

# SECUREMENT OF ONE-TON CONTAINERS IN OPEN STORAGE

U.S. ARMY MATERIEL COMMAND DRAWING			
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JULY 1976			
REVISION NO. 2	DECEMBER 1998	CLASS	DIVISION
SEE THE REVISION LISTING ON PAGE 2.		DRAWING	FILE
		19	48
		4507	CB 21M10

DO NOT SCALE

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 PROCEDURES DEPICTED HEREIN PROVIDE FOR THE SECUREMENT OF A CERTAIN NUMBER OF CHEMICAL FILLED ONE-TON CONTAINERS IN OPEN STORAGE. BASIC METHODS A, B AND C DEPICT A CABLE SECUREMENT PROCEDURE. METHOD B ALSO INCLUDES A STRUCTURAL FRAMING CAP. ALSO DEPICTED HEREIN ARE METHODS D, E AND F WHICH PROVIDE FOR THE ADDITION OF A TOP LAYER OF EMPTY ONE-TON CONTAINERS TO MITIGATE THE EFFECT OF SMALL AIRCRAFT CRASHING INTO THE STOCK PILE. ALL EMPTY CONTAINERS MUST BE DECONTAMINATED TO AT LEAST THE THREE X LEVEL PRIOR TO PLACEMENT IN A STACK. THE INSTALLATION COMMANDER MAY SELECT THE PROCEDURE TO BE USED WHICH IS MOST COMPATIBLE WITH LOCAL REQUIREMENTS. SEE GENERAL NOTE "H" BELOW.
- C. DETAILS OF THE ONE-TON CONTAINER:  
 DIMENSIONS - - - 81-1/2" LONG X 30-1/2" DIAMETER  
 GROSS WEIGHT (FILLED) - - - 3,500 POUNDS (APPROX)  
 NET WEIGHT (EMPTY) - - - - 1,500 POUNDS (APPROX)
- D. IF NECESSARY TO SECURE A SMALLER NUMBER OF CONTAINERS THAN SHOWN WITHIN A UNIT, THE METHOD A, C, D, E AND F PROCEDURES MAY BE USED BY MAKING A CORRESPONDING ADJUSTMENT TO THE LOCATION OF THE END SECUREMENTS FOR THAT UNIT.
- E. THE SPACING BETWEEN THE VERTICAL PIECES OF AN ASSEMBLED END BRACE WILL BE ADJUSTED AS REQUIRED TO PROVIDE PROPER BEARING ON THE EXISTING RAILS. PROVIDED THE RAILS ARE SET TO A STANDARD 4'-8-1/2" TRACK GAUGE, THE DISTANCE BETWEEN THE VERTICAL PIECES WILL BE APPROXIMATELY 4'-10" IF THE BALL OF THE RAIL IS IN GOOD CONDITION. SEE THE "ASSEMBLED END BRACE" DETAIL ON PAGE 9.
- F. THE VALVE END OF CONTAINERS WILL BE ORIENTED IN THE SAME DIRECTION WITHIN A UNIT. THE ENDS OF CONTAINERS WILL BE ACCESSIBLE FOR INSPECTION BY PROVIDING ADEQUATE ACCESS AISLES.
- G. VALVES ON EACH CONTAINER WILL BE POSITIONED IN THE PROPER VERTICAL OR HORIZONTAL ALIGNMENT, AS REQUIRED FOR THE SPECIFIC MATERIAL IN THE CONTAINER.
- H. MINOR VARIATIONS IN THE SECUREMENT PROCEDURES MAY BE MADE PROVIDED THE INTENT OF THE SPECIFIED PROCEDURES IS COMPLIED WITH, THE SECURITY PROVIDED IS EQUAL TO THE PROCEDURES SHOWN, AND ANY RISK IS DOCUMENTED AND ACCEPTED BY THE COMMANDER OR HIS AUTHORIZED REPRESENTATIVE.
- J. THE PINS IN THE JAW END ON ALL TURNBUCKELS AND THE NUTS ON ALL CLIPS AND BOLTS WILL BE SPOT WELDED OR OTHERWISE SECURELY FASTENED TO PRECLUDE EASY REMOVAL.
- K. TURNBUCKLES WILL NOT BE TIGHTENED TO THE EXTENT THAT TURNBUCKLES OR OTHER COMPONENTS ARE DAMAGED. HOWEVER, ALL SLACK, IF POSSIBLE, WILL BE REMOVED FROM THE WIRE ROPE CABLE. MINIMAL SLACK IN THE CABLE IS ACCEPTABLE PROVIDED THAT THE CABLE CANNOT BE READILY SLIPPED OFF OF THE STACK.

- L. THE TYPICAL RAILROAD RAIL IS DEPICTED TO BE ASSEMBLED IN ACCORDANCE WITH STANDARD RAILROAD TRACKAGE CONSTRUCTION PRACTICES. IF DESIRED, OTHER SUITABLE STRUCTURAL STEEL SHAPES, SUCH AS I-BEAMS AND CHANNELS, MAY BE USED IN LIEU OF THE SPECIFIED RAILS, PROVIDED THEY ARE OF ADEQUATE SIZE AND STRENGTH, AND ARE PROPERLY MOUNTED ON A SUITABLE BASE TO SUPPORT THE TOTAL LOAD.

(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

- STEEL, STRUCTURAL - - - - - : ROLLED SHAPES, PLATE, AND BAR; ASTM-A36.
- ROPE - - - - - : STEEL WIRE, PLAIN, PREFORMED, REGULAR LAY, 17.9 TONS. 6 X 19, FLEXIBLE IWRC, MACWHYTE WIRE ROPE CO (OR EQUAL). FED SPEC RR-W-410.
- CLIPS - - - - - : "U" BOLT, CROSBY, HEAVY DUTY, OR EQUAL. FED SPEC FF-C-450, TYPE 1, CLASS 1.
- THIMBLES, TURNBUCKLES, EYE BOLTS, HEX HEAD BOLTS AND NUTS - - - - - : COMMERCIAL GRADE.

