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DATE 12/1/00

BASIC PROCEDURES

LOADING AND BRACING PROCEDURES FOR AMMUNITION LOADED ON CONTAINER ROLL IN/OUT PLATFORM (CROP)

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NOTICE: THIS BASIC PROCEDURES DRAWING WILL BE AUGMENTED BY SEPARATELY ISSUED APPENDICES BEARING THE DRAWING AND FILE NUMBERS OF THIS DOCUMENT. AN APPENDIX WILL DELINEATE THE APPROVED LOADING PROCEDURES FOR ONE PARTICULAR CONFIGURATION OF AMMUNITION OR ONE TYPE OF AMMUNITION. APPENDICES CANNOT STAND ALONE, BUT MUST BE USED IN CONJUNCTION WITH THIS BASIC PROCEDURE DRAWING. THE DRAWING NUMBER OF EACH APPENDIX WILL CONTAIN A SUB-NUMBER FOR IDENTIFICATION (E.G., THE DRAWING NUMBER FOR APPENDIX 23 WILL BE 19-48-4906/23-CA17Q7). APPENDICES WILL NOT NECESSARILY BE ISSUED BY NUMERICAL SEQUENCE (E.G., IN THE SELECTED BLOCK OF SUB-NUMBERS OF 1 THRU 50, NUMBER 22 MAY NOT BE USED, THUS SUB-NUMBER 23 WILL FOLLOW 21.

- LOADING AND BRACING SPECIFICATIONS SET FORTH WITHIN THIS DRAWING ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL CARRIER SERVICE. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE MOVED BY MOTOR OR WATER CARRIERS.

U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY OPERATIONS SUPPORT COMMAND <i>Timothy J. Fox</i>	ENGINEER	BASIC	GREGORY WILLIS		DO NOT SCALE			
		REV.			WEBSITE: HTTP://WWW.DAC.ARMY.MIL			
APPROVED, U.S. ARMY AVIATION AND MISSILE COMMAND <i>Mark T. Henrich</i>	TECHNICIAN	BASIC			OCTOBER 2000			
		REV.						
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND <i>Gregory L. Willis</i>	DRAFTSMAN	BASIC						
		REV.						
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY DEFENSE AMMUNITION CENTER <i>James J. Cook</i>	TRANSPORTATION ENGINEERING DIVISION		<i>Gregory L. Willis</i>					
	VALIDATION ENGINEERING DIVISION		<i>Gregory L. Willis</i>		TESTED	CLASS	DIVISION	DRAWING
	ENGINEERING DIRECTORATE		<i>James J. Cook</i>			19	48	4906

GENERAL NOTES

(GENERAL NOTES CONTINUED)

A. **AUTHORITY:** THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).

B. **SCOPE AND APPLICATION:**

- 1. THIS DRAWING COVERS BASIC PROCEDURES APPLICABLE TO THE TRANSPORT OF AMMUNITION LOADED, BLOCKED, AND SECURED ON CONTAINER ROLL IN/OUT PLATFORM (CROP). SUBSEQUENT REFERENCE TO CROP LOAD MEANS THE CROP AND ALL ITS CONTENTS INCLUDING LADING, DUNNAGE, AND TIEDOWNS.
- 2. THIS DRAWING WILL BE CONSIDERED THE BASIC DOCUMENT AND ALL SPECIFIC CROP LOADS WILL BE DETAILED IN SEPARATELY ISSUED APPENDICES. EACH APPENDIX WILL COVER AN APPROVED CONFIGURATION FOR A CROP LOAD AND DEPICT A TYPICAL UNITIZATION PROCEDURE APPLICABLE TO THAT CONFIGURATION. EACH APPENDIX CANNOT STAND ALONE BUT MUST BE USED IN CONJUNCTION WITH ALL PERTINENT PROCEDURES, SPECIFICATIONS, AND CRITERIA CONTAINED HEREIN.
- 3. THE NSN/LOAD CROSS REFERENCE INDEX (AMC DRAWING 19-48-4906/0-CA17Q7) SHOULD BE CONSULTED TO DETERMINE THE CORRECT APPENDIX TO USE TO LOAD A SPECIFIC AMMUNITION COMMODITY.
- 4. EACH CROP LOAD IS DESIGNED FOR INSERTION INTO AN ISO CONTAINER FOR TRAILER/CONTAINER-ON-FLATCAR (T/COFC) SHIPMENT; HOWEVER, EACH CROP LOAD AS DESIGNED CAN ALSO BE MOVED BY OTHER SURFACE MODES OF TRANSPORT.

C. **EQUIPMENT DATA:**

- 1. FOR DETAILS OF THE CROP (M3 AND M3A1), SEE TM 9-3990-260-14&P. ALL OPERATIONAL WARNINGS PRESCRIBED WITHIN THIS TM MUST BE ADHERED TO. PROCEDURES CONTAINED HEREIN ARE BASED ON CROPS MANUFACTURED BY EITHER SUMMA TECHNOLOGY INC. (MODEL M3, NSN 3990-01-442-2751) OR HYUNDAI PRECISION AMERICA INC. (MODEL M3A1, NSN 3990-01-450-5671) WITH FOLLOWING BASIC CHARACTERISTICS:

EXTERNAL DIMENSIONS:

CROP DECK - - - - - 233" LONG X 91-1/2" WIDE X 10-1/4" HIGH
 A-FRAME UPRIGHT - - 71-1/2" HIGH
 CARGO ENVELOPE - - - 217" LONG X 89" WIDE X 73-3/4" HIGH
 TARE (EMPTY)
 WEIGHT - - - - - 3,800 POUNDS (APPROX)
 MAXIMUM PAYLOAD - - 32,450 POUNDS (APPROX)
 3" WIDE WEB STRAP
 TIEDOWN ASSEMBLIES - 14 PER CROP, BASIC ISSUE ITEM (BII)

- 2. EACH CROP LOAD AS SHOWN IN AN APPENDIX IS DESIGNED TO BE ASSEMBLED FIRST AND THEN FULLY INSERTED INTO A NOMINAL 20' LONG BY 8' WIDE BY 8'-6" HIGH END OPENING ISO CONTAINER WITH INSIDE DIMENSIONS OF 19'-4" LONG BY 92" WIDE BY 90" HIGH (DOORWAY), TARE WEIGHT OF 4,700 POUNDS (APPROX), AND A MAXIMUM GROSS WEIGHT RATING OF 52,910 POUNDS.

D. **BUILDING OF LOAD:**

- 1. ONLY GOOD CONDITION PALLET UNITS WILL BE USED IN THE LOAD. DUNNAGE ASSEMBLIES MUST PROVIDE A SNUG FIT AGAINST BOXES OR CONTAINERS WITHIN THE UNIT LOAD. ALL UNIT LOAD STRAPS MUST BE PROPERLY ALIGNED AND TENSIONED. UNIT LOADS MUST BE CONFIGURED IN ACCORDANCE WITH APPLICABLE DETAILS AND/OR DRAWINGS AS SPECIFIED IN EACH CROP LOAD APPENDIX.
- 2. FORWARD AND AFT END RESTRAINT GATES OF A CROP MUST BE IN UPRIGHT AND LOCKED POSITION AND ALL RETAINER PINS MUST BE PROPERLY ENGAGED TO PREVENT GATES FROM BECOMING DISLODGED DURING SHIPMENT. SEE "END GATE" DETAILS ON PAGES 6 AND 7.
- 3. WHEN LOADING PALLET UNITS ON TO A CROP, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD, TIGHT AGAINST THE ADJACENT PALLET UNITS AND TIGHT AGAINST THE DUNNAGE ASSEMBLIES. TYPICALLY THE LOAD IS TO BE BUILT STARTING FROM ONE END OF THE CROP AND PROGRESSIVELY LOADING TOWARDS THE OPPOSITE END. ANY REMAINING LONGITUDINAL GAP BETWEEN THE LOAD AND THE CROP END GATE IS TO BE FILLED BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS, E.G., 2" X 8" OR 1" X 8" LUMBER, TO THE END BLOCKING. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12".
- 4. THE UNBLOCKED SPACE ACROSS THE WIDTH OF A LOAD BAY IS NOT TO EXCEED 1/2". THE OVERALL WIDTH OF THE LOAD INCLUDING LADING AND SIDE BLOCKING MUST BE BETWEEN 88-1/2" AND 89" WIDE. EXCESSIVE SLACK CAN BE ELIMINATED FROM A LOAD BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS

TO THE SIDE BLOCKING ASSEMBLIES. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE LENGTH, THICKNESS, AND/OR QUANTITY OF PIECES IN THE SIDE FILL ASSEMBLIES MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF PALLET UNITS.

