

Open Source Rover: Rocker-Bogie Assembly Instructions

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1 Machining/Fabrication Steps

Table 1: Parts/Tools Necessary

Item	Ref	Qty	Image	Item	Ref	Qty	Image
3" Channel	S2	4		Metal Hacksaw or Bandsaw	D4		

1.1 Cutting the Aluminum Channels

On piece **S2**, measure the distance shown in Figure 1 from the edge and mark a straight line from the opposite corner to that point. Cut off the corner along that line¹. In total, you will need 4 of these modified pieces. Cut those now.

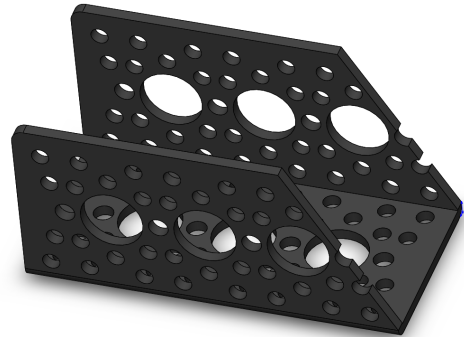
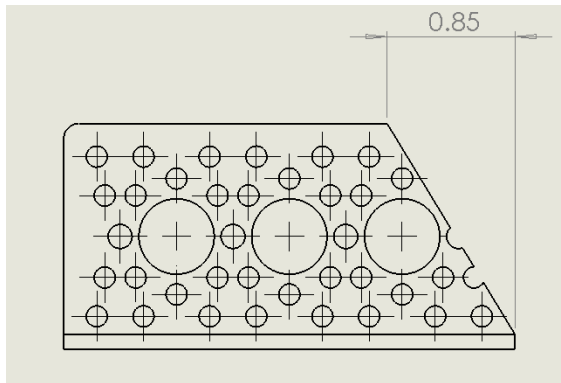


Figure 1: Channel Cutting Dimensions

1.2 Cutting the Aluminum Rod

Take the 4 inch aluminum rod **S18** and cut it down to 3 inches long, indicated by Figure 2². In total, you will need 2 of these 3-inch aluminum rods. Cut those now.

¹We use this piece to make the geometry of the rocker-bogie more structurally reinforced across its lateral bending moment. However, these channels will need to have their corners cut out because of clearance issues further on.

²These cuts keep the rod from sticking out too far from either end of the rocker-bogie pivot joint

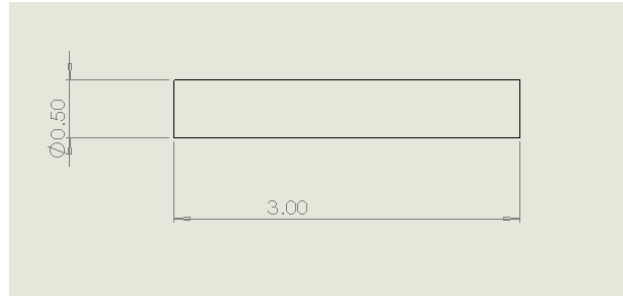





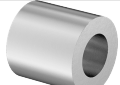












Figure 2: Aluminum Rod cutting dimensions

2 Mechanical/Structural Assembly

The Rocker-Bogie assembly is what attaches your wheels to the rover's body and allows it to climb over obstacles.

Table 2: Parts/Tools Necessary

Item	Ref	Qty	Image	Item	Ref	Qty	Image
3" Channel (Modified)	S2A	4		#6 Washer	W1	28	
3.75" Channel	S3	4		0.5" Nylon Washer	W3	12	
9" Channel	S5	2		#6 x 1/4" Standoff	T1	32	
Pattern F Bracket	S7	8		#6-32 x 3/8" Button Head Screw	B2	52	
0.5" Pillow Block	S11	4		#6-32 x 5/8" Button Head Screw	B4	32	
0.5" Face Tapped Clamping Hub	S13	2		#6-32 Locking Hex Nut	B11	60	
0.5" x 3" Aluminum Tube (Modified)	S18A	2		Allen Key Set	D2		
0.5" Collar Clamp	S22	4		5/16 Wrench	D1		

1. **Begin the Rocker Attachment:** Attach 9 inch channel **S5** and the a modified 3 inch channel **S2A** to pattern F bracket **S7** using screws **B2** and hex nuts **B11** making sure to put a 6-32 washer **W1** in between the channels and the bracket. Make sure that the cut modification in **S2A** is angled towards the 9 inch channel as shown in Figure 4.

