**Design**

**Chassis: The supporting frame and envelope of a motor vehicle**
- TIG welded 4130 Chromoly Steel Spaceframe Chassis
- Primary envelope features Front Bulkhead, Front Roll Hoop, Side Impact Structure, and Main Roll Hoop
- Proper triangulation ensures load cases are transferred into tension and compression
- Integrates all supporting systems and takes on various load cases from braking, cornering, and accelerating
- Extra room behind driver to accommodate large energy storage unit

**Fixtures:** *Equipment to hold pieces in fixed positions while fabricating*
- Fixture table dimensions: 4’x8’ with 3/8-16” tapped holes
- 1/4” thick hot rolled pickeled and oiled steel table with legs
- Designed to be 60% reusable
- Constrain chassis tubes from movement while being welded
- 16 perforated aluminum towers provide various heights for fixture arms
- 46 steel fixture arms and clasps utilized to match thermal dissipation of welding while keeping tube members in place
- 21 aluminum U-block constrains lowest tube members

**System Specifications**
- Weight: 72lbs
- Material: 4130 Chromoly
- Filler Rod: ER70S-2
- Tubes Used: 80
- Weld Time: 56 hours
- Torsional Rigidity: 2,450 ft-lb/deg at highest loading scenario
- Maximum moment of 170 ft-lbs applied, about the roll center, from suspension
- FEA Simulation represents realistic scenario with fixed rear trapezoid (purple) of the chassis and a couple moment on the front belcrank (red) tubes
- FEA Simulation can be accurately tested by our proposed test fixture (below). This can prove confidence in FEA going forward
- Proposed Test Fixture costs $398.67

**Analysis and Testing**
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