- 5. DUE TO VARIOUS HEIGHTS OF PALLET UNITS AND/OR MULTIPLE LAYERS, CROP LOAD HEIGHT MAY VARY WITHIN THE LOAD. AN APPROVED LOADING PATTERN CONFIGURATION AS DELINEATED WITHIN EACH APPENDIX SHOULD BE FOLLOWED. WHEN OPERATIONAL REQUIREMENTS VARY, THE LOADING PATTERN MAY BE ADJUSTED PROVIDED PALLET UNITS ARE ARRANGED SIMILAR TO THE LOAD PATTERN SHOWN. PALLET UNITS MUST BE POSITIONED TIGHTLY AGAINST ADJACENT PALLET UNITS AND/OR DUNNAGE ASSEMBLIES. BEARING SURFACE BETWEEN ADJACENT PALLET UNITS MUST MAKE UNIFORM CONTACT. LOAD STACK HEIGHTS SHOULD ASCEND AND/OR DESCEND IN SUCCESSIVE STAIR-STEP FASHION FROM ONE END OF LOAD TO THE OTHER. HIGHEST POINT OF LOAD SHOULD BE NEAR MIDDLE OF LOAD OR NEAR A-FRAME END OF LOAD TO FACILITATE INSERTION AND EXTRACTION OF CROP LOAD FROM AN ISO CONTAINER.

- E. **DIMENSIONAL LUMBER:** DUNNAGE LUMBER SPECIFIED IS OF NOMINAL SIZE. FOR EXAMPLE, 1" X 4" MATERIAL IS ACTUALLY 3/4" THICK BY 3-1/2" WIDE, 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE, AND 2" X 8" MATERIAL IS ACTUALLY 1-1/2" THICK BY 7-1/4" WIDE. UNLESS OTHERWISE SPECIFIED, ALL CONSTRUCTION TOLERANCES ARE +/- 1/8".
- F. **CONVERSION TO METRIC EQUIVALENTS:** DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454 KG.

G. **NAILING GUIDANCE:**

- 1. A STAGGERED NAILING PATTERN WILL BE USED WHENEVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES OR WHEN LAMINATING DUNNAGE. 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.
- 2. SEE "STRAP HOOK DETAIL" ON PAGE 7 FOR METHOD OF NAILING THROUGH STRAP ATTACHMENT SLOTS OF SNAP HOOKS INTO SIDE BLOCKING. THESE RETAINER NAILS ARE REQUIRED TO ENSURE SIDE BLOCKING REMAINS IN CORRECT ALIGNMENT DURING TRANSPORT. **NOTE:** STAPLES AS LISTED UNDER THE MATERIAL SPECIFICATIONS ON PAGE 4 MAY BE USED AS SUBSTITUTES FOR THESE RETAINER NAILS.
- 3. SEE "END GATE" DETAILS ON PAGES 6 AND 7 FOR METHOD OF NAILING THRU OPENINGS/SLOTS OF CROP END GATES TO RETAIN END BLOCKING AT FORWARD AND AFT ENDS OF SUMMA AND HYUNDAI CROPS. THESE RETAINER NAILS ARE REQUIRED TO ENSURE END BLOCKING REMAINS IN CORRECT ALIGNMENT DURING TRANSPORT.

- H. **TIEDOWN PROVISIONS:** THE TIEDOWN LOCATIONS DEPICTED WITHIN EACH APPENDIX ARE NUMBERED SEQUENTIALLY FROM ONE TO NINETEEN STARTING FROM A-FRAME END OF CROP AND GOING TOWARDS AFT END OF CROP. INSTRUCTIONAL NOTES WITHIN EACH APPENDIX SPECIFY THE ATTACHMENT LOCATIONS BASED ON THIS NUMBERING SCHEME.

- J. **INSPECTION OF TIEDOWN STRAPS:** ONLY WEB STRAPS OF GOOD QUALITY WILL BE USED. BEFORE AND DURING INSTALLATION, THE WEB STRAP ASSEMBLIES SHALL BE INSPECTED FOR DEFECTS. STRAPS HAVING ANY OF THE FOLLOWING DEFECTS WILL NOT BE USED FOR THE RESTRAINT OF ANY AMMUNITION LOAD:

- 1. STRAP ASSEMBLY HARDWARE SHALL BE REJECTED FOR BENT HOOKS, GOUGES, CORROSION, SIGNS OF REPAIR, BENT RATCHETS, WEAR, OR ANY OTHER NOTICEABLE DEFECTS.
- 2. STRAP WEBBING SHALL BE REJECTED FOR KNOTS, EXCESSIVE ABRASIVE WEAR, TEARS, PUNCTURES, CUTS, ACID OR CAUSTIC BURNS, BROKEN STITCHES, FRAYED ENDS, OIL OR GREASE SPOTS EXCEEDING SIX SQUARE INCHES, BLEACHING OF COLOR, INCREASED STIFFNESS, SPLICES, VISIBLE WEAR INDICATOR THREADS, OR ANY OTHER NOTICEABLE DEFECTS. **EXCEPTION:** A STRAP HAVING FRAYED ENDS CAN BE USED IF IT HAS NO OTHER DEFECTS AND THE FRAYED END IS TRIMMED AND MELTED WITH HEAT OR FLAME UNTIL ALL STRANDS ARE SEIZED.

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K. APPLICATION OF TIEDOWN STRAPS:

1. UNLESS OTHERWISE SPECIFIED, THE SNAP HOOK OF EACH WEB STRAP ASSEMBLY MUST BE CONNECTED DIRECTLY TO THE ANCHOR ROD INSIDE THE TIEDOWN OPENING AND THE FLOATING D-RING MUST BE POSITIONED ON THE OUTWARD SIDE OF THE SNAP HOOK TO SERVE AS A SPACER BETWEEN THE HOOK AND THE OUTER SIDE RAIL OF THE CROP. SEE "STRAP HOOK DETAIL" ON PAGE 7.
2. EXERCISE CARE DURING STRAP APPLICATION. ENSURE THAT ALL TWISTS ARE OUT OF STRAP PRIOR TO ATTACHING HOOKS TO TIEDOWN ANCHORS. AVOID TWISTS IN THE STRAP AND ENSURE THERE ARE NO KNOTS IN THE STRAP. ENSURE WEB STRAPS ARE POSITIONED IN STRAIGHT ALIGNMENT.
3. ADJUSTABLE SCUFF SLEEVES PROVIDED ON WEB STRAP ASSEMBLIES WILL BE LOCATED TO PROVIDE A PAD WHERE STRAPS PASS OVER SHARP EDGES, OR RATCHETS AND HOOKS ON PREVIOUSLY INSTALLED WEB STRAP TIEDOWN ASSEMBLIES. REMAINING SCUFF SLEEVES ARE TO BE POSITIONED OVER STITCHED JOINT OF WEBBING AT POINT OF ATTACHMENT TO SNAP HOOK. **NOTE:** IN SOME CASES, ADDITIONAL STRAPPING BOARDS MAY NEED TO BE INSTALLED ON EDGES OF LOAD TO ENSURE STRAPS WILL NOT BE CUT OR LODGED INTO JOINTS OF PALLET UNITS DURING SHIPMENT.
4. METAL PARTS OF A STRAP ASSEMBLY SHOULD BE LOCATED SO AS TO AVOID CONTACT WITH THE CARGO. IF CONTACT CANNOT BE AVOIDED, A SUITABLE ANTI-CHAFING MATERIAL, AS LISTED UNDER THE MATERIAL SPECIFICATIONS ON PAGE 4, MUST BE POSITIONED BETWEEN THE METAL PARTS OF A STRAP ASSEMBLY AND THE CARGO AND IF NECESSARY, TAPED OR TIED IN POSITION.
5. ARRANGE ALL STRAPS FIRST AND THEN FIRMLY TENSION. A STRAP IS FIRMLY TENSIONED WHEN THE OPERATOR PULLS ON THE RATCHET HANDLE BY HAND AND THE RATCHET WILL NOT ADVANCE ANOTHER NOTCH. WHEN TWO OR MORE WEB STRAPS CROSS OVER OR CONTACT ONE ANOTHER, ENSURE LOWER LEVEL STRAP IS TIGHTENED FIRST.
6. ENSURE STRAIGHT LAY OF THE STRAP ON THE TAKE-UP SPOOL OF THE RATCHET WHEN TENSIONING. AFTER INITIAL WEBBING-TO-WEBBING CONTACT HAS BEEN MADE, BY ROTATING THE TAKE-UP SPOOL UNTIL NO METAL ON THE SPOOL IS SHOWING AND THE STRAP HAS MADE CONTACT WITH ITSELF, THE TENSIONED STRAP MUST FORM AT LEAST 1/2 BUT NOT MORE THAN 1-1/2 WRAPS OF STRAP ON THE TAKE-UP SPOOL OF THE TENSIONING RATCHET. AFTER TENSIONING IS COMPLETED, ENSURE THAT THE SPOOL LOCKING LATCH IS FULLY SEATED AT BOTH ENDS OF THE SPOOL IN MATCHING LOCKING NOTCHES. FOR ADDITIONAL GUIDANCE, SEE "RATCHET AND STRAP TENSIONING DETAILS" ON PAGES 8 AND 9.
7. STRAP RATCHETS SHOULD BE STAGGERED, WHERE POSSIBLE, TO ENSURE MORE UNIFORM TENSION ON THE CROP LOAD.
8. DURING LONG HAULS, WHEN POSSIBLE, STRAPS SHOULD BE CHECKED DURING VEHICLE STOPS AND TIGHTENED, IF NECESSARY.
9. WEB STRAPS, TO THE MAXIMUM EXTENT POSSIBLE, WILL BE POSITIONED AS DEPICTED WITHIN EACH APPENDIX. A MINIMUM OF TWO WEB STRAPS WILL BE USED OVER TOP EACH LOAD STACK. WHERE POSSIBLE, WEB STRAPS WILL BE POSITIONED IN STRAIGHT ALIGNMENT OVER TOP EACH LOAD STACK; OTHERWISE, A PAIR OF WEB STRAPS MAY BE CROSSED OVER THE TOP OF A LOAD STACK.
10. CROP LOADS WITH MULTIPLE LAYERS OF PALLET UNITS WILL BE RESTRAINED AT EACH END OF THE LOAD WITH ONE OR MORE WEB STRAP ASSEMBLIES CROSSED OVER THE FACE OF THE LOAD.
11. AFTER ALL LOADING PROCEDURES ARE COMPLETE, CHECK ALL WEB STRAP TIEDOWN ASSEMBLIES FOR MAXIMUM TIGHTNESS AND RATCHET TIGHTER, IF REQUIRED, PRIOR TO FOLDING UP AND SECURING THE LOOSE ENDS OF STRAP.
12. SECURE EXCESS END (TAIL) OF WEB STRAP BY ROLLING INTO BUNDLE, FOLDING AGAINST THE TENSIONED LEG OF STRAP, AND SECURING TIGHTLY WITH A NYLON CABLE TIE. SEE "STRAP END SECUREMENT" DETAIL ON PAGE 9.
13. TO ENSURE ALL 14 BII STRAP ASSEMBLIES ARE AVAILABLE (ACCESSIBLE) TO RECEIVING UNITS, INSTALL ALL 14 STRAP ASSEMBLIES OVER LOAD OR POSITION UNUSED STRAPS BETWEEN BLOCKING ASSEMBLIES ON CROP DECK AND SECURE WITH APPROPRIATE MEANS; E.G., .0800 DIA BINDING WIRE.

