



— 2023
818ZX
BUILD BOOK

GRM \$2000 Challenge



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Subteam Leads

Kandhan Nadarajah	Lead Engineer/Engine Lead
Alex Wheeler	Transmission Lead
Kyle Socha	Safety Lead
Gracie Zhang	Coolant System Lead
Gabe Londres	Suspension and Braking Lead
Edwin Acosta	Fuel Team Lead
Zach Vermuelen	Engine Mounting Lead
Brett Patrick	Driver Controls Lead
Andrew Knops	Bodywork Lead

General Members

Abel Abebe	Fuel + Transmission
Carly McCoy	Fuel + Transmission
Craig Ackerman	Fuel + Transmission
Owen Gil	Transmission + Body
Ryan Baker	Transmission + Engine
Alex Castrejon	Cooling + Engine
John Phan	Engine Wiring
Nathan Nichols	Engine Wiring + Driver Controls
Aaditya Hingoo	Transmission + Fuel
Kendrick Xuan	Braking and Suspension + Driver Controls
Noah Singer	Braking and Suspension + Driver Controls
Austin Buck	Engine Wiring
Jose Rodriguez	Body
Clay Schimdt	Body
Matt Christie	Fuel
Thomas Thwaite	Transmission
David Knox	Body + Engine
Eric Villegas	Body

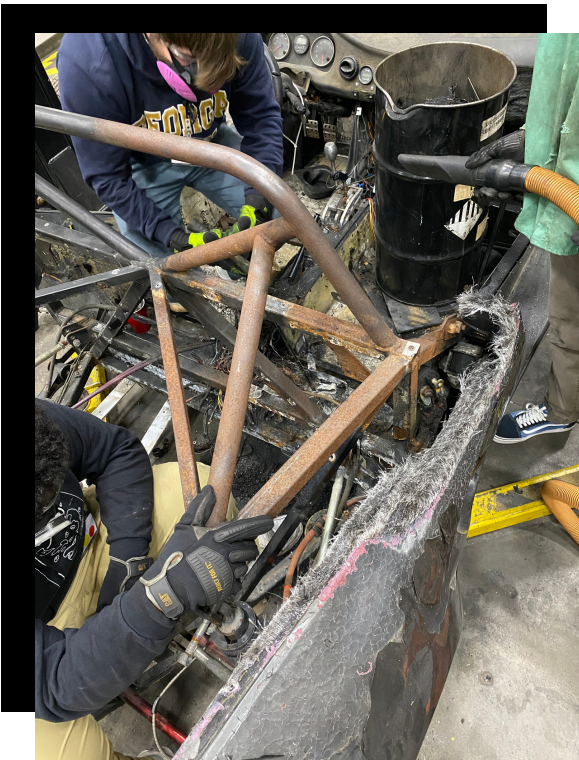


BUILD SUMMARY

Faced with the challenge of a shortened build cycle due to the switching of the competition dates, we chose a build we thought would be manageable for a school semester. The car we brought reflects months of hard work and dedication. The 818zx is a Factory Five 818 kit car with a Nissan 300zx shell that covers a Honda K24 powerplant. This combination of different parts and pieces presented us with a unique challenge, one that we solved through countless hours of analyzing, modeling, and fabricating. The final product is a car we are proud to label with the Georgia Tech logo.

Teardown

Bought for a steal due to fire damage, our 818 frame was a perfect platform to start with for an expedited build cycle. Originally an EV swap, the 818 was equipped with many parts we were able to recoup, leaving half the budget for everything else on the car.



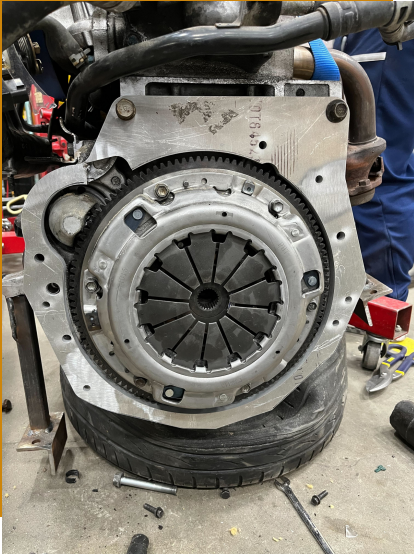
Due to the fire damage, we spent many tedious days removing the waste. Sourcing a new 818 body, we continued forward with our plan to build a capable track weapon.

PREPERATION

In order to prepare the 818 for its eventual engine swap, we stripped it of any and all wires, hoses, and broken EV parts. The result was an ultralight, race-ready chassis, a perfect platform to continue building.

