

# Conceptual Kart Engineering Drawings & Simulations

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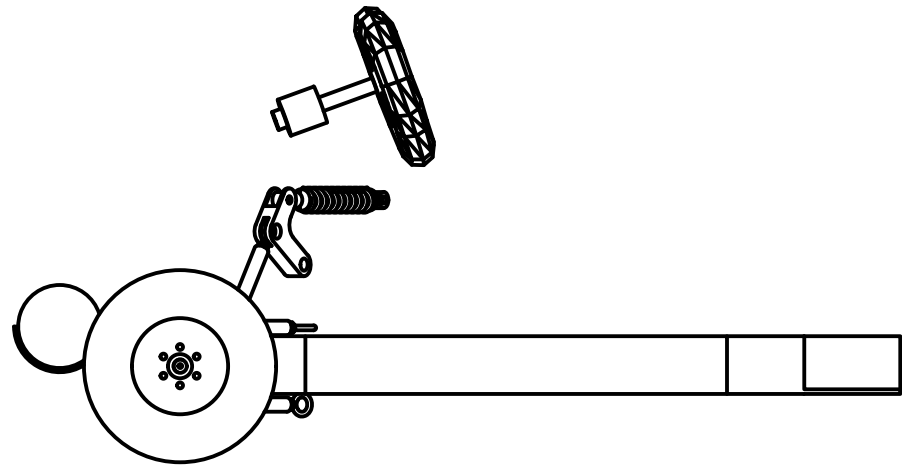
2      Conceptual Kart Assembly

\*Note: because the kart has four-wheel drive, and thus all wheels are the same, only one wheel is modeled for simplicity

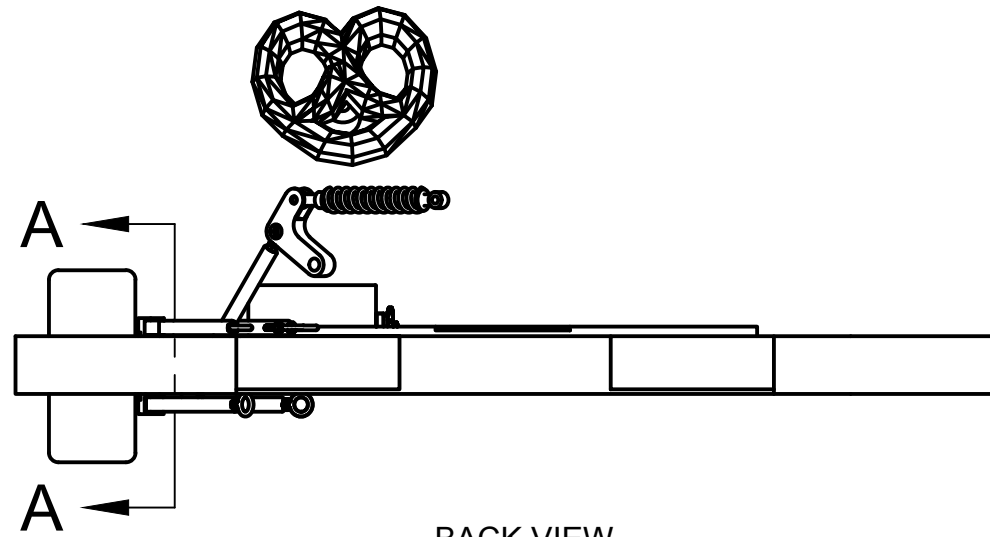
4      Individual Part Drawing: Suspension Knuckle Design

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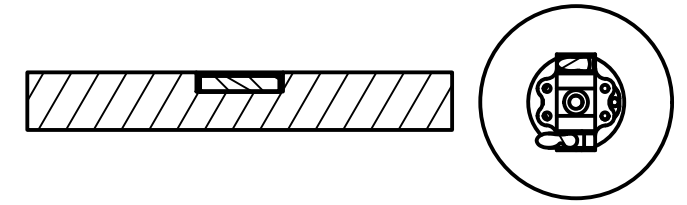
7      Finite Element Analysis (FEA): Structural Simulations



