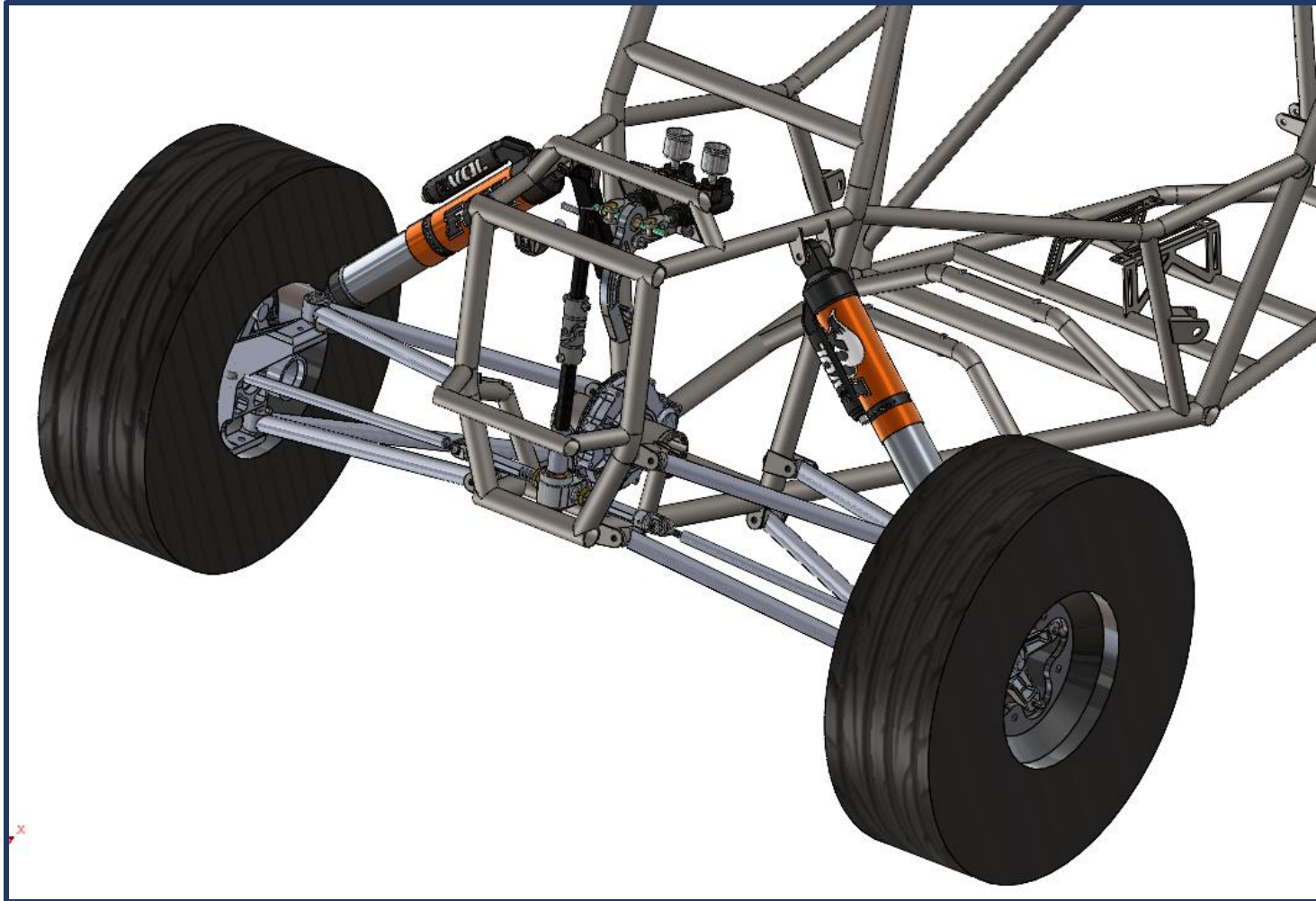


SAE Baja '24 Front End

100% Hardware Check

Abraham Plis, Evan Kamp, Bryce Fennell

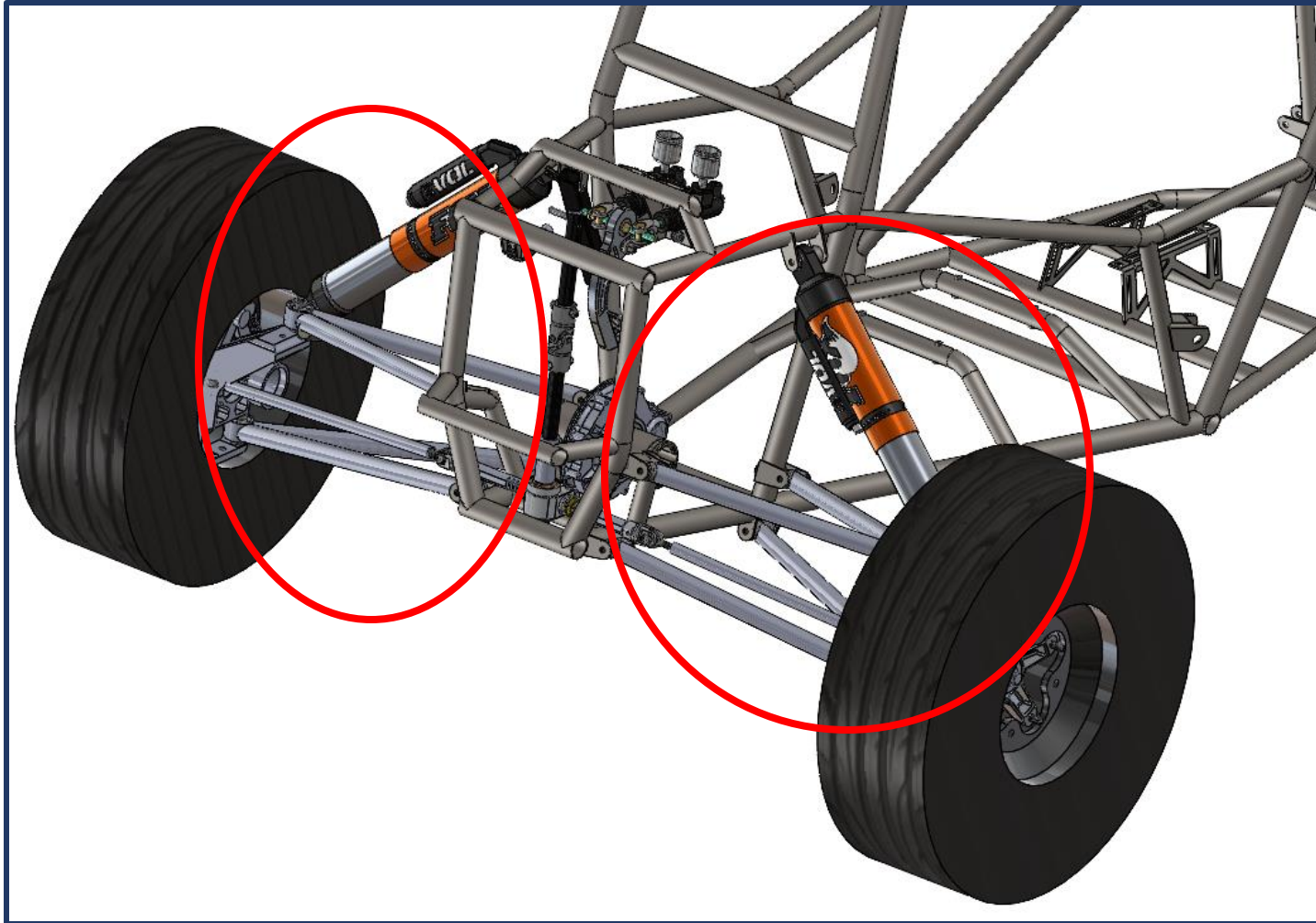
