

## Base isolation fibre-reinforced composite bearings using recycled rubber

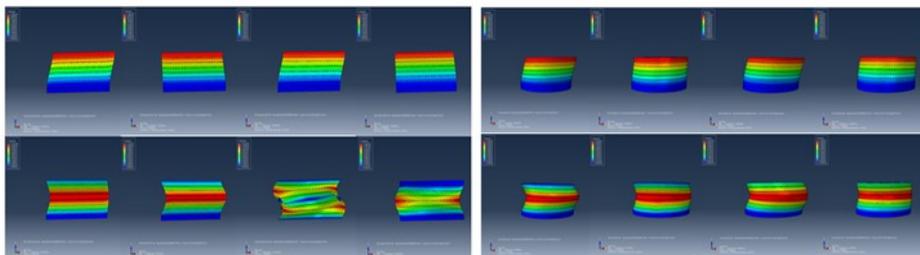
### ABSTRACT

In the past few years, there have been a number of previous researches on the rubber isolators for resisting earthquakes. A typical bearing consists of natural rubber sheets and bonded to steel plates. For an application of using rubber bearings, numerous isolated buildings have been constructed to resist an earthquake across the countries which experience earthquakes over decades. Another application might be used in the bridge structures of railways and highways, in order to suppress vibrations and dynamic actions.

The key idea is to use rubber isolators attached beneath the superstructures for attenuating the damage potential of seismic responses. This means that the rubber provides the isolators flexible in the horizontal direction and the steel makes them strong in the vertical direction. Anyways, most bearings are made of natural rubber or synthetic compound. These materials are costly and cannot be durable over time.

This study aims to develop a new design of bearing using recycled materials and fibre reinforcement. The concept is to design two models using the finite element method (FEM) as a square and circular shape for the investigation into the static and dynamic behaviour. Through, the finite element method will be conducted to evaluate structural response and effectiveness of the novel low-cost bearing. Bearing models from the analytical method based on the theory are verified by the FEM.

The overall results show that the fibre square model is less effective than the fibre circular model due to the different shape factors,  $S$ . The outcome of this project will help to enable more eco-friendly bearing materials for structural, highway and railway engineers. However, a further study of designing recycled rubber bearings with the fibre-reinforced polymer should be carried out by experimental tests. The study should be also compared with the performance between the fibre and steel bearing model, in order to verify the models created by FEA more effectively.



## Case study



### Client Profile

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### Funding

Thai Government

### Product used

Abaqus

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Submitted June 2019

