Getting into the Swing of Things

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Throughout our modern era, buildings have gotten taller and taller, but of course, building structures that tall has numerous technical issues, with one of the major ones being their susceptibility to shaking even from high winds. There are numerous methods engineers use to mitigate this problem, such as base isolators and specially designed floors to redistribute forces downwards away from the building. However, these methods can be costly and difficult to design. Despite that, there is one method that is very simple in its concept yet very effective. That method is using a tuned mass damper. A tuned mass damper is essentially a heavy pendulum placed at the top of a building that absorbs excess force by swinging back and forth. It seems counterintuitive, but through this experiment, I have found that yes, they do work, and the data during this experiment helps to show that. But even if they do work, there are still many variables which can determine how well it works, with one of the most important being the length of the pendulum. In essence, the problem that this experiment aims to solve is this: What is the ideal length for a tuned mass damper using a 62cm model tower? The 8cm pendulum did the best at reducing the building's displacement, with an initial average displacement of 30.333 mm compared to the 48.333 mm initial average displacement from the control. Overall, using tuned mass dampers to reduce shaking in buildings is incredibly practical for three reasons; it's innovative, effective, and cheap.

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