Design Efforts – Front CAD



Front End “Zones”

1. Suspension
2. Steering
3. Brake/Throttle

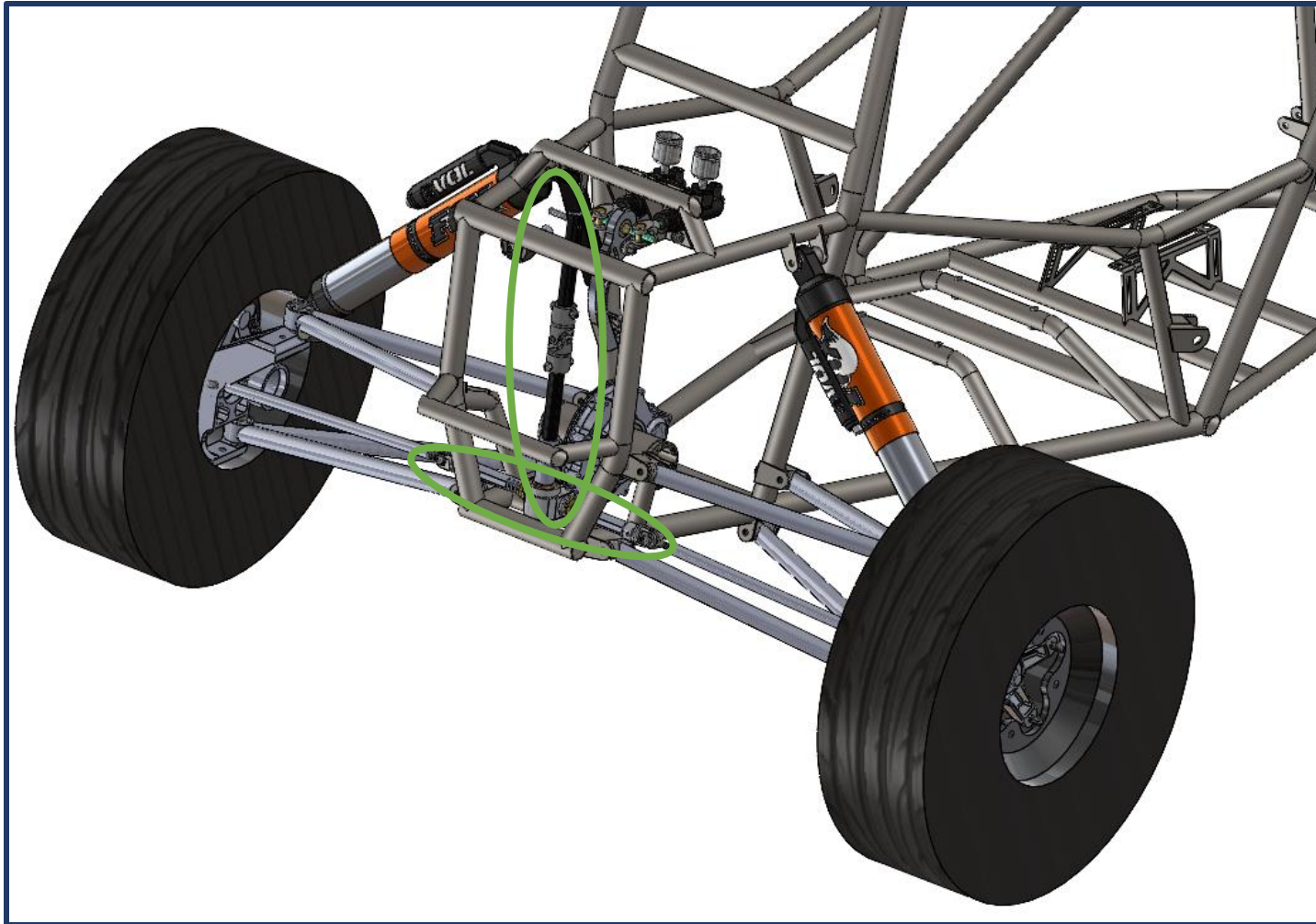
Design Efforts – Front CAD



Front End “Zones”