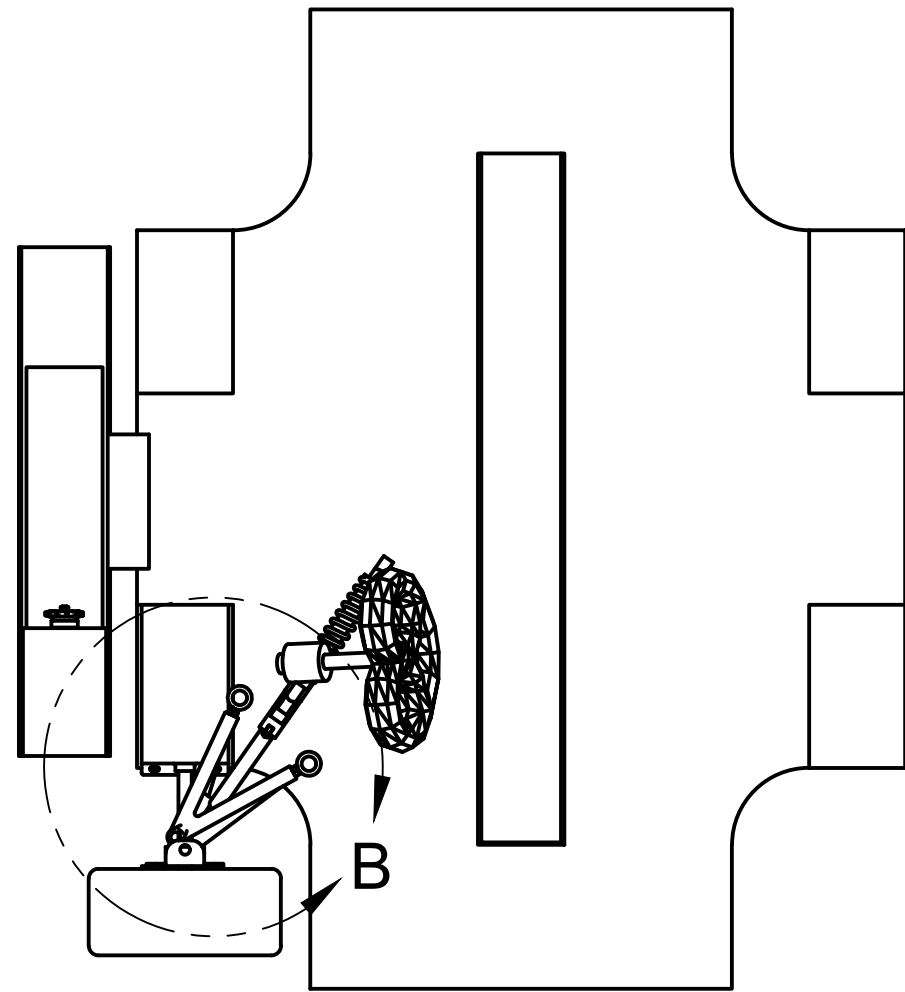
LEFT VIEW



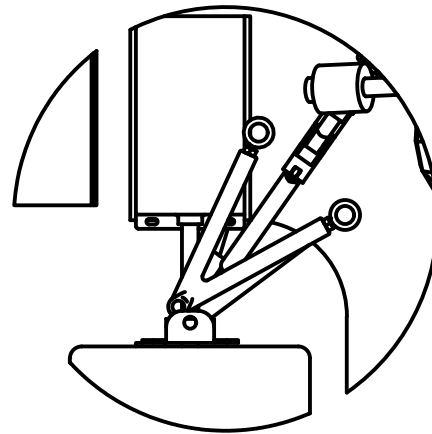
BACK VIEW



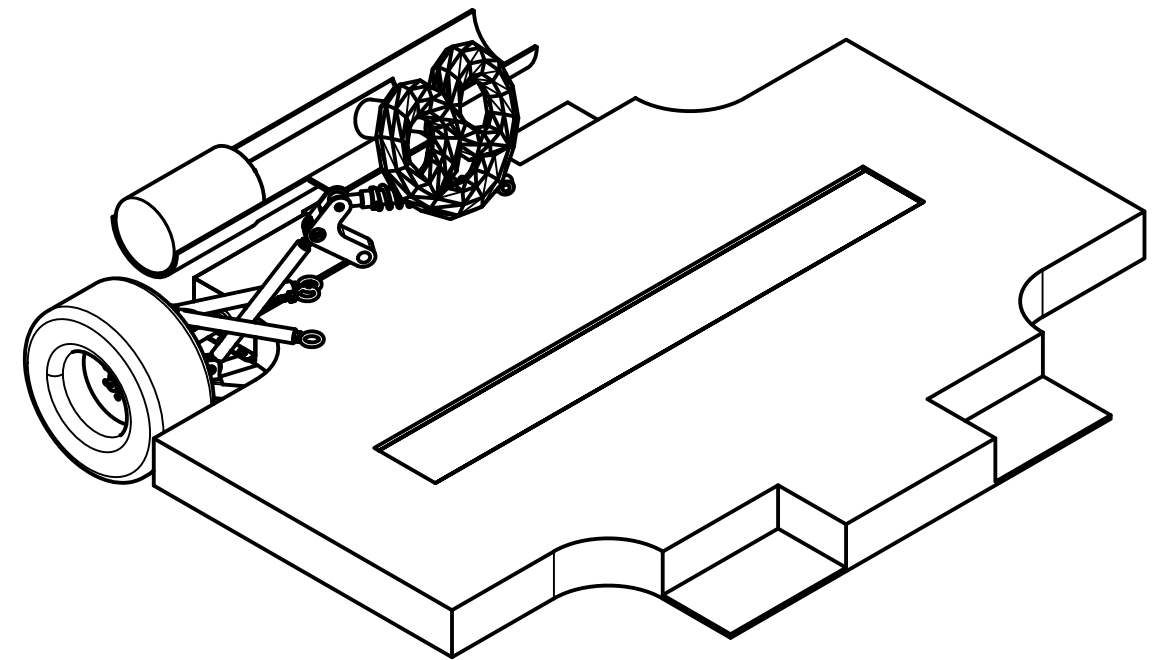
SECTION A-A  
SCALE 1:10



TOP VIEW

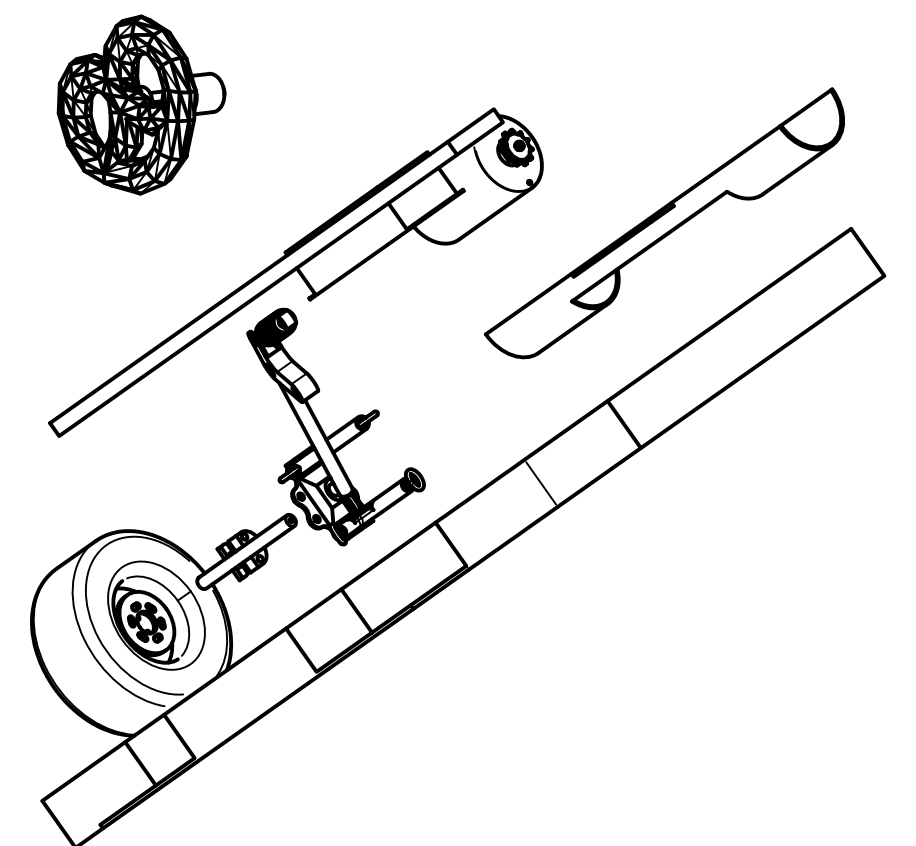
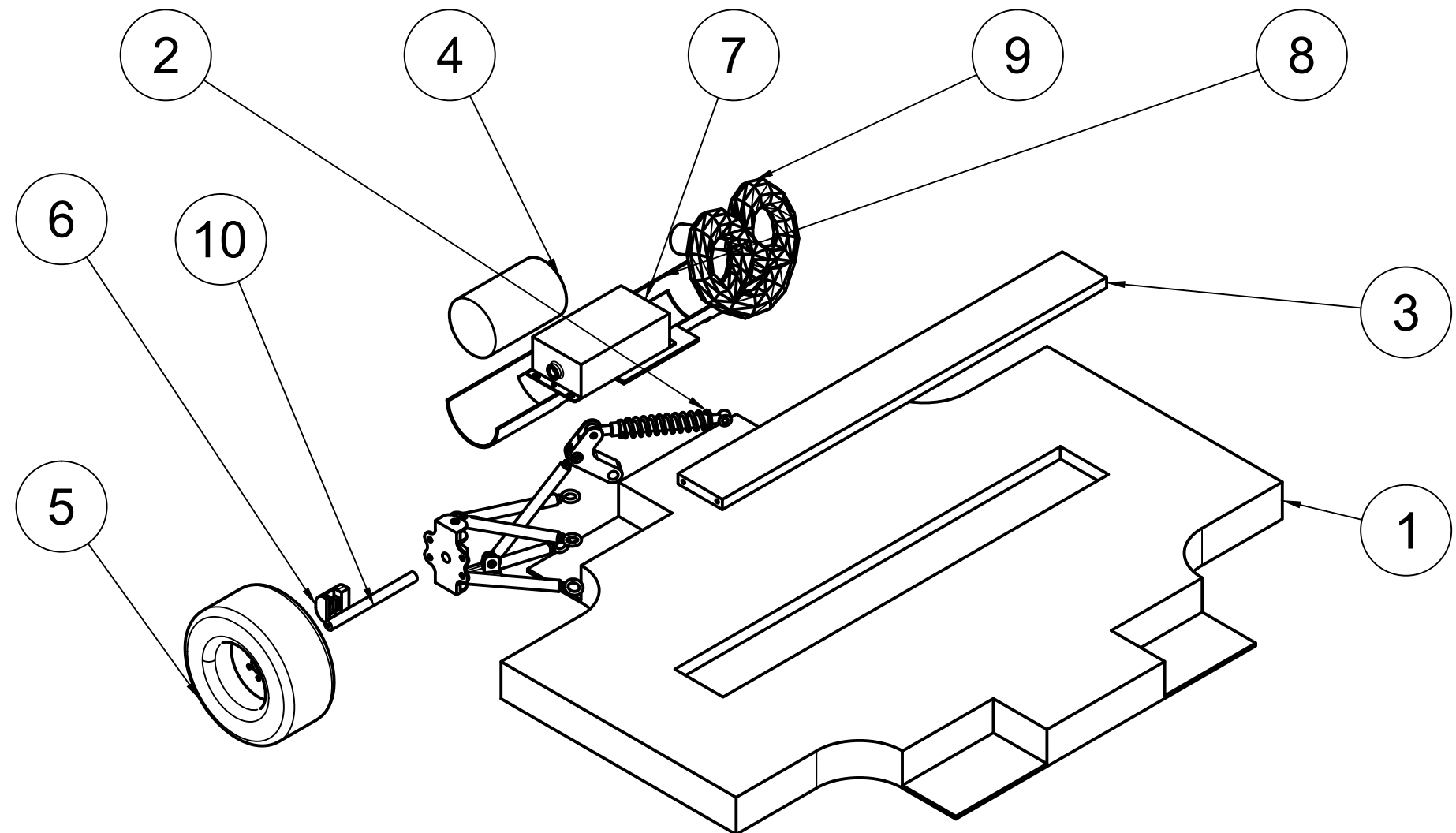