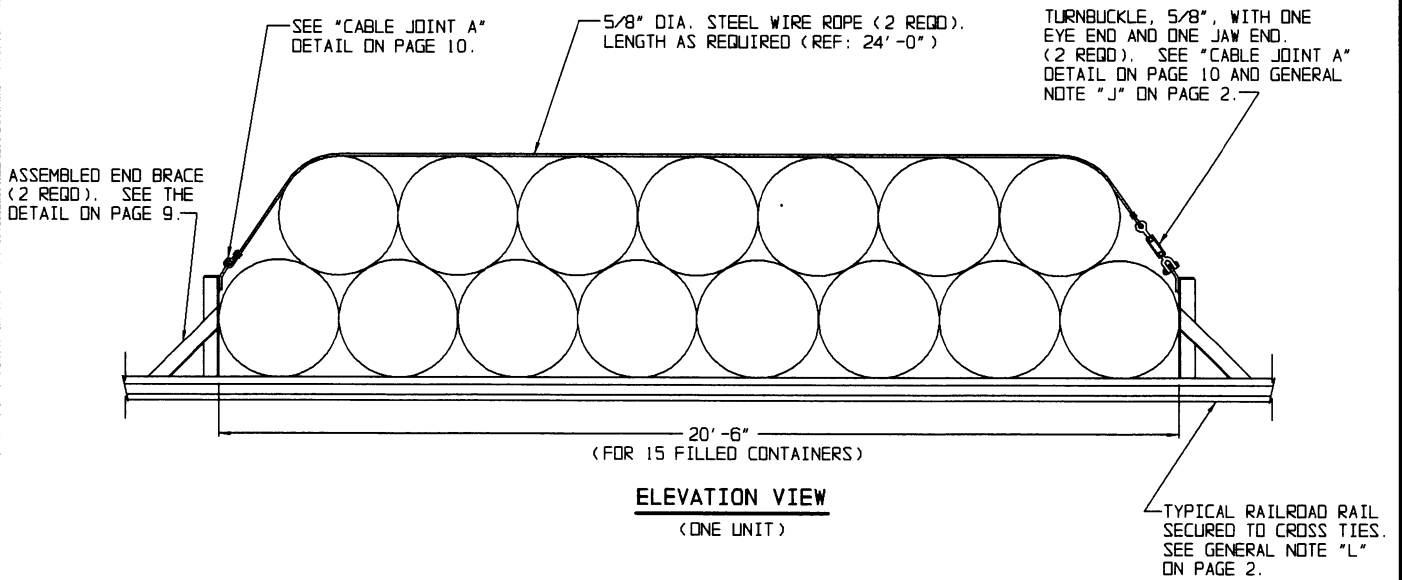
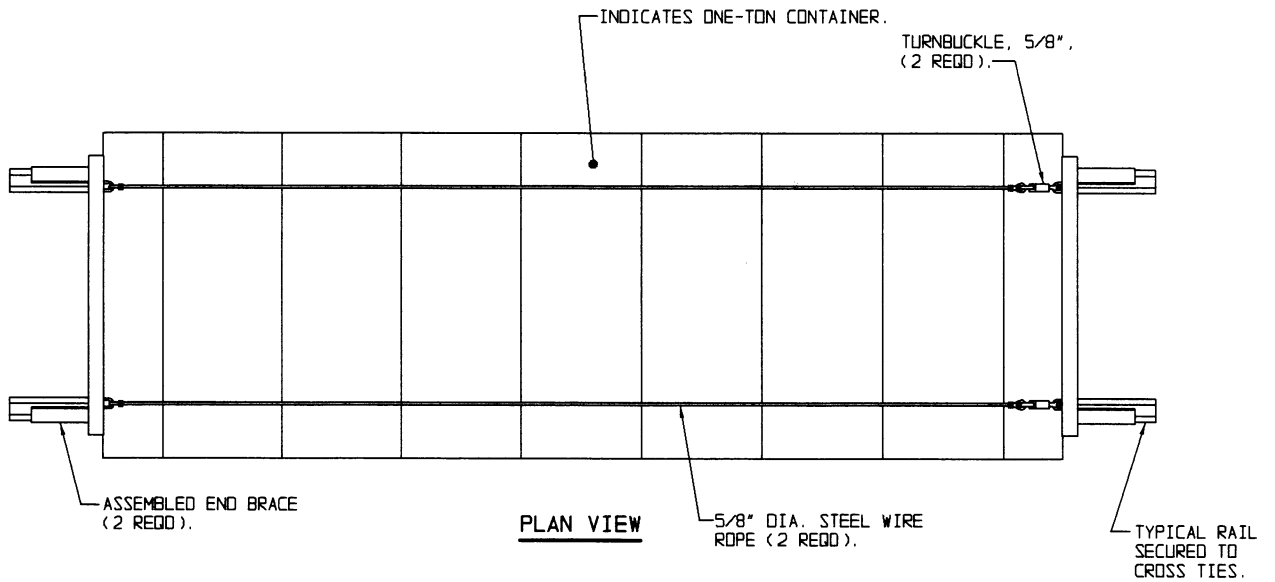
REVISIONS

REVISION NO. 1, DATED SEPTEMBER 1976, CONSIST OF:

- 1. UPDATING GENERAL NOTES.
- 2. ADDING METHOD C PROCEDURES.

REVISION NO. 2, DATED DECEMBER 1998, CONSIST OF:

