

# **Design and Development of Hands-On Learning Kit for Statics**

by

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Dissertation submitted in partial fulfillment of  
the requirements for the  
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## **CERTIFICATION OF APPROVAL**

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A project dissertation submitted to the  
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Approved:

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2009

## **CERTIFICATION OF ORIGINALITY**

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

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Beh Kheng Tat

## **ABSTRACT**

Statics is a core first year class delivered to all students who are undertaking degrees in mechanical, civil, chemical, manufacturing and marine, and architectural Engineering. In learning Statics, many students face difficulty in understanding engineering concepts due to weakness in visualizing abstract ideas, such as forces and moments. This is especially true for students who have difficulty in visualizing and sensing. The hands-on learning kits for Statics are being developed so that critical thinking and problem solving skills of students will be improved by engaging them in the learning process. The learning equipments are designed to help students overcome difficulties in visualization. Students need a learning kit that can assist them in visualizing abstract ideas in order to improve their understanding in learning Statics.

Hence, a learning kit will be introduced to students so that they have better understanding in the fundamental of Statics. The objective of this project is to design and fabricate a learning kit for Statics by using AutoCad and drilling machine. The scope is to investigate and understand student's problems in learning Statics and fabricate a model. Significance of this project is to aid students in visualizing abstract ideas, problem formulation and enhance learning opportunities. The methodologies are research and analyzing on learning kit/equipments that existing in the market for Statics, identification of problem, conduct a survey, design a learning kit based on findings and fabricate the learning kit and test and validation. From the questionnaires' results, there are almost 37% of 302 students or equivalent to 113 students in the Statics class adapt converging and accommodating learning style. %. The model of the learning kit can provide eleven settings/experiments as well as demonstrations. From test and validation results, the mark of the tests has been increased up to 30% by comparing test 1 and test2. As a conclusion, this learning kit can assist students to have better visualization in solving Statics problems efficiently.

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