DETAIL B  
SCALE 1:8



ISOMETRIC VIEW

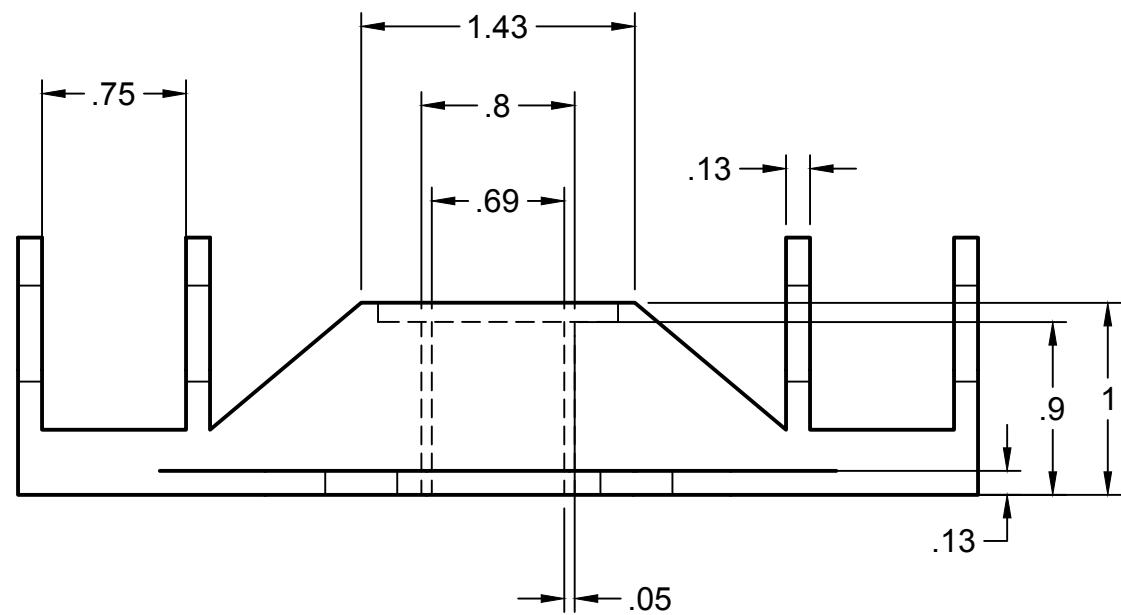
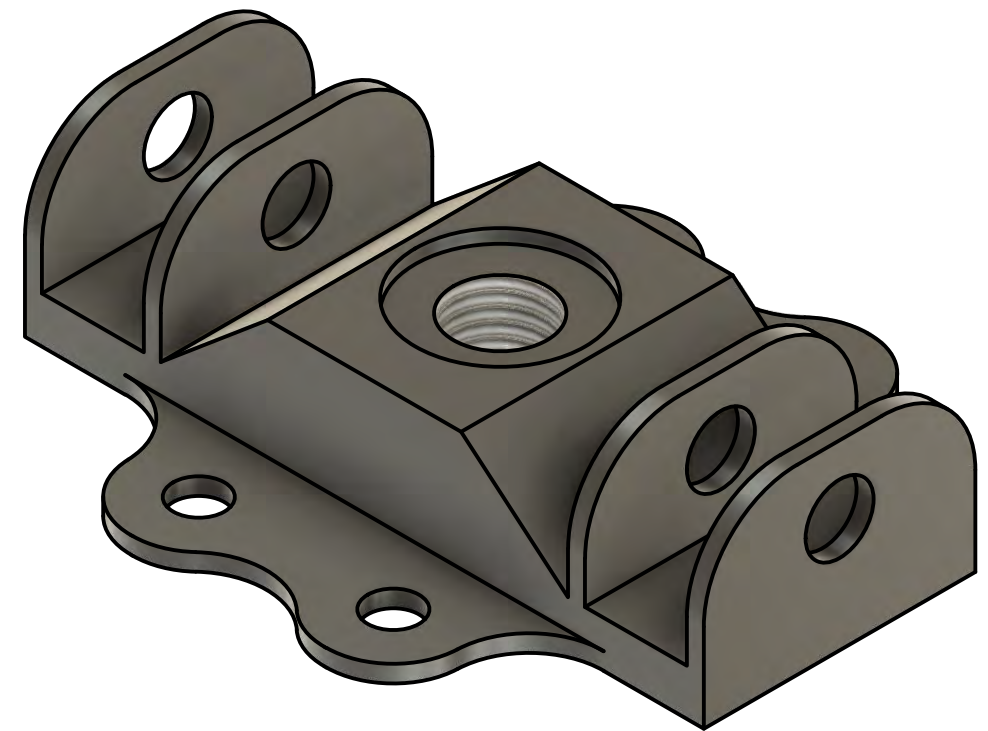
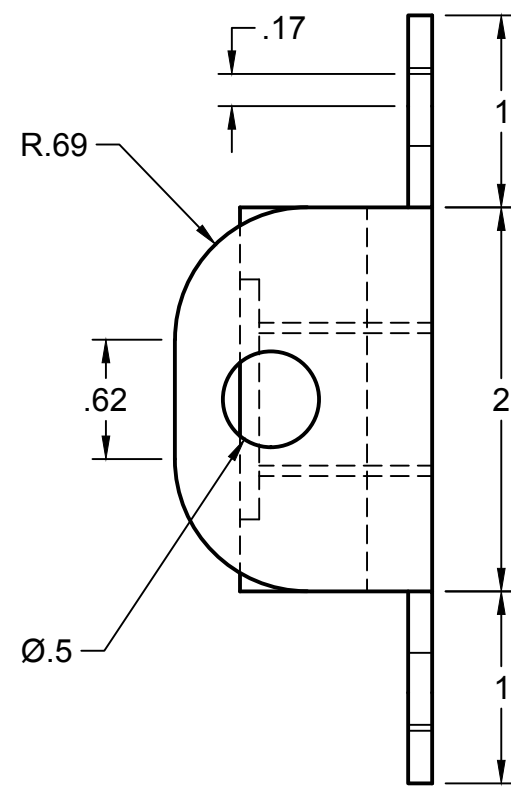
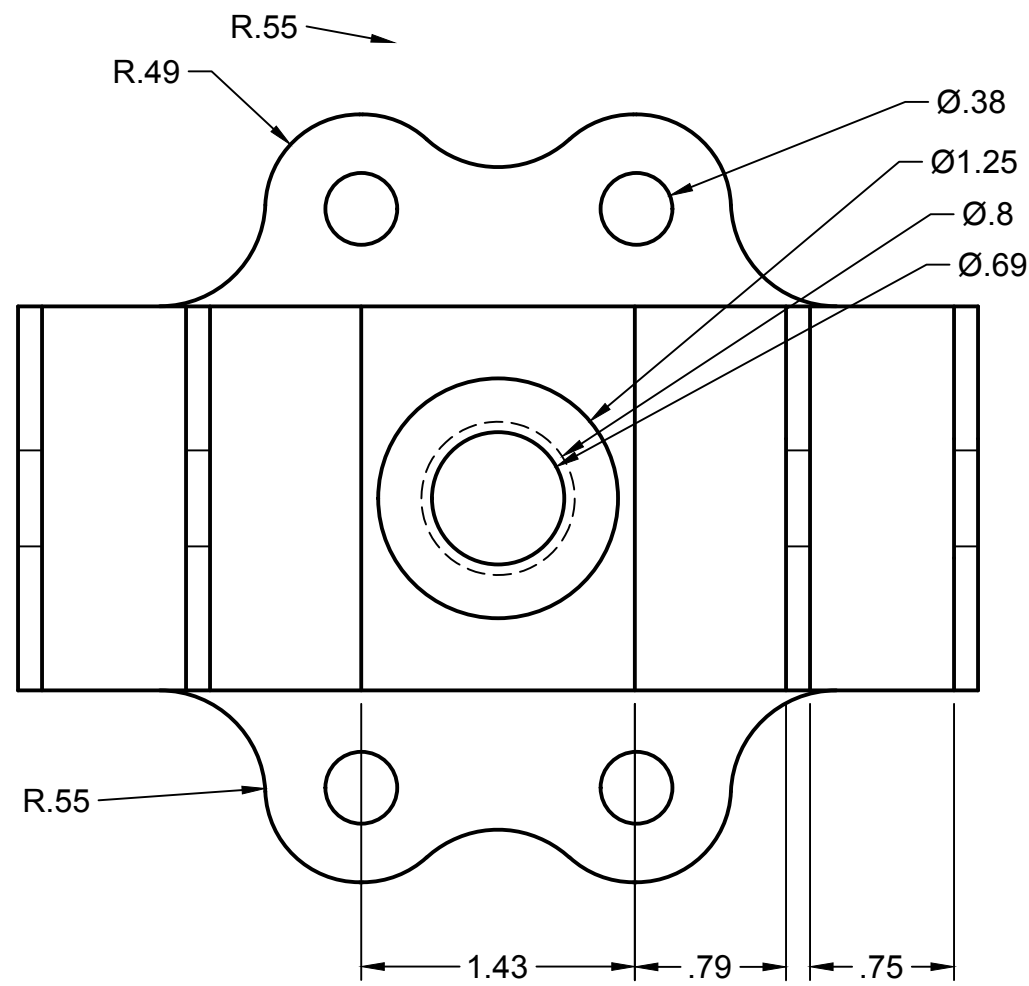
|          |             |  |            |        |
|----------|-------------|--|------------|--------|
|          |             | PROJECT  |            |        |
|          |             | <b>Bake&amp;Race</b>                                   |            |        |
|          |             | TITLE  |            |        |
|          |             | <b>Conceptual Car Assembly<br/>Selected Components</b> |            |        |
| APPROVED | SIZE        | CODE   | DWG NO     | REV    |
| CHECKED  | B           |  |            |        |