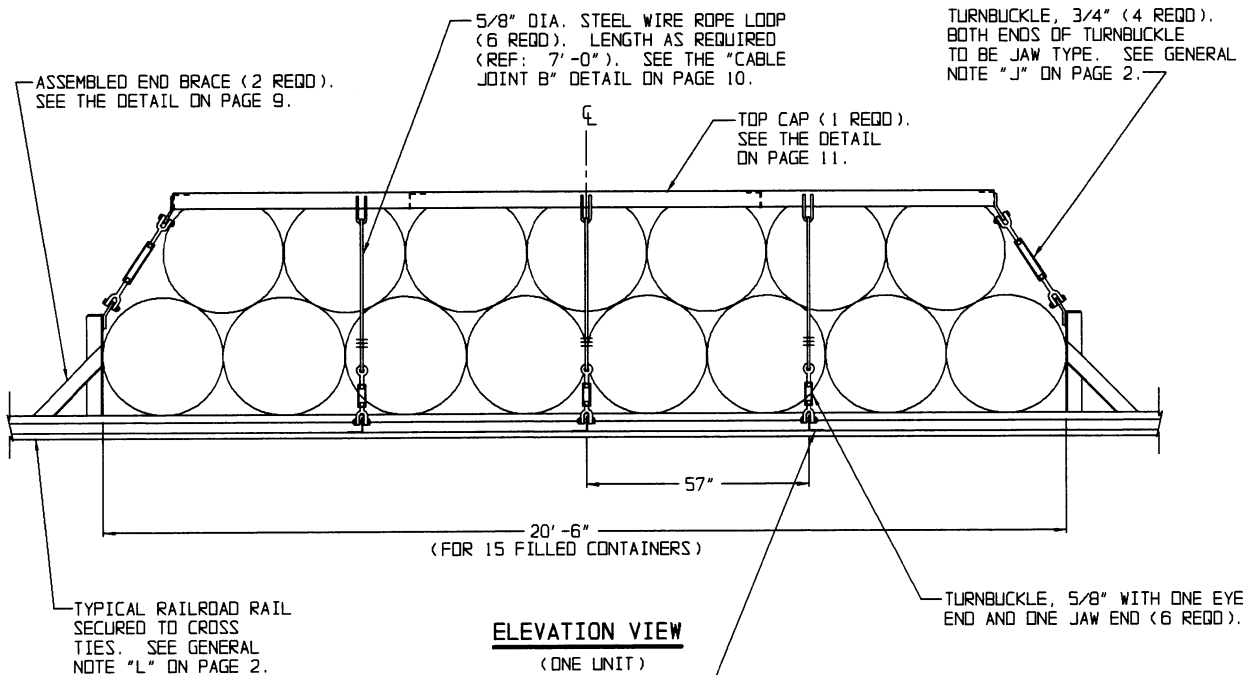
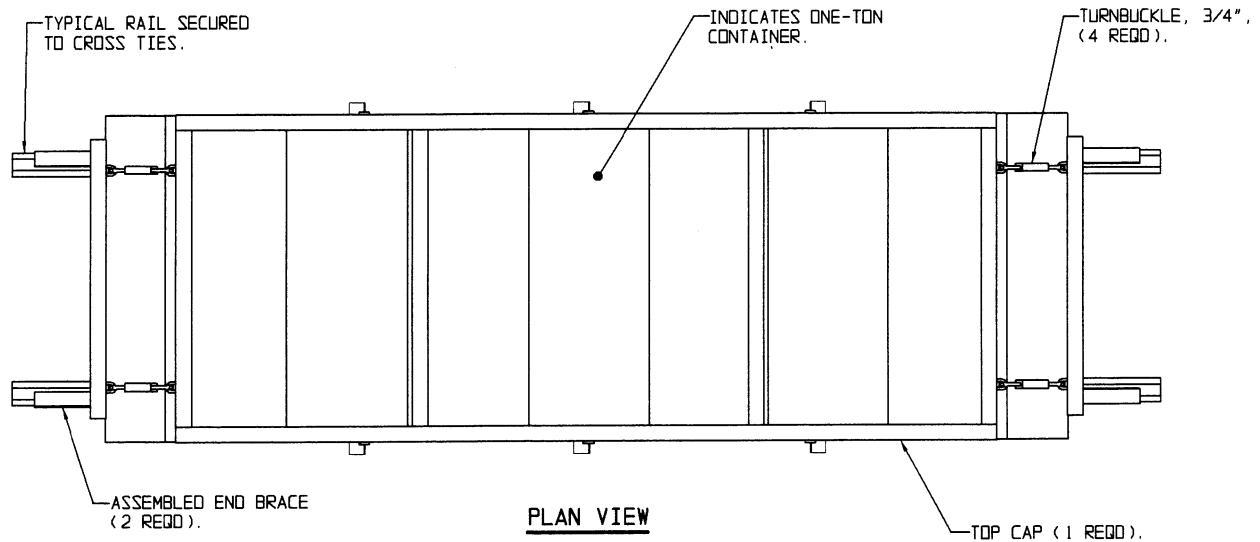
- 1. CONVERTING DRAWING TO CAD.
- 2. UPDATING DRAWING FORMAT TO CURRENT STANDARDS.
- 3. ADDING PROCEDURE METHODS D, E AND F.
- 4. UPDATING GENERAL NOTES.



BILL OF MATERIAL (PER UNIT)	
DESCRIPTION AND SIZE	NO. REQD
STEEL ANGLE, 4" X 4" X 1/4" X 26"	8
STEEL ANGLE, 4" X 4" X 1/4" X 72"	2
STEEL ROD, 5/8" DIA. X 20"	4
ROPE, STEEL WIRE, 5/8" DIA. -----	48' REQD
CLIP, 5/8" -----	12 REQD
THIMBLE, STANDARD, 5/8" -----	4 REQD
TURNBUCKLE, 5/8", JAW AND EYE -----	2 REQD

