHAFING MATERIAL (AS REQD). PROVIDE MATERIAL AT ALL LOCATIONS WHERE THE STEEL STRAPPING IS IN CONTACT WITH THE GMLA.
- ③ STACK UNITIZING STRAP, 1-1/4" X .031" OR .035" (32MM X .889MM OR .787MM) X 18'-6" (5,639MM) LONG STEEL STRAPPING (24 REQD, 4 PER STACK). STAPLE TO SUPPORT BLOCK, PIECE MARKED ①, WITH 2 STAPLES AT EACH END OF THE SUPPORT BLOCK.
- ④ SEAL FOR 1-1/4" STRAPPING (24 REQD, 1 PER STRAP). NOTCH EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "M" ON PAGE 2.
- ⑤ END GATE (5 REQD). SEE THE DETAIL ON PAGE 14. INSTALL SO HORIZONTAL PIECES OF END GATE ARE "IN" TOWARDS CENTER OF GMLA.
- ⑥ SIDE BLOCKING ASSEMBLY (6 REQD). SEE THE DETAIL ON PAGE 14. INSTALL SO HOLD-DOWN CLEATS OF ASSEMBLY WILL BE UNDERNEATH THE GMLA.
- ⑦ LOWER SWAY BRACE (3 REQD). SEE THE DETAILS ON PAGE 15.
- ⑧ SOLID FILL, 6" (140MM) WIDE X 40" (1,016MM) LONG MATERIAL OF A THICKNESS TO SUIT (AS REQD AT FOUR PLACES). TOENAIL THE FIRST PIECE TO THE VERTICAL PIECE OF AN END GATE, PIECE MARKED ⑤, W/2-10d NAILS AT EACH SIDE. TOENAIL EACH ADDITIONAL PIECE TO THE PREVIOUS PIECE IN A LIKE MANNER.
- ⑨ UPPER SWAY BRACE (6 REQD). SEE THE DETAIL ON PAGE 16. INSTALL EACH BRACE AS SHOWN AND WIRE TIE TO THE HORIZONTAL PORTION OF THE STACK UNITIZING STRAP NEAR EACH END OF THE BRACE. PARTIALLY DRIVE ONE 10d NAIL NEAR THE TIE WIRE AND BEND OVER THE TIE WIRE TO SECURE IT IN PLACE.

SEQUENTIAL LOADING PROCEDURES:

1. PRE-LOADING SEQUENCE.
 - A. UNITIZE SIX STACKS OF GMLAs FOLLOWING THE PROCEDURES AND REQUIREMENTS GIVEN ON PAGES 4 AND 5.
 - B. PREFABRICATE TWO END GATES WITH FILL PIECES AND THREE END GATES WITHOUT. SEE THE "END GATE" DETAIL ON PAGE 14.
 - C. PREFABRICATE SIX SIDE BLOCKING ASSEMBLIES. SEE THE "SIDE BLOCKING ASSEMBLY" DETAIL ON PAGE 14.
 - D. PREFABRICATE THE SIX FRAME ASSEMBLIES OF THE LOWER SWAY BRACES. SEE THE "LOWER SWAY BRACE" AND "FRAME ASSEMBLY" DETAILS ON PAGE 15.
2. LOADING SEQUENCE FOR LOAD BAY AT END OF GONDOLA CAR.
 - A. INSTALL AN END GATE AND A SIDE BLOCKING ASSEMBLY, PIECES MARKED ⑤ AND ⑥ ON PAGE 6, IN ONE END OF THE GONDOLA CAR. INSTALL SIDE BLOCKING ASSEMBLY SO THAT THE HOLD-DOWN CLEATS OF THE ASSEMBLY WILL BE UNDERNEATH THE GMLA STACK.
 - B. LOAD A GMLA STACK TIGHT AGAINST END GATE AND SIDE BLOCKING ASSEMBLY.
 - C. INSTALL A LOWER SWAY BRACE, PIECE MARKED ⑦ ON PAGE 6, AND A SIDE BLOCKING ASSEMBLY, PIECE MARKED ⑥ ON PAGE 6.
 - D. LOAD A GMLA STACK BETWEEN LOWER SWAY BRACE AND SIDE BLOCKING ASSEMBLY.
 - E. FABRICATE AND INSTALL TWO UPPER SWAY BRACES, PIECES MARKED ⑨ ON PAGE 6. WIRE TIE UPPER SWAY BRACES AS INSTRUCTED IN KEY NUMBER ⑨ ON PAGE 6.
 - F. INSTALL AN END GATE AT THE END OF THE GMLA STACKS.
3. LOADING SEQUENCE FOR LOAD BAY AT OTHER END OF GONDOLA CAR.
 - A. REPEAT SEQUENCE 2 AT OTHER END OF GONDOLA CAR.
4. LOADING SEQUENCE FOR CENTER LOAD BAY.
 - A. INSTALL A SIDE BLOCKING ASSEMBLY IN THE CENTER LOAD BAY.
 - B. LOAD A GMLA STACK TIGHT AGAINST AN END GATE AND THE SIDE BLOCKING ASSEMBLY.
 - C. INSTALL A LOWER SWAY BRACE AND A SIDE BLOCKING ASSEMBLY.
 - D. LOAD THE FINAL GMLA STACK AND FABRICATE AND INSTALL THE FINAL TWO UPPER SWAY BRACES.
 - E. INSTALL THE FINAL END GATE.
 - F. INSTALL THE SOLID FILL AS INSTRUCTED IN KEY NUMBER ⑧ ON PAGE 6.

SPECIAL NOTES:

1. A 12-UNIT LOAD IS SHOWN IN A KOREAN GONDOLA CAR. ONE TO FIVE GMLAs MAY BE OMITTED FROM THE LOAD SHOWN ON PAGE 6, PROVIDED THE OMITTED GMLAs ARE REMOVED FROM THE UPPER LAYER AND THE OMITTED GMLAs ARE REPLACED WITH FILLER ASSEMBLIES "A". SEE THE "OMITTED GMLA PROCEDURES FOR A DOUBLE-LAYER LOAD" ON PAGE 12 FOR GUIDANCE ON INSTALLING FILLER ASSEMBLY "A". NOTE THAT FILLER ASSEMBLY "A" MUST BE ASSEMBLED TO A GMLA PRIOR TO LOADING. SEE PAGES 8 AND 9 FOR PROCEDURES ON SHIPPING FOUR TO SIX GMLAs. SEE PAGES 10 AND 11 FOR PROCEDURES ON SHIPPING ONE TO THREE GMLAs.
2. SEE SPECIAL HANDLING GUIDANCE NOTE "5.A" ON PAGE 4.
3. SEE CHART NOS. 1 AND 2 ON PAGE 2 FOR DIMENSIONAL LUMBER AND NAIL SIZE METRIC CONVERSIONS. NOTE THAT METRIC SIZES GIVEN IN THIS DRAWING ARE MINIMUM REQUIREMENTS.