| DRAWN    | Angela Baek | 8/26/22  | SCALE 1:20 | WEIGHT |
|          |             |  | SHEET 1/2  |        |



ASSEMBLY EXPLODED VIEW

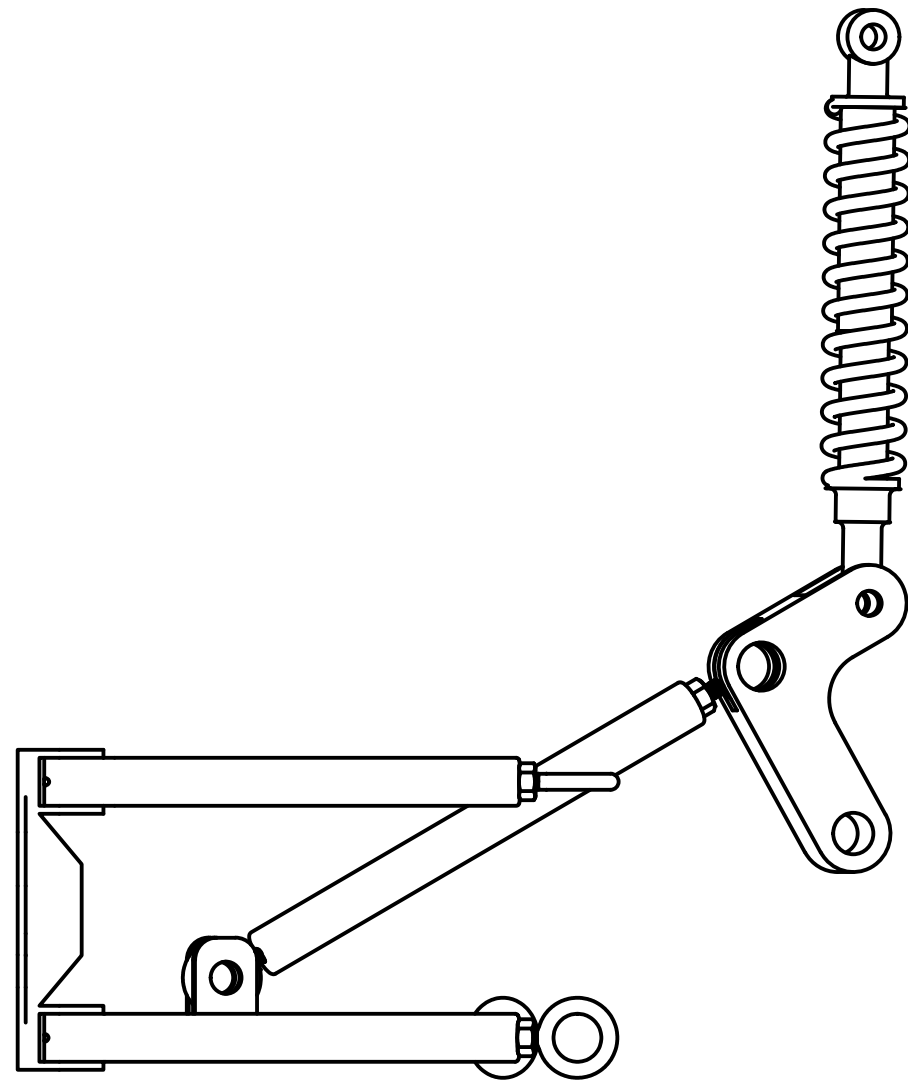
| PARTS LIST |     |                         |
|------------|-----|-------------------------|
| ITEM       | QTY | PART NAME               |
| 1          | 1   | FRAME BOTTOM V3         |
| 2          | 1   | SUSPENSION ASSEMBLY V24 |
| 3          | 1   | BATTERY PACK V2         |
| 4          | 1   | MOTOR V15               |
| 5          | 1   | WHEEL + RIM V4          |
| 6          | 1   | FRICTION BRAKE V4       |
| 7          | 1   | GEAR BOX V4             |
| 8          | 1   | ATTACHMENT BASE V3      |
| 9          | 1   | STEERING WHEEL V3       |
| 10         | 1   | DRIVE SHAFT V5          |

