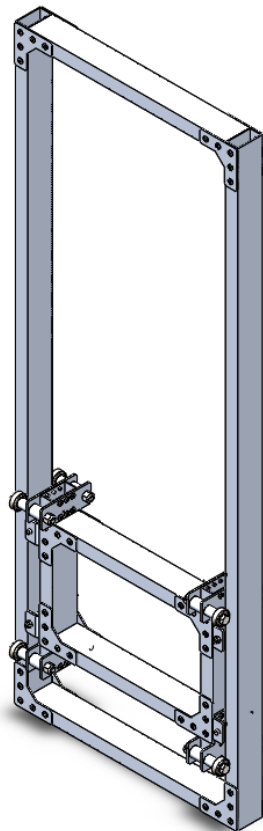




User Guide

2x1 Single Stage Elevator Bearing and Structure Kit

(am-3844)



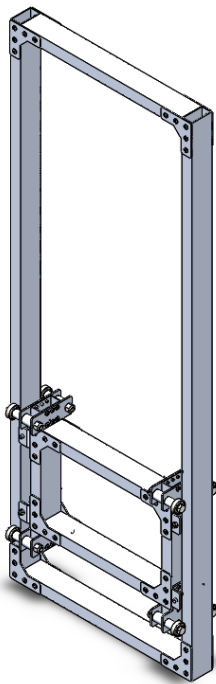
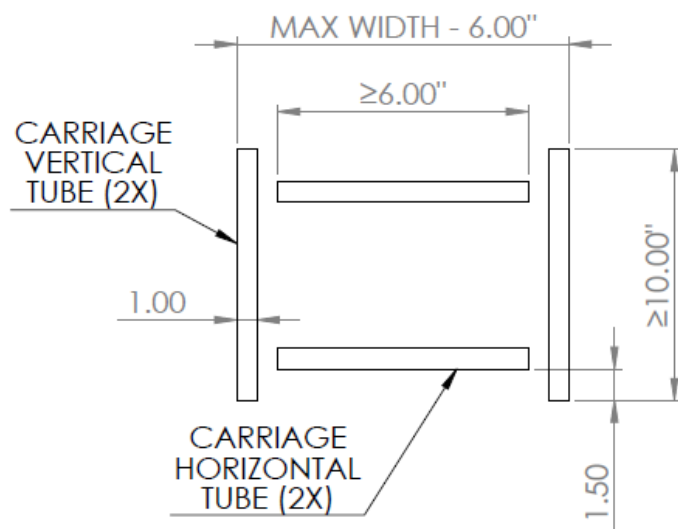
BOM & Tools

Part Number	Description	Quantity
am-1054	Nut, nylock 3/8-16	8
am-0209	Bearing, 3/8"ID 1614ZZ	8
am-1226	3/16" dia. Steel Rivet, grip range 1/8 to 1/4	128
am-1027	Washer, 1/4"	8
am-3794	Large Bearing Plate for 2x1 Elevator	4
am-3793	Small Bearing Plate for 2x1 Elevator	4
am-1452	Hex Bolt, 3/8"-16 x 3", Zinc	8
am-1450	Spacer, 3/4 OD x .382 ID x 1", Aluminum	8
am-1451	Spacer, 5/8 OD x .382 ID x 3/4", Aluminum	8
am-1449	Nylon Roller for 2x1 Elevator	8
am-0602	Axle Tube, RD Brass, .192 x .250 x 2.14	4
am-1397	SHCS 10-32 x 2750	4
am-1042	10-32 Nylock Nut	4
am-2906	90 Degree REV Bracket	16
am-3214-6	2x1x0.063" 6061 Aluminum Tubing, 6ft	4