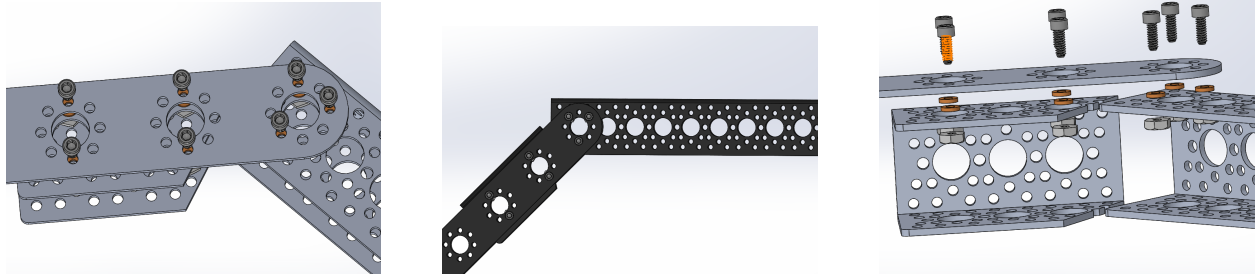


Figure 3: Begin the Rocker attachment

2. **Start the Bogie pivot joint:** Put rod **S18A** though the last hole in the pattern F bracket. Then, assemble the pivot joint by attaching another modified 3 inch channel **S2A** and another pattern F bracket using washers **W3**, collar clamp **S22**, standoffs **T1**, and screws **B4**. Make sure to use the 2nd from the bottom hole on the 2nd pattern F bracket. See Figure 4:

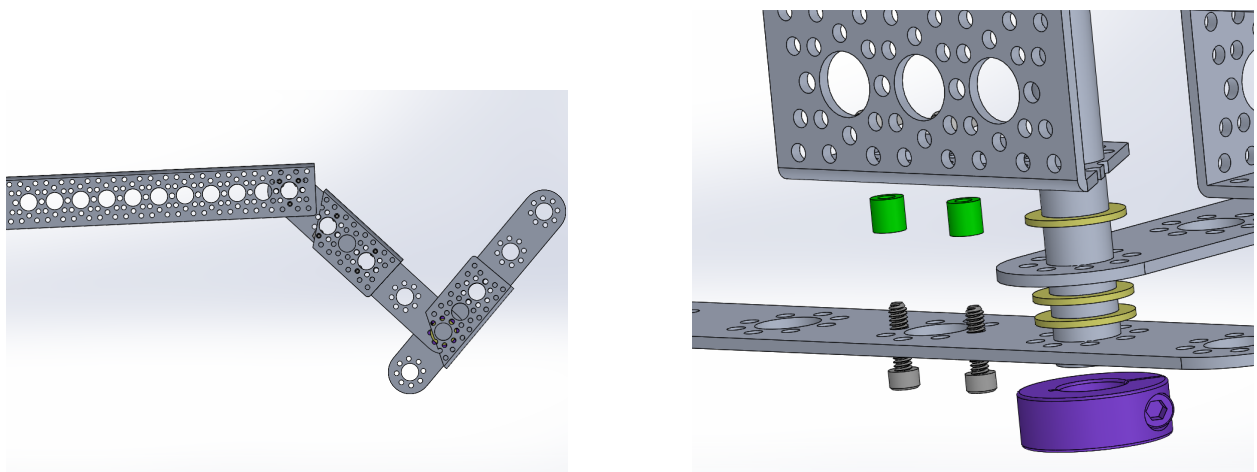


Figure 4: Start Rocker-Bogie pivot joint

3. **Attachment for Front Corner:** Attach 3.75 inch channel **S3** to the top hole of the

pattern F bracket using spacers **T1**, screws **B4**, and hex nuts **B11** as shown in Figure 5.