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L. SPECIAL HANDLING GUIDANCE:

1. SEE "SPECIAL HANDLING GUIDANCE" DETAIL ON PAGE 5 FOR METHOD OF INSERTING CROP LOAD INTO ISO CONTAINER WITH FORKLIFT TRUCK.
2. A PAIR OF DURABLE METAL RAMPS SHOULD BE USED FOR SUSTAINED LOADING OPERATIONS. REFER TO DAC DRAWING ACV00632 FOR CONSTRUCTION OF METAL RAMPS. WOODEN RAMPS MAY BE USED FOR SHORT TERM LOADING OPERATIONS. REFER TO DAC DRAWING ACV00628 FOR CONSTRUCTION OF WOODEN RAMPS.
3. PUSH/PULL ATTACHMENTS SHOULD BE USED ON TINES OF FORKLIFT TRUCK TO PRECLUDE DAMAGE TO UNDERSTRUCTURE OF CROP AND TO IMPROVE HANDLING CONTROL. REFER TO DAC DRAWING ACV00635 FOR CONSTRUCTION OF PUSH/PULL ATTACHMENTS FOR FORKLIFT TRUCK.

M. CROP TO CONTAINER SECUREMENT:

1. THE CROP IS EQUIPPED WITH AFT END CORNER BUMPERS THAT NEST INTO THE FRONT CORNER POSTS OF THE ISO CONTAINER AND SECUREMENT DEVICES ON THE A-FRAME END CORNERS THAT LOCK INTO THE SLOT AHEAD OF THE DOOR CORNER POSTS OF THE ISO CONTAINER. REFER TO TM 9-3990-260-14&P FOR DETAILS ON LOADING AND SECURING A CROP WITHIN AN ISO CONTAINER.
2. CROP MUST BE FULLY INSERTED INTO AN ISO CONTAINER. AFT END CROP BUMPERS MUST SEAT COMPLETELY INTO FRONT CORNER POSTS OF ISO CONTAINER. **NOTE:** CORRECT INSERTION DISTANCE CAN BE DETERMINED BY INSERTING EMPTY CROP AND CHECKING FIT WITH CONTAINER PRIOR TO START OF ACTUAL LOADING OPERATIONS.
3. ENSURE CROP SECUREMENT DEVICES (SUMMA CAMS OR HYUNDAI LATCHES AND SHIMS) ARE FULLY SEATED AND LOCKED INTO THE DOOR POST SHORING SLOTS TO MAXIMUM EXTENT POSSIBLE. CROP SECUREMENT DEVICES WILL BE EXTENDED AND/OR ADJUSTED LONGITUDINALLY TO PROVIDE A SNUG FIT AGAINST THE BACK OF THE DOOR POST SHORING SLOT.
4. SECUREMENT DEVICES WILL BE EXTENDED LATERALLY INTO THE SHORING SLOTS AS FAR AS POSSIBLE. THE TOTAL COMBINED AMOUNT OF ANY REMAINING LATERAL GAPS BETWEEN SECUREMENT DEVICES AND SIDES OF SHORING SLOTS MUST NOT EXCEED 1/2".
5. LOCKING PINS AND RETAINER PINS MUST BE FULLY INSERTED TO PREVENT SECUREMENT DEVICES FROM RETRACTING DURING SHIPMENT. SEE "END GATE" DETAILS ON PAGE 6. ALSO REFER TO APPLICABLE DETAILS IN TM 9-3990-260-14&P.
6. IF THE CONTAINER IS EQUIPPED WITH A "TIE-BAR" IN THE DOOR POST SLOT AND IT PREVENTS SAFE ENGAGEMENT OF A CROP SECUREMENT DEVICE OR RETAINER PIN, THE TIE-BAR MUST BE REMOVED OR THE ISO CONTAINER CANNOT BE USED FOR SHIPMENT OF THE CROP LOAD.

N. RECOMMENDED SEQUENTIAL LOADING PROCEDURES:

1. POSITION SERVICEABLE ISO CONTAINER ON LOADING PAD, OPEN CONTAINER DOORS FULLY, AND POSITION GROUND RAMPS PER "SPECIAL HANDLING GUIDANCE" DETAIL ON PAGE 5.
2. POSITION CROP ON GROUND WITH AFT END ROLLERS ALIGNED WITH END OF RAMPS, CROP CENTERED ON CONTAINER DOORWAY, AND CROP PARALLEL TO CONTAINER.
3. ENSURE FORWARD AND AFT END RESTRAINT GATES OF CROP ARE IN UPRIGHT AND LOCKED POSITION AND ALL RETAINER OR CLIP PINS ARE PROPERLY ENGAGED TO PREVENT GATES FROM BECOMING DISLODGED DURING SHIPMENT. SEE "END GATE" DETAILS ON PAGES 6 AND 7.
4. LOAD PALLET UNITS, BRACE, AND SECURE ACCORDING TO APPLICABLE APPENDIX FOR AMMUNITION ITEM OR ITEMS BEING SHIPPED.
5. LIFT BENEATH A-FRAME END OF LOADED CROP WITH PUSH/PULL ATTACHMENTS MOUNTED ON TINES OF APPROPRIATE SIZED FORKLIFT TRUCK. RAISE END OF CROP A FEW INCHES AND INSERT CROP CAREFULLY INTO CONTAINER. MAINTAIN STRAIGHT ALIGNMENT OF CROP WITH CONTAINER. USE GROUND GUIDE PERSON ON BOTH SIDES OF LOAD TO MAINTAIN SAFE OPERATION AND TO ENSURE NEITHER LADING, STRAPS, NOR RATCHETS COME IN CONTACT WITH CONTAINER DOOR HEADER OR CONTAINER SIDE WALLS.