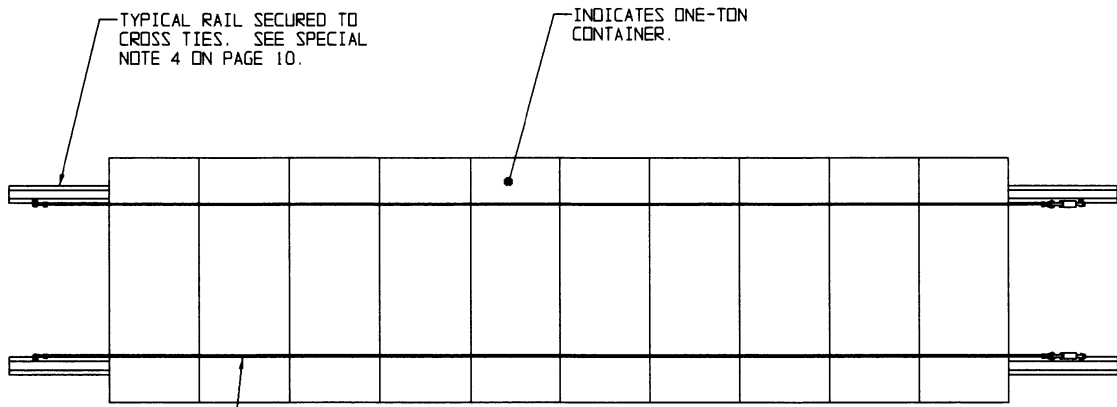
METHOD A

**PAGE 3**



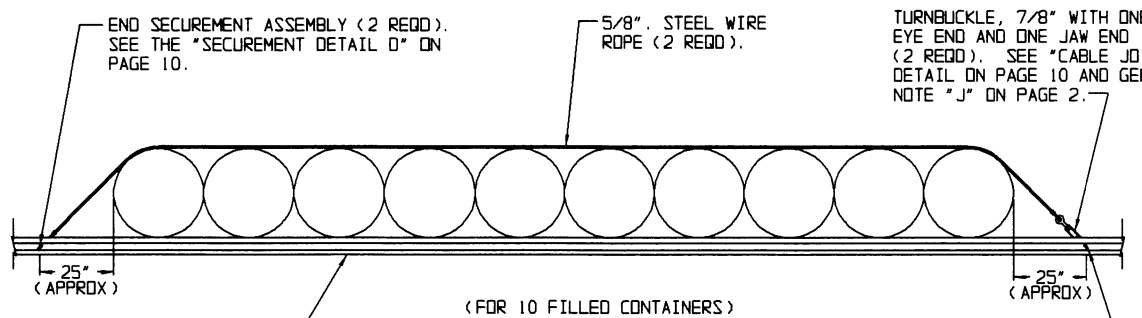
BILL OF MATERIAL (PER UNIT)	
DESCRIPTION AND SIZE	NO. REQD
STEEL ANGLE, 4" X 4" X 1/4" X 26"	8
STEEL ANGLE, 4" X 4" X 1/4" X 72"	2
STEEL ANGLE, 4" X 4" X 1/4" X 83"	4
STEEL ANGLE, 4" X 4" X 1/4" X 17'-6"	2
STEEL ANGLE, 4" X 4" X 1/4" X 15"	6
STEEL ROD, 5/8" DIA. X 20"	14
ROPE, STEEL WIRE, 5/8" DIA. - - - - -	42' REQD
CLIP, 5/8" - - - - -	24 REQD
THIMBLE, STANDARD, 5/8" - - - - -	12 REQD
TURNBUCKLE, 3/4", JAW AND JAW - - - - -	4 REQD
TURNBUCKLE, 5/8", JAW AND EYE - - - - -	6 REQD

**METHOD B**



**PLAN VIEW**

5/8" DIA. STEEL WIRE ROPE (2 REGD).  
 LENGTH AS REQUIRED (REF: 32'-0").  
 SEE THE "CABLE JOINT A" DETAIL  
 ON PAGE 10.



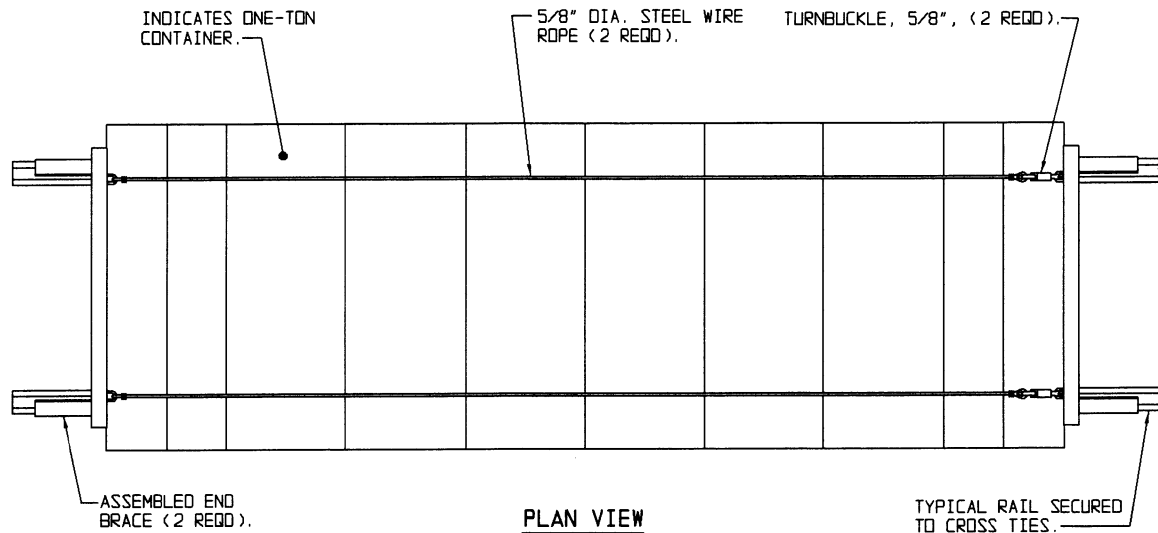
(FOR 10 FILLED CONTAINERS)

**ELEVATION VIEW**  
 (ONE UNIT)

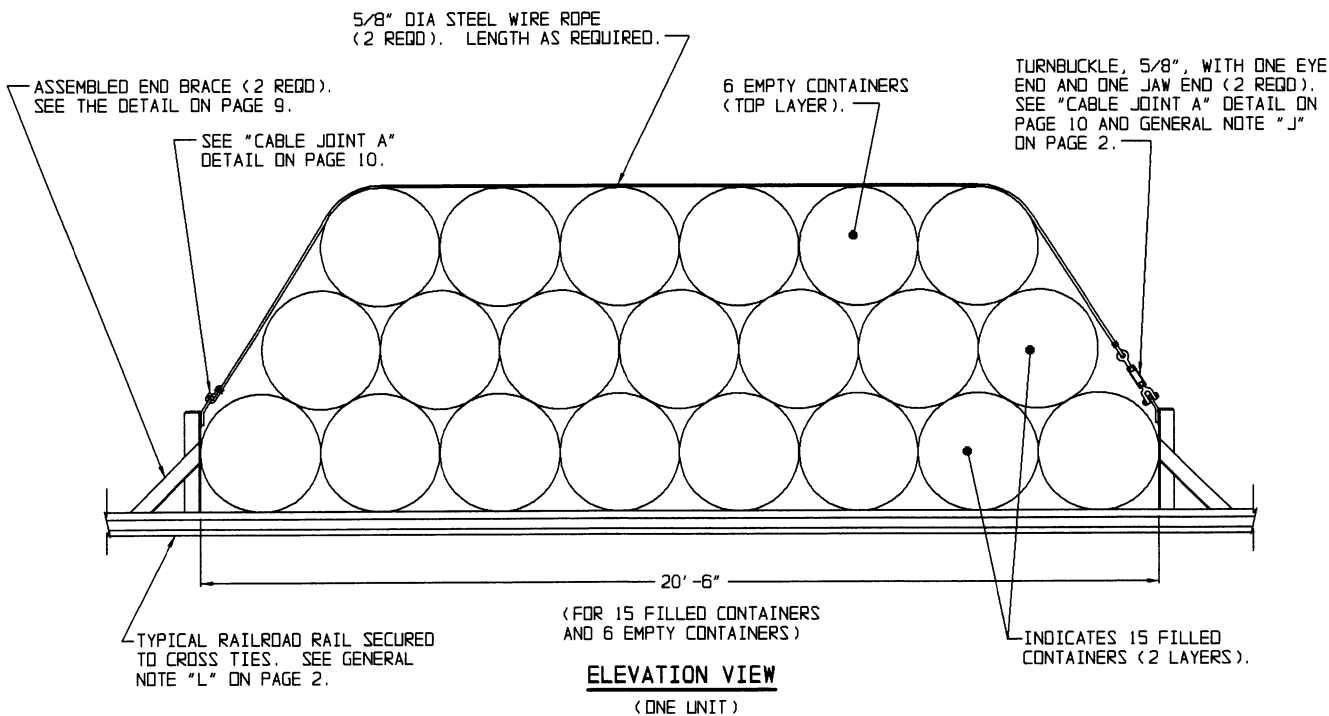
TYPICAL RAILROAD RAIL SECURED  
 TO CROSS TIES. SEE GENERAL NOTE  
 "L" ON PAGE 2 AND SPECIAL NOTE 4  
 ON PAGE 10.

