Anti-Lock Brakes Applied to a Bicycle

Dulaney, Jesse (School: Southwest Virginia Governor's School)

Anti-lock braking system (ABS) is a technology standard in all cars and motorcycles today. When the tires lose traction because of braking, the brake pressure is released so the wheels can still roll. This same technology can be applied to a bicycle and provide similar benefits. The project goal is to create an anti-lock braking system that would improve the braking on a modern mountain bike with mechanical disc brakes. The system used speed sensors to find the speed of the wheels and determine if there was an irregularity in the wheel speed while braking. When this occurred, the microcontroller sent a signal to the motor to rapidly oscillate the front brake to prevent it from completely locking up. Without ABS the braking distance was 5.2 meters. With the system engaged it was 4.9 meters. These results show that having anti-lock brakes can decrease the braking distance of a bicycle. This can be used as a new safety feature on modern bikes and prevent crashes for many different levels of riders. It can be improved in the future to make a more compact and powerful system with hydraulic brakes.

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