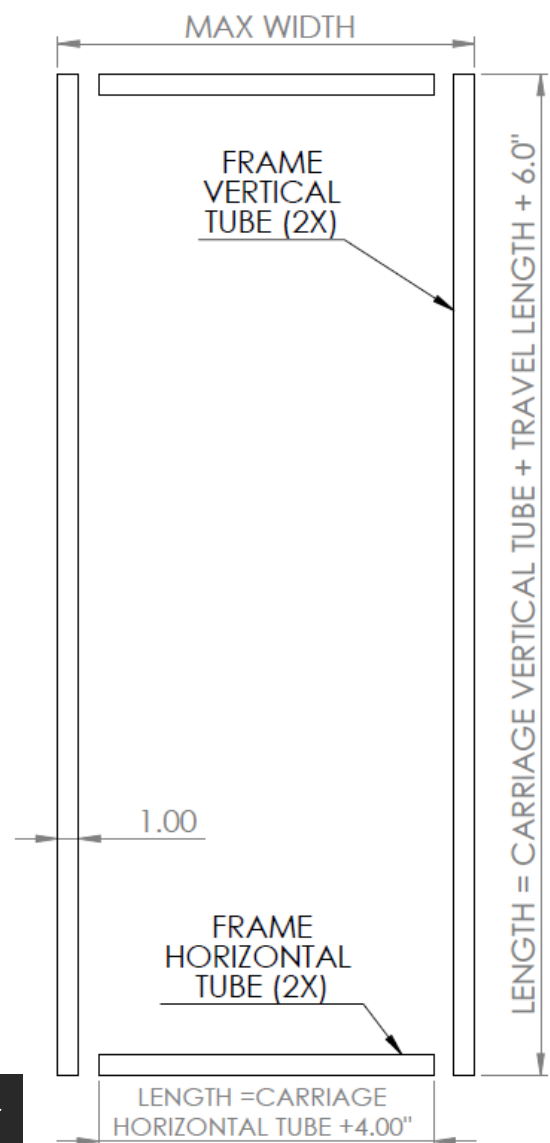
Tools Needed	Part Number
Cold Saw (preferred) or Band/Hack Saw	
12ft or longer Tape Measure	
Bench Vise	
3" C-Clamps, multiple	
Cordless Drill	
#9 Drill Bit	
Rivet Gun	
36" Bar Clamps, multiple	
Try Square	
5/32" Allen Wrench	am-2751
3/8" Wrench	am-2745
9/16" Wrenches, Multiple	am-2746

Tube Cutting Guide

Note: The following cutting diagrams are for a single stage elevator system. This guide is written with minimum required dimensions, as this elevator bearing system was designed to adapt to many different size needs and constraints of *FIRST* Robotics Competition teams. **Before cutting tubes, you must determine your desired length of travel and desired MAX width of your elevator.** The dimensions below are the minimum required lengths for each tube, and also notes the important relationship between the length of the Carriage Horizontal Tubes and the length of the Frame Horizontal Tubes.

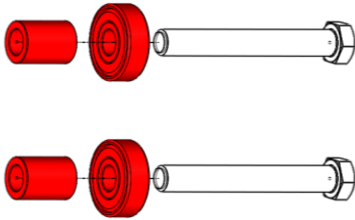


NOTE: The ends of each HORIZONTAL tube **MUST** be cut square.

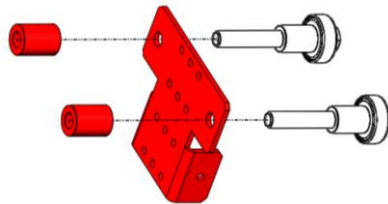


Corner Bearing Assembly

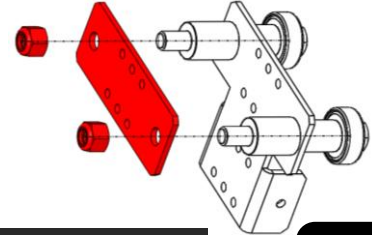
Step 1: Slide one 1614Z Bearing (am-0209) and one 3/4" long Aluminum Spacer (am-1451) onto two 3/8" x 3" bolt (am-1452).



Step 2: Slide one Large Bearing Plate (am-3794) and two 1" Long Aluminum Spacers (am-1450) onto the two 3/8" x 3" Bolts.



