

ME, ECE, BE Capstone Design Programs

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Team 4: 1929 Buick Suspension and Drivetrain Restoration

Background

- 1929 Buick Model 47 chassis
- 1963 Buick Riviera donor vehicle
 - Wildcat V8 Engine: 401 [cu. in], 325 [hp], 445 [ft*lbs]
 - Dynaflow transmission (1.83:1)



Specifications

- Support weight: 4,000 [lbs]
- Ride height: 10-12"
- Wheel base: 121"
- Wheel rate: 1-2 [Hz]
- Turning Radius: <20'
- Alignment: Toe: +1/8°, Chamber: +1/2°, Caster: +1°
- Brake pressure: 700 [psi]
- Radiator: 18" wide x 28" tall

Manufacturing

- 1. Frame Reinforcement** – Plasma cut steel sheets to form “boxing-in” templates in order to enclose c-channel frame beams. Professionally welded into frame to strengthen & provide surface for mounting.
- 2. Engine & Transmission Mounts** – Engine & transmission assembly measured in desired position. Fabricated mounts welded onto frame.
- 3. Front Suspension** – Front crossmember & spring caps cut & welded onto frame to allow for installation of bolt-on Mustang II front suspension kit.
- 4. Rear Suspension** – Repurposed rear axle measured in desired position. Fabricated control arms installed via brackets on frame & axle.



Objective

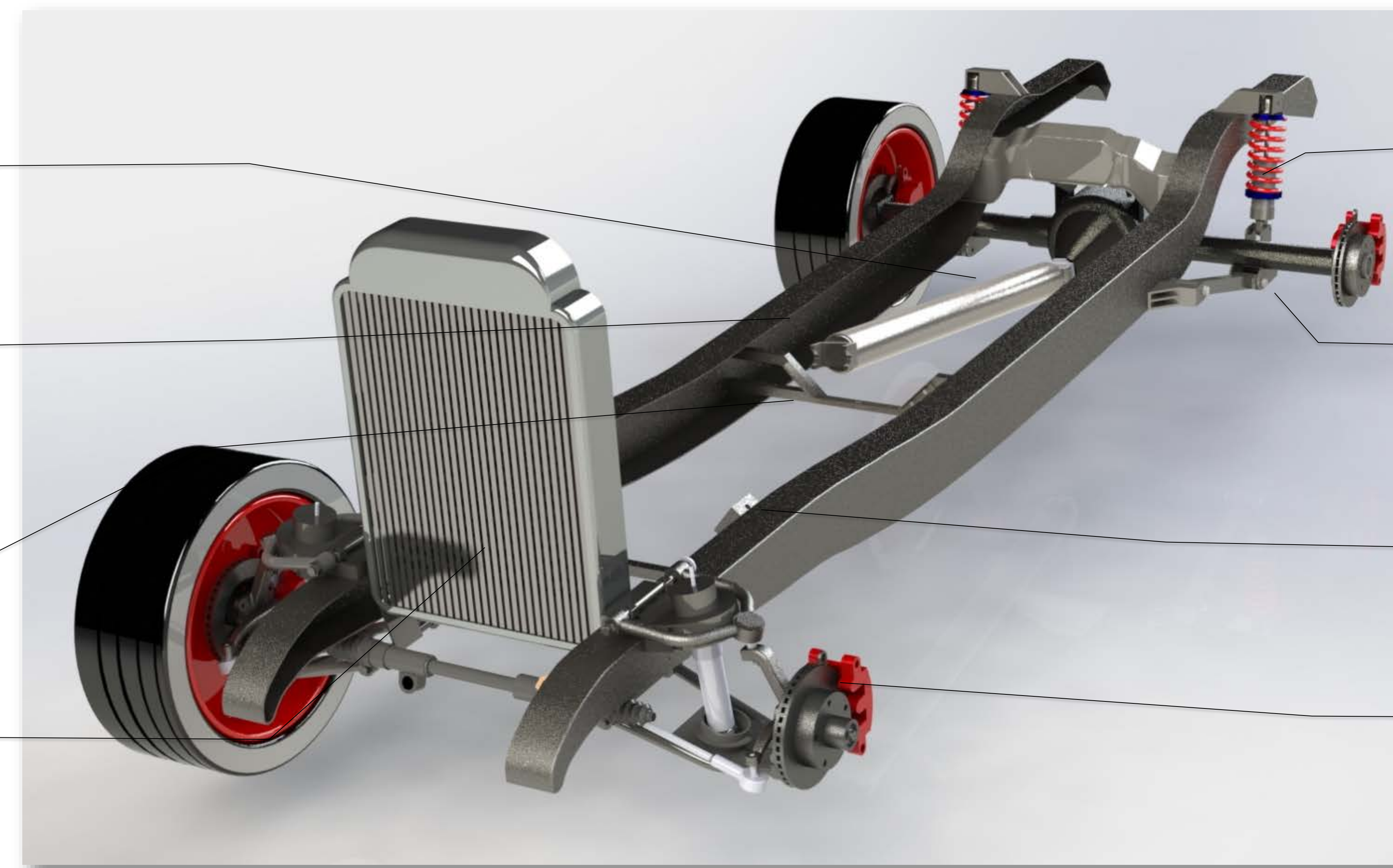
Modify the existing 1929 Buick chassis in order to implement updated suspension and drivetrain systems.