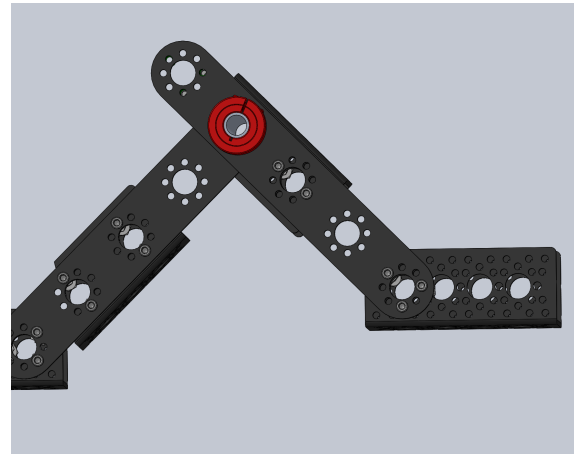
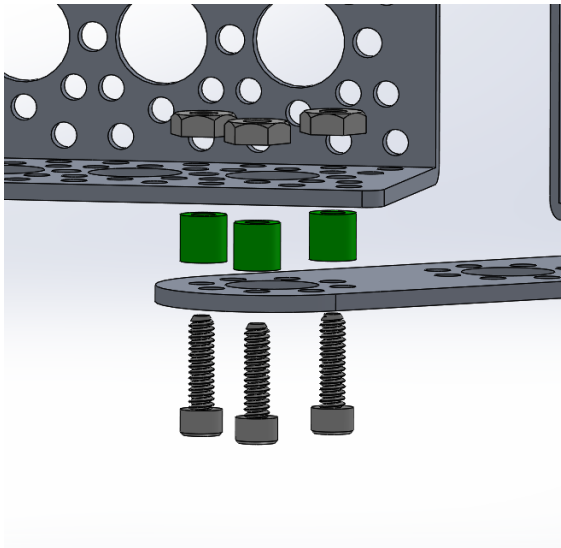


Figure 5: Attaching channel to corner steering

4. **Attachment for middle Wheel:** Attach another 3.75 inch channel **S3** to the bottom hole of the pattern F bracket using spacers **T1**, screws **B4**, and hex nuts **B11** as shown in Figure 6.

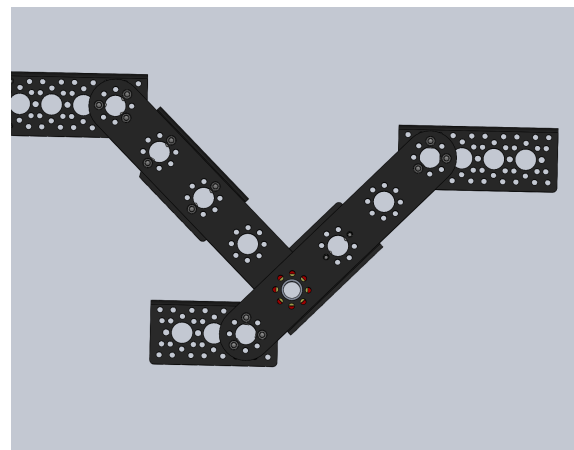
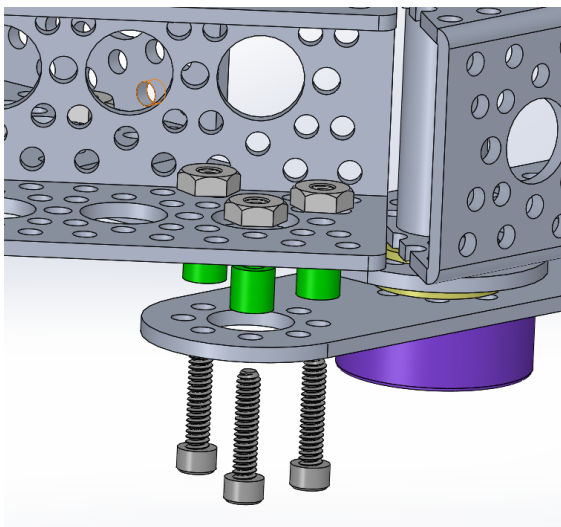


Figure 6: Attachment for middle wheel

5. **Opposite edge of Rocker-Bogie Joint:** Attach another Pattern F bracket **S7** to

the opposite side of the channels using washers **W1** and **W3**, screws **B4**, and hex nuts **B8** as shown in Figure 7.