END SECUREMENT ASSEMBLY (2 REGD).  
 SEE THE "SECUREMENT DETAIL "C" ON  
 PAGE 10.

BILL OF MATERIAL (ONE UNIT)	
ROPE, STEEL WIRE, 5/8" DIA. - - - - -	64' REGD
CLIP, 5/8" - - - - -	12 REGD
THIMBLE, STANDARD, 5/8" - - - - -	4 REGD
TURNBUCKLE, 7/8", JAW AND EYE - - - - -	2 REGD
EYE BOLT, 5/8" X 1-3/4", W/NUT,	
SHOULDER PATTERN - - - - -	4 REGD
BOLT, HEX HD. 3/4" X 3-1/2", W/NUT - - - - -	2 REGD



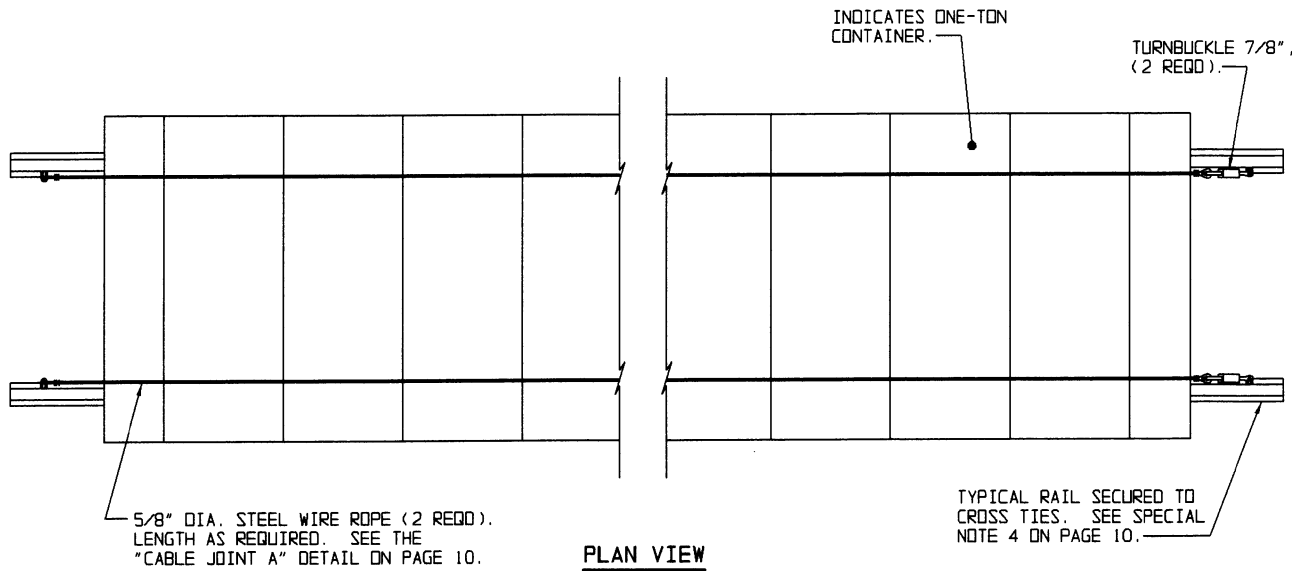
**PLAN VIEW**



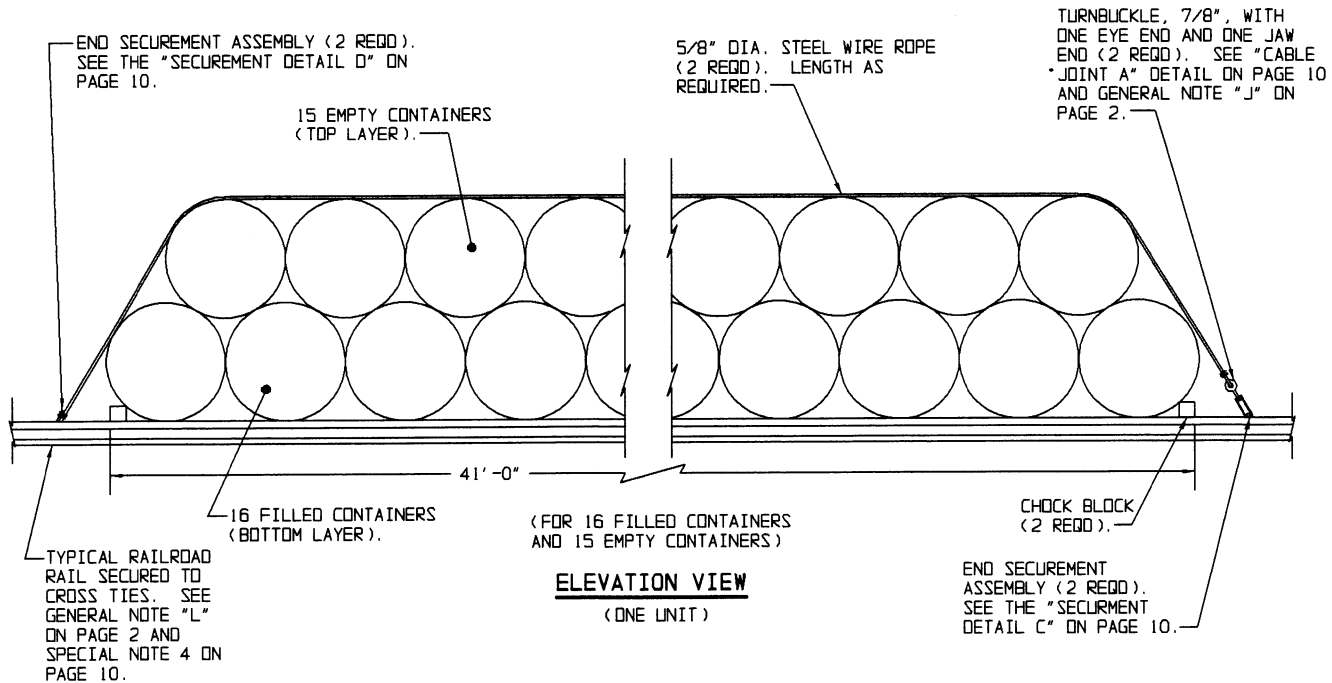
**ELEVATION VIEW**  
(ONE UNIT)

