Novel Concepts for Spring-Based Mechanical Energy Storage in Motor Vehicles

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Development of Novel Spring-Based Energy Storage Systems for Motor Vehicle Applications
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Objective: To improve efficiency and environmental safety of motor vehicles by utilizing springs in mechanical energy storage systems, such as hybrid drivetrains and engine starters.

Introduction/Motivation
- Inherent disadvantages of electrical energy storage systems: hazardous, inefficient
- Gas-electric hybrid systems are costly: limited use in developing countries

Methodology
- Review of available spring materials
- Tensile testing to examine the energy storage potential of material samples
- Mechanical starter and hybrid drivetrain concepts developed
- Proof-of-concept prototypes built and tested

Conclusions
- Natural rubber material samples showed the greatest energy storage potential of those tested
- Transmission refinement needed for hybrid system
- Mechanical starter is most promising concept due to ease of potential integration with current vehicles
- Research is ongoing

Future Direction
- Refinement of hybrid drivetrain concept including transmission development
- Motorcycle will be purchased
- Starter prototype will be adapted to meet size and power requirements of motorcycle engine