# Formula Technion Racing Team

# Drivetrain System

Design of a New Project Course #034353/4

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## Abstract

The **Drivetrain team** of the Technion Formula conducted comprehensive research of drivetrain systems and vehicle dynamics.

The Drivetrain system used consisted of a chain driven limited slip differential. The chain tensioning was made by eccentric system, all parts were made from light weight Magnesium Alloy AZ80 T5.

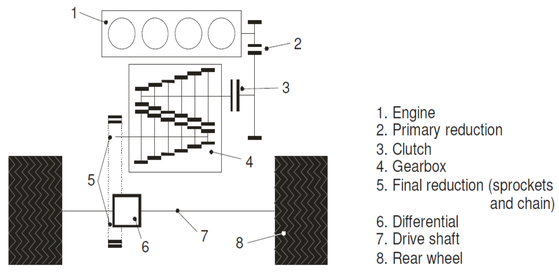


Figure 1.1; schematic overview of the driveline

## Project Objective and Requirements

The **Drivetrain Team's** objective is to design and develop drivetrain system that will optimize performance and reliability while minimizing cost and weight.
The main objective was to reduce the distance between the centers of the sprockets to meet the overall size reduction of the vehicle , while maintaining the same reduction ratio (about 3) .
Last year the Drivetrain system failed and thus, this year we put a strong emphasis on reliability and accurate analyzes .

## Product Description

### HOW THE SYSTEM WORKS

Drivetrain system is a mechanical system which delivers the power generated from the engine to the wheels.

1- The power is transmitted from the engine to the rear axle by a sprocket chain as shown in Figure 1.

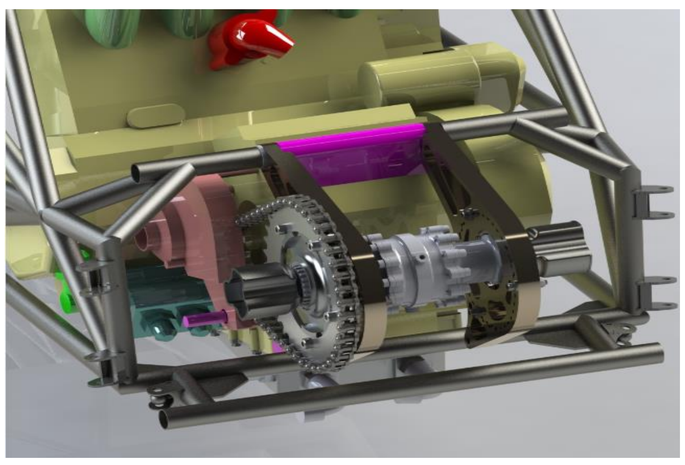

Figure 1.

2-The power is transmitted from the rear Sprocket to the differential through the sprocket-Differential Adapter (Figure 2)

Figure 2.

3- The differential (Figure 3) transfer torque to both rear drive axles while allowing them to spin at different speeds (transfer different torque).

Figure 3.

4- RCV Formula SAE Driveshafts(axles Figure 4) deliver the power from the differential to the wheels.

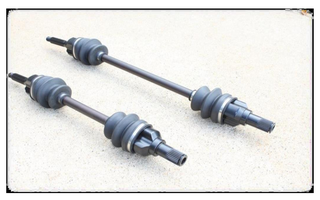

Figure 4.

## Analysis

**SRR -System requirement review:**
System Requirement Review used to define fundamental requirements from the complete system.
- Transmission connected via chain to the rear axle.
- Fitting to 2005 Suzuki GSX-R600 Engine.
- Acceleration 0-100km/h: 4.0[sec].
- Life duration :3500 [km].
- Force Analyses.

**PDR-Preliminary design review:**
Comprehensive research and study conducted in order to set primary design key-points.
- Drexler Limited Slip Differential.
- RCV Formula SAE drive shaft.
- Final reduction ratio:38/13.
- Eccentric chain tension adjustment.

**CDR-Critical design review:**
Thorough design and analysis, based on PDR primary key-points,conducted before fabrication and assembly of final system layout.
- Calculation of maximal forces applied on the Drive train system.
- Finite element Simulations for components designated for extreme loads.
- Final CAD modeling for the complete system.
- Fasteners, bearings and seals selection.

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The chain is tensioned by an eccentric mechanism as shown in figure 5.

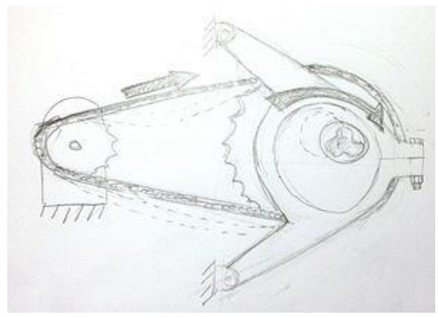


Figure 5.

The results of Force Analyses as shown in Figure 6 and Figure 7.

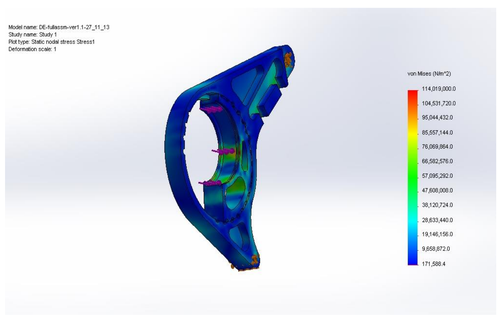


Figure 6.

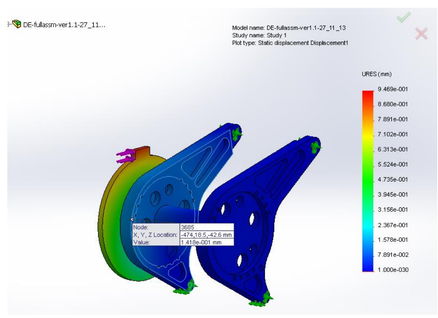
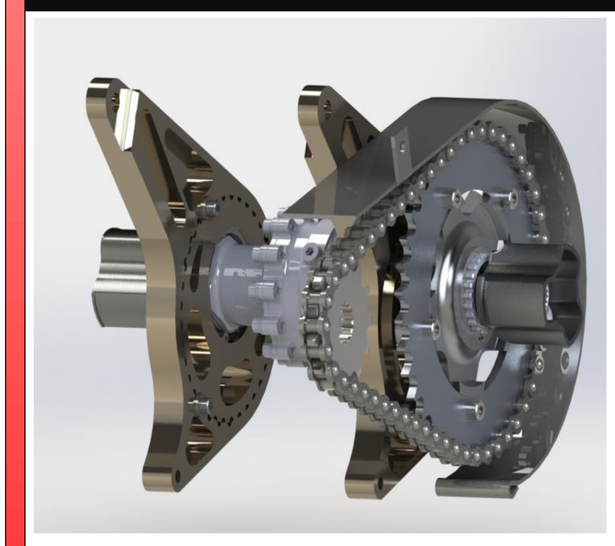


Figure 7.

## Final Product



## Acknowledgements

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