BILL OF MATERIAL (PER UNIT)	
DESCRIPTION AND SIZE	NO. REQD
STEEL ANGLE, 4" X 4" X 1/4" X 26"	8
STEEL ANGLE, 4" X 4" X 1/4" X 72"	2
STEEL ROD, 5/8" DIA. X 20"	4
ROPE, STEEL WIRE, 5/8" DIA. - - - - - LENGTH AS REQD	
CLIP, 5/8" - - - - -	12 REQD
THIMBLE, STANDARD, 5/8" - - - - -	4 REQD
TURNBUCKLE, 5/8", JAW AND EYE - - - - -	2 REQD





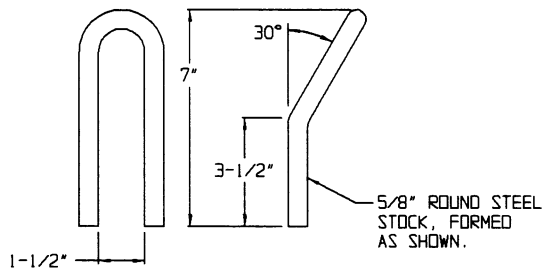
**PLAN VIEW**



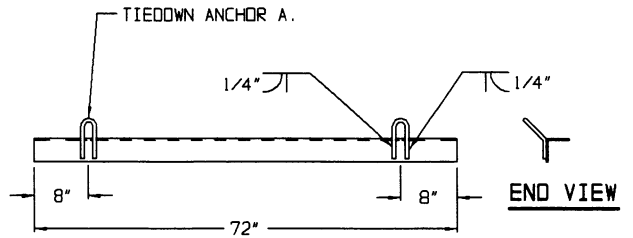
**ELEVATION VIEW  
(ONE UNIT)**

BILL OF MATERIAL (PER UNIT)	
ROPE, STEEL WIRE, 5/8" DIA. - - - - -	LENGTH AS REQD
CLIP, 5/8" - - - - -	12 REQD
THIMBLE, STANDARD, 5/8" - - - - -	4 REQD
TURNBUCKLE, 7/8", JAW AND EYE - - - - -	2 REQD
EYE BOLT, 5/8" X 1-3/4", W/NUT,	
SHOULDER PATTERN - - - - -	4 REQD
BOLT, HEX HD. 3/4" X 3-1/2", W/NUT - - - - -	2 REQD



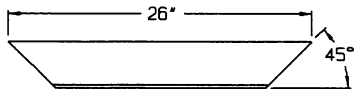


**TIEDOWN ANCHOR A**



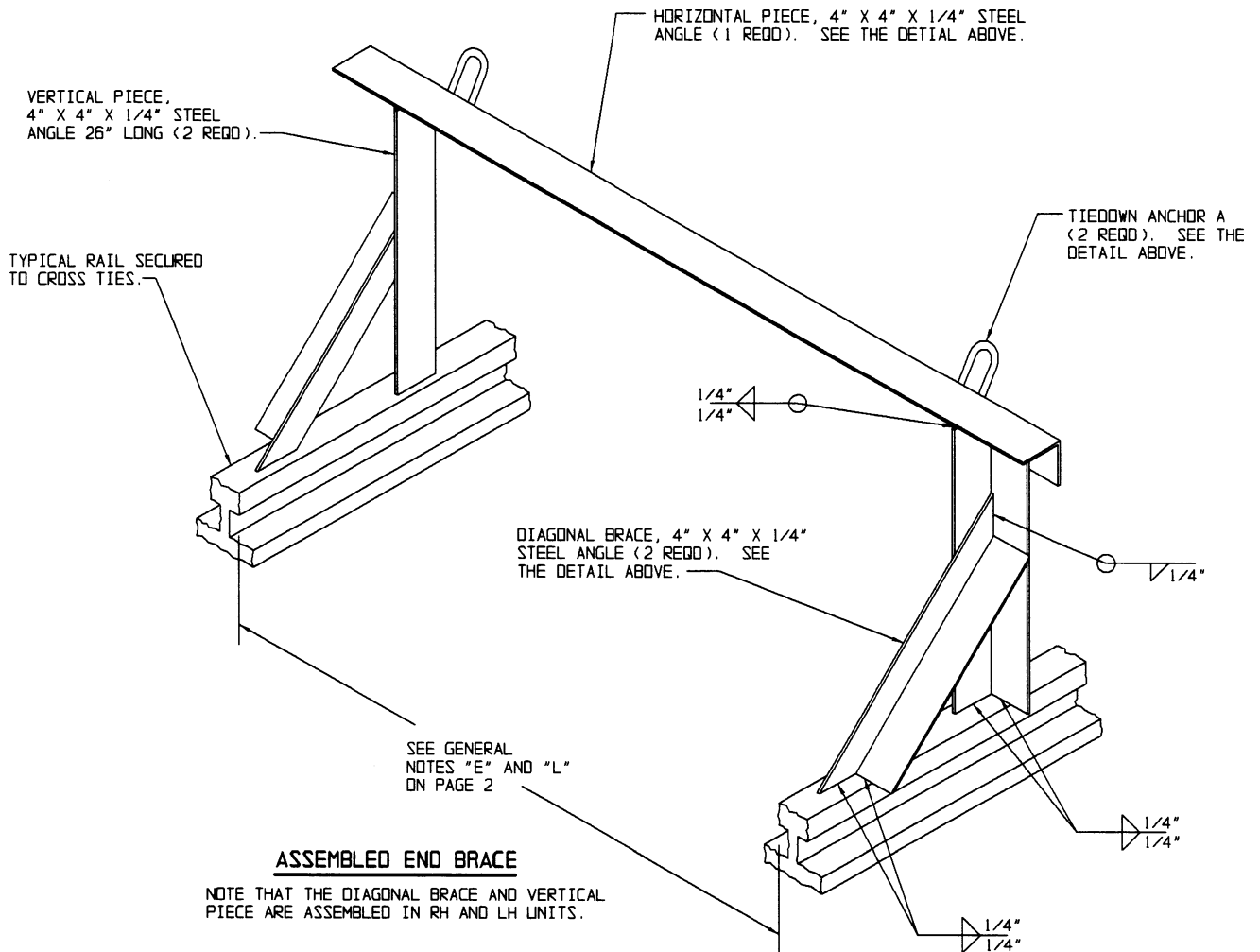
**HORIZONTAL PIECE**

(4" X 4" X 1/4" STEEL ANGLE)



**DIAGONAL BRACE**

(4" X 4" X 1/4" STEEL ANGLE)



**ASSEMBLED END BRACE**

NOTE THAT THE DIAGONAL BRACE AND VERTICAL PIECE ARE ASSEMBLED IN RH AND LH UNITS.