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- 6. FULLY INSERT CROP INTO ISO CONTAINER UNTIL AFT END CROP BUMPERS ARE SEATED COMPLETELY INTO FRONT CORNER POSTS OF ISO CONTAINER. NOTE: CORRECT INSERTION DISTANCE CAN BE DETERMINED BY INSERTING EMPTY CROP AND CHECKING FIT WITH CONTAINER PRIOR TO START OF ACTUAL LOADING OPERATIONS.
- 7. ENGAGE CROP SECUREMENT DEVICES AND INSTALL ALL LOCKING PINS AND/OR RETAINER PINS. ENSURE SUMMA CAMS OR HYUNDAI LATCHES AND SHIMS ARE FULLY SEATED AND LOCKED INTO THE DOOR POST SHORING SLOTS TO MAXIMUM EXTENT POSSIBLE. IF SEATED PROPERLY, NO LONGITUDINAL GAP AND LESS THAN 1/2" OF LATERAL GAP WILL REMAIN.
- 8. ENSURE PROPER PLACARDING OF THE CONTAINER, INSERT SHIPPING PAPERS, CLOSE AND SEAL DOORS. PLACARDS MUST BE ATTACHED BEFORE THE FIRST AMMO ITEM ENTERS CONTAINER.

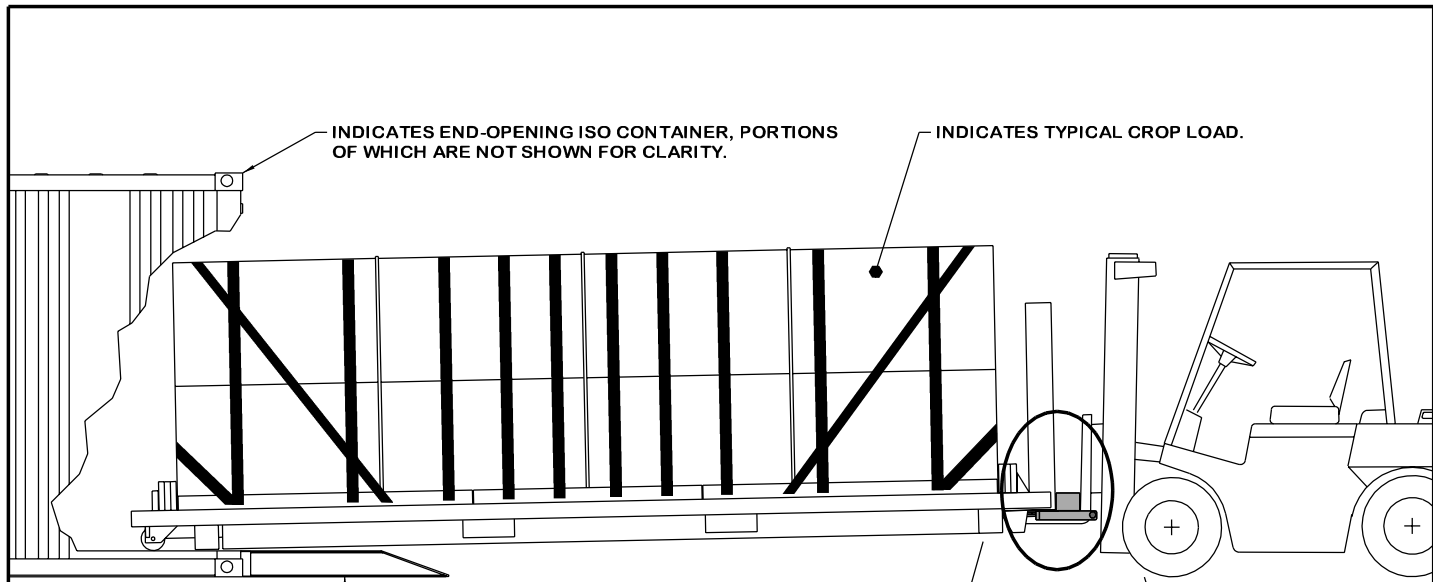
O. TRANSPORTATION REQUIREMENTS:

- 1. PROCEDURES DEPICTED HEREIN ARE TYPICAL IN NATURE. ITEM LOCATION AND QUANTITIES OF THE DESIGNATED ITEMS MAY BE VARIED TO SATISFY OPERATIONAL REQUIREMENTS, PROVIDING LOADING AND TIEDOWN PRINCIPLES SPECIFIED HEREIN ARE FOLLOWED AS CLOSELY AS POSSIBLE.
- 2. THE MAXIMUM LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPABILITY FACTORS. DEPENDING ON TRANSPORTATION ROUTING, IT MAY BE NECESSARY TO REDUCE THE LOAD WEIGHT TO SATISFY A SPECIFIC WEIGHT RESTRICTION. ALTHOUGH A FULL LOAD IS DELINEATED IN THE LOAD VIEW OF EACH APPENDIX, THE QUANTITY OF LADING UNITS CAN BE REDUCED TO SATISFY A LESSER WEIGHT RESTRICTION OR CHANGES IN OPERATIONAL REQUIREMENTS.
- 3. IF A LOAD IS REDUCED BY ONLY A SMALL AMOUNT (ONE OR TWO LADING UNITS), LADING UNITS NORMALLY MAY BE ELIMINATED FROM THE TOP LAYER AND/OR ENDS OF THE CROP LOAD.
- 4. IF A LOAD IS REDUCED BY A LARGE AMOUNT (MORE THAN TWO LADING UNITS), LADING UNITS SHOULD BE ELIMINATED AS REQUIRED AND THE TOTAL LOAD SHIFTED FORE OR AFT, AS NECESSARY, TO ACHIEVE A SYMMETRICAL WEIGHT DISTRIBUTION. THE DEPICTED PROCEDURES WILL BE FOLLOWED AS CLOSELY AS POSSIBLE, MAKING ONLY THOSE ADJUSTMENTS TO THE DUNNAGE WHICH ARE REQUIRED TO ACCOMMODATE THE NUMBER OF UNITS TO BE SHIPPED.
- 5. WHETHER A CROP LOAD IS FULL OR IS LOADED WITH A REDUCED QUANTITY OF LADING UNITS, THE LENGTHWISE CENTER OF GRAVITY OF THE LOAD MUST BE WITHIN 12", IN EITHER DIRECTION, OF THE MID-POINT OF THE CROP.
- 6. REQUIREMENTS CITED WITHIN THE ASSOCIATION OF AMERICAN RAILROADS (AAR) INTERMODAL LOADING GUIDE APPLY WHEN THE SHIPMENT MOVES BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC).
- 7. A LOADED CONTAINER MUST BE ON A CHASSIS EQUIPPED WITH TWO BOGIE ASSEMBLIES WHEN BEING MOVED IN TOFC SERVICE.
- 8. THE LOAD LIMIT OF A T/COFC RAILCAR MUST NOT BE EXCEEDED, NOR WILL A CAR BE LOADED SO THAT THE TRUCK UNDER ONE END OF THE CAR CARRIES MORE THAN ONE-HALF OF THE LOAD LIMIT FOR THAT CAR.
- 9. DURING INTRASTATE AND/OR INTERSTATE MOVES BY MOTOR CARRIER, A PROPER CHASSIS OR MODIFIED FLATBED TRAILER MUST BE USED TO PRECLUDE VIOLATION OF ONE OR MORE "WEIGHT LAWS" APPLICABLE TO THE STATE OR STATES INVOLVED.

P. STEEL STRAPPING REQUIREMENTS:

- 1. AS REQUIRED BY THE ASSOCIATION OF AMERICAN RAILROADS (AAR), ALL 1-1/4" AND 2" STEEL STRAPPING USED FOR LOAD RESTRAINT MUST BE MARKED AS SPECIFIED WITHIN THE APPLICABLE AAR RULES GOVERNING LOADING, BLOCKING AND BRACING OF FREIGHT WITHIN THE CONVEYANCE. FOR THE SPECIFIC MARKING SIZE, FREQUENCY, ETC., REQUIRED, REFER TO THE APPROPRIATE AAR LOADING RULES.
- 2. 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 5 FOR GUIDANCE.

