



**CALIFORNIA STATE SCIENCE FAIR  
2002 PROJECT SUMMARY**

<b>Name(s)</b> <b>Brendan C. Jonesrebandt</b>	<b>Project Number</b> <b>J0712</b>
<b>Project Title</b> <b>What Interval Timing Is Best for an Electromagnetic Propulsion Device?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> I found out that the Superman ride, at Magic Mountain, was powered by electromagnetic propulsion. I built an electromagnetic propulsion device that worked the same way. I wanted to find the optimal timing interval of the electronic pulses for the propulsion device. My hypothesis was the longer the pulse the further the object will travel because it will have the most time to build up speed.</p> <p><b>Methods/Materials</b> I built several models using magnet wire coils and various power sources, propulsion objects, and timing variations. For my final model I had a soup can with segments of tape determining when the brushes touched the can and made a connection. The power source was a car battery.</p> <p><b>Results</b> A nail somewhat longer than the coil worked the best as the propulsion media. The furthest I got the nail to travel was over 8 feet. I got a lot of travel from the nail when I had 4 coils that were sequentially timed. With one coil that was very well timed you could shoot the nail nearly as far as you could with four coils that weren't timed very well. Adding each additional coil required the timing of it's pulse to be relative to the coils sequentially before the new coil. Adjusting the interval between the pulses became more and more difficult as additional coils were added.</p> <p><b>Conclusions/Discussion</b> My hypothesis stated that the longer the pulse, the further the object would travel. This was true only up to a certain point. The object did move very quickly if the pulse was elongated, but after I reached a certain pulse length, it began to slow the object down because it would pull the nail back into the magnet. Also the length of the pulse had to be adjusted relative to which coil it was in the sequence.</p>	
<b>Summary Statement</b> Perfecting the interval timing of an electromagnetic propulsion device.	
<b>Help Received</b> Mother bought backboard and proofread my papers; father let me use his tools and gave me some expertise; a friend helped me perform experiment.	