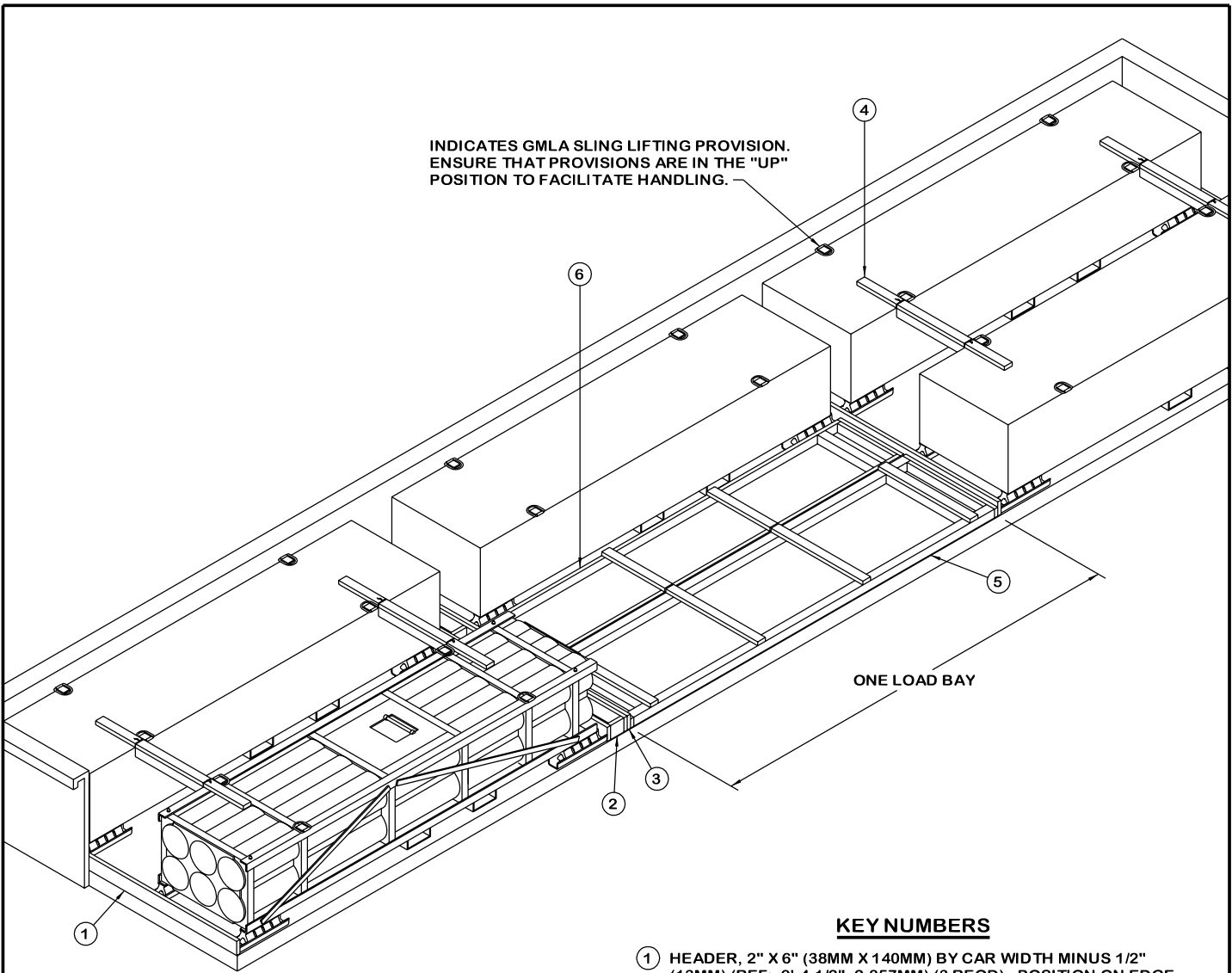
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	299	199
2" X 6"	340	340
4" X 4"	91	121
NAILS	NO. REQD	POUNDS
10d (3")	630	9-3/4
STEEL STRAPPING, 1-1/4" - 444' REQD - - - 63-1/2 LBS		
SEAL FOR 1-1/4" STRAPPING - 24 REQD - - - 1-1/4 LBS		
WIRE, .0800" (2MM) DIA - - 24' REQD - - - 1/2 LB		
STAPLE, 1-17/32" X 3/4" - - 96 REQD - - - 3/4 LB		
ANTI-CHAFING MATERIAL - - - AS REQD - - - - - NIL		

● SEE GENERAL NOTE "P" AND CHART NOS. 1 AND 2 ON PAGE 2.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
GMLA	12	61,200 LBS (27,784 KG)
DUNNAGE		1,396 LBS (633 KG)
TOTAL WEIGHT		62,596 LBS (APPROX) (28,393 KG) (APPROX)

INDICATES GMLA SLING LIFTING PROVISION.
ENSURE THAT PROVISIONS ARE IN THE "UP"
POSITION TO FACILITATE HANDLING.



ISOMETRIC VIEW

KEY NUMBERS

- ① HEADER, 2" X 6" (38MM X 140MM) BY CAR WIDTH MINUS 1/2" (13MM) (REF: 9'-4-1/2", 2,857MM) (3 REQD). POSITION ON EDGE AGAINST CAR ENDWALL AND/OR BETWEEN CONTAINERS AS SHOWN.
- ② CENTER BLOCKING ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 16. SEE SPECIAL NOTE 2 ON PAGE 9.
- ③ FILL PIECE, 1" OR 2" X 6" (19MM OR 38MM X 140MM) BY CAR WIDTH MINUS 1/2" (13MM) (REF: 9'-4-1/2", 2,857MM) (AS REQD). INSTALL SO AS TO FILL THE GAP BETWEEN THE CENTER BLOCKING ASSEMBLY, PIECE MARKED ②, AND THE GMLA SHOCK ISOLATORS. TOENAIL TO THE CENTER BLOCKING ASSEMBLY W/4-10d NAILS.
- ④ UPPER SWAY BRACE (4 REQD). SEE THE DETAIL ON PAGE 16. INSTALL EACH BRACE AS SHOWN AND POSITIVELY WIRE TIE TO THE GMLA. PARTIALLY DRIVE ONE 10d NAIL NEAR THE TIE WIRE AND BEND OVER THE TIE WIRE TO SECURE IT IN PLACE. SEE SPECIAL NOTE 3 ON PAGE 9.
- ⑤ FILLER ASSEMBLY B (1 REQD). SEE THE DETAIL ON PAGE 13. SEE SPECIAL NOTE 4 ON PAGE 9.
- ⑥ SPACER ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 13. SEE SPECIAL NOTES 3 AND 4 ON PAGE 9.