- LUMBER - - - - - -: SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
- LUMBER, HARDWOOD - - -: FED SPEC MM-L-736; TYPE II.
- NAILS - - - - - -: ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).
- PLYWOOD - - - - - -: COMMERCIAL ITEM DESCRIPTION A-A-55057, INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.
- HARDBOARD - - - - - -: ANSI/AHA A135.4, CLASS 1.
- PALLET - - - - - -: MIL SPEC MIL-P-15011; 4-WAY ENTRY, STYLE 1, 1A, OR 1B, TYPE I, CLASS 1, PRESERVATIVE TREATED.
- STRAPPING, STEEL - - -: ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH B (GRADE 2).
- SEAL, STRAP - - - - - -: ASTM D3953; CLASS H, FINISH B (GRADE 2), DOUBLE NOTCH TYPE, STYLE I, II, OR IV. ALTERNATIVE SEAL FINISH: SIGNODE PAINTED SEALS MAY BE USED AS AN ALTERNATIVE IF ALL SURFACES ARE PAINTED. GRITTED BACKING IS NOT PERMITTED.
- EDGE PROTECTOR, STEEL - - - - - -: STEEL EDGE PROTECTOR, SIGNODE MODEL 7 OR EG3A OR EQUIVALENT.
- WIRE, CARBON STEEL - -: ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, 0.0800" DIA, GRADE 1006 OR BETTER.
- STAPLE - - - - - -: ASTM F1667; TYPE IV, STYLE 3: FOR 3/4" STRAPPING, STFCs-189 OR STFCs-207, 15/16" OR 1" CROWN WIDTH X 3/4" LEG LENGTH; FOR 1-1/4" STRAPPING, STFSC-223 OR STFSC-224, 1-3/8" CROWN WIDTH X 3/4" LEG LENGTH.
- STAKE POCKET PROTECTOR - - - - - -: COMMERCIAL GRADE.
- STRAP, 2-INCH WIDE - -: WEBBING, UNIVERSAL TIEDOWN, NSN 5340-01-204-3009, PN 9392419.
- STRAP, 3-INCH WIDE - -: WEB STRAP ASSEMBLY, CROP BII, NSN 5340-01-466-4985, PN 12468730.
- EDGE PROTECTOR, REINFORCED RUBBER - -: CORNER PROTECTOR FOR 3-INCH WIDE WEBBING, ANCR A PN 42098-11 OR EQUIVALENT.
- CABLE TIE - - - - - -: BLACK NYLON, COMMERCIAL GRADE, ULTRAVIOLET LIGHT-RESISTANT.
- ANTI-CHAFING MATERIAL - - - - - -: MIL-B-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.



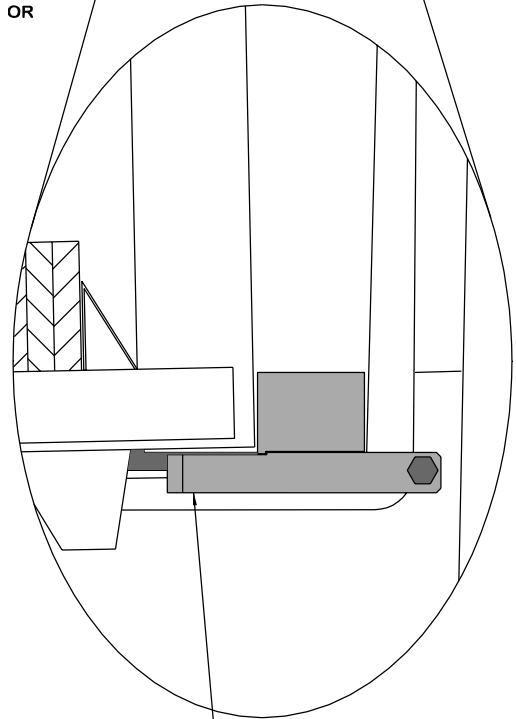
INDICATES END-OPENING ISO CONTAINER, PORTIONS OF WHICH ARE NOT SHOWN FOR CLARITY.

INDICATES TYPICAL CROP LOAD.

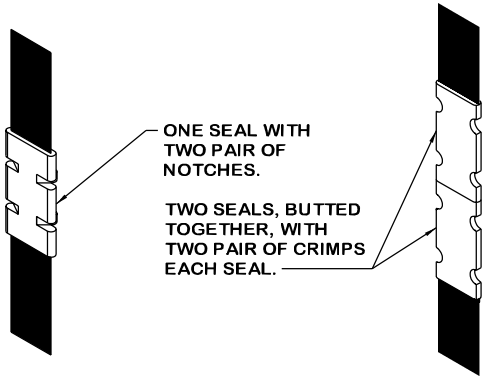
INDICATES PAIR OF METAL RAMPS POSITIONED AT DOOR SILL OF ISO CONTAINER TO SUPPORT CROP ROLLERS AND FACILITATE INSERTION OR EXTRACTION OF CROP LOAD. REFER TO DAC DRAWING ACV00628 FOR FABRICATION DETAILS.

SPECIAL HANDLING GUIDANCE

NOTE: A-FRAME END OF CROP NEED ONLY BE LIFTED A FEW INCHES TO PERMIT CROP ROLLERS TO FUNCTION. EXTREME CARE MUST BE EXERCISED DURING INSERTION OR EXTRACTION OF CROP LOAD. SEE GENERAL NOTES "N.5" AND "N.6" ON PAGE 3.



INDICATES PUSH/PULL ATTACHMENT MOUNTED ON FORKLIFT TRUCK TINE AND ENGAGED WITH END RAIL OF CROP. REFER TO DAC DRAWING ACV00635 FOR FABRICATION DETAILS.



ONE SEAL WITH TWO PAIR OF NOTCHES.

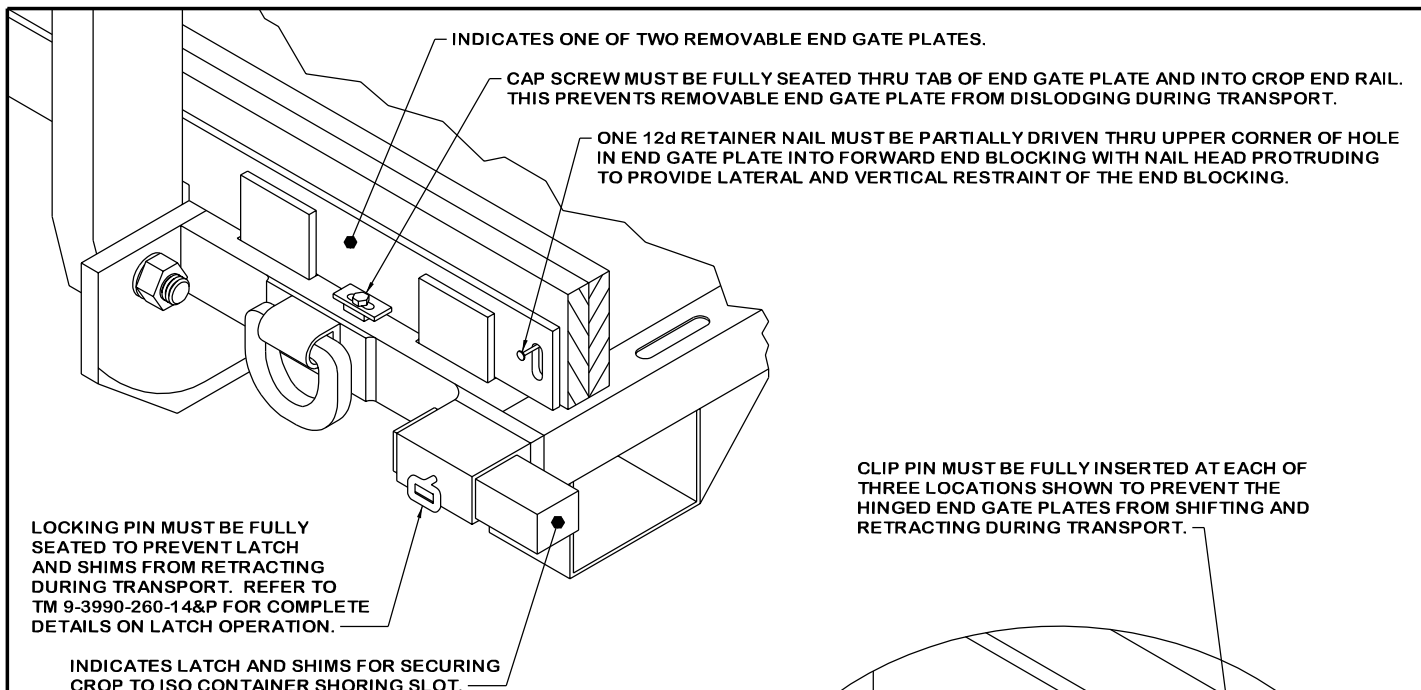
TWO SEALS, BUTTED TOGETHER, WITH TWO PAIR OF CRIMPS EACH SEAL.

