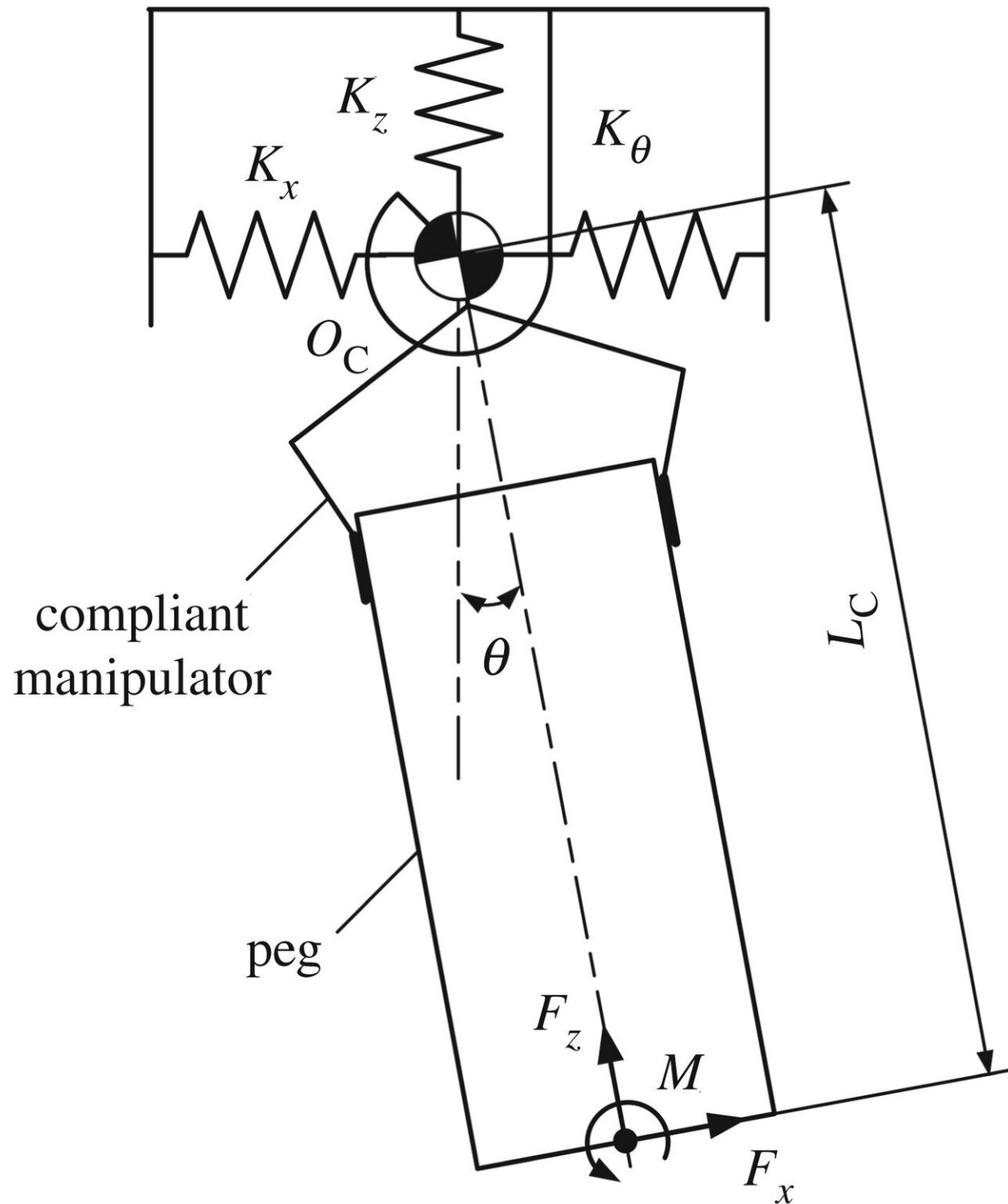


Engineers demonstrate key step in robotic disassembly

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Definition of coordinate frame. Credit: *Royal Society Open Science* (2019). DOI: 10.1098/rsos.190476

Engineers at the University of Birmingham have successfully designed a robotic system that can perform a key task in disassembling component parts.

The research is an important advance for manufacturers looking for more efficient ways to build products from a combination of reused, repaired and new parts.

Known as remanufacturing, this process is becoming increasingly commonplace in manufacturing and is attractive because it can use as little as 10 per cent of the energy and raw materials required to build the product from scratch. It can also reduce CO2 emissions by more than 80 per cent.

A key part of the process is the ability to disassemble the 'core', the returned product. It's a challenge because of the huge variety within these products, with lots of unknowns in the size, shape and condition of components.

The new study, published in *Royal Society Open Science*, demonstrates a process for removing pins from holes—components like these are extremely common in a wide variety of machines, such as internal combustion engines. The research is the first to investigate this operation in depth and identify the key parameters required to automate the process.

Yongquan Zhang, of the Autonomous Remanufacturing Laboratory at the University of Birmingham is lead author on the paper. "Processes currently used for automating disassembly are fairly ad hoc," he explained. "We need to be able to design robust systems that can handle the uncertainties that are inherent in disassembly processes—and to do that, we need a better fundamental understanding of disassembly."

"The results of this study demonstrate how that fundamental understanding can be used to design robotic systems for reliably performing one common disassembly operation."

More information: Yongquan Zhang et al, Peg–hole disassembly using active compliance, *Royal Society Open Science* (2019). [DOI: 10.1098/rsos.190476](https://doi.org/10.1098/rsos.190476)

Provided by University of Birmingham

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