1. Suspension
2. Steering
3. Brake/Throttle

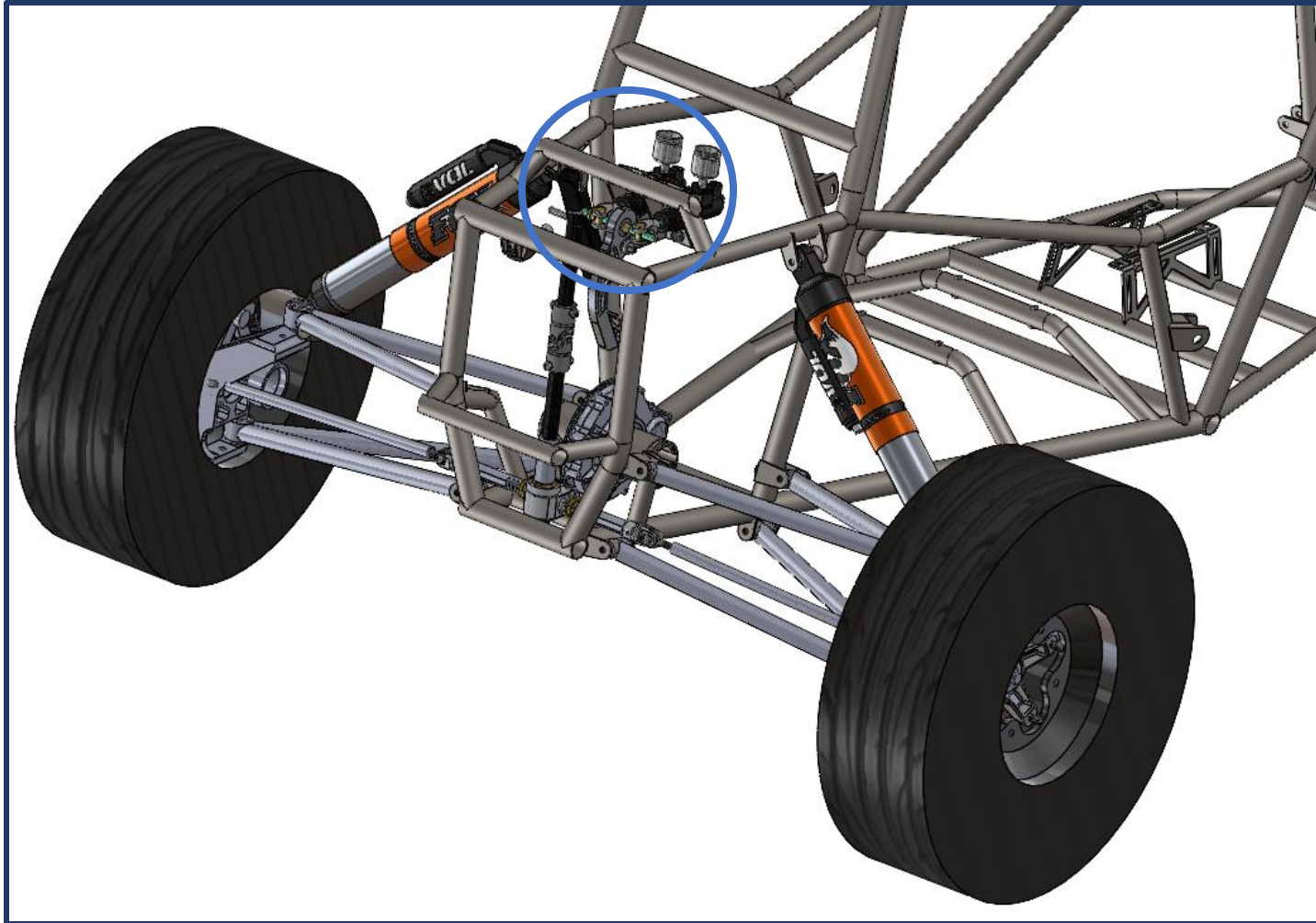
Design Efforts – Front CAD



Front End “Zones”