Step 3: Slide one Small Bearing Plate (am-3793) onto the 3/8" bolts, and secure with the 3/8-16 Lock Nuts (am-1054)

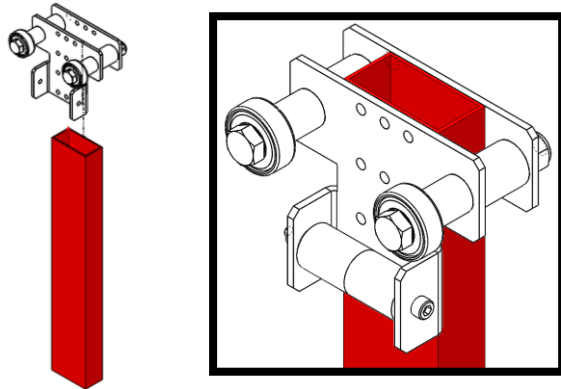


NOTE: Only tighten the bolts until they are snug. Do not over-tighten.

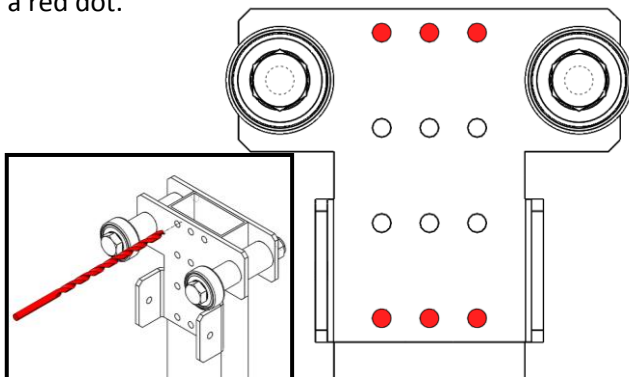
4X

Carriage Assembly

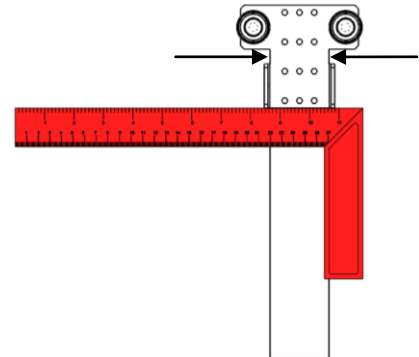
Step 1: Slide one Corner Bearing Assembly onto one Carriage Vertical Tube, and line up the top of the assembly with the end of the tube. This should be a somewhat snug fit.



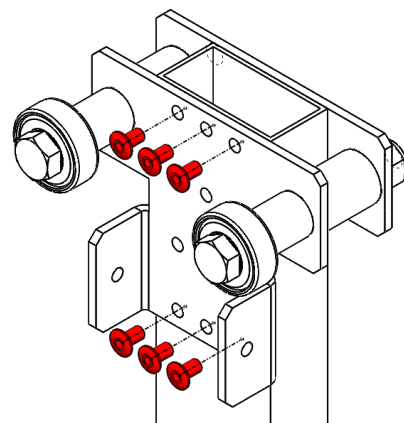
Step 3: Match drill the rivet holes with a #9 (0.196") drill bit through the Large Bearing Plate into the nearest side of the Tube in the locations shown with a red dot.



Step 2: Use a Try Square to ensure the bottom of the Corner Bearing Assembly is perpendicular with the 1" wide faces of the Carriage Vertical Tube. Align the inside surface of the notch (as shown with arrows,) with the outside surfaces of the Tube.

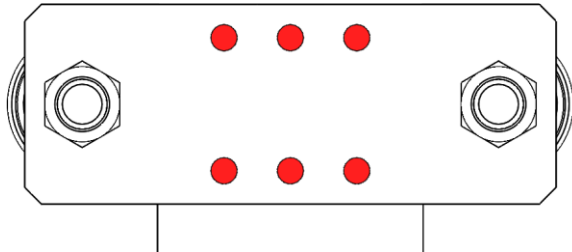


Step 4: Rivet the Large Bearing Plate in place with six 3/16" x 1/4" Steel Rivets (am-1226)