Modified Repurposed Driveshaft

Reinforced Boxed-in Frame

Transmission Mount Support

Custom Aluminum Downflow Radiator



Rear 4-Link Coil-over Suspension

11 inch Disc Brakes

Engine Mount Support

Mustang II Independent Front Suspension

Testing

Frame Tensile Testing

- Ultimate Strength (σ_{ult}) = 43.88 ksi
- Endurance Limit (S_e) = 20.16 ksi
- Yield Strength (σ_y) = 28.8 ksi
- Low carbon steel

Suspension Deflection

- Loaded chassis with anticipated total vehicle weight
- Weight support: 4,000 [lbs]
- Final ride height: 8"



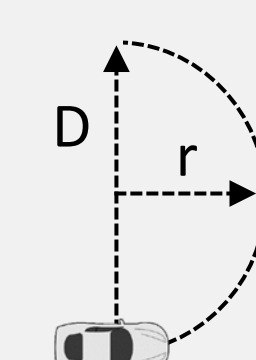
Weld Penetration

- Visual NDT inspection



Turning Radius

- Turn steering wheel to maximum extent
- Performed 180° turn, measured centerline
- Turning radius: 18'



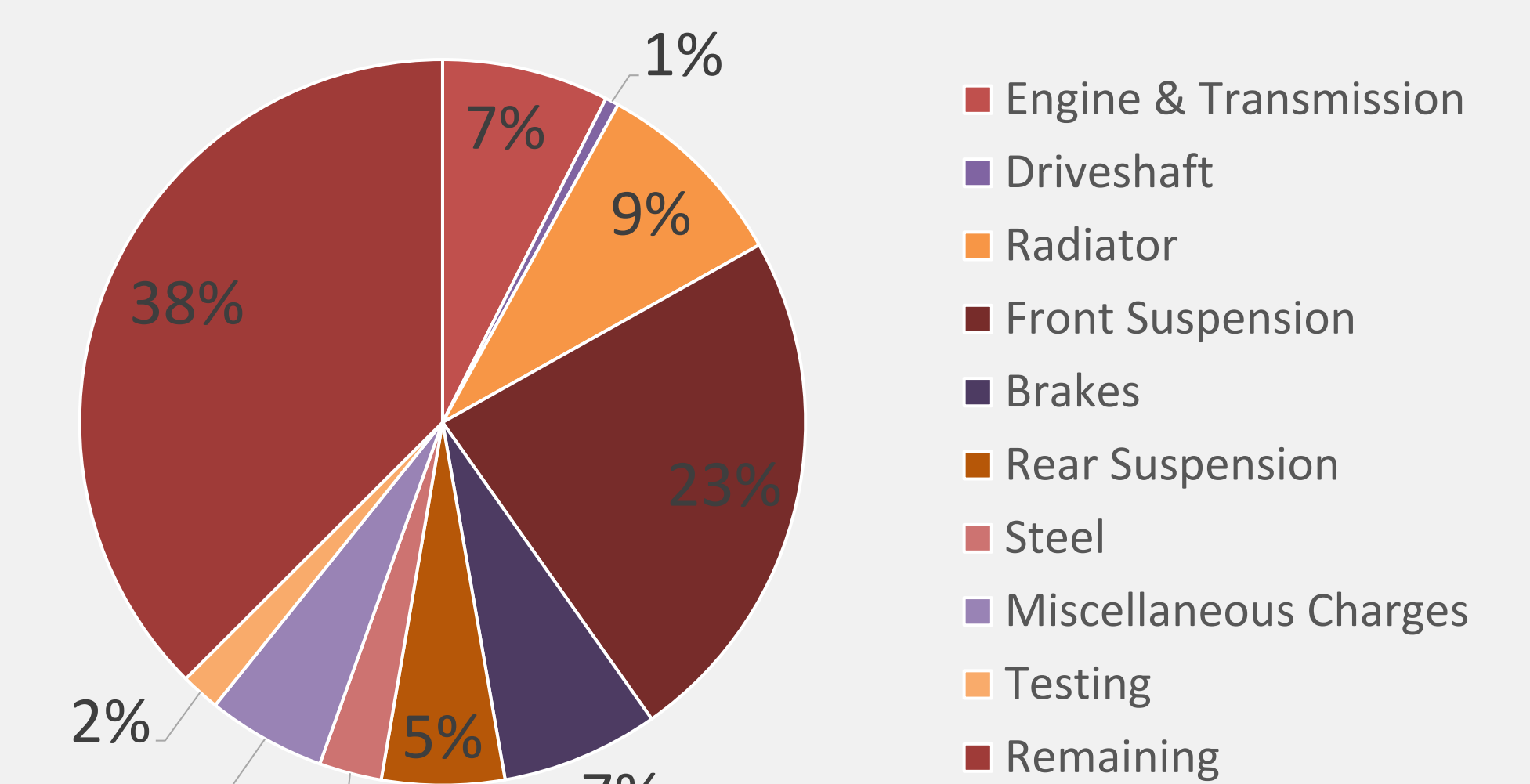
Conclusion

The delivered product was a rolling chassis, adapted to accommodate repurposed engine & transmission, and modernized suspension systems. The chassis was drivable, complete with functioning brakes, steering, & ignition.



Budget

Total Budget: \$10,000



Project Start

Concept Generation

Analysis

Final Design

Manufacturing / Analysis Refinement

Testing

September

October

November

December

January

February

March

April

May

Sponsors: Kearney Lejeune, Owner, *Kel's Custom Classics, LLC*

Advisors: Dr. Glenn Sinclair, Bob Waltman, Dick Juneau