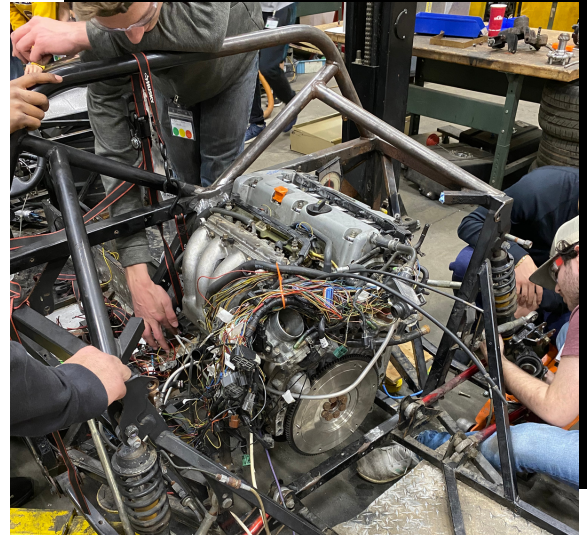


DRIVETRAIN



Custom Adapter Plate

K24



Test-fitting Engine

For our drivetrain, we chose a Honda K24 due to its ease of installation, reliability, and parts availability. To mate the K24 to the existing Subaru transaxle, we designed a custom adaptor plate out of welded scrap aluminum.



Mating Engine to Trans

Shifter



Engine mounts

To make the engine fit in the 818, we had to make custom engine mounts. We also made custom transmission mounts to accommodate a slightly modified transmission position, which was needed to make room for the engine.

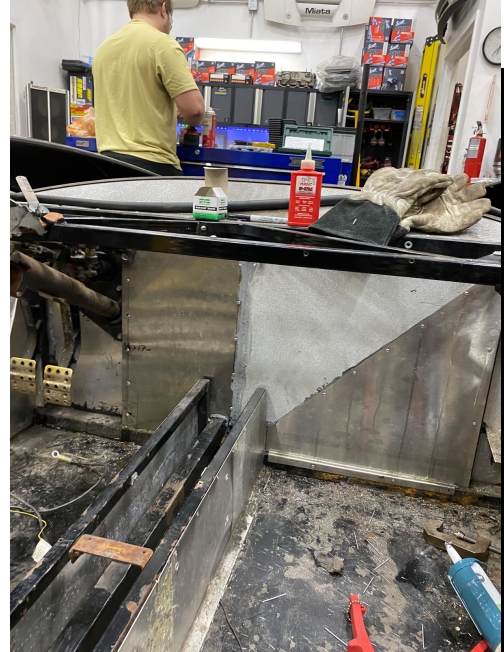


We worked on several cosmetic modifications to the engine. Firstly was to paint the valve cover and intake manifold, and we also created a cool logo bracket to cover the injectors