1. Suspension
2. Steering
3. Brake/Throttle

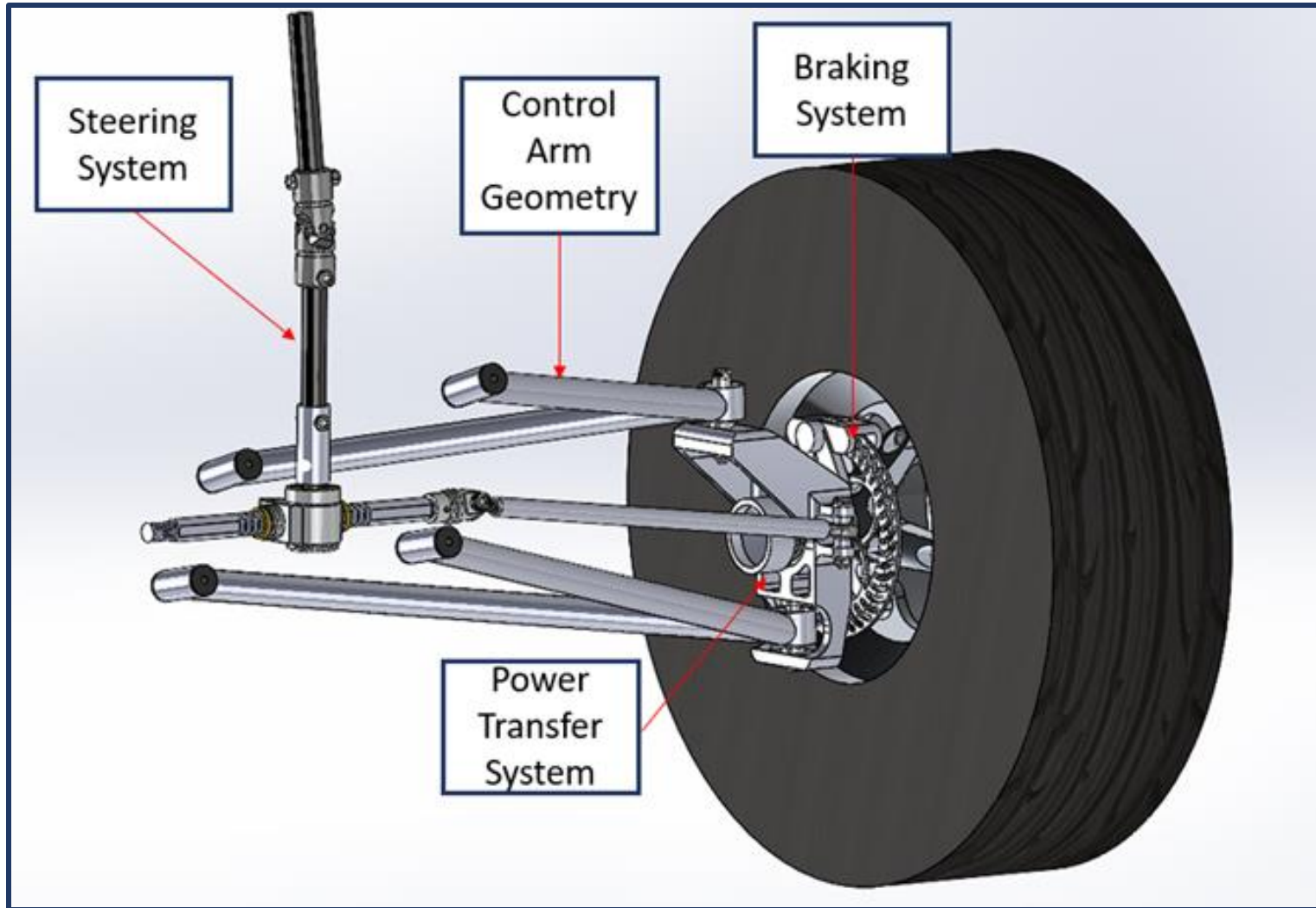
Design Efforts – Front CAD



Front End “Zones”

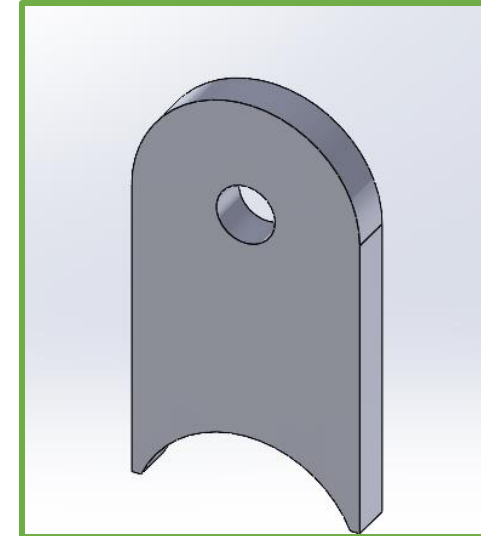
1. Suspension
2. Steering
3. Brake/Throttle

Design Efforts – Simplified CAD



Purchasing Plan - Suspension

Classification	Part Name	Quantity	Cost	Total Cost	Material	Purchase/Made	Vender	Vender Part Number
Suspension	CV Axle/Nut	2	108	216	Steel	Purchased	Amazon	YFM350FGI
Suspension	CV Spline	2	40	80	Steel	Purchased	Amazon	Yfm350ba
Suspension	CV Bearing	4	72.92	291.68	Steel	Purchased	SKF	6006-2RS1
Suspension	Control Arm Swivel Joint	4	68.21	272.84	Steel	Purchased	McMaster Carr	63195K36
Suspension	Upper Control Arm Tabs	4	0	0	Steel	Purchased	Vroom	N/A



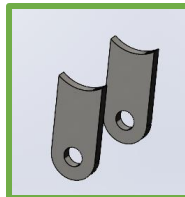
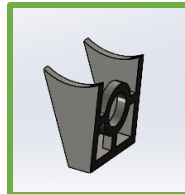
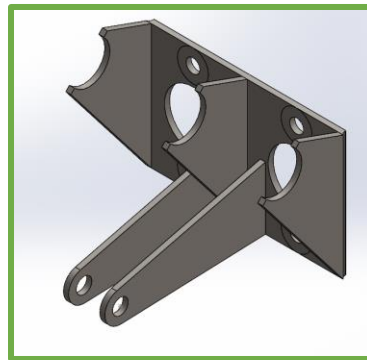
Purchasing Plan - Steering

