

AI insights could help reduce injuries in construction industry

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Artificial intelligence (AI) is giving researchers at the University of Waterloo new insights to help reduce wear-and-tear injuries and boost the productivity of skilled construction workers.

Studies using motion sensors and AI software have revealed expert bricklayers use previously unidentified techniques to limit the loads on their joints, knowledge that can now be passed on to apprentices in training programs.

"The people in skilled trades learn or acquire a kind of physical wisdom that they can't even articulate," said Carl Haas, a professor of civil and environmental engineering at Waterloo. "It's pretty amazing and pretty important."

Surprisingly, the research shows master masons don't follow the standard ergonomic rules taught to novices. Instead, they develop their own ways of working quickly and safely.

Examples include more swinging than lifting of blocks and less bending of their backs.

"They're basically doing the work twice as fast with half the effort - and they're doing it with higher quality," said Haas, who leads the research with Eihab Abdel-Rahman, a systems design engineering professor at Waterloo. "It's really intriguing."

In their first study, the researchers analyzed data from bricklayers of various experience levels who wore sensor suits while building a wall with concrete blocks. The data showed experts put less stress on their bodies, but were able to do much more work.

A followup study was done to determine how master masons work so efficiently. It involved the use of sensors to record their movements and AI computer programs to identify patterns of body positions.

The researchers now plan to do more in-depth study of how the experts move on the job.

"Skilled masons work in ways we can show are safer, but we don't quite understand yet how they manage to do that," said Hass, who compares their skill to a professional golf swing. "Now we need to understand the dynamics."

Musculoskeletal injuries are a significant problem in bricklaying, causing many apprentices to drop out and many experienced workers to prematurely wear out.

As part of their [work](#), the researchers are now developing a system that uses sensor suits to give trainees immediate feedback so they can modify their movements to reduce stress on their bodies.

"There is an unseen problem with craft workers who are just wearing out their bodies," he said. "It's not humane and it's not good for our economy for skilled tradespeople to be done when they're 50."

A study on the use of AI to analyze bricklayer [body](#) positions was recently published in the journal *Automation in Construction*.

Provided by University of Waterloo

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