SPECIAL NOTES:

1. A 5-UNIT LOAD IS SHOWN IN A KOREAN GONDOLA CAR. THE LOAD SHOWN ON PAGE 8 MAY BE INCREASED UP TO A FULL LOAD OF 12 GMLAs BY FOLLOWING THE PROCEDURES GIVEN ON PAGES 6 AND 7. THE LOAD SHOWN ON PAGE 8 MAY BE INCREASED TO SIX GMLAs BY REMOVING FILLER ASSEMBLY "B" AND LOADING AN ADDITIONAL GMLA. THE LOAD MAY ALSO BE REDUCED TO FOUR GMLAs, WHICH WILL REQUIRE AN ADDITIONAL FILLER ASSEMBLY "B" (TWO TOTAL). GMLAs WILL BE OMITTED FROM THE CENTER LOAD BAY. FOLLOW THE PROCEDURES ON PAGES 10 AND 11 TO SHIP THREE GMLAs.
2. THE CENTER BLOCKING ASSEMBLY, PIECE MARKED ② ON PAGE 8, MAY BE REPLACED WITH SOLID FILL IF SO DESIRED. SEE THE LOAD ON PAGE 10 FOR GUIDANCE ON INSTALLING SOLID FILL.
3. THE UPPER SWAY BRACES, PIECES MARKED ④ ON PAGE 8, MAY BE REPLACED WITH SPACER ASSEMBLIES, PIECES MARKED ⑥ ON PAGE 8, IF SO DESIRED.
4. THE INSTALLED POSITIONS OF FILLER ASSEMBLY "B" AND THE SPACER ASSEMBLY, AS DEPICTED IN THE ISOMETRIC VIEW ON PAGE 8, SHALL NOT BE INTERCHANGED.
5. ANTI-CHAFING MATERIAL IS NOT SHOWN IN THE ISOMETRIC VIEW ON PAGE 8, BUT MAY BE INSTALLED BETWEEN THE GMLA AND THE CAR SIDEWALL IF SO DESIRED.
6. SEE CHART NOS. 1 AND 2 ON PAGE 2 FOR DIMENSIONAL LUMBER AND NAIL SIZE METRIC CONVERSIONS. NOTE THAT METRIC SIZES GIVEN IN THIS DRAWING ARE MINIMUM REQUIREMENTS.

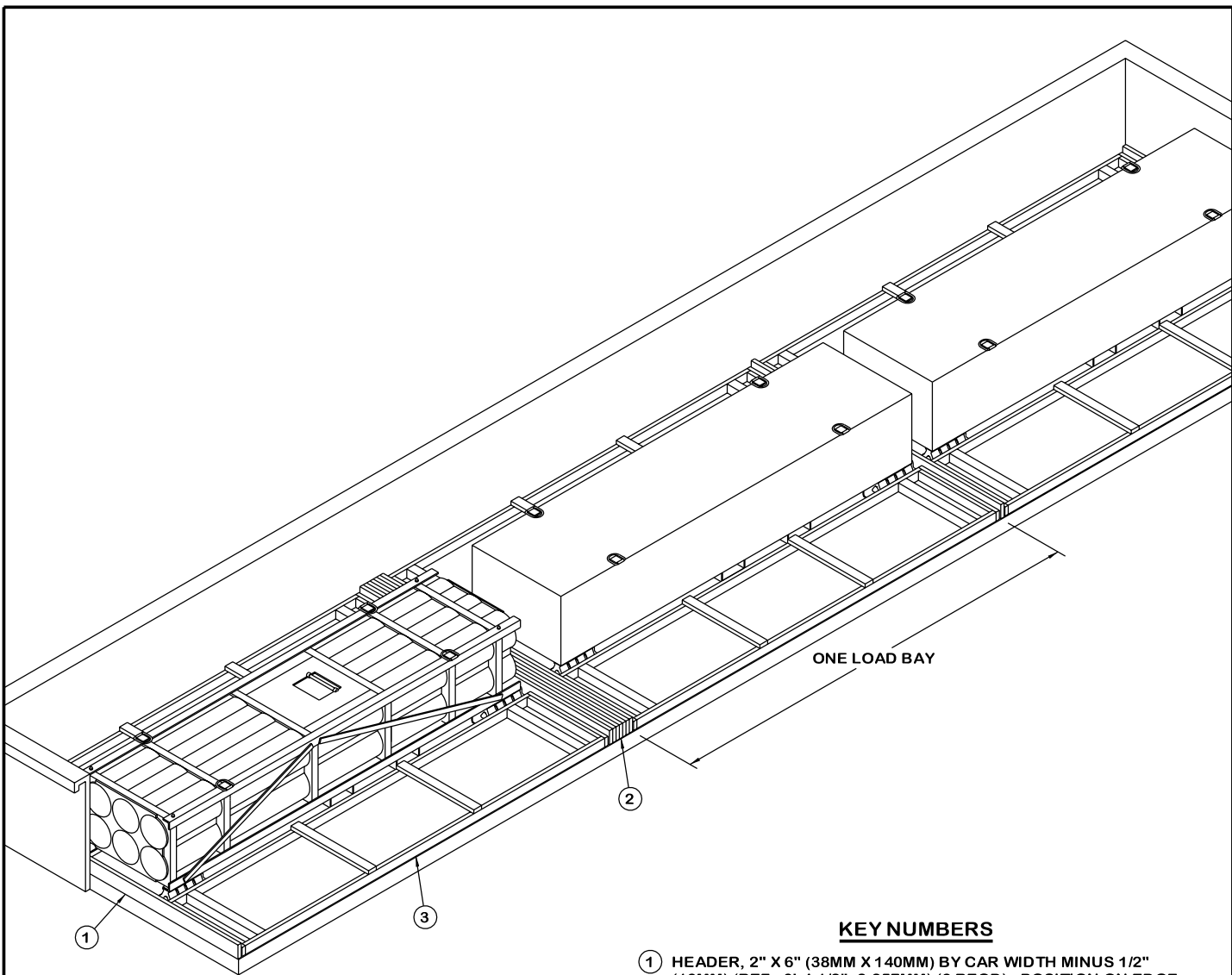
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	90	60
2" X 6"	58	58
4" X 4"	48	63
NAILS	NO. REQD	POUNDS
10d (3")	130	2
WIRE, .0800" (2MM) DIA - - - - 8' REQD - - - 1/4 LBS		

● SEE GENERAL NOTE "P" AND CHART NOS. 1 AND 2 ON PAGE 2.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
GMLA - - - - -	5 - - - - -	25,500 LBS (11,567 KG)
DUNNAGE - - - - -	- - - - -	365 LBS (166 KG)
TOTAL WEIGHT - - - - -		25,865 LBS (APPROX) (11,732 KG) (APPROX)



ISOMETRIC VIEW

KEY NUMBERS

- ① HEADER, 2" X 6" (38MM X 140MM) BY CAR WIDTH MINUS 1/2" (13MM) (REF: 9'-4-1/2", 2,857MM) (3 REQD). POSITION ON EDGE AGAINST CAR ENDWALL AND/OR BETWEEN CONTAINERS AS SHOWN.
- ② SOLID FILL, 2" X 6" (38MM X 140MM) BY CAR WIDTH MINUS 1/2" (13MM) (REF: 9'-4-1/2", 2,857MM) (AS REQD). NAIL THE FIRST PIECE TO THE SECOND W/9-10d NAILS. NAIL EACH ADDITIONAL PIECE IN A LIKE MANNER. SEE SPECIAL NOTE 2 ON PAGE 11.
- ③ SPACER ASSEMBLY (6 REQD). SEE THE DETAIL ON PAGE 13.