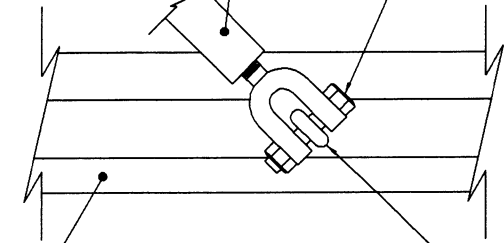
SEE GENERAL NOTES "E" AND "L" ON PAGE 2

**SPECIAL NOTES:**

1. THE 5/8" EYE BOLT WILL BE SECURED TO THE RAIL BY DRILLING AN 11/16 INCH HOLE THROUGH THE WEB OF THE RAIL, PLACING THE EYEBOLT SHANK THROUGH THE HOLE AND SECURING WITH A NUT. SEE GENERAL NOTE "J" ON PAGE 2.
2. IF DESIRED, THE SHANK OF THE EYEBOLT MAY BE CUT OFF AND THE SHOULDER OF THE EYEBOLT MAY BE SECURELY WELDED DIRECTLY TO THE WEB OF THE RAIL.
3. A SMALLER NUMBER OF CONTAINERS MAY BE SECURED WITHIN A UNIT, IF DESIRED.
4. WHEN SECURING CONTAINERS BY THE METHOD C OR F PROCEDURES DEPICTED, THE RAILS UPON WHICH A UNIT IS SUPPORTED WILL BE OF SUFFICIENT LENGTH SO AS TO EXTEND UNDER THREE OR MORE CONTAINERS. SHORT PIECES OF RAIL MAY BE BOLTED TOGETHER WITH ANGLE BARS, SUCH AS COMMONLY USED IN TYPICAL RAILROAD CONSTRUCTION, OR THE PIECES OF RAIL MAY BE WELDED TOGETHER.

INDICATES 7/8" TURNBUCKLE WITH ONE EYE END AND ONE JAW END.

3/4" HEX HEAD BOLT 3-1/2" LONG WITH NUT.



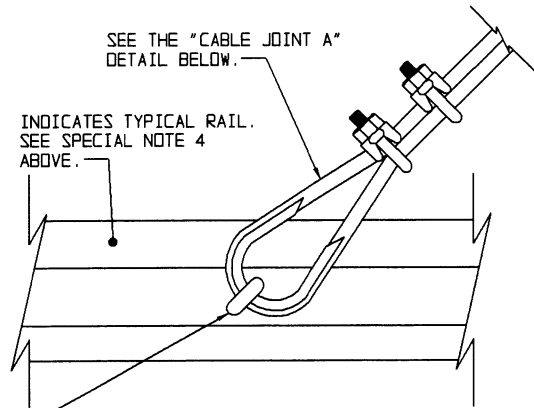
**SECUREMENT DETAIL C**

INDICATES 5/8" EYEBOLT, SHOULDER PATTERN, THREADED, 1-3/4" MINIMUM SHAFT LENGTH. (2 REQD/UNIT). SEE SPECIAL NOTES 1 AND 2 AT RIGHT.

INDICATES TYPICAL RAIL. SEE SPECIAL NOTE 4 AT RIGHT.

SEE THE "CABLE JOINT A" DETAIL BELOW.

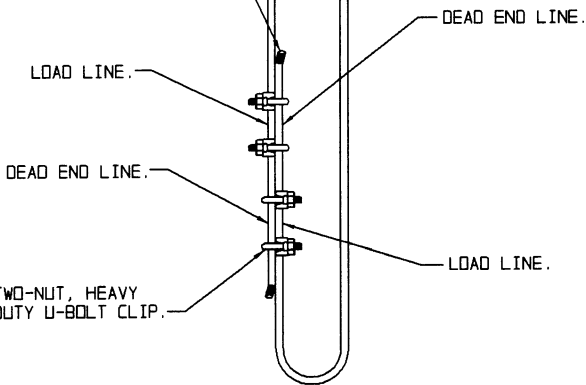
INDICATES TYPICAL RAIL. SEE SPECIAL NOTE 4 ABOVE.



**SECUREMENT DETAIL D**

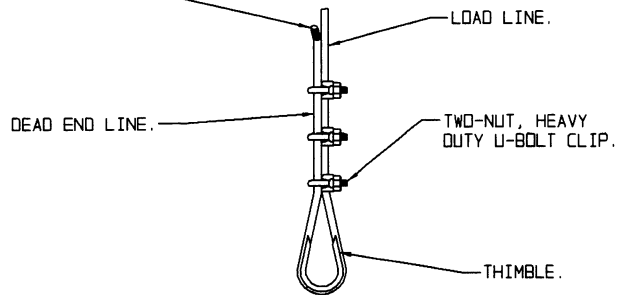
INDICATES 5/8" EYEBOLT, SHOULDER PATTERN, THREADED, 1-3/4" MINIMUM SHAFT LENGTH (2 REQD/UNIT). SEE SPECIAL NOTES 1 AND 2 ABOVE.

ALL FREE ENDS WIRE WRAPPED OR TAPED OR CABLE BAND FASTENED.



**CABLE JOINT B**

ALL FREE ENDS WIRE WRAPPED OR TAPED OR CABLE BAND FASTENED.



**CABLE JOINT A**

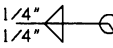
PROPER TIGHTING OF THE WIRE ROPE CLIP NUTS CAN BE ACCOMPLISHED BY UTILIZING A PROPER SIZED TORQUE WRENCH. AFTER THE NUTS HAVE BEEN INITIALLY TIGHTENED, THE "U" SIDE OF EACH CLIP MUST BE STRUCK SEVERAL TIMES WITH A HAMMER TO ENSURE PROPER SEATING INTO THE DEAD END LINE. FINAL TORQUE WILL BE ACQUIRED BY REPEATEDLY AND ALTERNATELY TIGHTENING EACH CLIP NUT TO AT LEAST 60 FOOT-POUNDS. SEE GENERAL NOTE "J" ON PAGE 2.