|                           |  |  |      |           |
|---------------------------|--|--|------|-----------|
| APPROVED                  |  | PROJECT  |      |           |
|                           |  | <b>Bake&amp;Race</b>                                   |      |           |
| CHECKED                   |  | TITLE  |      |           |
|                           |  | <b>Conceptual Car Assembly<br/>Selected Components</b> |      |           |
| DRAWN Angela Baek 8/26/22 |  | SIZE   | CODE | DWG NO    |
|                           |  | B  |      |           |
|                           |  | SCALE 1:10   |      | WEIGHT    |
|                           |  |  |      | SHEET 2/2 |
|                           |  |  |      | REV       |

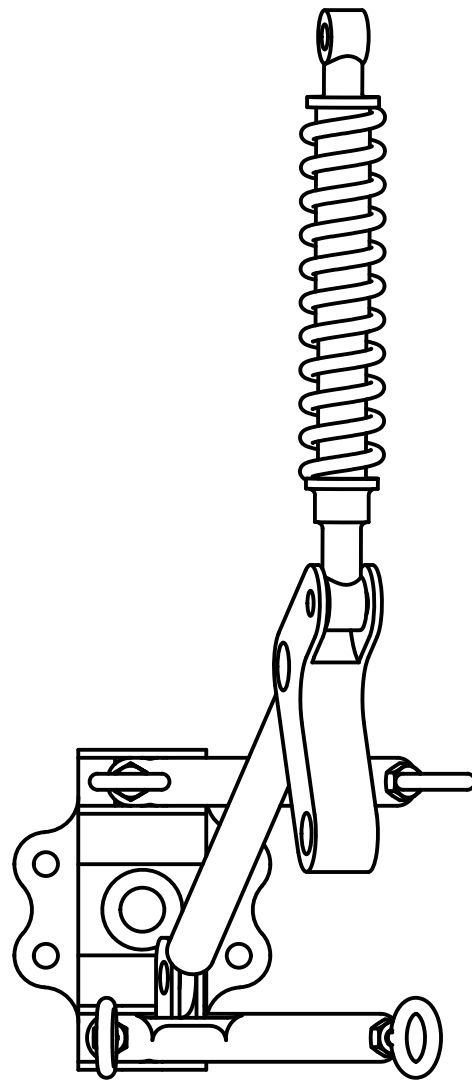


Measurements in Inches  
Material: Carbon Steel (ASTM A105)

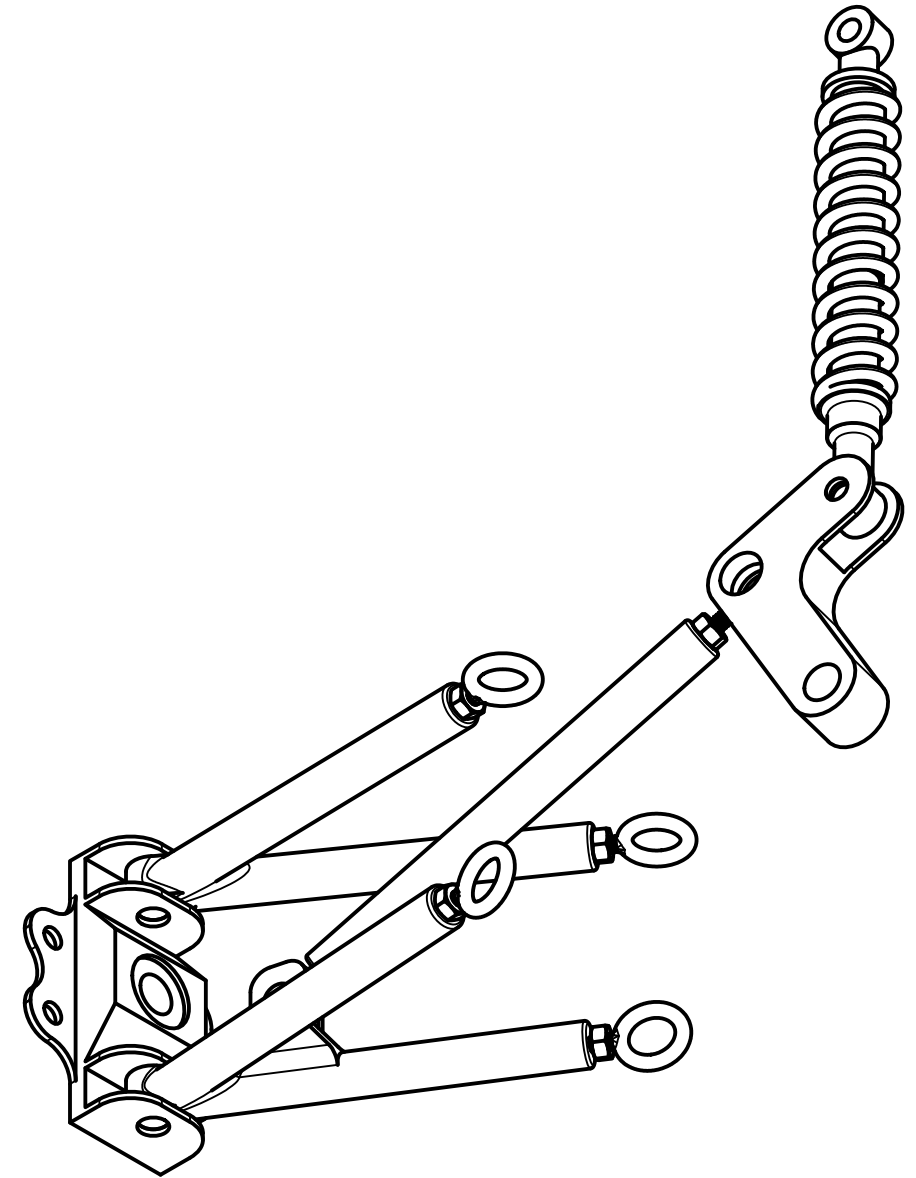
|             |           |                           |      |           |     |
|-------------|-----------|---------------------------|------|-----------|-----|
| APPROVED    |           | PROJECT                   |      |           |     |
|             |           | <b>Bake&amp;Race</b>      |      |           |     |
| CHECKED     |           | TITLE                     |      |           |     |
|             |           | <b>Suspension Knuckle</b> |      |           |     |
| DRAWN       |           | SIZE                      | CODE | DWG NO    | REV |
| Angela Baek |           | B                         |      |           |     |
| 8/26/22     | SCALE 1:1 | WEIGHT                    |      | SHEET 1/1 |     |