SPECIAL NOTES:

1. A 3-UNIT LOAD IS SHOWN IN A KOREAN GONDOLA CAR. THE LOAD SHOWN ON PAGE 10 MAY BE INCREASED TO BETWEEN SEVEN AND 12 GMLAs BY FOLLOWING THE PROCEDURES GIVEN ON PAGES 6 AND 7. THE LOAD SHOWN ON PAGE 10 MAY BE INCREASED UP TO A FULL, SINGLE LAYER LOAD BY FOLLOWING THE PROCEDURES ON PAGES 8 AND 9. THE LOAD MAY ALSO BE REDUCED BY ONE OR TWO GMLAs, WHICH WILL REQUIRE THE INSTALLATION OF FILLER ASSEMBLY "B" IN THE PLACE OF OMITTED GMLAs.
2. THE SOLID FILL, PIECES MARKED ② ON PAGE 10, MAY BE REPLACED BY A CENTER BLOCKING ASSEMBLY AND FILL PIECE IF SO DESIRED. SEE THE LOAD ON PAGE 8 FOR GUIDANCE IN INSTALLING A CENTER BLOCKING ASSEMBLY AND FILL PIECE.
3. SEE CHART NOS. 1 AND 2 ON PAGE 2 FOR DIMENSIONAL LUMBER AND NAIL SIZE METRIC CONVERSIONS. NOTE THAT METRIC SIZES GIVEN IN THIS DRAWING ARE MINIMUM REQUIREMENTS.

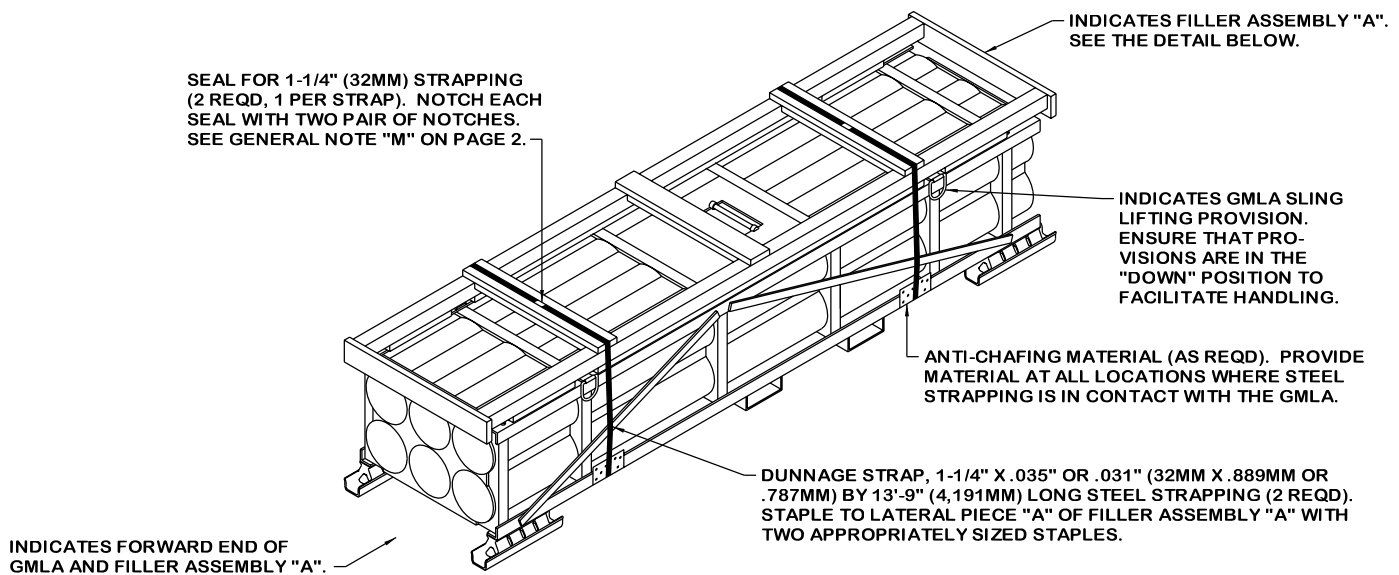
BILL OF MATERIAL ●

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	264	176
2" X 6"	94	94
4" X 4"	32	43
NAILS	NO. REQD	POUNDS
10d (3")	258	4

● SEE GENERAL NOTE "P" AND CHART NOS. 1 AND 2 ON PAGE 2.

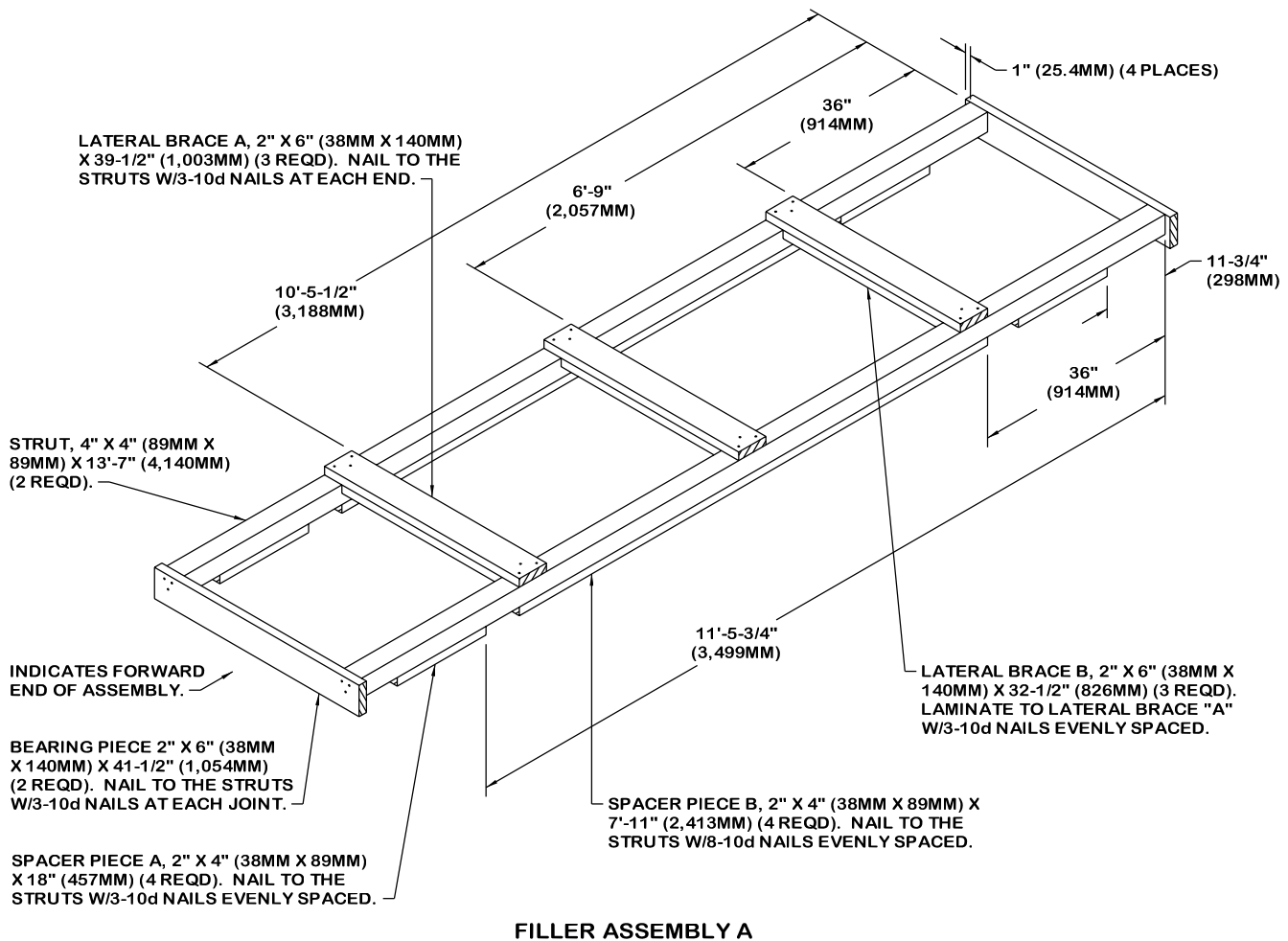
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
GMLA - - - - -	3 - - - - -	15,300 LBS (6,940 KG)
DUNNAGE - - - - -	- - - - -	630 LBS (286 KG)
TOTAL WEIGHT - - - - -		15,930 LBS (APPROX) (7,226 KG) (APPROX)

