# MECHANICAL EGR DESIGN I (Fall 2018 M16)006

**To:** **Dr. David Trevas**

**Cc: Brandon Begay**

**Client: Dr. Sarah Oman**

**From:** **Ahmad Alharbi, Ahmad Altheyaib, Abdulaziz Hussain, Mishary Alhooli, Mahmoud Shaban**

**Re:** **Analytical Analyses Team Memo**

**Introduction**

In this memo we are dividing the tasks between each team member and member will use the assigned task for the individual analysis that will perform after this. Individual analysis will do to analyze different parts of the project thoroughly and identify the reasons and proofs using the equations and calculations. These calculations will be based on some assumptions as well to justify the process. The tasks assigned to each member are as follows:

**Ahmad Alharbi: Gear Analysis**

In this gear analysis, I will analyze the gears using the interlocked system to determine how much teeth of gears are enough for any movement in the interlocking. I will also focus on the movement of gear system and the angle at which the interlocking will be possible to happen to make it perfectly running the system.

This analysis will help the team in finalizing the type of gears that will use in it and will help them in selecting the final design as well.

**Mishary Alhooli: Torque**

For the project, I am going to analyze the project on the basis of torque. For our project, torque is an essential part, as we have to start the project by providing an initial torque. Furthermore, I will analyze that torque as well along with focusing on the following equation

$$T=rF$$

This analysis will help the team in understanding the design of project. As the initial torque will calculate in the analysis so team will able to identify which material will easily manage the required torque.

**Abdulaziz Hussain: Stability**

For any project, stability is important factor. Without the stability we cannot make anything work. So for our project, I will work on the stability factor of our project. Stability will count as a balancing between all sides to stand up properly. Furthermore, I will also count the motion stability, when the device will be in motion. Also the weight cause instability as well so I will analyze the weight effect on the stability.

This will help the team in making the design and selecting the material because my analysis will give the description of how the design will carry out and then also how the material will use in the device to make it stable.

**Ahmad Altheyaib: Fatigue**

For this part of the project, I will analyze Fatigue for the motion of wings, as the design of product will be based on some sort of wings. Fatigue properties and the nominal maximum **stress** values that cause such damage may be much less than the **strength** of the material typically quoted as the ultimate tensile **stress** limit, or the yield **stress** limit. Fatigue occurs when a material is subjected to repeated loading and unloading.

This will help the team in making the design and selecting materials as well because the team’s aim is to deliver a sculpture that is both durable and robust.

**Mahmoud Shaban: Spring**

Out project of kinetic sculpture will use spring to do the movement using the potential energy and kinetic energy. As the spring stores potential energy when it compresses and release that potential energy in the form of kinetic energy when it expands. Equation to use in this analysis will be based on

$$F=kx$$

Where, F is force, k is spring constant, and x is the displacement of spring from its original point.

This analysis will help in the project for the design implementation, when the spring will select to put into the product, so my analysis will help the team to select the spring.