

# Risk-based decision making using structural health monitoring information

Daigo Kawabe

Keywords: Risk-based decision making

## 【Background】

Although the quantitative information about the state of the structure is obtained by structural health monitoring (SHM), there is not a practical way of proposing the best decision for structure authorities once the output from SHM would be obtained.

## 【Objective】

This study aims to realize one-stop monitoring that propose the best actions from the output of SHM based on decision theory. Especially, this study investigates the scour monitoring of railway bridge pier as a case study. The expected utility values when certain actions are taken are calculated from identified frequency of bridge pier in real time, and the best action is determined. To do this, this study firstly assign the probability of scour occurrence when frequency is obtained.

## 【Approach】

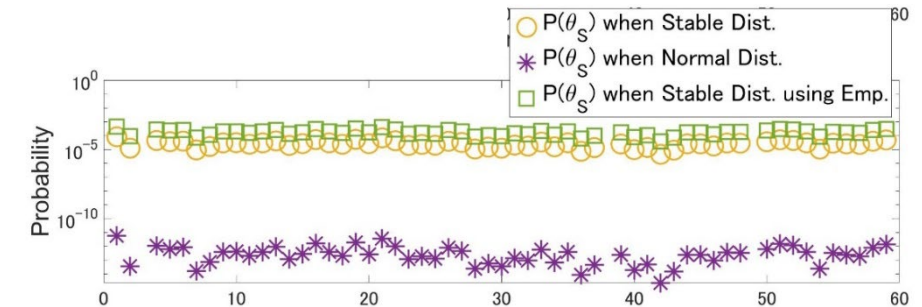
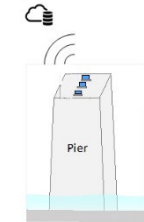
The way of estimating the conditional probability of scour occurrence when identified frequency of pier is obtained is considered using stable distribution and logistic curve. The validity of the proposed method is evaluated for applying the information observed in the past flood.

## 【Publication plan】

- 2022 JSCE Annual Conference
- IFIP WG 7.5 2022 Reliability and Optimization of structural systems

## 【Results】

The probability that scour occurs when identified frequency of bridge pier is obtained by use of logistic curve is proposed. The validity of estimated probability is evaluated by applying the monitoring information in a swollen water period in the past.



Real-time plot in probability of scour occurrence when swollen water period.