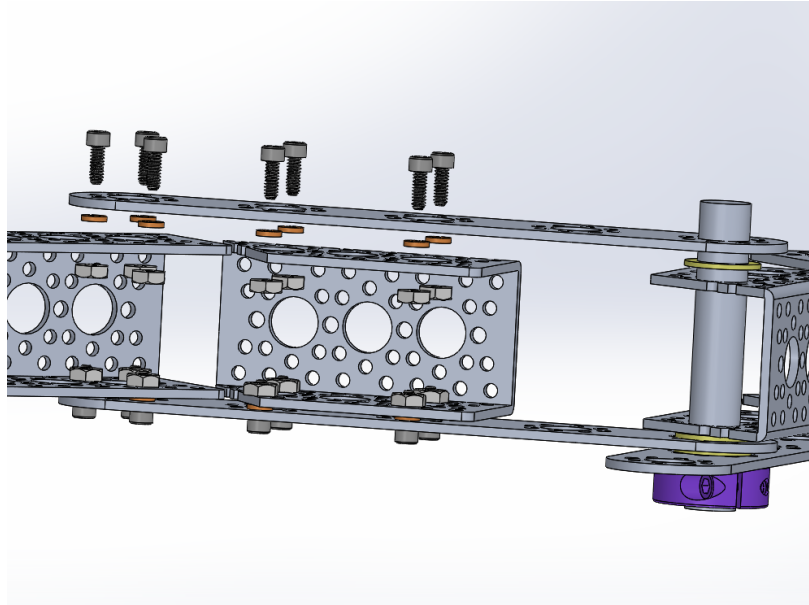


Figure 7: Start the other side of Rocker-Bogie joint

6. **Other edge of Rocker-Bogie Joint Cont:** Using washers **W1**, collar clamp **S22**, spacers **T1**, and screws **B10** attach pattern F bracket to the final connecting channels as shown in Figure 8.

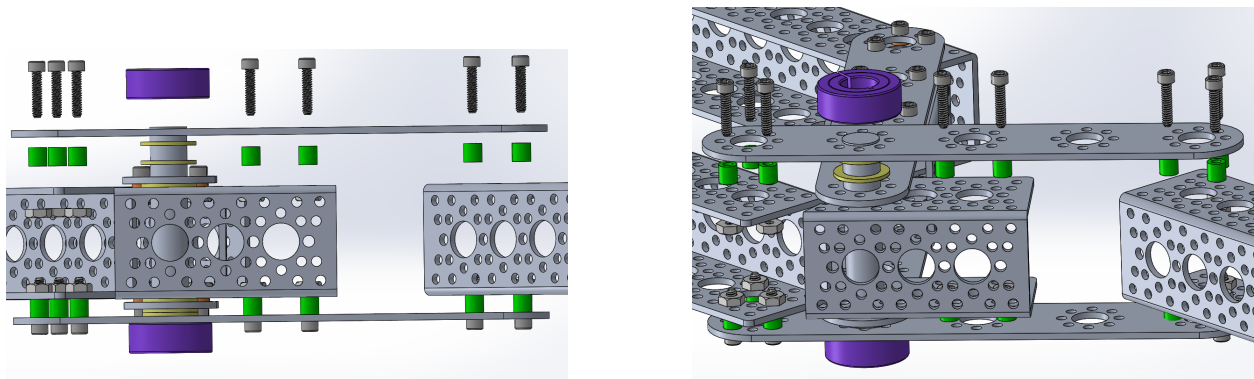


Figure 8: Other edge of Rocker-Bogie joint

7. **Checkpoint:** At this point your rocker bogie joint should look like Figure 9:

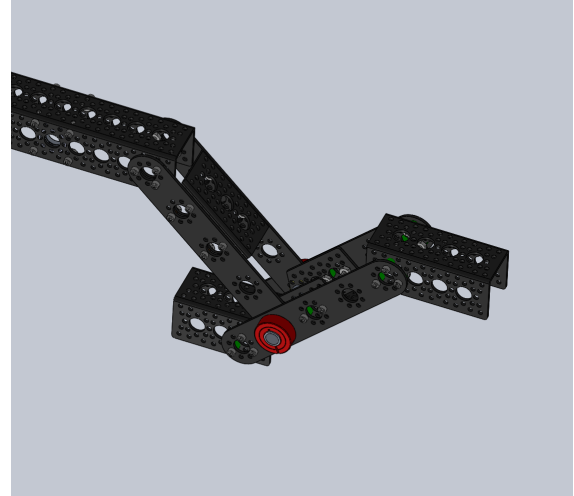
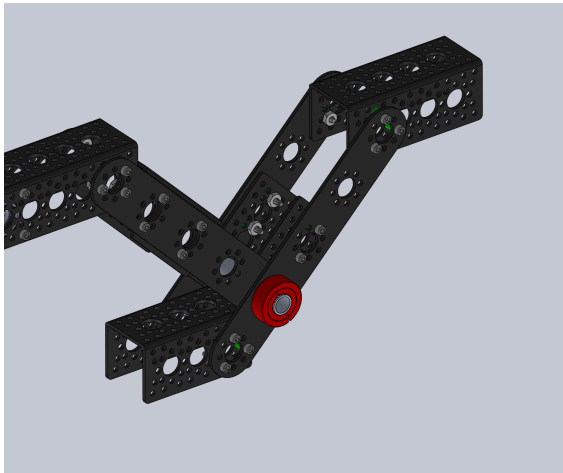