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

DETAILS

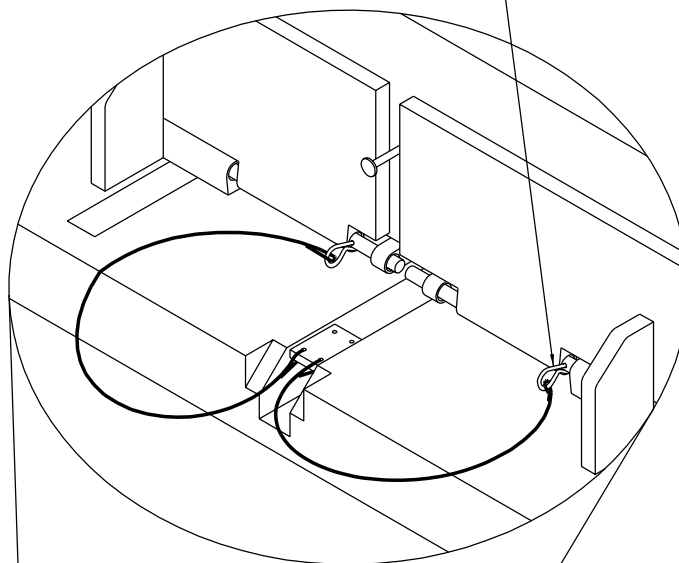


M3A1 (HYUNDAI) CROP FORWARD END GATE

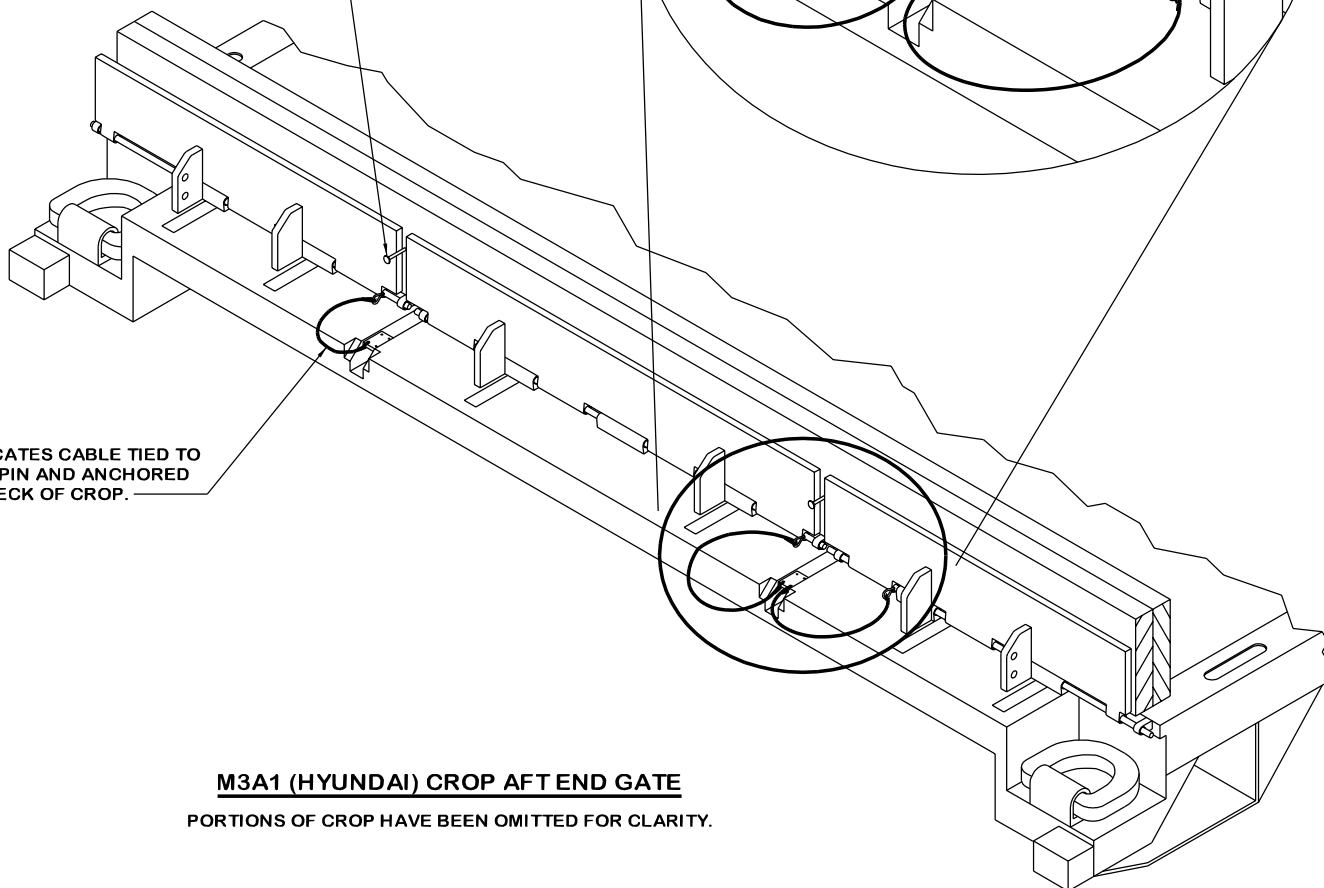
NOTE: ONLY FRONT DRIVERSIDE IS SHOWN ABOVE. CAP SCREW AND RETAINER NAIL REQUIREMENTS ALSO APPLY TO THE FRONT CURBSIDE END GATE PLATE.

ONE 12d RETAINER NAIL MUST BE PARTIALLY DRIVEN THRU EACH OF TWO SLOTS IN AFT END GATE INTO AFT BLOCKING WITH NAIL HEAD PROTRUDING TO PROVIDE LATERAL RESTRAINT OF THE AFT END BLOCKING.

CLIP PIN MUST BE FULLY INSERTED AT EACH OF THREE LOCATIONS SHOWN TO PREVENT THE HINGED END GATE PLATES FROM SHIFTING AND RETRACTING DURING TRANSPORT.

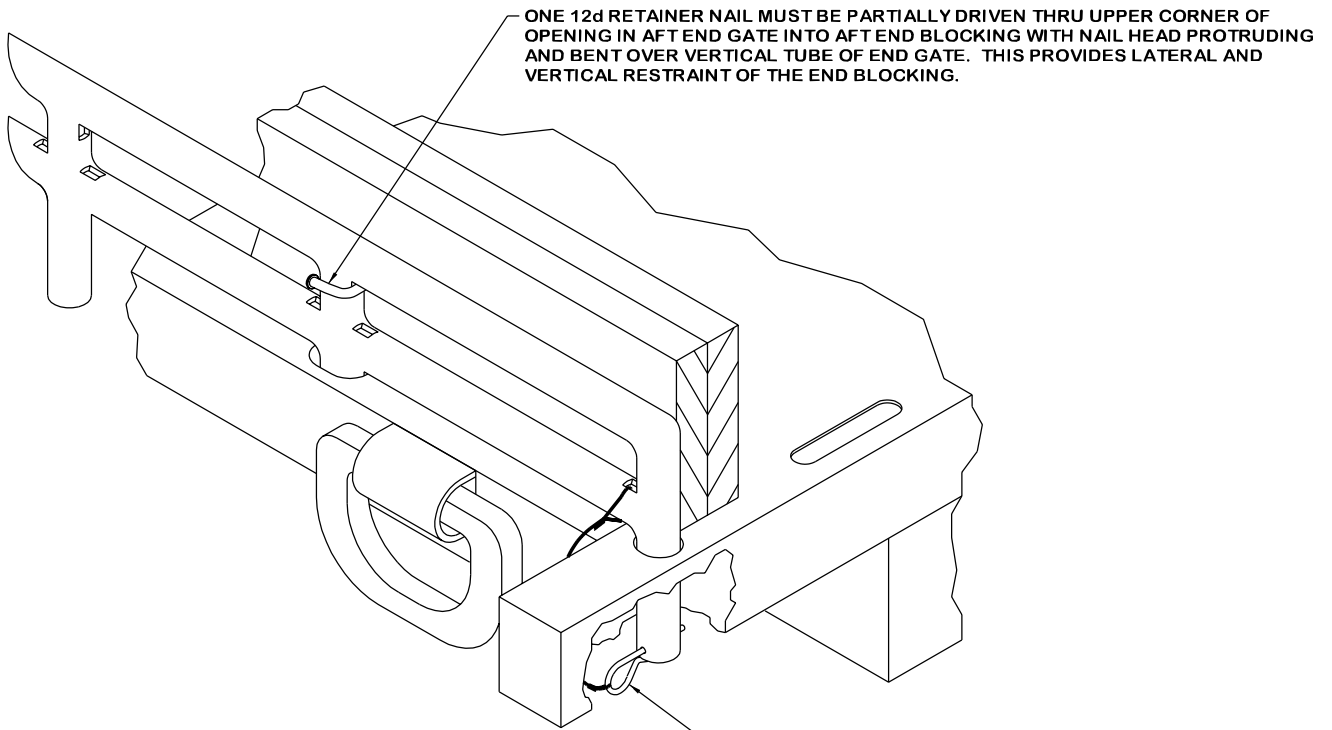


INDICATES CABLE TIED TO CLIP PIN AND ANCHORED TO DECK OF CROP.



