Modeling Project #2

Gravel roads often develop a "washboard" shape consisting of regularly spaced ridges and valleys running perpendicular to the road. Develop a model that allows you to design a suspension system appropriate for driving a vehicle on a washboard road. Take both safety and comfort into account. For safety, it is important that the wheels of the vehicle maintain contact with the road.

In simple terms, you can think of the suspension system as consisting of a spring and a shock absorber. Your goal is to find values for the model parameters (e.g., spring constant and damping constant) so that the suspension system responds satisfactorily. You should tune the suspension system to work well for a reasonable range of speeds. You should also determine if there are ranges of speeds that should be avoided with the system you propose. Base your model and parameter values on realistic values for quantites such as the mass of a car and the spacing of a washboard pattern.

You should analyze this situation and write a technical report as if you are a consultant who has been hired by an vehicle manufacturer to make a recommendation. Assume the readers of the report have some technical background but have not analyzed this specific question. Since you have a deadline for this report, you should develop a model that is simple enough to give some results and complex enough to give meaningful results. Your report can include comments on the strengths and weaknesses of your model and suggestions for improving the model.

This project is due on Wednesday, November 8.