Appendix - Figures

Figure A - Frame Being Constructed in Jig

Figure B - SolidWorks Capture of Differential Design
Figure C - GEN 1 ODU Formula SAE Vehicle (#72)

Figure D - SkidPad Track Layout Dimensions
Figure E - Patran/Nastran Side Impact Frame Analysis

Figure F - Unsprung and Sprung Mass Diagram
Figure G - FSAE Car Center of Gravity Diagram
Figure H - Natural Frequency Sprung & Unsprung MATLAB Graph

Figure I - Caster, Camber, Toe-Out Angle Visualization

CASTER ANGLE
Caster is the inclination of the steering axis from vertical in the longitudinal plane (wheel viewed from the side.) Positive caster is achieved when the steering axis is inclined toward the rear of the vehicle at the top in the side view. Negative caster is when the steering axis is inclined toward the front of the vehicle at the top in the side view.

CAMBER ANGLE
Camber is defined as the inward or outward tilt of a wheel at the top relative to vertical at the center of the wheel in the lateral plane. If the top of the tire is leaning inward toward the center of the car (viewed from the front of the vehicle,) the tire has negative camber. If top of tire is leaning outward, it has positive camber.

TOW-OUT
Tow-out is the difference in distance between the front and rear axle measurements of tires on the same axle in the center of the tread surface at spindle height, where the front measurement is greater than the rear. Tow-in is opposite. Tow-out is a static alignment made to minimize tire scrub and rolling resistance, which develop when a car is cornering.
Figure J - Motion Ratio Dimension Visual

Figure K - Patran/Nastran Front Impact Frame Analysis
Figure L - Completed Frame Powder Coated for Race

Figure M - Differential Mount SolidWorks Analysis
Figure N - PE3 ECU Manifold Air Pressure Compensation Window

Figure O - KAZ Technologies Steering Rack Technical Data
Figure P - Force Graphs for Upshift and Downshift

Figure Q - Pneumatic Shifting System in Upshift
Figure R - Pneumatic Shifting System in Downshift

Figure S - Brake Kinetic Energy MATLAB Graph