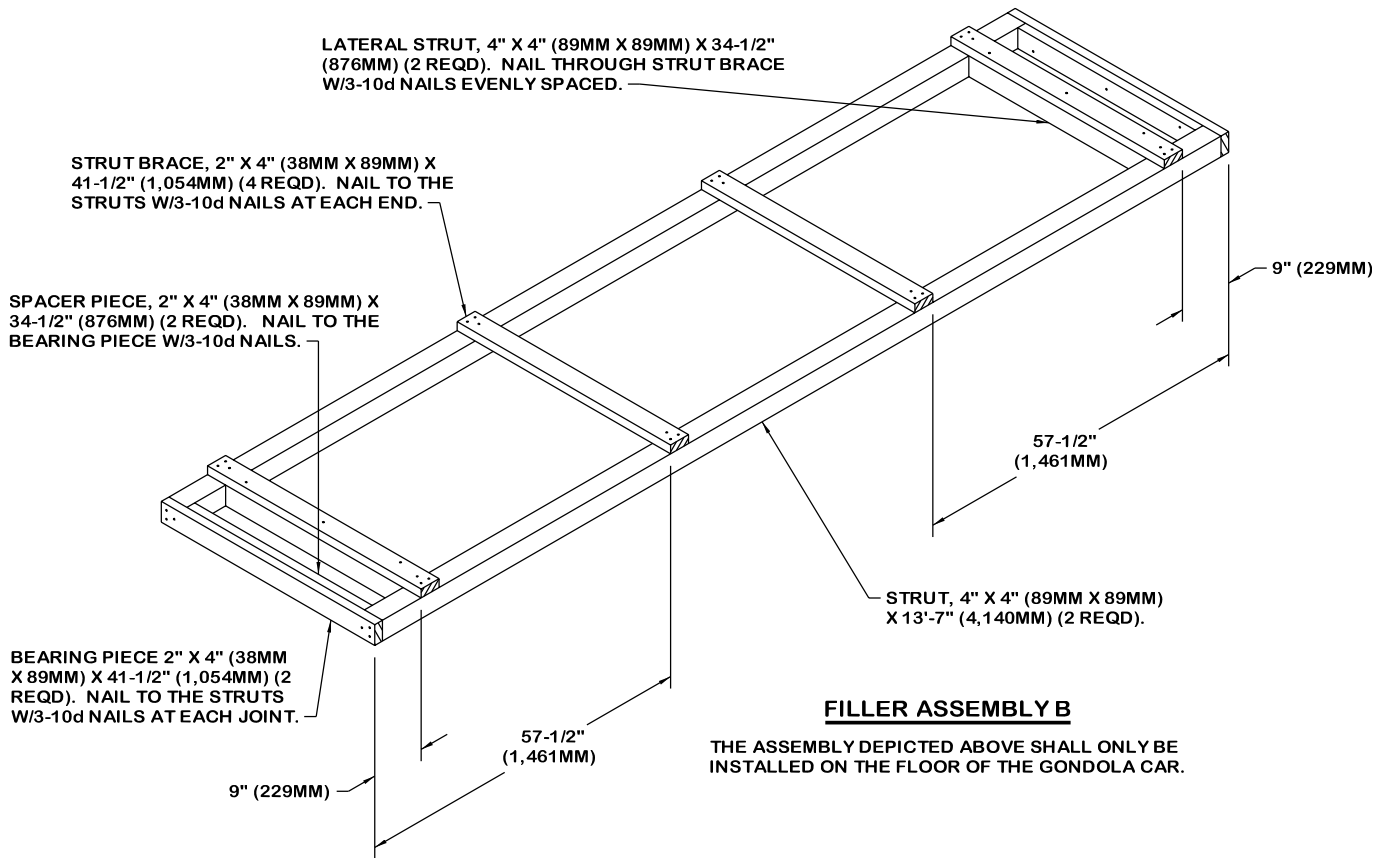


INSTALLATION OF FILLER ASSEMBLY A

THE PROCEDURE DEPICTED ABOVE IS APPLICABLE FOR REDUCING A DOUBLE-LAYER LOAD, SUCH AS THE LOAD SHOWN IN THE ISOMETRIC VIEW ON PAGE 6. WHEN A DOUBLE-LAYER LOAD IS REDUCED, GMLAs MUST BE REMOVED FROM THE TOP LAYER AND THE RESULTING SINGLE GMLA IN THE LOWER LAYER MUST HAVE FILLER ASSEMBLY "A" INSTALLED.

