Antilock Braking System (ABS) for bicycles

Reference No: B77080

CHALLENGE

Cycling is undoubtedly an inexpensive, environmentally friendly and healthy way to get around. However, it also carries the risk of falls, especially in startle situations. A dangerous situation is the locking of the front wheel and the resulting loss of control or the rollover due to overbraking of the front wheel. These two driving situations are effectively avoided by an actively intervening safety system (ABS). Until now, ABS systems have required a constant power supply, which is usually not guaranteed on conventional bicycles. For this reason, their use has so far been limited to motor vehicles and e-bikes.

INNOVATION

The innovative solution to this challenge is a bicycle ABS in which all necessary components, including an electrical generator, a rechargeable backup battery, a clutch, actuators and control electronics are integrated in the front wheel hub. This makes the system completely self-contained so that both e-bikes and bicycles can be equipped or upgraded with it. In addition, all components of the original brake system can still be used.

COMMERCIAL OPPORTUNITIES

- ✓ Not limited to e-bikes and/or proprietary e-bike drive-systems.
- ✓ ABS as an upgrade option and/or after-sales solution.
- ✓ System expansion for e-drive manufacturers who do not offer ABS yet.

DEVELOPMENT STATUS

- ✓ System-specific control logic successfully simulated in Matlab® with the help of a multi-body simulation of a bicycle.
- ✓ Clutch test bench available (Fig. 1).
- ✓ Prototype for test rides expected to be available by the end of 2021.

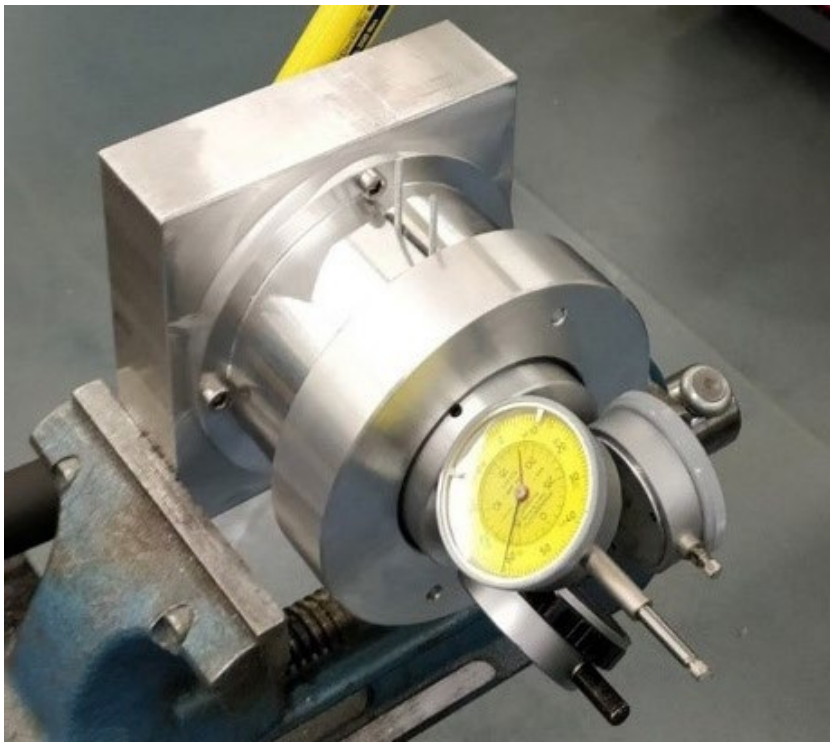

Fig. 1: The clutch test bench for gaining initial experience with the relaxation stroke and the friction force.

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