Classification	Part Name	Quantity	Cost	Total Cost	Material	Purchase/Made	Vender	Vender Part Number
Steering	Rack End Set Screws	2	5	10	Aluminum	Purchased	Joes Racing Products	N/A
Steering	Pinion Housing	1	100	100	Aluminum	Purchased	Joes Racing Products	N/A
Steering	Pinion Gear	1	100	100	Steel	Purchased	Joes Racing Products	N/A
Steering	Pinion Bearing	2	10	20	N/A	Purchased	Joes Racing Products	N/A
Steering	3/8 Rod End for Tie Rod	4	10	40	Steel	Purchased	McMaster Carr	60645K14
Steering	Tie Rod	2	15	30	Carbon	Purchased	Amazon	N/A
Steering	Steering Column	3	15	45	Carbon	Purchased	Amazon	N/A
Steering	U Joint - ORDER ONE MORE	2	40	80	Steel	Purchased	McMaster Carr	6443K106
Steering	Pinion Face Plate	1	5	5	Plastic	Purchased	Joes Racing Products	N/A



Purchasing Plan – Throttle & Brake

Classification	Part Name	Quantity	Cost	Total Cost	Material	Purchase/Made	Vender	Vender Part Number
Brake	Brake Rotor	2	N/A	N/A	Steel	Purchased	Vroom	N/A
Brake	Master Cylinder	2	220	440	N/A	Purchased	Tilton	78-625
Brake	Brake Hose	2	18.4	36.8	Steel	Purchased	Amazon	N/A
Brake	Pedal Sensor	1	5	5	N/A	Purchased	Amazon	4012866
Throttle	Throttle Pedal Sensor	1	5	5	N/A	Purchased	Digikey	SW156-ND
Brake	Brake Bias Shaft	1	62.9	62.9	Steel	Purchased	Pitstop USA	TIL72-250
Brake	Bronze Bushing	7	10	70	Bronze	Purchased	MMC	6391K867 and 6391K625
Throttle	Throttle Pedal Tabs	4	0	0	Steel	Purchased	Vroom	N/A
Brake	Master Cylinder Tabs	1	0	0	Steel	Purchased	Vroom	N/A
Throttle	Throttle Pedal Stopper	1	10	0	Titanium	Purchased	Existing Stock	N/A
Brake	Master Cylinder Reservoirs	2	14.88	29.76	Aluminum	Purchased	Amazon	AD-BRR-003
Brake	Assorted Fittings	8	12	96	kel/Brass/Alumin	Purchased	Jegs	N/A



Purchasing Plan – Hardware

Classifier	Part Name	Quantity	Cost	Total Cost	Material	Purchase/Made	Vender	Vender Part Number
Hardware	Wheel Studs (25/pk), 3/8"x16, 1" Length, Button Head Bolt	8	0	0	Steel	Purchased	Copper State	91255A624
Hardware	Brake Rotor Bolt (10/pk), 1/4"-20, 5/16" Length, Socket Head	8	0	0	Steel	Purchased	Copper State	91864A061
Hardware	Brake Caliper Bolt, M8x1.25, 20mm length, Countersunk	4	0	0	Steel	Purchased	Copper State	91294A284
Hardware	LCA Knuckle Shoulder Bolt, 1/4"-20, 1/4", 2" Length	2	0	0	Steel	Purchased	McMaster Carr	90807A119
Hardware	TR Shoulder Bolt, 5/16"-18, 3/8", 1.5" Length	2	0	0	Steel	Purchased	Copper State	91259A628
Hardware	TR/UCA Shoulder Bolt Nut (100/pk), Grade 8, 5/16"-18	15	0	0	Steel	Purchased	Copper State	95922A120
Hardware	UCA Knuckle Shoulder Bolt, 5/16"-18, 3/8, 2.25" Length	2	0	0	Steel	Purchased	McMaster Carr	91259A633
Hardware	Control Arm Mount Bolt, 3/8" Shoulder, 2" length, 5/16-18"	8	0	0	Steel	Purchased	Copper State	91259A632
Hardware	TR Rack Shoulder Bolt, 3/8", 5/16-18", 1.25" Length	2	0	0	Steel	Purchased	Copper State	91259A626
Hardware	Rack Mount Bolts, 3/8"-16, 2" Length (10/pk)	2	0	0	Steel	Purchased	Copper State	92620A632
Hardware	MC Bolt 3/8"-16, 7/8" Length	2	0	0	Steel	Purchased	Copper State	92620A658
Hardware	MC Bolt 3/8"-16, 1" Length	2	0	0	Steel	Purchased	Copper State	92620A655
Hardware	MC Nut, 3/8"-16 nut	2	0	0	Steel	Purchased	Copper State	N/A
Hardware	MC Nut 3/8"-16 Locnut, THIN (1/4" Max Height)	2	0	0	Steel	Purchased	Copper State	N/A
Hardware	Brake Pedal Shoulder Bolt, 3/8", 5/16"-18, 1" Length	1	0	0	Steel	Purchased	Copper State	N/A
Hardware	Brake Pedal CS Bolt, 1/4"-20, 1" Length	2	0	0	Steel	Purchased	Copper State	N/A



Copper State Bolt & Nut Co.