M3A1 (HYUNDAI) CROP AFT END GATE

PORTIONS OF CROP HAVE BEEN OMITTED FOR CLARITY.

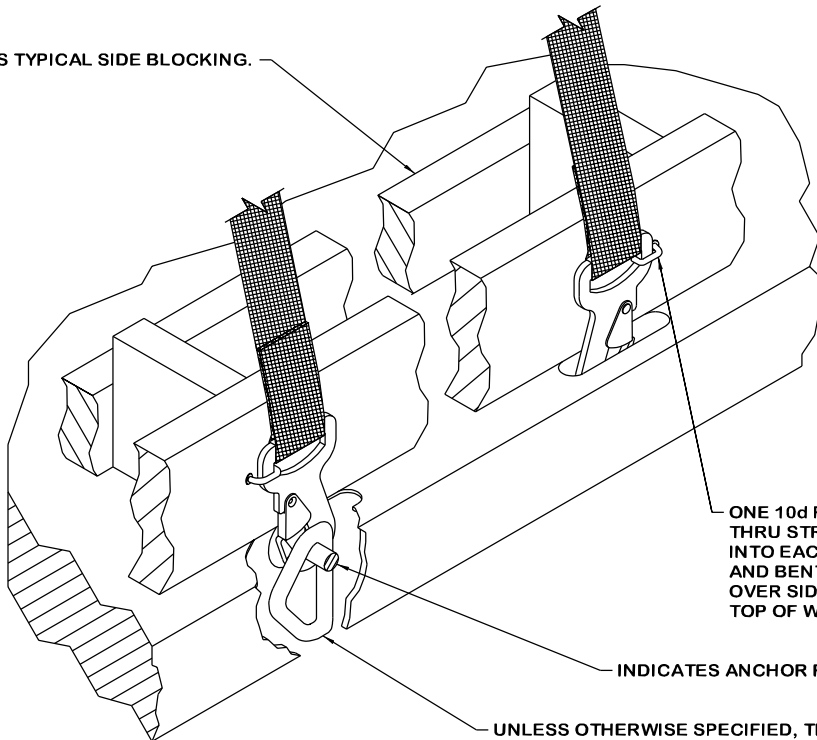


M3 (SUMMA) CROP AFT END GATE

NOTE: ONLY AFT CURBSIDE IS SHOWN ABOVE. AN OPPOSING RETAINER NAIL IS ALSO REQUIRED ON THE AFT DRIVERSIDE OF THE END GATE.

CLIP PIN MUST BE FULLY INSERTED AT EACH OF FOUR LOCATIONS ALONG AFT END RAIL OF CROP TO PREVENT THE END GATE FROM DISLODGING DURING TRANSPORT.

INDICATES TYPICAL SIDE BLOCKING.

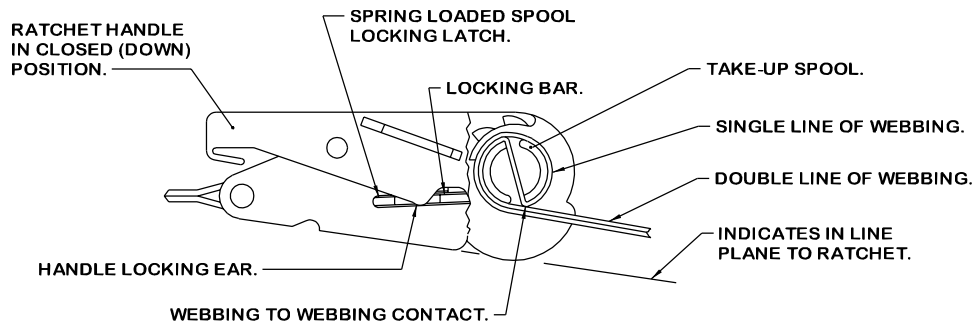


ONE 10d RETAINER NAIL MUST BE PARTIALLY DRIVEN THRU STRAP ATTACHMENT SLOT OF THE SNAP HOOK INTO EACH END OF EACH SIDE BLOCKING ASSEMBLY AND BENT OVER SIDE OF HOOK. CAUTION: BEND NAIL OVER SIDE OF HOOK ONLY. DO NOT BEND NAIL OVER TOP OF WEBBING.

UNLESS OTHERWISE SPECIFIED, THE FLOATING D-RING MUST BE POSITIONED ON THE OUTWARD SIDE OF THE SNAP HOOK OF EACH WEB STRAP ASSEMBLY TO SERVE AS A SPACER BETWEEN THE HOOK AND THE OUTER SIDE RAIL OF THE CROP.

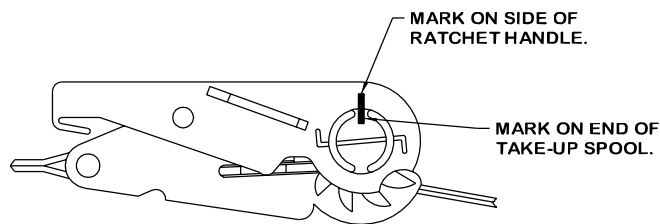
NOTE: UNLESS OTHERWISE SPECIFIED, THE SNAP HOOK OF EACH WEB STRAP ASSEMBLY IS TO BE CONNECTED DIRECTLY TO THE ANCHOR ROD INSIDE THE TIEDOWN OPENING.

STRAP HOOK DETAIL



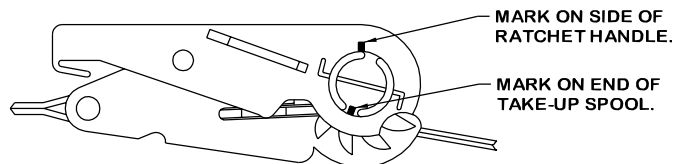
STEP 1

IN THIS VIEW PART OF THE RATCHET HOUSING IS SHOWN BROKEN AWAY TO DEPICT WEBBING-TO-WEBBING CONTACT ON THE TAKE-UP SPOOL OF THE RATCHET. WEBBING-TO-WEBBING CONTACT IS ACHIEVED WHEN THE OPERATOR HOLDS THE DOUBLE LINE OF WEBBING IN AN "IN LINE PLANE TO THE RATCHET" AND IT MAKES CONTACT WITH THE SINGLE LINE OF WEBBING.



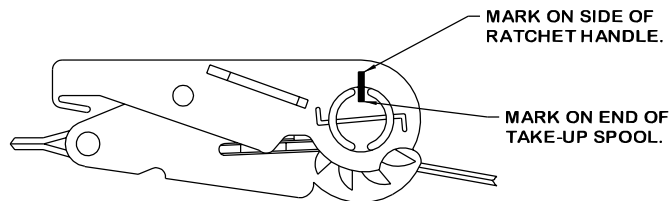
STEP 2

THIS VIEW DEPICTS THE LOCATION OF THE FIXED MARK ON THE RATCHETING HANDLE, WITH ANOTHER MATCHING MARK ON THE TAKE-UP SPOOL, AFTER WEBBING-TO-WEBBING CONTACT HAS BEEN MADE.



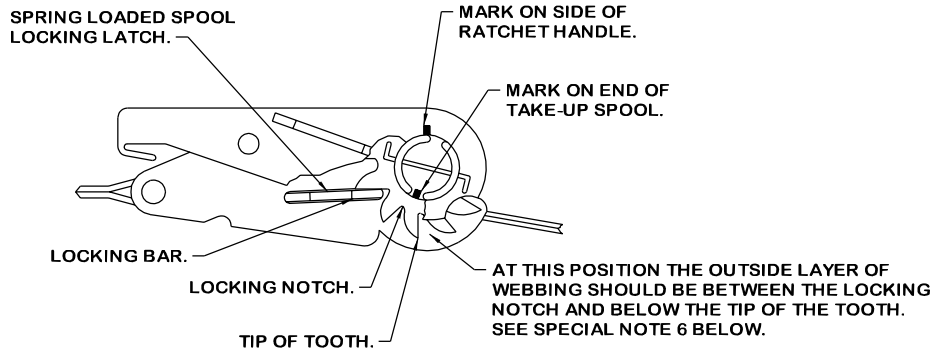
STEP 3

THIS VIEW DEPICTS THE LOCATION OF THE MARK ON THE END OF THE TAKE-UP SPOOL AFTER THE SPOOL HAS BEEN ROTATED ONE-HALF TURN, AFTER WEBBING-TO-WEBBING CONTACT HAS BEEN MADE.