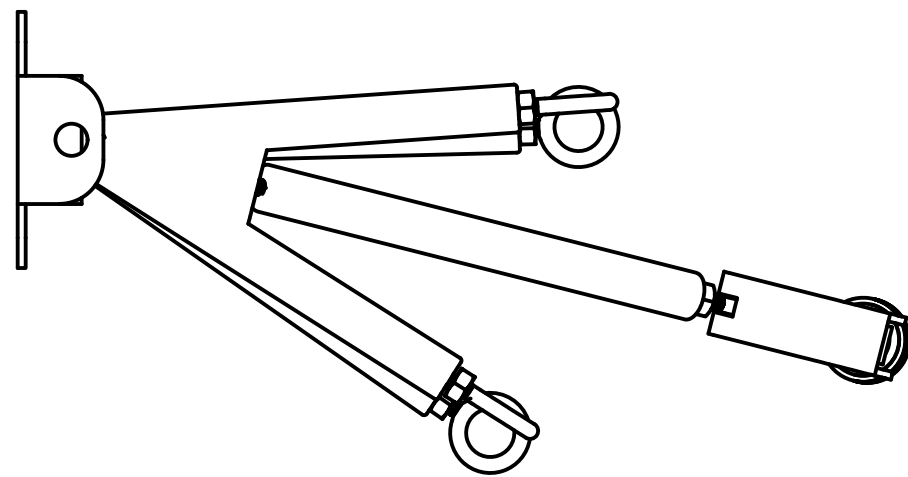
BASE VIEW



FRONT VIEW



ORTHOGRAPHIC VIEW

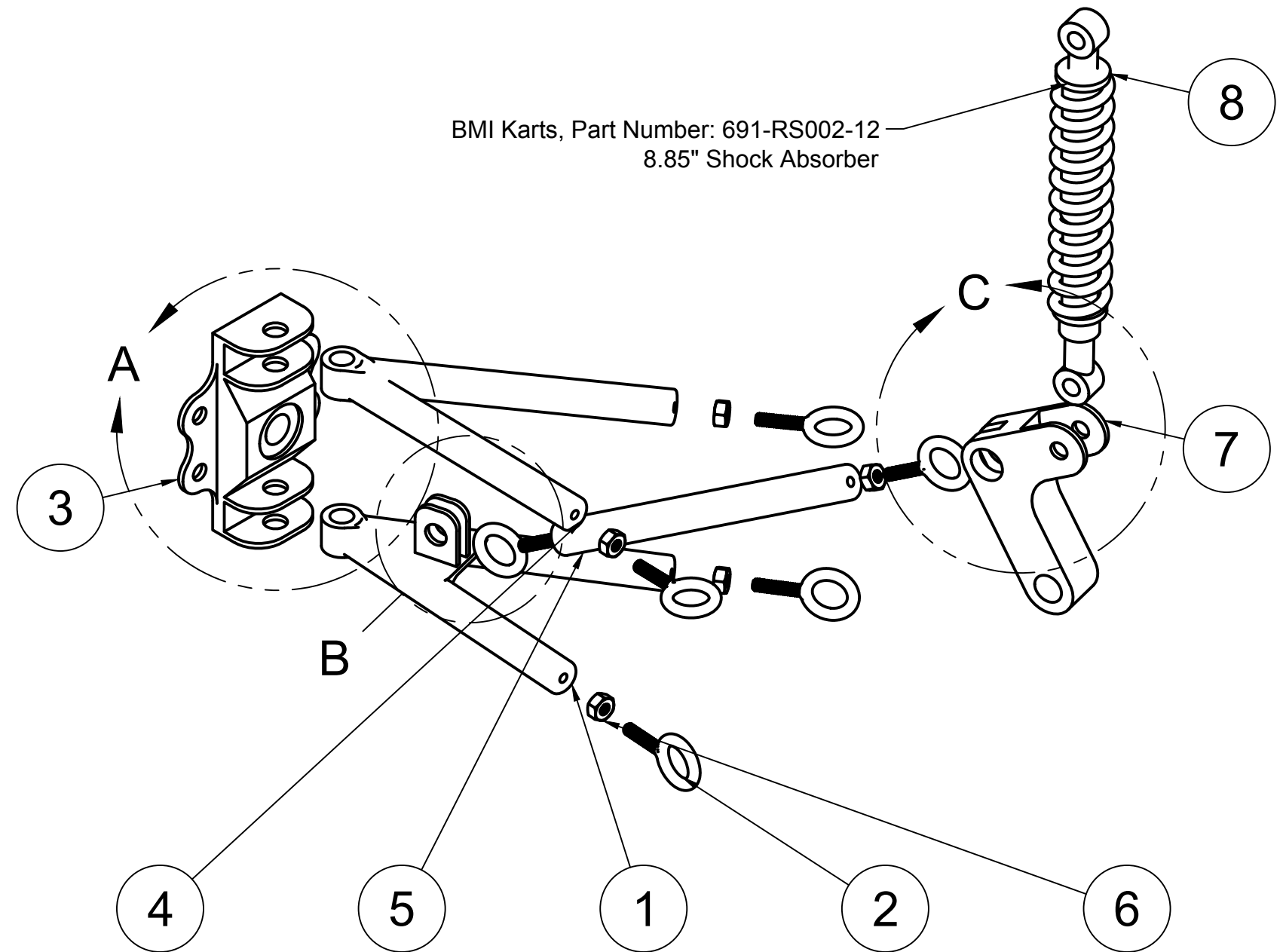


PROJECTED SIDE VIEW

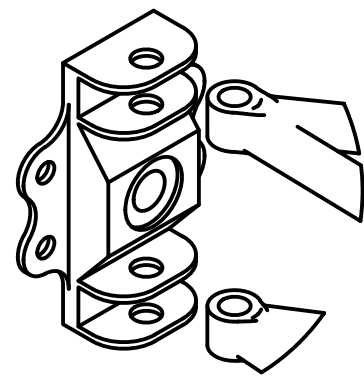
|          |             |                            |           |        |
|----------|-------------|----------------------------|-----------|--------|
|          |             | PROJECT                    |           |        |
|          |             | <b>Bake&amp;Race</b>       |           |        |
|          |             | TITLE                      |           |        |
|          |             | <b>Suspension Assembly</b> |           |        |
| APPROVED | SIZE        | CODE                       | DWG NO    | REV    |
| CHECKED  | B           |                            |           |        |
| DRAWN    | Angela Baek | 8/26/22                    | SCALE 1:3 | WEIGHT |
|          |             |                            | SHEET 1/2 |        |

