In an attempt to place better in the SAE formula car race, ODU students design and build a new SAE car every year, attempting to fix the car from last year’s weaknesses. Several factors come in to play when it comes to designing a SAE car; one of the most important is how aerodynamic it is [1]. On top of making the car as resistant to wind as possible, safety upon design needs to be taken into consideration. Measurements must be taken with a reasonable safety factor to avoid an unbalanced amount of stress, leading to deformation [2]. Inaccurate calculations can be hazardous to the driver, which is why testing out the car is important [2].

 “Solid Works” is a program that will be used to make 3-D models of any element of the car, without having to build test trials. The use of a 3-D modeling program enables the ability to test out the dimensions and aerodynamics of a material/part, potentially saving both money and time [3].

 A main interest of focus for the Fall SAE group is the suspension. As oppose to last year’s model, this year’s will be using a push-rod suspension. Push-rod suspensions will give the ability to reduce drag, have a better airflow, and the ability to lower the center of gravity [4]. Suspension design can be varied to keep the tyres in better contact with the ground, which is considered to be the main key factor in performance [5]. Since the suspension is responsible for assembling so many components together, altercations in it can result in the need to change dimensions of other components [4]. The importance of a suspension’s geometry should be taken into consideration, as it needs to account for factors such as the anti-dive and anti-squat, which are responsible for braking and accelerating [4].

 The Fall Formula Group intends on both designing and creating a frame and suspension for next year’s race. Through communication with the SAE Formula Club along with research journals regarding the subject, they will attempt to design/build the car to the best of their capabilities, with dimensions and materials that they see best fit. Therefore the purpose of this assignment was to make the formula car as efficient as possible.

**References**

[1] S. Rehnberg, “Race car aerodynamics – The design process of an aerodynamic package for the 2012 chalmers formula SAE car”, *SAE Technical Papers,* v 2, 2013

[2] G. Savage, “Sub-critical crack growth in highly stressed Formula 1 race car composite suspension components”, *Engineering Failure Analysis,* v 16, n 2, p 608-617, 2009

[3] Q. Bang, “Finite element static analysis of the racing car frame”, *2012 IEEE International Conference on Cyber Technology in Automation, Control, and Intelligent Systems (CYBER)*, p225-8, 2012

[4] A. Mihailidis, “The design of a Formula Student race car: a case study”, *Proceedings of the Institution of Mechanical Engineers, Part D (Journal of Automobile Engineering)*, v 223, n D6, p 805-18, 2009

[5] H. Nozaki, “Consideration of suspension mechanism with high cornering performance for a formula car”, *SAE Technical Papers,* 2008