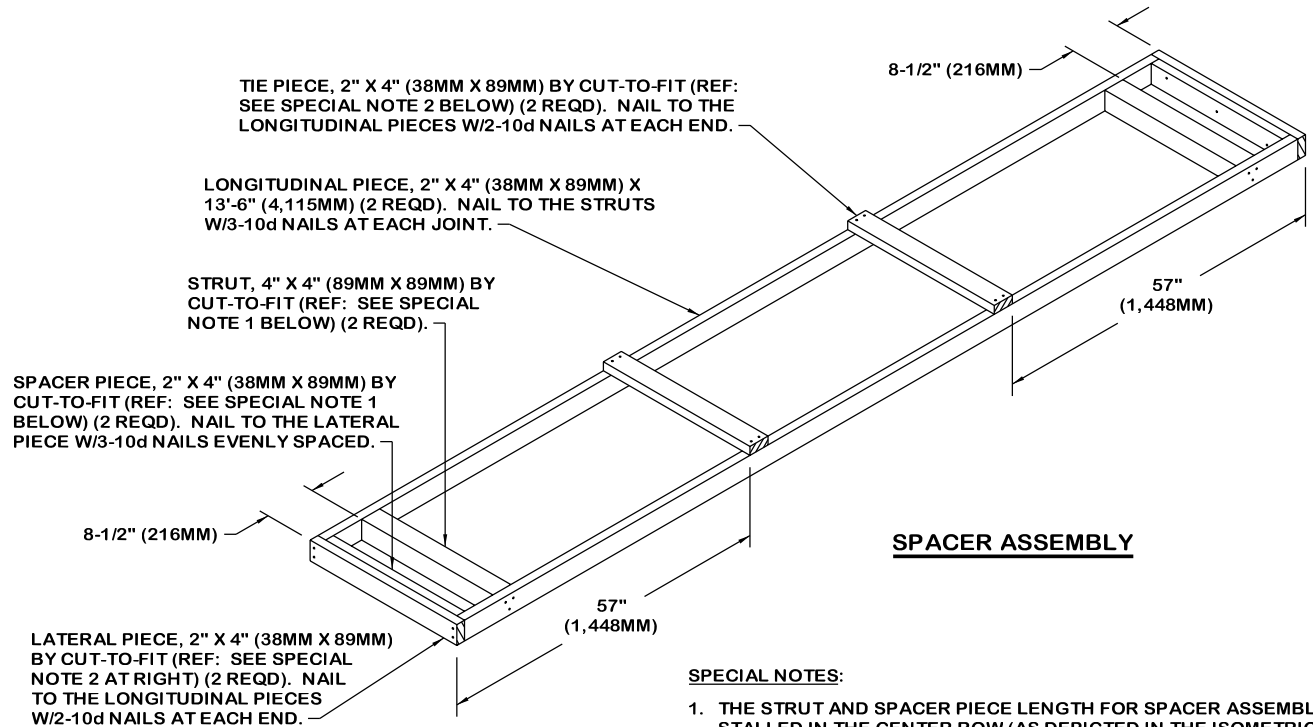


FILLER ASSEMBLY A



FILLER ASSEMBLY B

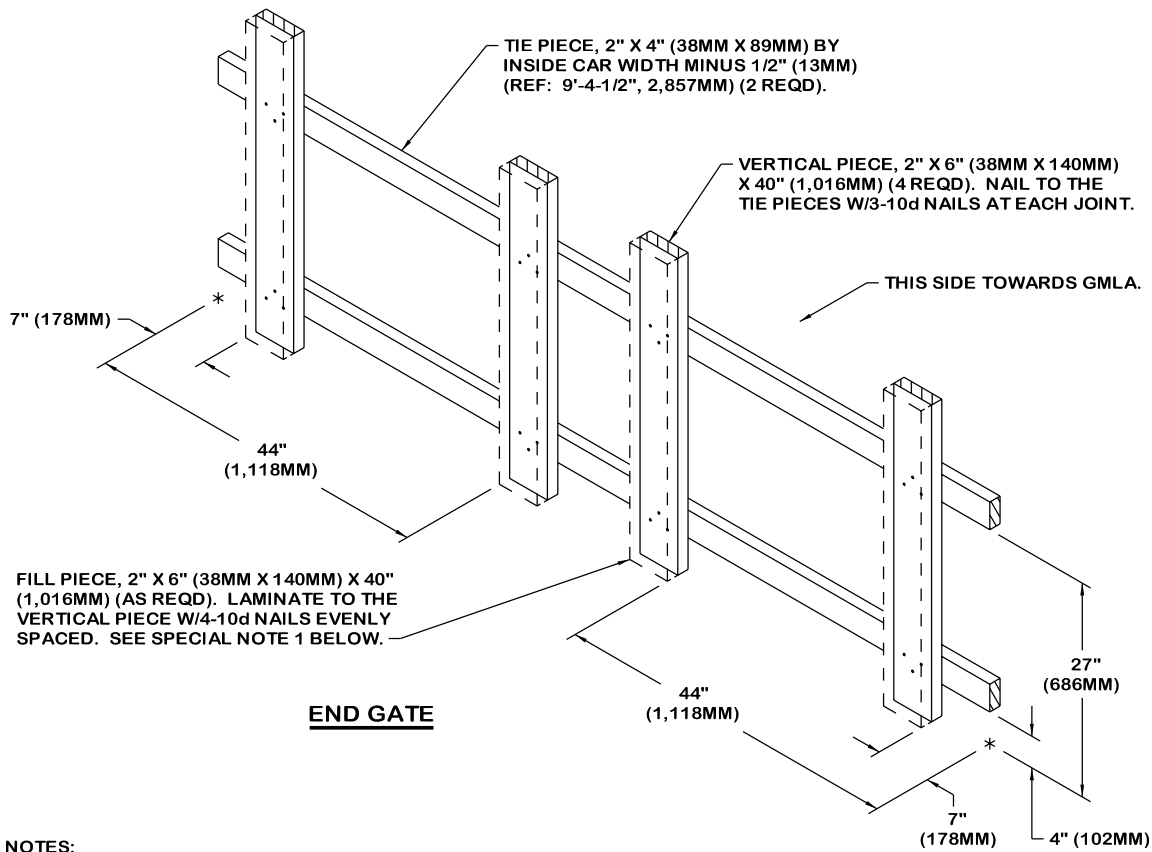
THE ASSEMBLY DEPICTED ABOVE SHALL ONLY BE INSTALLED ON THE FLOOR OF THE GONDOLA CAR.



