



<i>Project Title:</i>	New Generation Green and Healthy Jackhammers with Integrated Bio-Inspired Anti-vibration Handles
<i>Principal Investigator (PI):</i>	Dr JING Xingjian
<i>Project ID:</i>	CICR/02/20
<i>Research Institution:</i>	The Hong Kong Polytechnic University
<i>Subject Area:</i>	Construction Safety
<i>Duration:</i>	24 months

Background

Based on the bio-inspired X-shaped structure technology, the PI and his team (Research Team) have successfully developed the bio-inspired anti-vibration exoskeleton (BIAVE) technology, which is an assistive exoskeleton for different jackhammers of different sizes. A series of site trials was carried out in the past years. The BIAVE technology received the 2017 HK CIC Construction Innovation Award first prize. The anti-vibration X-shaped structure technology obtained the TechConnect World Innovation Award in the US and the corresponding theory received the European EASD senior research prize in 2017. Based on the experience of the Research Team and their understanding of the current market products and needs, the new technology to be developed in this project would have the following significance and/or values.

- ♦ The new technology is based on advanced nonlinear dynamics theory and taking a bio-inspired design approach;
- ♦ The vibration isolation performance can dampen up to 70% or more the vibration transmitted to hands and arms of the operator; and
- ♦ The new product can significantly prolong working duration, increase efficiency and productivity and greatly reduce the risk of workers from contracting occupational diseases.

Objectives

- ♦ To develop a prototype of new generation jackhammer with anti-vibration handle;
- ♦ To carry out piloting trials of the new generation jackhammer; and
- ♦ To file a patent of the new generation jackhammer.

Key Deliverables

- ♦ A systematic report on the design and its analysis result; and
- ♦ (1) A prototype; (2) A patent filing; (3) A testing and trial report (following ISO 10819 and HK construction safety and health regulation).

Disclaimer

The information given in this report is correct and complete to the best of knowledge of the authors and publisher. All recommendations are made without guarantee on the part of the authors or publisher. The authors and publisher disclaim any liability in connection with the use of the information given in this report.