Purchasing Plan Percentages

Purchased

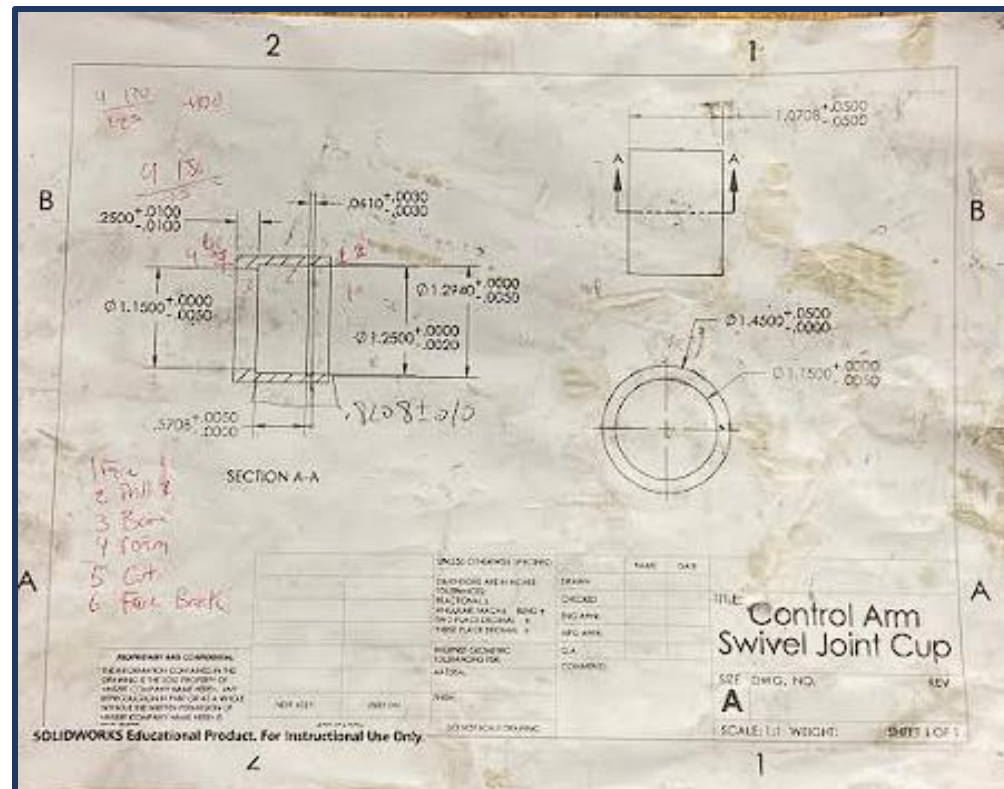
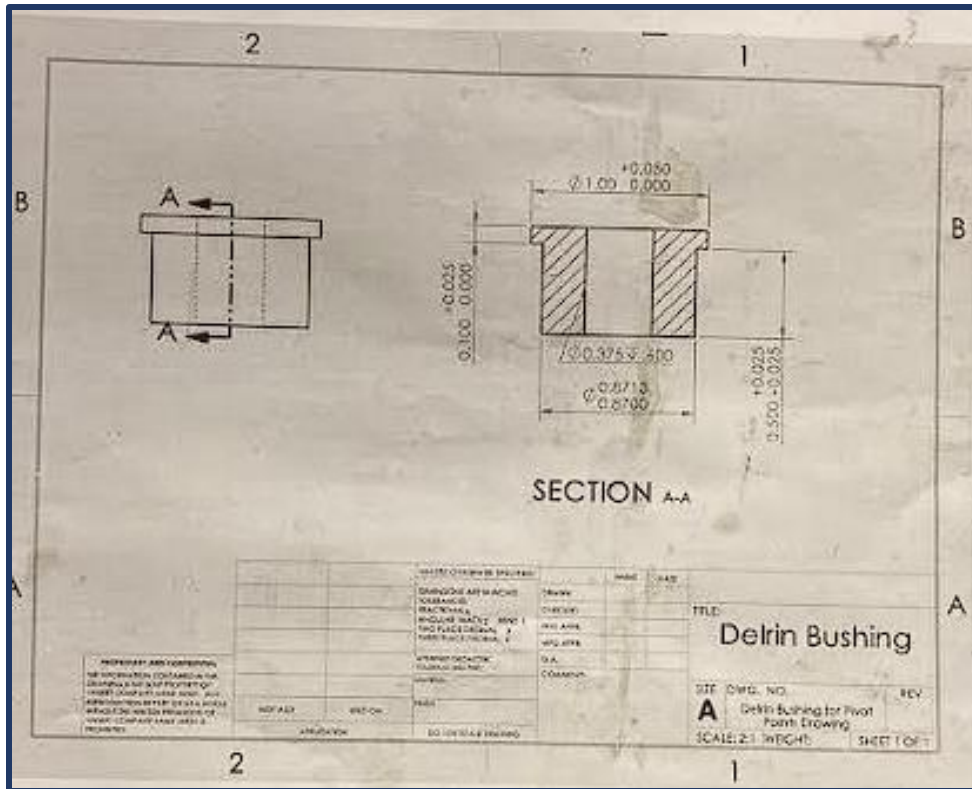
$$\frac{130 \text{ items}}{130 \text{ items}} = 100\%$$

