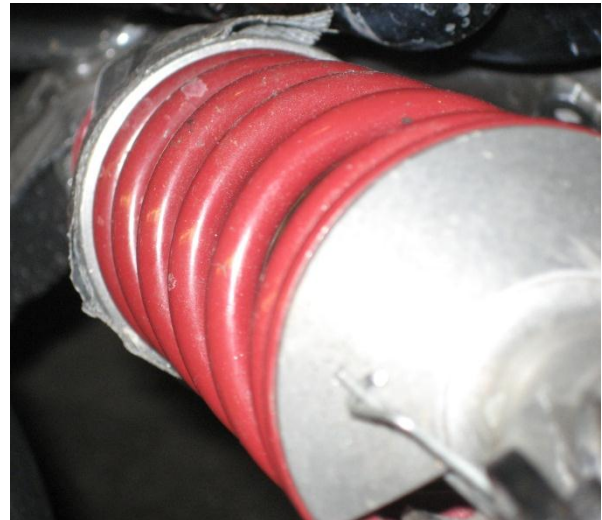


The car being designed this year by the UNH Precision Race Team will be different from cars we have designed in past years. Innovations and improvements have been made in many areas, including the suspension, engine, controls, and frame.

### ***Suspension***

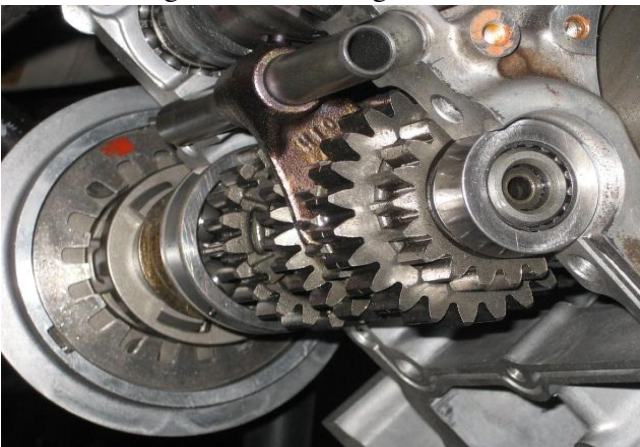
There are many new aspects to this year's car in terms of the suspension system and design being used for the competition. We are currently testing different ways to reduce the car's un-sprung weight. By cutting the weight of the car it will also reduce the car's wheel hop which occurs when the back end loses traction and slides during braking, causing the back end to hop up and down. By reducing the wheel hop, the wheels will be in contact with the racing surface more, allowing for better control. The current design uses a solid rear axle in order to eliminate problems that occurred in previous years due to an independent rear suspension setup with a differential. A new design that will be incorporated into this year's car is an adjustable bracket to change the angle of the rear axle during cornering. Also in a continuous effort to reduce the weight of this year's car, the rear links will be made out of carbon fiber, one of the lightest and strongest materials availa-

ble. In addition, a rear sway bar will be added to the rear suspension. The anti-sway bar will help stabilize the car by significantly reducing the amount of body roll the chassis experiences while it's cornering. There have also been advancements in the chain tensioner, steering, and rear braking system to fix the issues that were experienced at last year's competition.

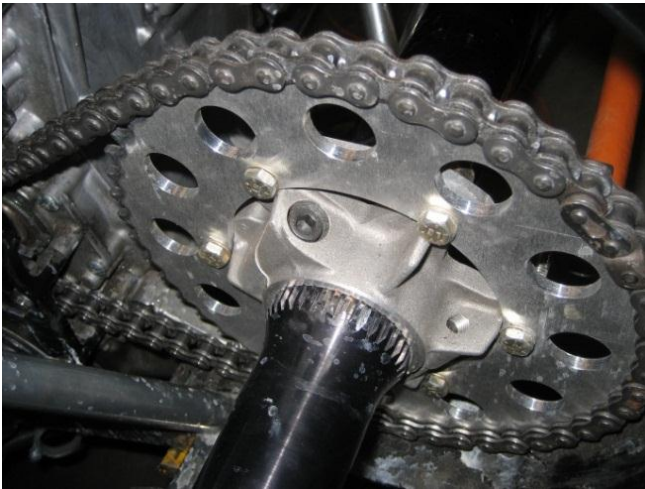


### ***Engine***

This semester the focus of the Drive Train group has been identifying problem areas and fixing them, as well as possible improvements on last year's design. Last year's drive train experienced a few problems ranging from issues with the car starting to the car experiencing lag under acceleration. Tests have been done to identify the cause of these problems. Many of these problems can be attributed to burnt pins and blown fuses in the engine control unit which means that extra care will be taken this year when wiring the main power supply connections, as well as incorporating lower current aftermarket relays which will reduce the likelihood of future pin burnouts. The lag issues



during acceleration can be cut by up to 50% when the tuning is changed from Alpha-n, throttle position, to manifold air pressure (MAP) based tuning. By switching to manifold air pressure based tuning we have been able to cut the injector pulse width by half. In turn, along with other contributing factors, the fuel efficiency of the car will be doubled. Also, we will hopefully be able to distribute the power more efficiently. This efficiency will allow for a car that will use much less fuel than previous cars which is needed to do well in the fuel efficiency segment of the Formula SAE competition.



## Controls

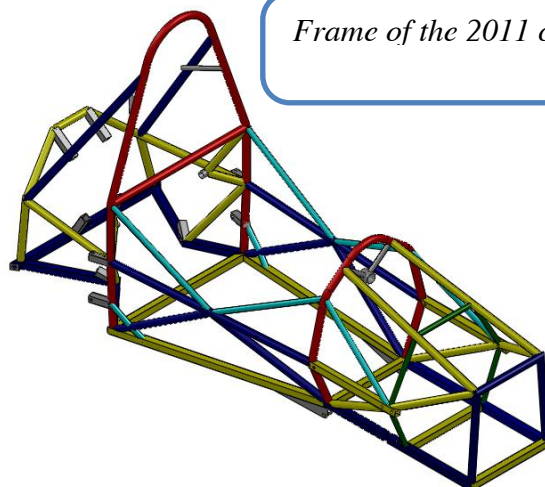
For the first time in team history the car will implement a paddle shifting system, rather than the traditional bump shifter. Paddle shifters send electric signals to a system that actuates the shifter arm on the transmission. The signal is sent via

paddles, located on the steering wheel, to the shifting arm in a way that allows the driver to change gears without having to remove their hands from the steering wheel. The design implements an electric DC motor, in order to actuate the shifter arm.

Although each group is making progress under the strong leadership of this year's seniors, the future of the UNH Precision Race Team is also bright with a strong freshman contingent. A new pedal box is needed and a team of all freshmen is designing and fabricating it. The new pedal box is required to take a force of 2000N without failure. Also it must be easily removable if any changes need to be made to the pedals.

## Frame

There is little that is allowable within the rules of the competition that can be changed with the frame of this year's car. However, changes have been made to the rear part of the frame. In past competitions that area of the frame was clustered, the plan is to open the frame up a little bit in order to create additional space so that not everything is on top of each other.



*Frame of the 2011 car*

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