Figure 9: Rocker-Bogie Checkpoint

8. **Attach Bearing Blocks:** Attach two Pillow Bearing Blocks **S11** using screws **B2** and hex nuts **B11** as shown in Figure 10. The bearing blocks should be aligned with the 5th large hole back from the front of the 9-inch U channel.

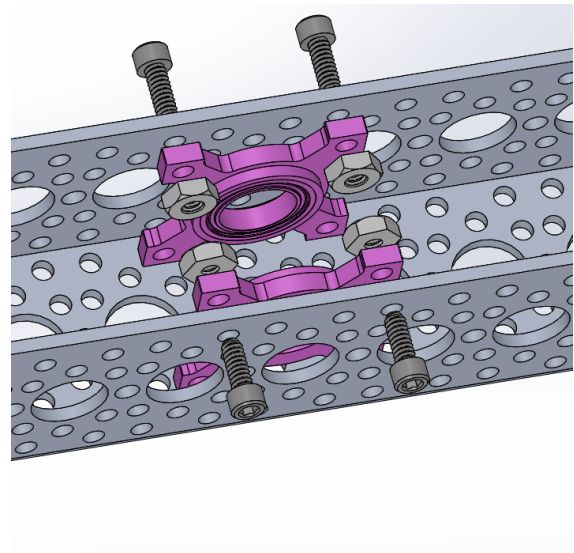
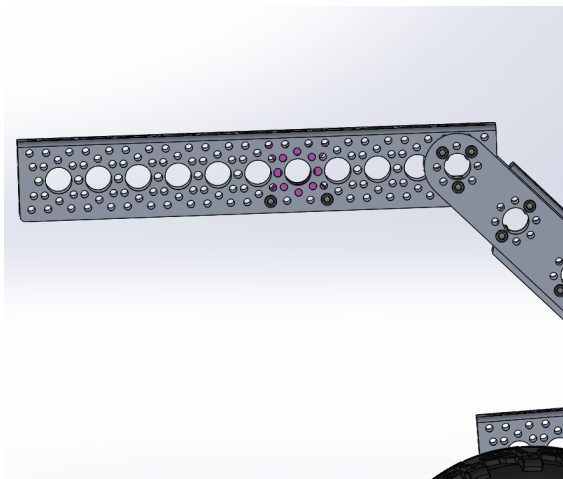


Figure 10: Pillow bearing block attachment

9. **Attach Clamping Hub:** Attach the Clamping Hub **S13** using screws **B2** and hex nuts **B11** as shown in Figure 11. The clamping hub should be centered above where you just placed the pillow bearing blocks.