SPACER ASSEMBLY

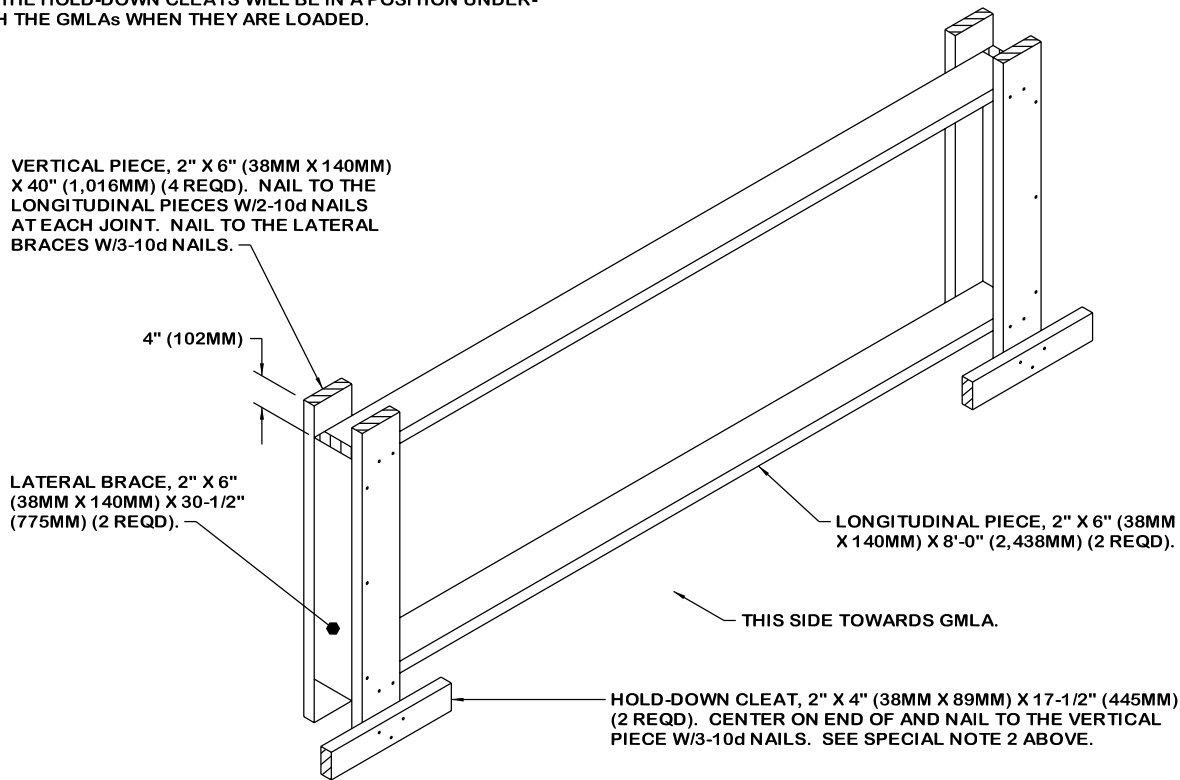
SPECIAL NOTES:

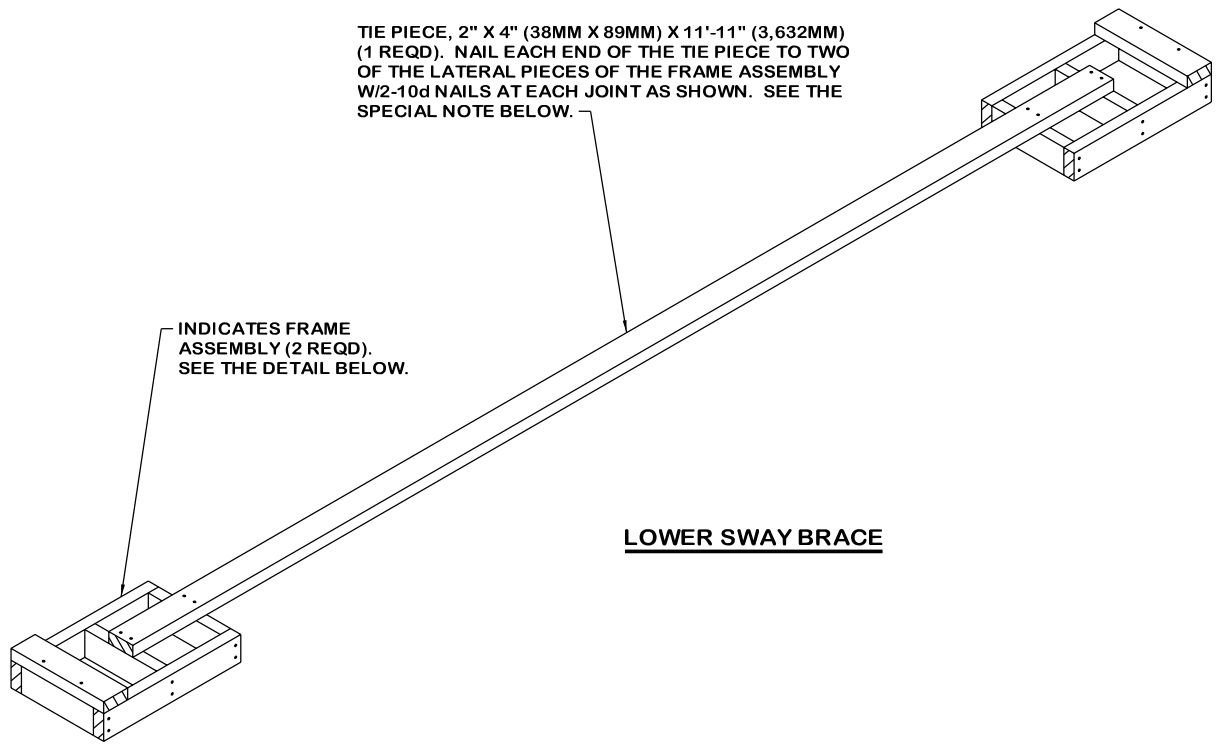
1. THE STRUT AND SPACER PIECE LENGTH FOR SPACER ASSEMBLIES INSTALLED IN THE CENTER ROW (AS DEPICTED IN THE ISOMETRIC VIEW ON PAGE 8), IS 25-1/2" (648MM). THE STRUT AND SPACER PIECE LENGTH FOR SPACER ASSEMBLIES INSTALLED IN AN OUTER ROW (AS DEPICTED IN THE ISOMETRIC VIEW ON PAGE 10) IS 32" (813MM).
2. THE TIE PIECE AND LATERAL PIECE LENGTH FOR SPACER ASSEMBLIES INSTALLED IN THE CENTER ROW (AS DEPICTED IN THE ISOMETRIC VIEW ON PAGE 8), IS 28-1/2" (724MM). THE TIE PIECE AND LATERAL PIECE LENGTH FOR SPACER ASSEMBLIES INSTALLED IN AN OUTER ROW (AS DEPICTED IN THE ISOMETRIC VIEW ON PAGE 10) IS 35" (889MM).



SPECIAL NOTES:

1. THE FILL PIECES OF THE END GATE ARE RECOMMENDED WHEN THE END GATE IS INSTALLED ADJACENT TO THE CAR END WALL. FOR END GATES INSTALLED BETWEEN LONGITUDINALLY ADJACENT GMLAs, THE FILL PIECES ARE NOT REQUIRED.
2. THE SIDE BLOCKING ASSEMBLY SHALL BE INSTALLED IN THE CAR SO THAT THE HOLD-DOWN CLEATS WILL BE IN A POSITION UNDERNEATH THE GMLAs WHEN THEY ARE LOADED.





TIE PIECE, 2" X 4" (38MM X 89MM) X 11'-11" (3,632MM) (1 REQD). NAIL EACH END OF THE TIE PIECE TO TWO OF THE LATERAL PIECES OF THE FRAME ASSEMBLY W/2-10d NAILS AT EACH JOINT AS SHOWN. SEE THE SPECIAL NOTE BELOW.

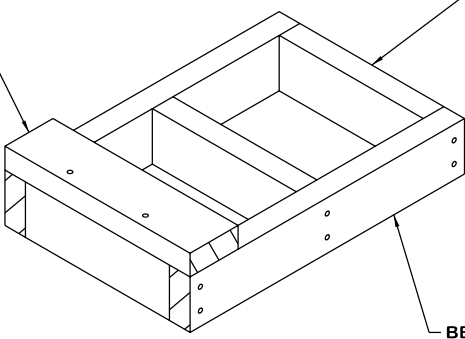
INDICATES FRAME ASSEMBLY (2 REQD). SEE THE DETAIL BELOW.