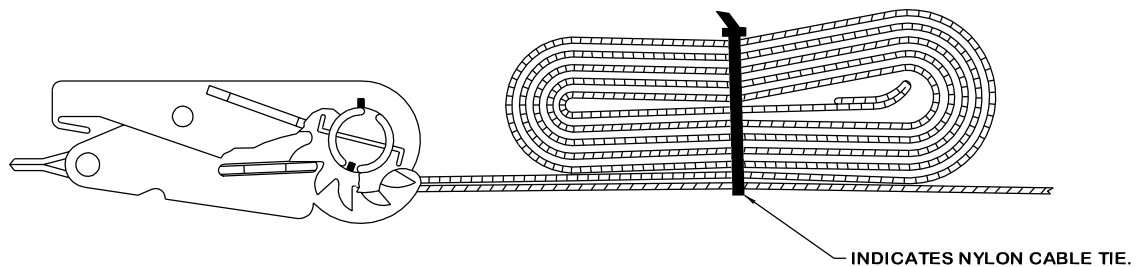
STEP 4

THIS VIEW DEPICTS THE LOCATION OF THE MARK ON THE END OF THE TAKE-UP SPOOL AFTER THE SPOOL HAS BEEN ROTATED ONE FULL TURN, AFTER WEBBING-TO-WEBBING CONTACT HAS BEEN MADE.



STEP 5

THIS VIEW DEPICTS THE LOCATION OF THE MARK ON THE END OF THE TAKE-UP SPOOL AFTER THE SPOOL HAS BEEN ROTATED ONE AND ONE-HALF TURNS, AFTER WEBBING-TO-WEBBING CONTACT HAS BEEN MADE. ALSO IN THIS VIEW, PART OF THE RATCHET HANDLE IS BROKEN AWAY TO SHOW THE LOCKING BAR FULLY SEATED IN THE MATCHING LOCKING NOTCH (SPROCKET GEAR TEETH).



STRAP END SECUREMENT

SPECIAL NOTES:

1. THE PURPOSE OF THE RATCHET DETAILS ON PAGE 8 AND THE DETAIL AND NOTES ON THIS PAGE ARE TO AUGMENT THE GUIDANCE SET FORTH WITHIN GENERAL NOTE "K.6" ON PAGE 3.
2. THE REQUIREMENT FOR 1/2 BUT NOT MORE THAN 1-1/2 WRAPS OF STRAP ON THE TAKE-UP SPOOL OF THE TENSIONING RATCHET, AS SPECIFIED WITHIN GENERAL NOTE "K.6" ON PAGE 3, ACTUALLY MEANS 1/2 TO 1-1/2 WRAPS OF DOUBLE WEBBING. ALSO, THE 1/2 TO 1-1/2 WRAPS (TURNS) ARE TO BE ACCOMPLISHED ONLY AFTER ENOUGH WEBBING HAS BEEN WOUND ONTO THE SPOOL TO ACHIEVE A WEBBING-TO-WEBBING CONFIGURATION, AS SHOWN IN THE "STEP 1" DETAIL ON PAGE 8.
3. ONE METHOD THAT CAN BE USED TO ENSURE THAT THE 1/2 TO 1-1/2 WRAPS ARE WOUND ONTO THE TAKE-UP SPOOL, AFTER WEBBING-TO-WEBBING CONTACT HAS BEEN MADE, IS TO PLACE A FIXED MARK (PAINT OR SIMILAR MATERIAL) ON THE SIDE OF THE RATCHETING HANDLE, WITH THE HANDLE IN ITS CLOSED (DOWN) POSITION, AND ANOTHER SHORT MATCHING MARK ON THE END OF THE SPOOL, AS SHOWN IN THE "STEP 2" DETAIL ON PAGE 8. AS THE SPOOL IS ROTATED TO TENSION A TIEDOWN STRAP ASSEMBLY, THE NUMBER OF WRAPS (TURNS) CAN BE DETERMINED VISUALLY BY COMPARING THE "MARK" LOCATION ON THE SPOOL TO THE "MARK" LOCATION ON THE RATCHETING HANDLE WITH THE HANDLE IN CLOSED POSITION. SEE THE "STEP 3" AND "STEP 4" DETAILS ON PAGE 8, AND "STEP 5" ABOVE.
4. ANOTHER METHOD THAT CAN BE USED TO ENSURE THAT THE 1/2 TO 1-1/2 WRAPS ARE ACHIEVED, AFTER WEBBING-TO-WEBBING CONTACT HAS BEEN MADE, IS TO COUNT THE AUDIBLE CLICKS MADE BY THE RATCHET ASSEMBLY AS A WEB STRAP ASSEMBLY IS BEING TENSIONED. THE RATCHET ASSEMBLY ON MOST WEB STRAP ASSEMBLIES HAVE 11 TEETH ON THE GEARLIKE DEVICE ON EACH END OF THE TAKE-UP SPOOL; THE CROP STRAP ASSEMBLIES HAVE 12 TEETH. THEREFORE, AFTER INITIAL WEBBING-TO-WEBBING CONTACT HAS BEEN MADE, ROTATE (TURN) THE SPOOL THROUGH A MINIMUM OF SIX TO A MAXIMUM OF 18 CLICKS (1/2 TO 1-1/2 WRAPS).

(CONTINUED AT RIGHT)

(SPECIAL NOTES CONTINUED)

5. AFTER A STRAP ASSEMBLY HAS BEEN PROPERLY TENSIONED, CARE MUST BE EXERCISED TO ASSURE THAT THE TAKE-UP SPOOL LOCKING LATCH (SPRING LOADED DEVICE WITH A LOCKING BAR ON EACH SIDE OF THE RATCHET ASSEMBLY) IS FULLY SEATED ON BOTH SIDES IN MATCHING LOCKING NOTCHES, WHICH ARE SIMILAR TO SPROCKET GEAR TEETH, THAT ARE LOCATED ON EACH END OF THE TAKE-UP SPOOL. SEE "STEP 5" DETAIL ABOVE. THE LOCKING LATCH IS "FULLY SEATED" WHEN THE HANDLE WILL CLOSE AND THE LOCKING EAR, OR SIMILAR DEVICE ON THE HANDLE, PREVENTS THE ACCIDENTAL WITHDRAWAL OF THE LOCKING LATCH. SEE "STEP 1" DETAIL ON PAGE 8. IF THE FULLY SEATED CONDITION CANNOT BE ACHIEVED, THE STRAP MUST BE RE-LEASED AND HAND RETENSIONED AS TIGHT AS POSSIBLE TO ACHIEVE THE FULLY SEATED CONDITION.
6. ANOTHER VISUAL METHOD OF DETERMINING WHEN THERE IS 1/2 TO 1-1/2 WRAPS OF WEBBING ON THE TAKE-UP SPOOL, AFTER INITIAL WEBBING-TO-WEBBING CONTACT HAS BEEN MADE, IS TO LOOK AT THE SPOOL. WHEN A TIEDOWN IS COMPLETE, THE STRAP WEBBING ON THE SPOOL OF THE RATCHET SHOULD BE ABOVE THE LOWER CURVE OF THE LOCKING NOTCH, AND SHOULD BE BELOW THE TIPS OF THE TEETH OF THE RATCHET AS IDENTIFIED IN "STEP 5" ABOVE. IT SHOULD BE NOTED THAT ANY PROCEDURES THAT ENSURE PROPER TENSIONING ARE ACCEPTABLE AND METHODS WITHIN THIS DRAWING ARE TYPICAL.
7. AFTER A STRAP HAS BEEN FIRMLY TENSIONED AND PROPERLY CHECKED, THE EXCESS END (TAIL) OF WEBBING SHOULD BE SECURED BY ROLLING IT INTO A BUNDLE, FOLDING IT AGAINST THE TENSIONED LEG OF STRAP, AND SECURING TIGHTLY WITH A NYLON CABLE TIE OR OTHER SUITABLE FASTENER. SEE "STRAP END SECUREMENT" DETAIL ABOVE.

