



<i>Project Title:</i>	Optimal Use of Internet of Things (IoT) Technology to Prevent Failure (Collapse) of Temporary Support System in Construction
<i>Principal Investigator:</i>	Prof. Louis LAM
<i>Project ID:</i>	CICR/02/18
<i>Research Institution:</i>	Chu Hai College of Higher Education
<i>Subject Area:</i>	Construction Safety
<i>Duration:</i>	24 months

## Background

Internet of Things (IoT) technology has been growing rapidly in recent years both worldwide and locally. In Hong Kong, development of IoT technology for construction monitoring to enhance construction safety and quality have been carried out in the past 5 years by a partnership collaboration between an educational institute and a research and development corporation. A construction monitoring system, which has the capability to collect monitored data from a large number of sensors of various types, and transmit and store the data safely, has been successfully developed and validated. It can also be used to record all relevant information related to the collected data. An application software platform that allows users of the system to view and use the data for various purposes has also been developed and validated.

By leveraging an IoT construction monitoring (IoTCM) system, many areas in building and civil engineering construction can be improved. However, despite the existence of a working IoTCM system, a lot of research work still has to be done to ensure that the IoT methodology can be applied correctly, efficiently, and effectively in various specific areas.

## Objectives

- ♦ To capture and adjust force and inclination of key support members before a construction project begins;
- ♦ To monitor force and inclination of key support members continuously, along with load distribution in the entire support structure system throughout the construction work;
- ♦ To devise effective means of capturing critical load and inclination data with a minimal amount of devices; and
- ♦ To assess the effectiveness of the IoTCM system in fostering a safer working environment in construction sites.

## Key Deliverables

The primary expected outcome of this research is the establishment of an improved methodology in monitoring temporary structures. The following outcome would be achieved:

- Real-time updates of sensors' measurements and issuance of warning signals when the measured load and/or inclination on a sensor exceeds a safety limit set by the user, which is accessible through users' devices as soon as the sensors are mounted,
- Comprehensive real-time reports generated regularly throughout the project period at a predefined frequency, consisting of load and inclination of individual key support members, load distribution in the entire support structure system, and record of warnings triggered by individual supporting members when safety limits are exceeded, and



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- An effective means in determining the most strategic placement of sensors on typical construction sites such that comprehensive information of site conditions can be obtained with the least number of sensors, i.e. at a minimum cost.

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