

Picking up bad vibes to gauge bridge health

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By monitoring changes in vibrations of bridges it is possible to identify hidden cracks and fractures, according to a Queensland University of Technology researcher.

QUT engineering researcher Henry Shih said variations in bridge vibrations of a bridge could be a telling sign of its structural "health".

"It's not always possible to see damage to a bridge, but using vibrations it is possible to 'see' what can't be seen," he said.

"Changes in the physical properties of a structure, such as cracks and fractures in a bridge, will cause changes in its vibration. By monitoring these vibrations it is possible to detect any changes which may indicate bridge damage."

QUT has undertaken research in bridge vibration for more than 10 years and this has involved monitoring vibrations in some of Brisbane's bridges.

As a part of this on-going research program Mr Shih will develop models to assess the damage in certain types of bridges.

Mr Shih said given Brisbane was a river city linked by a criss-cross of bridges, it was important to continuously monitor the "health" of these structures.

"Bridges form an important part of civil infrastructure and are normally designed to have long life spans. But changes in load characteristics, deterioration with age, environmental influences and random actions may cause damage to bridges," he said.

"Continuously monitoring the health of bridges will enable the early identification of distress and allow appropriate retrofitting in order to avoid bridge failure or collapse."

Mr Shih's research will use computer modelling to

test the vibration characteristics of beam type and truss type bridges before and after damage

"As part of the study we will install sensors to monitor the vibrations of simulated bridge models in the laboratory. We will then calibrate the computer models to ensure the data is accurate," he said.

"Just like an electrocardiogram can measure the health of a heart, by monitoring vibration characteristics we can evaluate the health of a bridge."

He said by inputting the data into a computer modelling system it was possible to assess whether or not the bridge was in distress or at risk of failure or collapse.

"We are going to be able to rate how healthy the bridge is and also monitor its deterioration over time."

Source: Queensland University of Technology

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