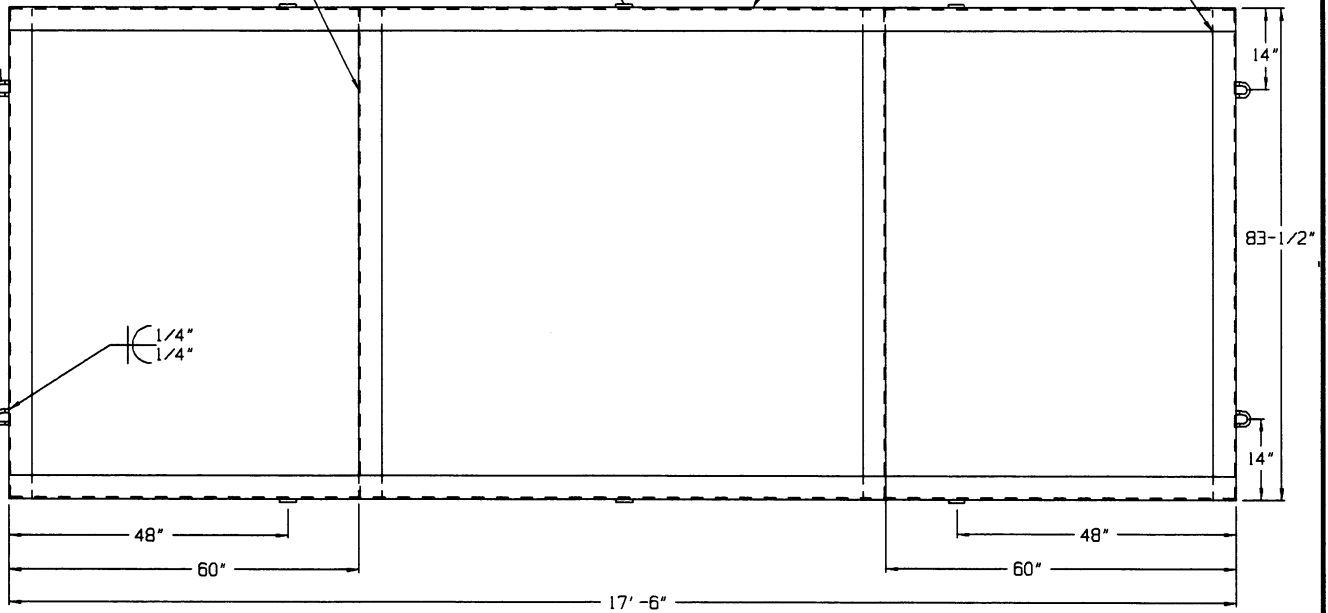
TIEDOWN ANCHOR A  
(4 REQD). SEE THE  
DETAIL ON PAGE 9.

TIEDOWN ANCHOR B  
(6 REQD). SEE THE  
DETAIL BELOW.

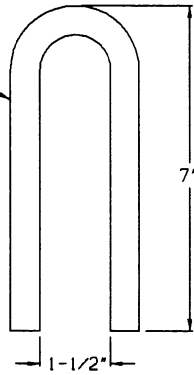
LONGITUDINAL PIECE, 4" X 4"  
X 1/4" STEEL ANGLE 17'-6" LONG.

HORIZONTAL PIECE,  
4" X 4" X 1/4" STEEL  
ANGLE 83" LONG.

1/4"   
1/4"



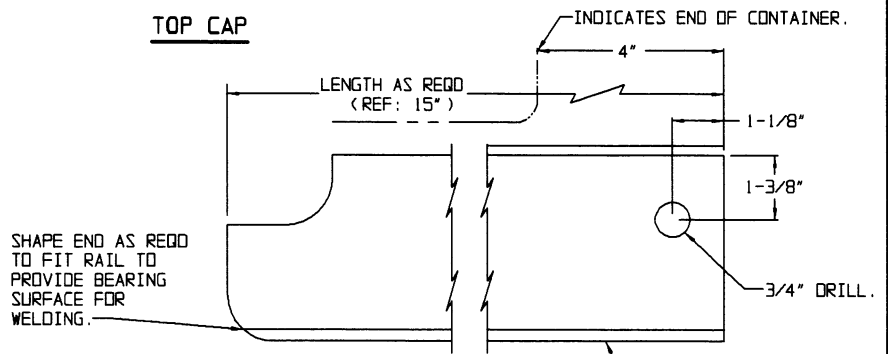
5/8" ROUND STEEL  
STOCK, FORMED  
AS SHOWN.



**TIEDOWN ANCHOR B**

(SEE "SECUREMENT DETAIL A" BELOW)

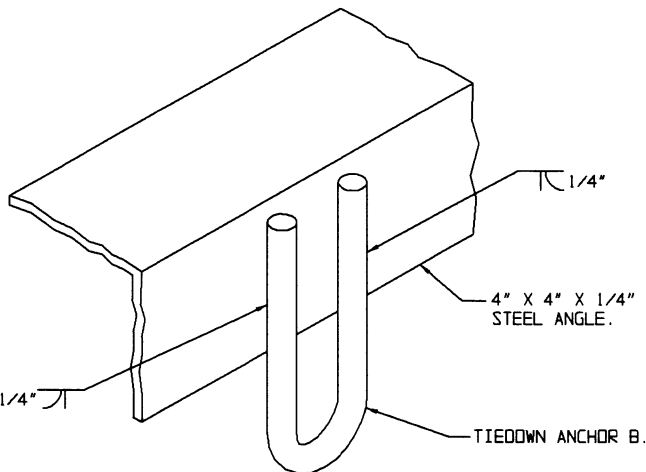
**TOP CAP**



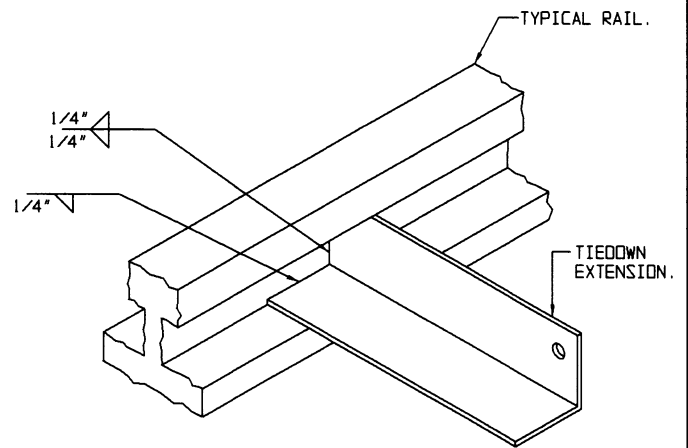
**DIAGONAL BRACE**

ADJUST LENGTH BASED ON TRACK  
GAUGE OF EXISTING RAILS. SEE  
"SECUREMENT DETAIL B" BELOW.

4" X 4" X 1/4" STEEL  
ANGLE.



**SECUREMENT DETAIL A**



**SECUREMENT DETAIL B**