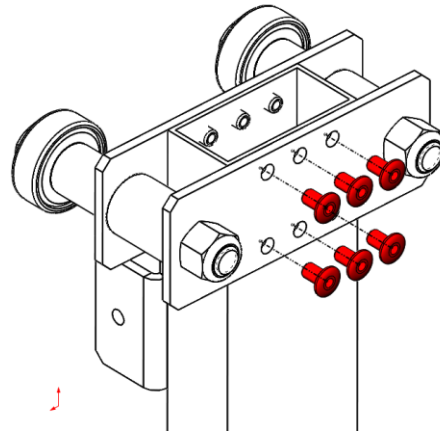


Carriage Assembly Continued

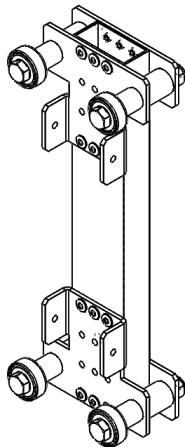
Step 5: Flip the assembly over, and match drill the rivet holes through the Small Bearing Plate to the nearest side of the tube in the locations shown with a red dot.



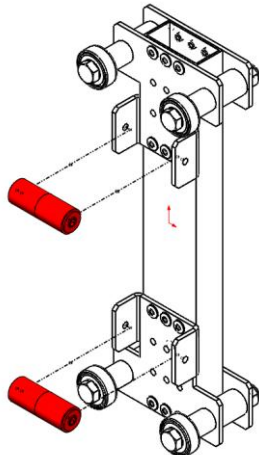
Step 6: Rivet the Small Bearing Plate in place with six 3/16" x 1/4" Steel Rivets.



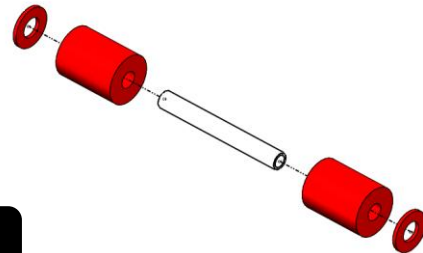
Step 7: Repeat Steps 1-6 to attach a second Corner Bearing Assembly to the other end of the tube.



Step 9: Slide each roller assembly between the tabs on the Large Bearing Plate.

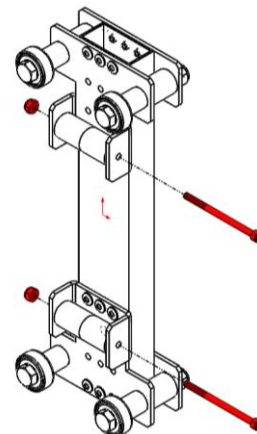


Step 8: Slide two Nylon Spacers (am-1449) and two 1/4" Washers (am-1027) over a 2.14" Brass Tube (am-0602) as shown to create a roller assembly. The spacers should be against each other, with the washers at the ends of the assembly. Repeat to create a second spacer assembly.



2X

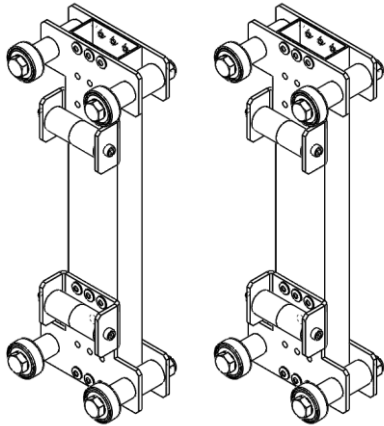
Step 10: Secure each roller assembly with a #10-32x2.75" SHCS (am-1397) and a #10-32 Nylock nut. (am-1042) **Do not over-tighten the screws.**



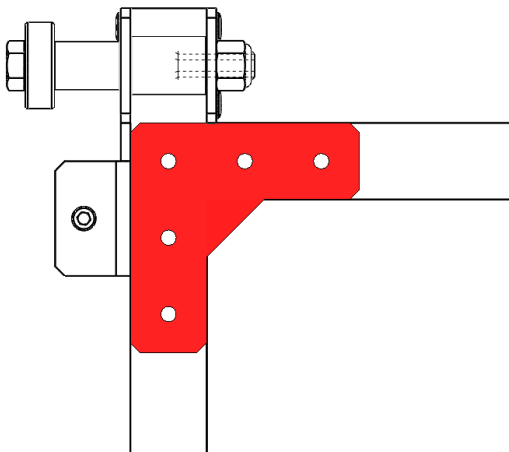
NOTE: Ensure the Nylon Rollers spin free. If they bind, loosen the screws.

