

## EGS 2310 Engineering Analysis – Statics

Instructor: Dr. Kwabena Ofosu, P.E.

### Homework 3

**Due Date:**

#### **Objectives:**

The objective of this assignment is to apply concepts we have learned under Shear Force and Bending Moment Diagrams, Centroids and Center of Gravity, Fluid Pressure, Moments of Inertia, and Friction to your project. You are to then perform sample calculations and work through various scenarios.

To achieve these objectives you must address the following;

#### **Methodology: (30 points)**

Identify the principles learned from the relevant topics apply them to your project? For example if you previously analyzed the force vectors relevant to a bridge, you may now draw the shear force and bending moment diagrams of a typical beam supporting the structure. If you previously analyzed a vehicle chassis, you may now determine the location of its center of gravity, and how it will be affected if it were to be driven through a flooded roadway (fluid pressure). Identify concepts that will enable you incorporate this scenario into your calculations.

#### **Data: (20 points)**

Identify all input parameters and explain how you got the values. For example if you are analyzing the friction resistance of a dam against sliding, explain how you got the coefficient of friction. If you are using inputs presented by other authors, provide the reference so an interested third party may look up your references and confirm.

#### **Calculations: (30 points)**

Present calculations for numerous and various scenarios of your problem by varying the input parameters and obtaining new results. For example if you are analyzing the analyzing internal forces of a structural member, how does varying the length affect the shear force and bending moment diagrams? Or if say you treated the applied loading as a single point load versus a distributed load does it make your structural analysis results change? If you are applying computer programming skills, this is where it will make a difference by enabling you to rapidly run through many simulations. Report any relevant findings whether they are positive or negative outcomes.

Compare your results with those obtained in the previous homework in which you may have treated your system differently. How do they compare? Which method gives a more accurate depiction of the reality?

#### **Conclusions and Recommendations: (20 points)**

Identify any improvements that can be made. Identify further analyses that that may be applicable but is beyond the scope of this class. Usually when conducting studies of this nature, conclusions may raise questions on some other aspect of your work. What other questions or topics of interest would you like to pursue as a result of what you have learned from this exercise?

**Group members:**

The output of a group shall be commensurate with the size of the group. For example a group of three presenting say two scenario calculations will be considered insufficient. If you are working in a group, provide a tentative breakdown of each member's contribution to this submittal. A contribution shall involve some analysis or computational input. For example a group member cannot be responsible solely for typing up the reports, she or he must have some substantial contribution involving Statics, data collection or processing, scenario calculations, or computer programming.