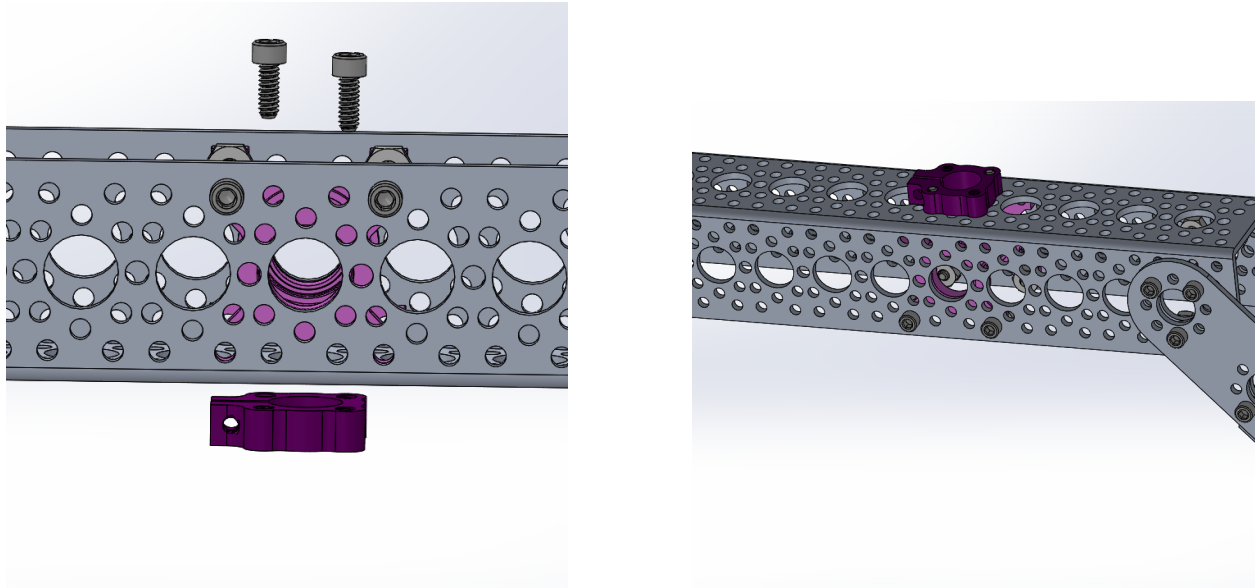


Figure 11: Clamping hub attachment

Your rocker-bogie suspension joint is now complete! Repeat all of section 2 in this document to create the suspension for the other side of the rover.

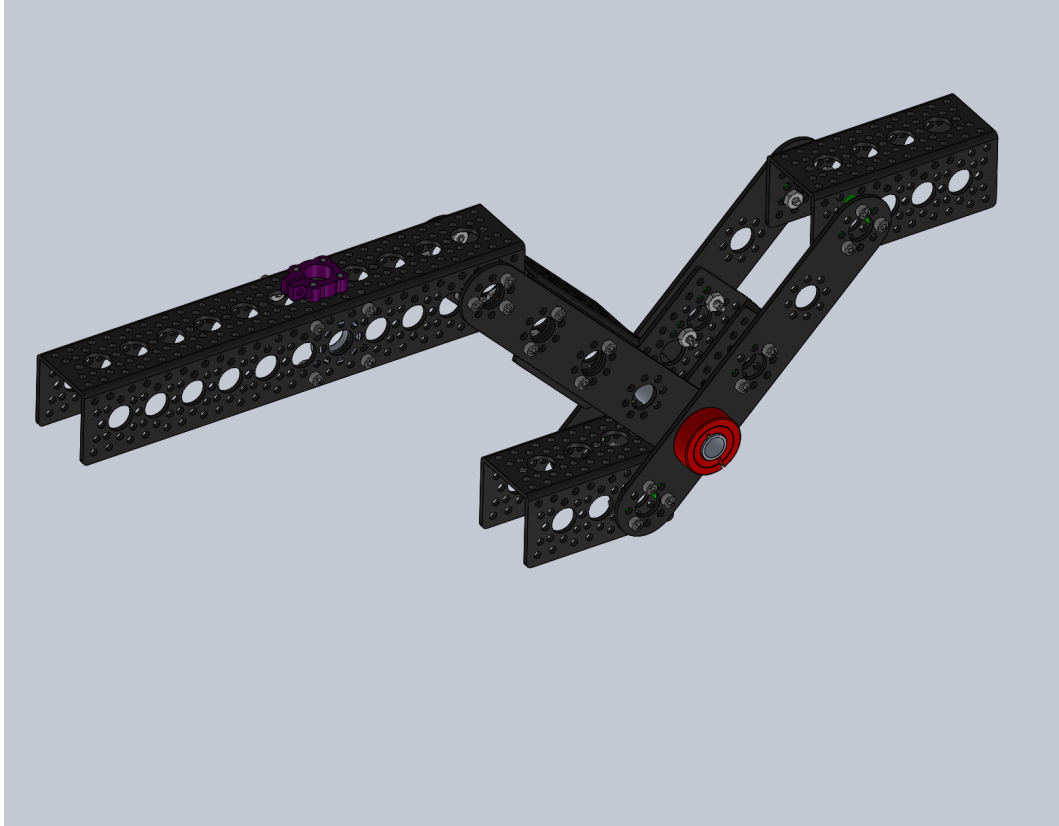


Figure 12: Finished Rocker-Bogie