Project Motivation
In developing countries, small displacement motorcycles are often the primary source of transportation. They not only transport people, but are also used to transport goods and cargo between villages. Often the motorcycles are dangerously overloaded in order to transport the maximum amount of cargo.

In order to combat these problems, the CART team is working to design a motorcycle hitch that can fit on any small motorcycle. The design would allow for a small trailer to be attached to the motorcycle and allow for safer and more efficient transportation of goods. By making use of vehicles that people in other countries already have, we can provide a valuable service with minimal cost.

Current Work
In past years, research was done on different types of motorcycle hitches that are currently available on the market. A Kawasaki KE100 small displacement motorcycle, which is similar to what would be found in developing countries, was also purchased. This year, we began the hitch design process and chose to mount the hitch to the shock mounts on the motorcycle, as this was a universal point. Two different hitch designs were created with slightly different frames.

We found that one design 2 had a more universal fit, so we decided to build only one prototype. Once complete, the hitch was attached to the motorcycle with a small trailer. We then tested clearance and range of motion by tipping the bike through a range of angles expected under normal operation and maneuvering the bike around sharp corners.

A 350lb load was added to the trailer and was pulled around with the motorcycle. We tested turning radius and braking capabilities with a 350 lb. load, and verified clearance of the hitch when hitting bumps.

Next Steps
Now that we know that our hitch works as intended, we hope to complete more quantitative load analysis using strain gauges. These results will help us to predict the hitch’s response to fatigue. We are also planning on distributing our design for field testing to Collaboratory contacts in developing countries. Hitch prototypes will be constructed and tested over the summer. The feedback from this field testing will allow us to improve the durability and universality our hitch design.

In future years we also hope to design a trailer specifically for use with our hitch with a built in braking system to increase user safety.

Further Information
messiah.edu/info/22005/collab_internal

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