Carriage Assembly Continued

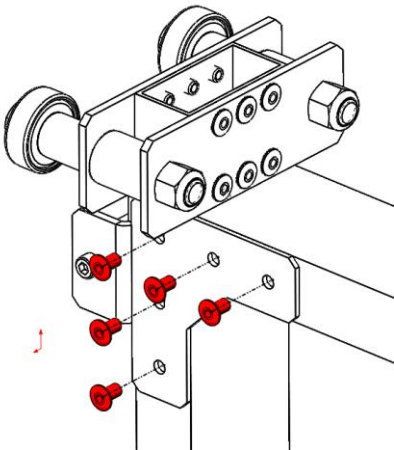
Step 11: Repeat Steps 1-10 to create a second Corner Bearing and Carriage Vertical Tube assembly.



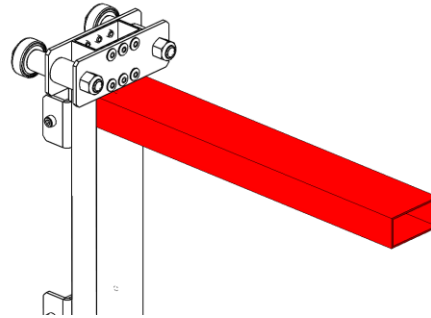
Step 13: Align a 90 degree gusset (am-2906) with both tubes as shown.



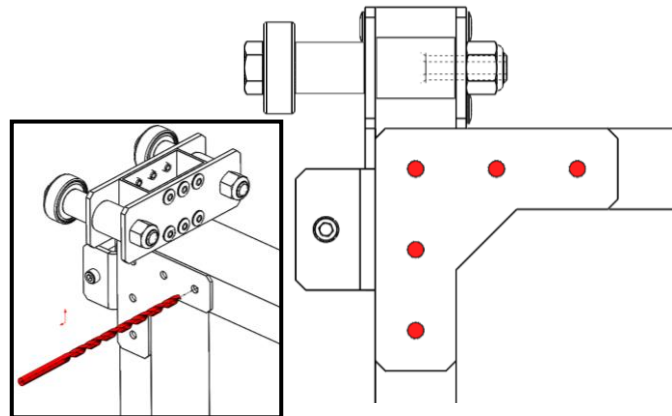
Step 15: Rivet the gusset in place with five 3/16" x 1/4" Steel Rivets.



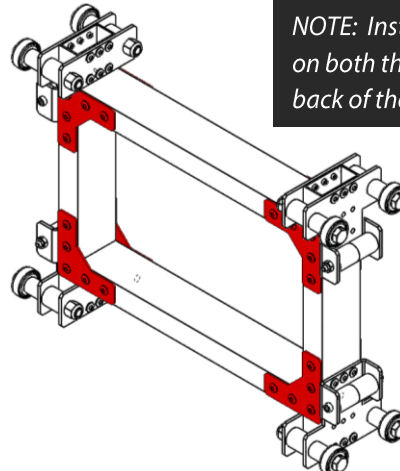
Step 12: Place a Carriage Horizontal Tube against the 2" face of the Carriage Vertical tube, and the bottom of Small Bearing Plate. Line up the 1" wide face of the Carriage Vertical Tube to the 1" wide face of the Carriage Vertical Tube.



Step 14: Match drill the rivet holes through the gusset to the nearest side of each tube in the locations shown with a red dot.



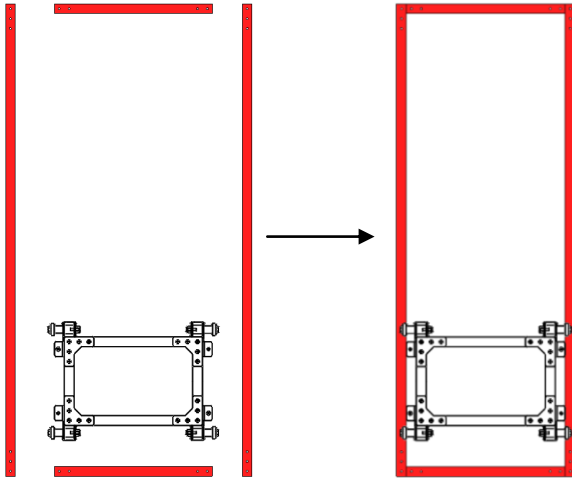
Step 15: Repeat Steps 13-15 for the remaining seven gussets to finish assembling the Carriage as shown.