| PARTS LIST |     |   |               |
|------------|-----|---|---------------|
| ITEM       | QTY | PART NAME                                     | MATERIAL      |
| 1          | 1   | SUSPENSION<br>BOTTOM WISHBONE<br>V8           | STEEL, CARBON |
| 2          | 6   | SUSPENSION<br>EYEBOLT V2                      | STEEL, CARBON |
| 3          | 1   | SUSPENSION<br>KNUCKLE V10                     | STEEL, CARBON |
| 4          | 1   | SUSPENSION TOP<br>WISHBONE V16                | STEEL, CARBON |
| 5          | 1   | SUSPENSION<br>SHOCK ABSORBER<br>CONNECTION V2 | STEEL, CARBON |
| 6          | 5   | SUSPENSION HEX<br>NUT V2                      | STEEL, CARBON |
| 7          | 1   | SUSPENSION<br>SHOCK SHOULDER<br>V2            | STEEL, CARBON |
| 8          | 1   | SHOCK ABSORBER<br>ASSEMBLY V10                |               |

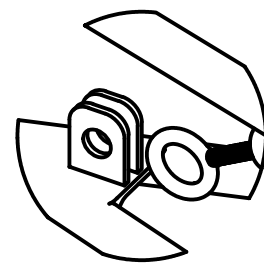
BMI Karts, Part Number: 691-RS002-12  
8.85" Shock Absorber



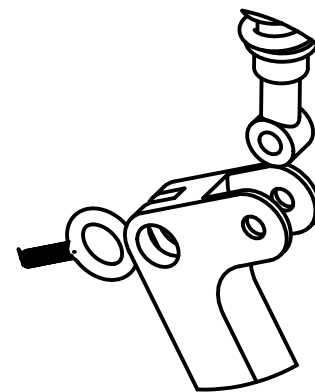
EXPLODED VIEW



DETAIL A  
SCALE 1:3



DETAIL B  
SCALE 1:3



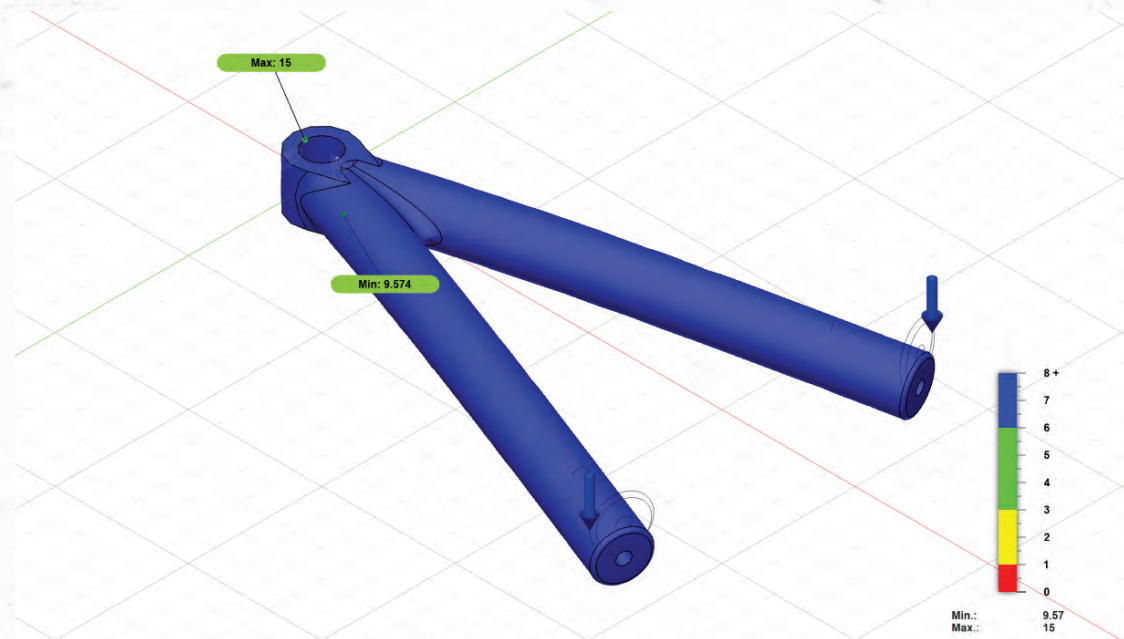
DETAIL C  
SCALE 1:3

|                   |  |                            |      |           |
|-------------------|--|----------------------------|------|-----------|
| APPROVED          |  | PROJECT                    |      |           |
|                   |  | <b>Bake&amp;Race</b>       |      |           |
| CHECKED           |  | TITLE                      |      |           |
|                   |  | <b>Suspension Assembly</b> |      |           |
| DRAWN Angela Baek |  | SIZE                       | CODE | DWG NO    |
| 8/26/22           |  | B                          |      |           |
| SCALE 1:3         |  | WEIGHT                     |      | SHEET 2/2 |
|                   |  |                            |      | REV       |

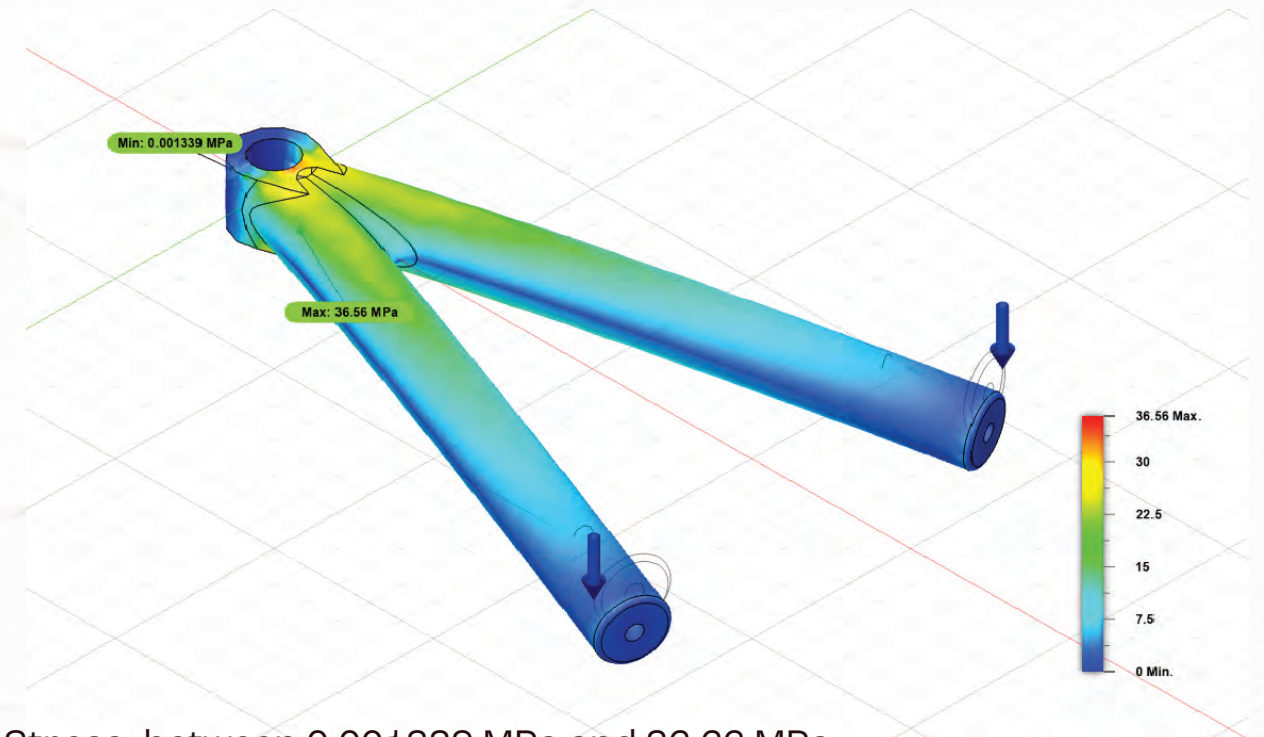
# Double Wishbone Suspension System FEA (finite element analysis)

