



301/C

Co-benefit assessment of a coastal railway embankment for tsunami risk reduction: A case study in Panadura, Sri Lanka

A.H.M.S. Siriwardana* and R.S.M. Samarasekara

Department of Civil engineering, University of Sri Jayewardenepura, Nugegoda, Sri Lanka

The tsunami risk in populated coastal areas is escalating due to unprecedented population growth. Tsunami risk management in Sri Lanka primarily depends on Early Warning Systems but, they can only save human lives. Expensive, hard, defensive structures such as seawalls and tsunami breakwaters are needed to protect property against a tsunami. Developing countries like Sri Lanka do not have sufficient budgetary allocations for such measures. However, some coastal infrastructure such as coastal railway embankments could be upgraded to function as defensive structures as a co-benefit. This abstract presents a case study that has identified the viability of upgrading the coastal railway embankment between Panadura and Pinwatta considering a probable tsunami risk. A set of upgrades was proposed to the existing railway to achieve this co-benefit and the cost of upgrading was estimated. The tsunami inundation, propagation, and generation were modelled using the Community Model Interface for Tsunami (ComMIT model). The tsunami induced damage on the housing sector in the selected case study area was estimated in monetary terms with and without the proposed upgrades to the railway embankment. The tsunami damage mitigation co-benefit was interpreted in monetary terms. Results emphasized a massive reduction in the property damage worth Rs 0.36 billion due to the upgraded embankment with an estimated co-benefit of Rs 0.17 billion. The inundation extent of the study area was reduced by 2.68 km². It was economical to upgrade the selected railway embankment as a co-beneficial structure for tsunami damage mitigation. The upgraded coastal railway embankment not only reduced the property damage but also increased the possible evacuation time of the occupants of the area. Coastal railway designs should be done considering both economic development and tsunami risk reduction perspectives to make those public fund investments more fruitful.

Keywords: Tsunami, Sri Lanka, co-benefit, economical

Acknowledgement: Financial assistance through undergraduate research allowance by the University of Sri Jayewardenepura

E-mail: en82726@sjp.ac.lk