On-Hand

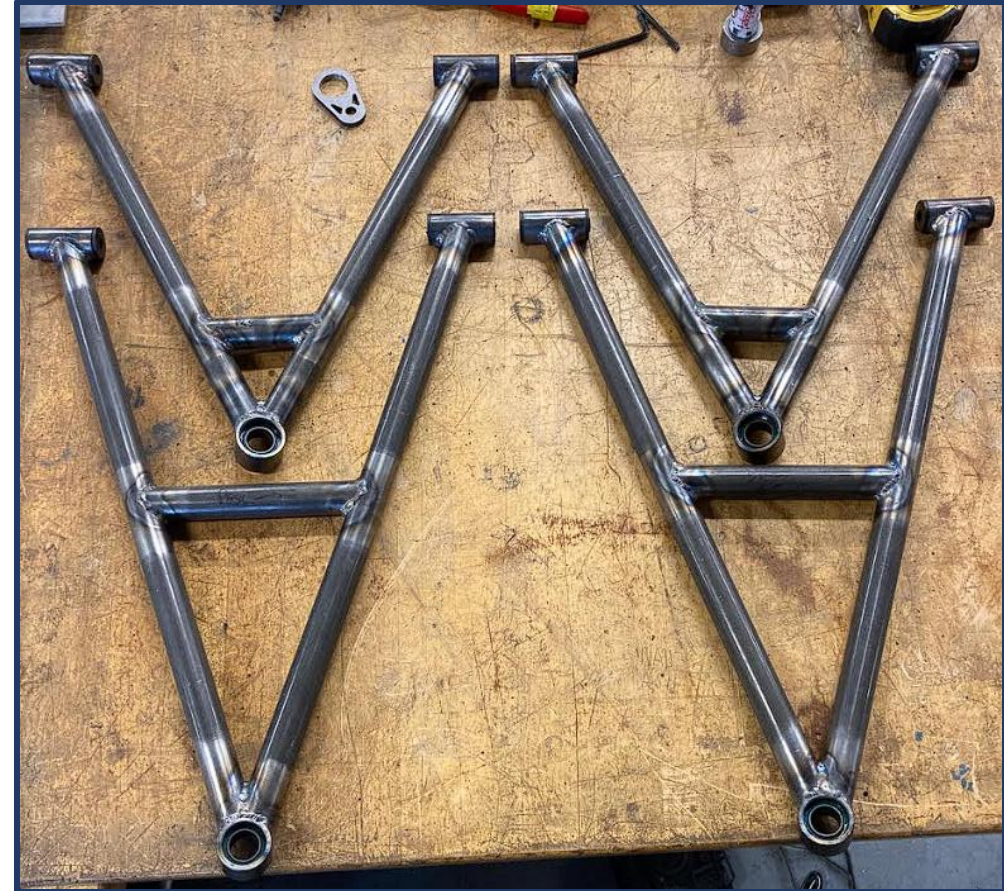
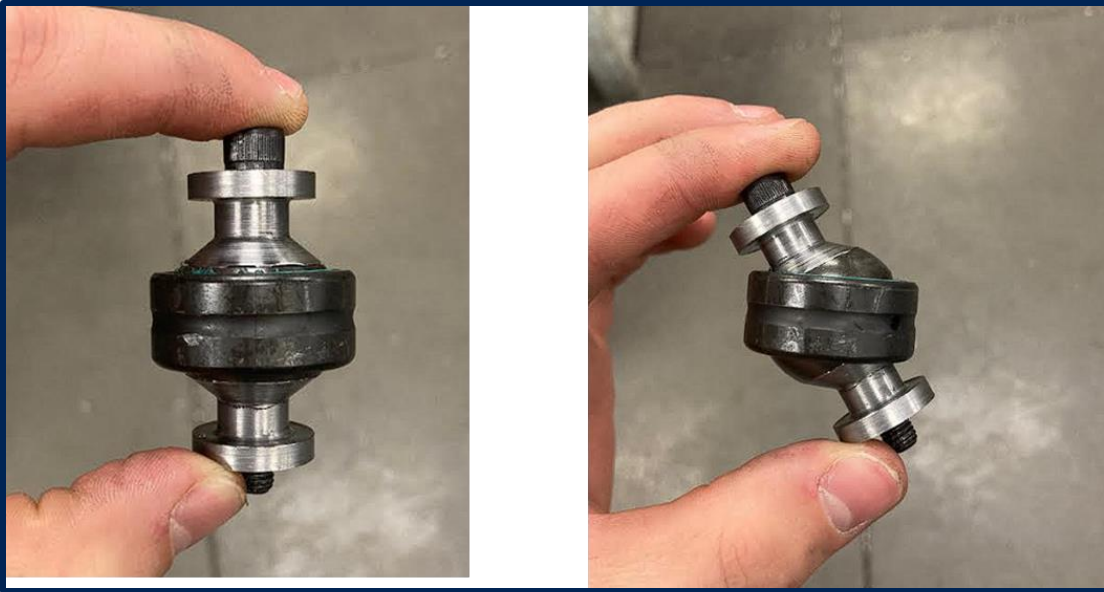
$$\frac{130 \text{ items}}{130 \text{ items}} = 100\%$$

Manufacturing Plan - Suspension

Classification	Part Name	Quantity	Cost	Total Cost	Material	Purchase/Made	Vender	Vender Part Number	Man Hours Expended	Man Hours to Complete
Suspension	Upper Control Arm Tubes	2	8.8	105.6	4130, 4'	Made	IMS	N/A	44	44
Suspension	Lower Control Arm Tubes	2	8.8	105.6	4130, 4'	Made	IMS	N/A	44	44
Suspension	Control Arm Cups	4	0	0	Steel	Made	N/A	N/A	15	15
Suspension	Knuckle	2	450	900	6061-T6	Made	Ryan	N/A	80	80
Suspension	Hub	2	190	380	6061-T6	Made	Ryan	N/A	35	35
Suspension	Upper Swivel Joint Spacer	4	0	0	Steel	Made	Existing Stock	N/A	10	10
Suspension	Lower Swivel Joint Spacer	4	0	0	Steel	Made	Existing Stock	N/A	10	10
Suspension	Delrin Bushing	16	1.5	24	Delrin	Made	MMC	7521T16	4	4
Suspension	Upper Control Arm Shock Spacer	8	0	0	CF PETG	Made	N/A	N/A	4	4
Suspension	Hub Spacers	2	0	0	Aluminum	Made	N/A	N/A	2	2