Mounting the Fuel Cell and Pump



Fabricating a Firewall

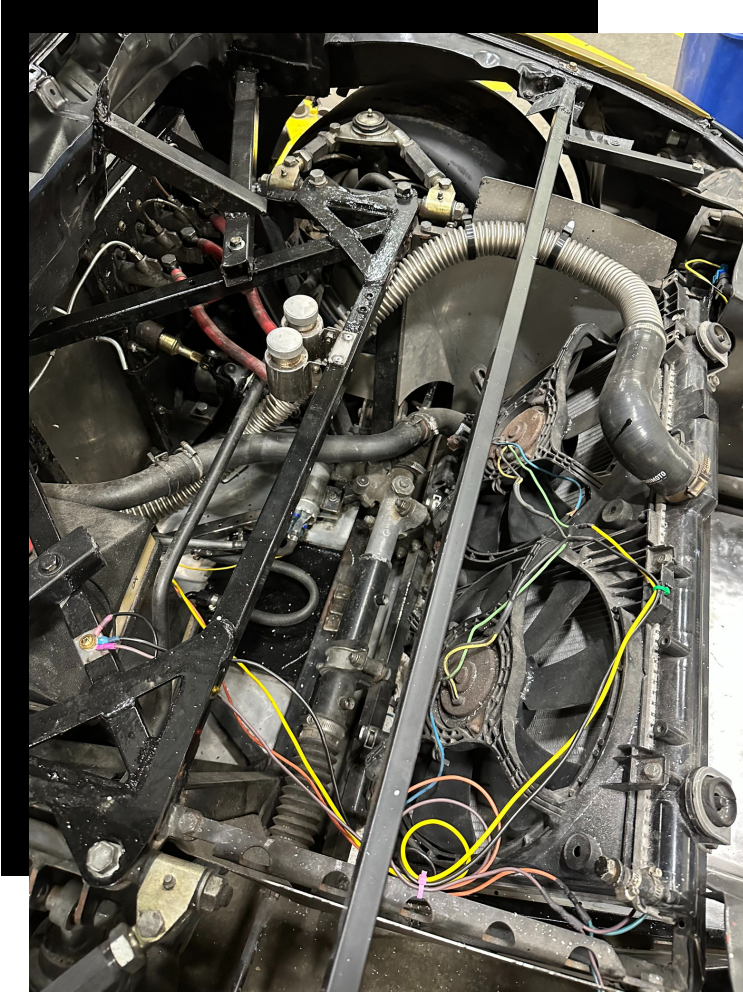


Hard Fuel Lines found in the dumpster

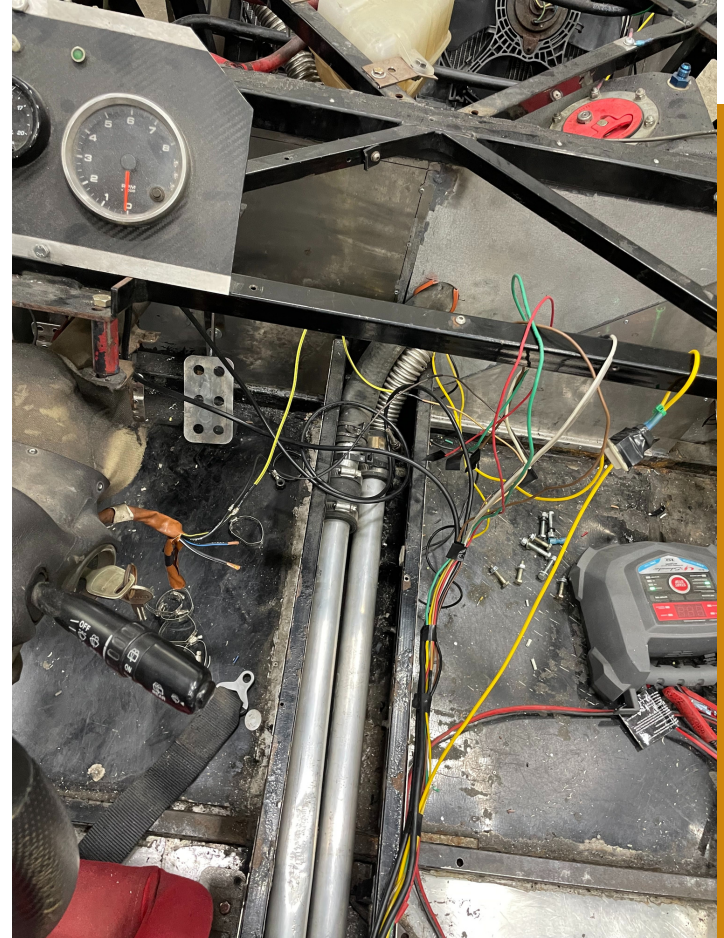
We had to fabricate several firewalls around the cabin due to the fuel cell being mounted in the front. We also found some discarded fuel lines in the dumpster from one of the other motorsport teams. We also attempted to use these fuel lines as shifter cable housings, but eventually fabricated a hard linkage.



Radiator and Coolant Lines



We found a WRX radiator off of Facebook and used some of the cut up coolant lines from the K24 along with some hard lines that were in the original 818 chassis to create our cooling system



The coolant lines ran from the front of the car, through the firewall and the trans tunnel, until it was eventually connected to the engine in the rear.

BRAKES AND SUSPENSION

Replacing the Brakes

The 818 has brakes from a WRX, but we decided to replace them as the ones on the vehicle were in bad shape.



We also used the original suspension off the 818, also from a WRX, as that suspension was working just fine for our application.

Modification from stock controls

We made several adjustments to the 818 driver controls to accommodate the K24. We moved the seat and firewall and created a new gas pedal.

We also reused the 818 shifter, finding a combination of 818 cables and square stock due to a portion of the 818 cables being destroyed in the fire.



A custom gauge cluster was added to improve driver sightlines and ergonomics.



300ZX BODY

In order to maintain our non-exhibition status, we had to source a cheap body with a similar wheelbase to the Factory Five 818. After weeks of searching, we acquired a 1990s Nissan 300zx.



Body Sourced



Test-fitting body to frame

Fitment

To get the body to fit, we had to cut the front fenders to move the wheel arch back three inches. For our front bumper, we decided to keep the 818 bumper untouched, mounting it to the chassis.



Test-fitting after bodywork



Prepping for paint

We then blended the body into the bumper, and created some side cards to join the 300zx and 818 body lines.



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