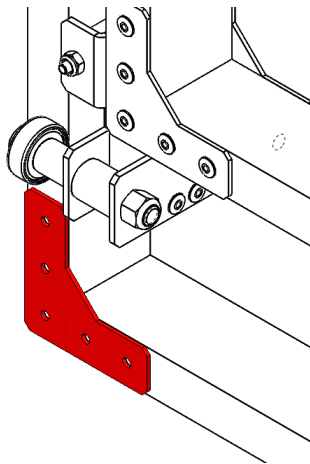
NOTE: Install gussets on both the front and back of the Carriage.

Frame Assembly

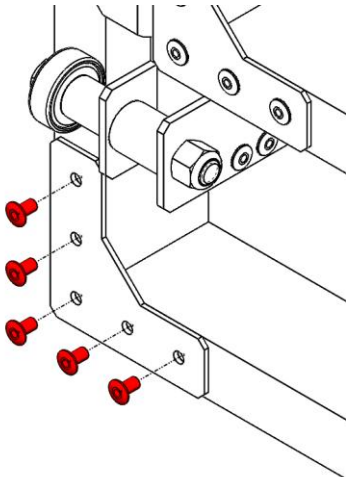
Step 1: Lay out the Frame Vertical Tubes and Frame Horizontal Tubes around the Carriage as shown.



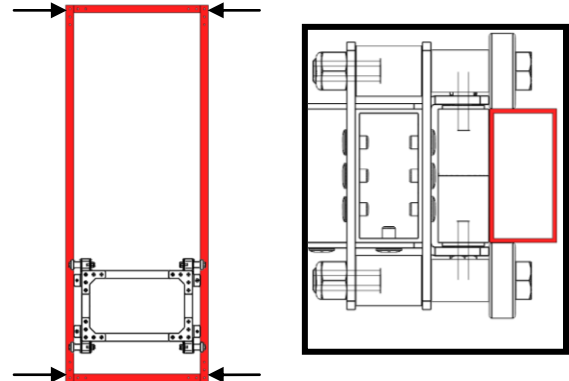
Step 3: Align a 90 degree gusset to the outer edges of one corner of the Frame as shown.



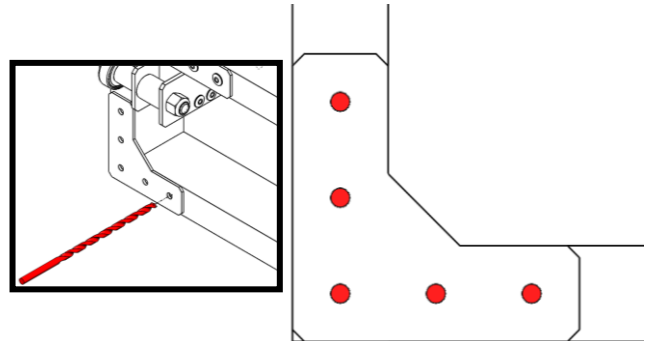
Step 5: Rivet the gusset in place with five 3/16" x 1/4" Steel Rivets.



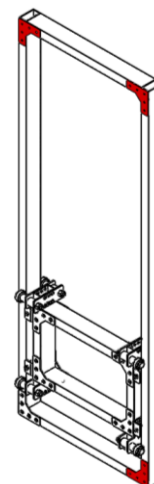
Step 2: Carefully clamp the Frame together between the arrows, and ensure it slides freely. Check the left/right movement of the carriage. If it exceeds 1/32", the Frame Horizontal Tubes should be trimmed to avoid potential binding.



Step 4: Match drill the rivet holes through the gusset to the nearest side of each tube in the locations shown with a red dot.



Step 6: Repeat Steps 3-5 for the remaining seven gussets to complete the Frame as shown.



NOTE: Install gussets on both the front and back of the Frame.