Simulations through Fusion 360 / Solidworks

top  
wishbone



Safety Factor: between 9.574 & 15

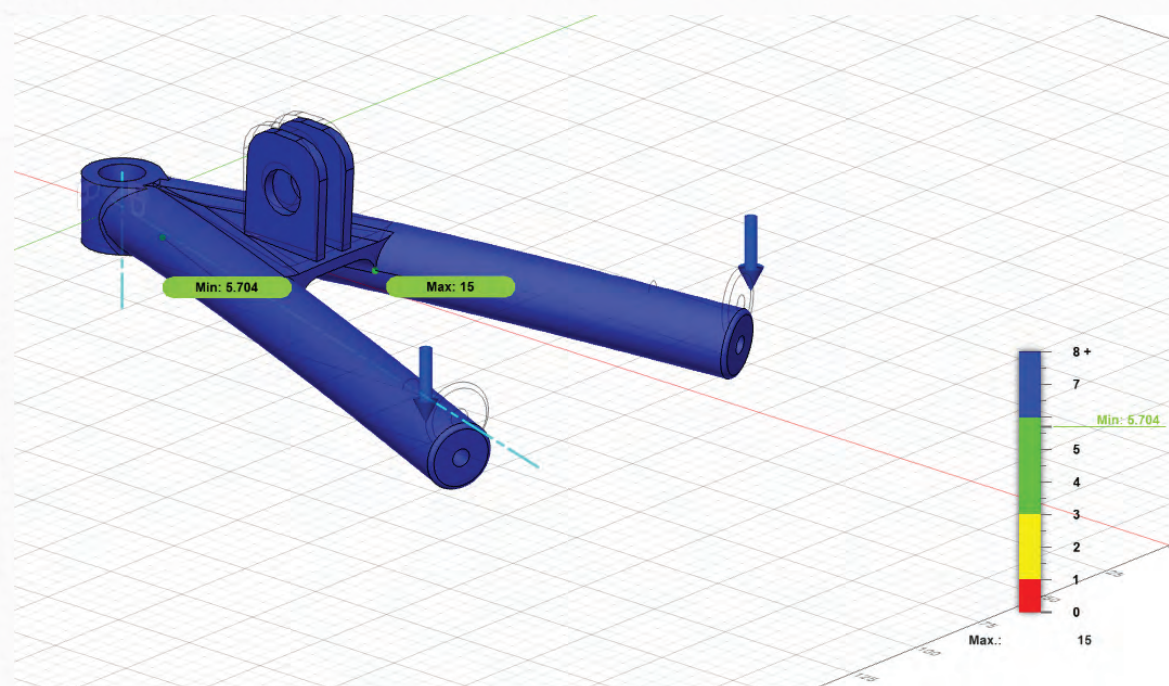


Stress: between 0.001339 MPa and 36.66 MPa

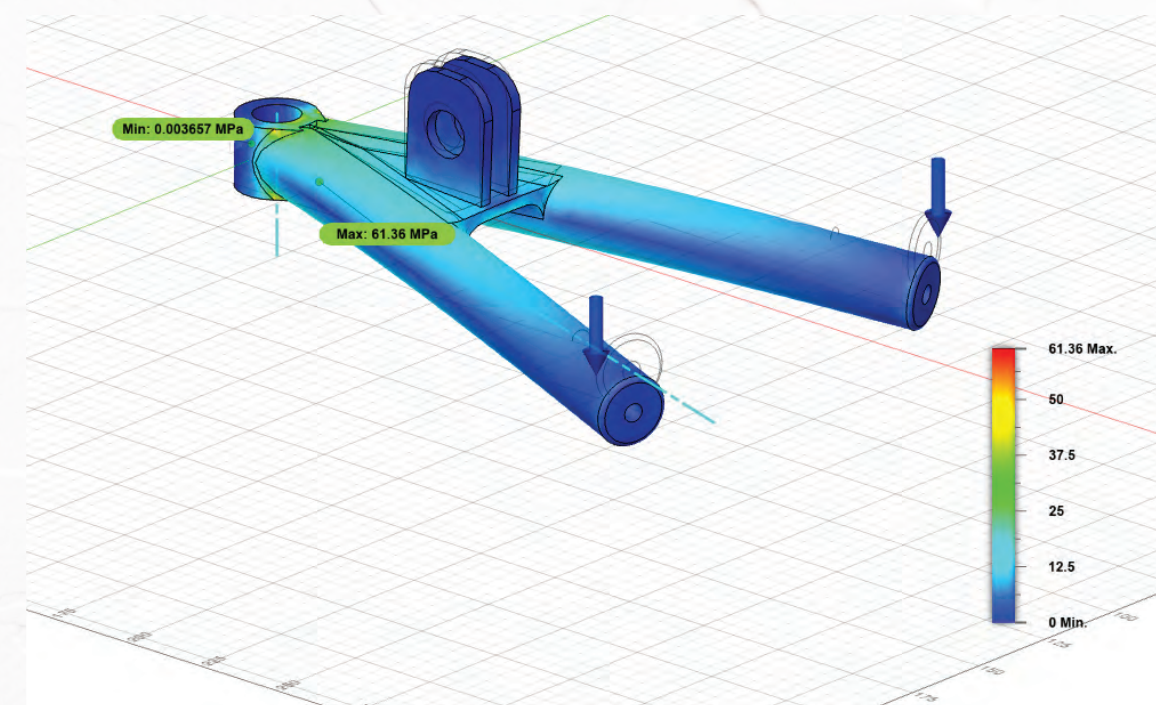
a Safety Factor within and above the green area of the chart is considered safe; both simulations exceed safety expectations.

The simulations were done with the entire kart's weight on the end of the part (typically, the majority of the stress would be supported by the shock absorber), so the MPa values are not a source of concern.

bottom  
wishbone



Safety Factor: between 5.704 & 15



Stress: between 0.003657 MPa and 61.36 MPa