Manufacturing Plan - Suspension



Manufacturing Plan - Suspension



Manufacturing Plan - Steering

Classification	Part Name	Quantity	Cost	Total Cost	Material	Purchase/Made	Vender	Vender Part Number	Man Hours Expended	Man Hours to Complete
Steering	Lower Knuckle Spacer	2	0	0	6061-T6	Made	Existing Stock	N/A	3	3
Steering	Steering Rack	1	0	0	Steel	Made	N/A	N/A	15	15
Steering	Rack End	2	0	0	Aluminum	Made	N/A	N/A	20	20
Steering	Steering Rack Support Sleeve	2	0	0	Aluminum	Made	Existing Stock	N/A	3	3
Steering	Steering Rack Support Bushing	4	20	80	Bronze	Made	MMC	N/A	4	4
Steering	Tie Rod Threaded Insert	4	0	0	Aluminum	Made	N/A	N/A	8	8
Steering	Steering Column Insert	4	0	0	Aluminum	Made	N/A	N/A	4	4
Steering	Steering Wheel	1	0	0	Carbon Plate	Made	Nova	N/A	15	15
Steering	Steering Wheel Bushings	4	1.5	6	Delrin	Made	MMC	N/A	2	2



Manufacturing Plan – Brake & Throttle

Classification	Part Name	Quantity	Cost	Total Cost	Material	Purchase/Made	Vender	Vender Part Number	Man Hours Expended	Man Hours to Complete
Brake	Brake Pedal	1	95	95	6061-T6	Made	Existing Stock	N/A	25	25
Throttle	Throttle Pedal	1	0	0	Carbon	Made	Bauer	N/A	2	2
Throttle	Throttle Pedal Spacer	1	0	0	Aluminum	Made	Existing Stock	N/A	2	2



Manufacturing Plan - Percentages

Manufactured

$$\frac{351 \text{ hours}}{351 \text{ hours}} = 100\%$$

Project Demo (Cool Stuff)



Project Demo (Cool Stuff)



Project Demo (Cool Stuff)



Project Demo (Cool Stuff)



Project Demo (Cool Stuff)

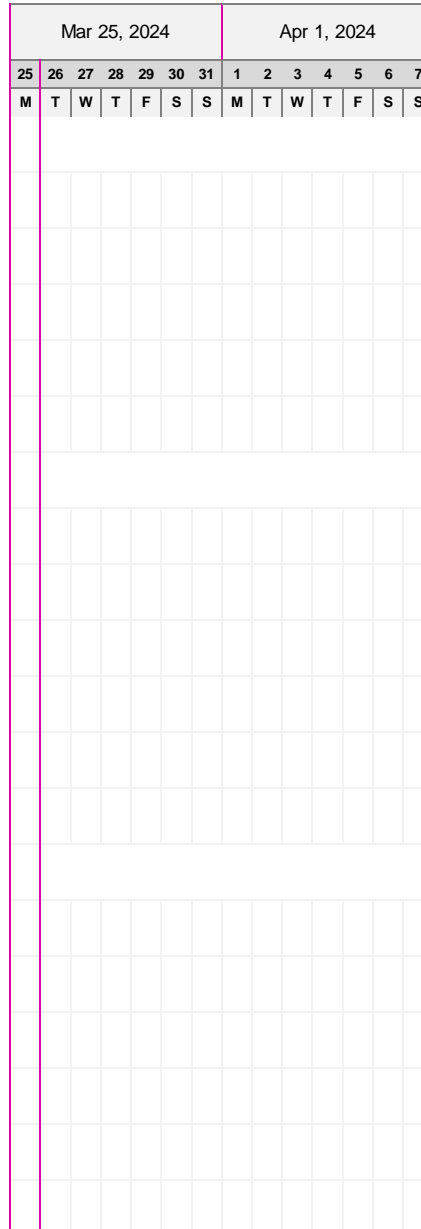


Project Demo (Cool Stuff)



Gantt Chart Updates

TASK	ASSIGNED TO	PROGRESS	START	END
Suspension				
Control Arms	Abe, Bryce, Evan	100%	1/16/24	2/28/24
Knuckle	Bryce	100%	2/19/24	3/9/24
Hub	Bryce	100%	2/12/24	2/28/24
Spacers	Bryce	100%	2/6/24	2/20/24
Hardware & Bearings	Evan, Bryce, Abe	100%	1/16/24	2/6/24
Steering				
Rack/Housing/Ends	Evan, Abe	100%	2/7/24	3/8/24
Mounting Tabs	Evan	100%	2/22/24	3/8/24
Tie Rod Insert	Evan, Abe	100%	2/19/24	2/23/24
Bushings	Abe, Evan	100%	2/7/24	2/17/24
Hardware	Abe, Bryce, Evan	100%	2/5/24	2/23/24
Column	Abe, Bryce, Evan	100%	2/23/24	3/9/24
Braking/Throttle				
Brake Pedal	Evan	100%	2/12/24	3/9/24
Mounting Tab	Evan	100%	2/21/24	3/9/24
Master Cylinder & Fluids	Evan	100%	2/26/24	3/1/24
Throttle Pedal, Cables, Stopper	Abe	100%	2/19/24	2/26/24
Hardware, Bearings, & Bushings	Abe, Evan	100%	1/31/24	2/21/24
CV Shaft, Brake Caliper, & Brake Rotor	Abe	100%	1/16/24	2/10/24



TASK	ASSIGNED TO	PROGRESS	START	END
Final Assembly				
Suspension	Team	100%	3/11/24	3/15/24
Steering	Team	100%	3/11/24	3/15/24
Brake System	Team	75%	3/18/24	3/29/24
Throttle System	Team	70%	3/18/24	3/29/24

Immediate Priorities:

1. Help to get car driving (all hands on deck)
2. Button up front brake system and bleed brakes
3. Run Rear Hardlines
4. Mount Throttle Pedal and Route Cable

Current Status:
Mostly On-track