LOWER SWAY BRACE

SPECIAL NOTE:

TO FACILITATE HANDLING OF THE LOWER SWAY BRACE, IT IS RECOMMENDED THAT PREFABRICATED FRAME ASSEMBLIES AND THE TIE PIECE BE ASSEMBLED IN THE GONDOLA CAR.

STOP PIECE, 2" X 4" (38MM X 89MM) X 13-1/2" (343MM) (1 REQD). NAIL TO THE LATERAL PIECE W/2-10d NAILS.



LATERAL STRUT, 2" X 4" (38MM X 89MM) X 10-1/2" (267MM) (3 REQD).

BEARING PIECE, 2" X 4" (38MM X 89MM) X 20" (508MM) (2 REQD). NAIL TO THE LATERAL PIECES W/2-10d NAILS AT EACH JOINT.

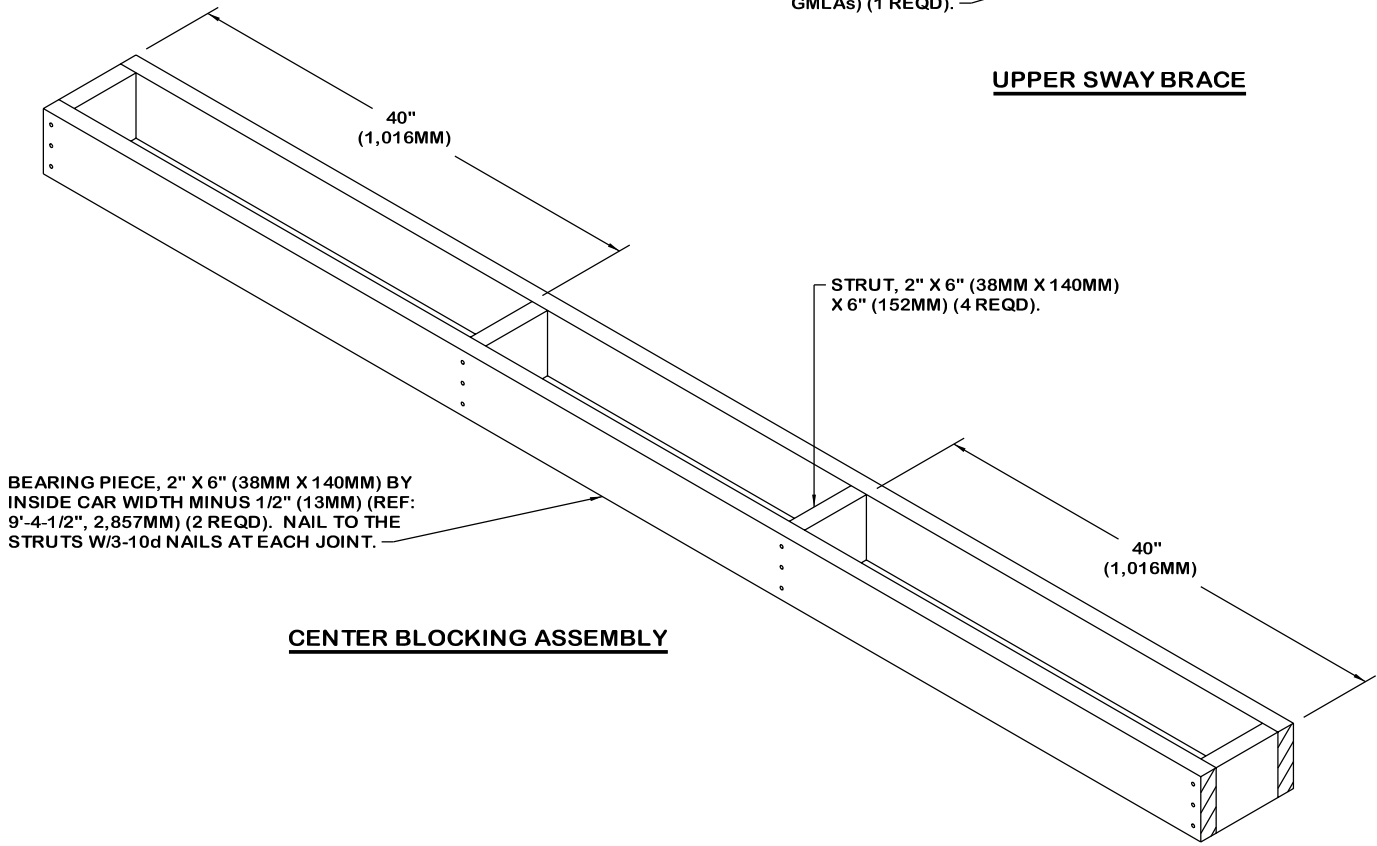
FRAME ASSEMBLY

DETAILS

SUPPORT PIECE, 2" X 4" (38MM X 89MM) X CUT-TO-FIT (REF: LATERAL DISTANCE BETWEEN GMLAs PLUS 36" (914MM)) (1 REQD). CENTER THE SPACER PIECE BELOW THE SUPPORT PIECE AND NAIL W/3-10d NAILS EVENLY SPACED.

SPACER PIECE, 4" X 4" (89MM X 89MM) X CUT-TO-FIT (REF: LATERAL DISTANCE BETWEEN GMLAs) (1 REQD).

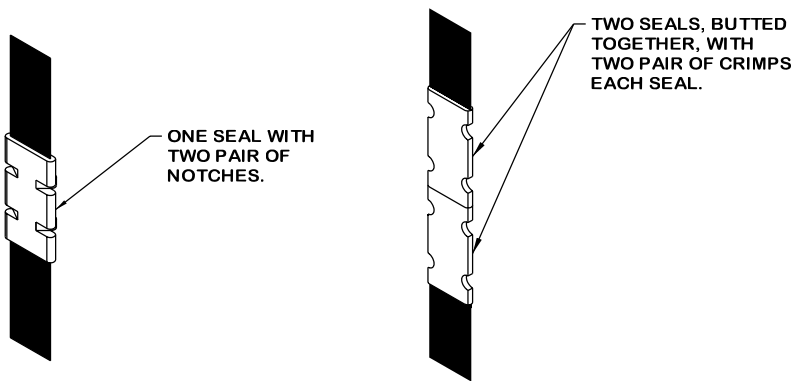
UPPER SWAY BRACE



BEARING PIECE, 2" X 6" (38MM X 140MM) BY INSIDE CAR WIDTH MINUS 1/2" (13MM) (REF: 9'-4-1/2", 2,857MM) (2 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.

STRUT, 2" X 6" (38MM X 140MM) X 6" (152MM) (4 REQD).

CENTER BLOCKING ASSEMBLY



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

SEE GENERAL NOTE "M" ON PAGE 2.