Leaky rusty water pipes pose million-dollar problem for water authorities

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Australia's water mains are getting older, and bursting or leaking water pipes are costing business and local residents millions of dollars, but many of these dollars could be saved thanks to some clever computer modeling by a PhD researcher.

The costs come through extended loss of service supply, water contamination, massive losses of water, and high costs of repair.

Through pioneering research, Queensland University of Technology engineering PhD candidate Fengfeng Li has developed an innovative decision support tool that can help reduce the risks and costs associated with the renewal of pipelines.

It takes into account the equipment needed, the location of the pipes and the best time to schedule work so it will not disrupt the local community. He can also predict which pipes are most likely to fail and the most efficient way to schedule repair works.

Called the Replacement Decision Optimisation Model for Group Scheduling, the tool also has the potential to be applied to other linear assets such as railways and power transmission lines.

"All over the country, in cities especially, pipelines in water distribution systems are ageing and the likelihood of failing is increasing," says Mr Li.

"Most pipelines tend to be hidden underground. They aren't laid out in neat grids, they're hard to access, they're of different ages and construction, they can cross jurisdictional borders, and maintenance service often means interruptions for customers.

"It's essential that water pipelines can be maintained effectively at the lowest cost possible. But it's difficult to get the best outcomes through traditional maintenance planning, especially when this planning depends so much on individual planners," says Li.

The new model schedules pipeline maintenance not on an individual pipe or needs-must basis. Maintenance is proactively scheduled based on the application of an algorithm that optimises groupings.

The novel classification system for pipeline maintenance scheduling was developed in collaboration with industry partners.

Professor Lin Ma, Li's PhD supervisor is impressed with his research:

"Li has independently developed the optimisation model for this complex problem," she said. "It's ground breaking research."

“Modern water utilities are under a great deal of pressure to squeeze every cent of value out of the maintenance and management of their pipeline networks. Li’s model can help them to reduce the cost of operation and price to consumers without compromising the quality of service and reliability.”

Fengfeng Li will be speaking at the **annual conference of the Cooperative Research Centre Association** —‘Collaborate | Innovate |2012’—, **National Wine Centre of Australia in Adelaide on 15–17 May**.

He will speak at Plenary Session 3 on **Wednesday 16 May 8:30–10:30am** following addresses by Senator The Hon. Chris Evans, Minister for Tertiary Education, Skills, Science and Research and Simon McKeon , 2011 Australian of the Year.

Further information/interview:

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