

## Better protection for critical pipelines during land movement

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Credit: nolan-kattinger on unsplash

Researchers at the University of Technology Sydney (UTS) have developed a cost-effective and practical method to protect pipelines and keep them operating during significant fault rupture incidents and large ground movements.

Australia's <u>pipeline</u> length of 50,000 km has a critical role in transporting water, gas and oil products, and transferring sewage to treatment plants.

UTS Associate Professor Behzad Fatahi (Head of Geotechnical and Transportation Discipline) supported by Habib Rasouli (Ph.D. Candidate) at the School of Civil and Environmental Engineering developed an advanced three-dimensional computer model to assess the mechanical performance of a pipeline protected by proposed polymer blocks under a strike-slip (horizontal) <u>fault rupture</u>.

While Australia is a relatively stable continental region with low to moderate magnitude earthquakes expected, there are numerous active <u>fault lines</u> such as the Darling fault, extending over 1000 km in the west where most oil products—including 71% of crude oil and condensate—are produced.

"Polymeric geofoam blocks as an inexpensive and light material can offer a safer and cost-effective solution to the challenges faced by Australia engineers passing pipelines through fault lines, increasing Australian competitiveness in international market as well as safety and reliability," said Dr. Fatahi.



His findings prove pipes protected with geofoam blocks have a superior performance and remain operational under different strike-slip fault rupture scenarios, while the conventional buried pipelines suffer catastrophic damage. This proposed solution can save lives and reduce the potential environmental disaster due to content leakage.

"We can see how conventional pipelines buried in soil could be severely damaged under a strike-slip fault rupture due to excessive longitudinal compressive and tensile strains in the pipeline, or how the pipe section could be flattened due to bending of the pipeline," he said.

The unacceptable performance of buried water mains, sewage network, and oil and gas pipelines could all lead to environmental disasters due to content leakage.

**More information:** Habib Rasouli et al. Geofoam blocks to protect buried pipelines subjected to strike-slip fault rupture, *Geotextiles and Geomembranes* (2019). DOI: 10.1016/j.geotexmem.2019.11.011

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