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Recent Publications

Active Grants

RU Grant

Title: Formability Analysis of Tailor Welded Blank of Steel and Aluminum Alloys, 2019-2021

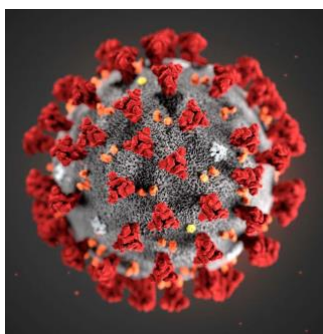
PRGS Grant

Title: Prototyping of hybrid machine; 2019-2021



Preface

Our country is in Movement Control Order (MCO) due to Covid-19. This pandemic became a threat not only Malaysia, but also throughout the world. By end of March 2020, around the globe it causes approximately more than 10,000 deaths. This situation not only affects public safety and health, but others also. As a teaching and learning center, USM also affected. This is because, due to MCO, universities are directed to be closed and all activities including research works especially that requires laboratory facilities being hold to unknown date.



Note that most of our group research activities involve experimental works and requires the student to physically attend in the laboratories. Based on current situation, seem to be difficult to any student working according to their planned tasks.

New Member

MFRL Bulletin would like to welcome new member, who joined the group recently. Mr. Kamarul Al-Hafiz bin Abdul Razak is lecturer from ADTEC Kulim, Kedah. He obtained scholarship under JPA.

Name	Kamarul Al-Hafiz Bin Abdul Razak
Research Title	Dimensional deviation of tailor welded blank manufacturing via incremental forming.
Main Supervisor	Associate Professor Dr. Ahmad Baharuddin Bin Abdullah
Co-Supervisor	Assoc. Professor Dr. Zahurin Samad
Start	Mac 2020



(PhD)

Preface-continue

To avoid virus from spreading, Work From Home (WFH), now become working mode for all. Nevertheless, research cannot be stopped. There are many activities were suggested to be carried out during MCO. For example, students will have more time to have a thorough literature review. In addition, students can plan for future tasks, preparing the list of required tools and equipments. If involve fabrication of test rig, it is worth to design and finalized the CAD model.

“STAY AT HOME, STAY SAFE”

CAD Modeling for Secondary School Student

In the era of Industrial Revolution 4.0, knowledge on 3D modeling will give advantages to the next generation of skilled CAD engineers. Few relevant pillars, including additive manufacturing, cloud computing, big data and simulation requires knowledge in CAD modeling. There are a few available CAD software in the market, with their own advantages and disadvantages. Typically, price, resources and easiness of the usage are the main criteria in the selection of the software. SolidWorks, for example become one of the popular CAD software use in the UK since 2016 (recently 1000 schools involve in the initiatives name as SolidWorks in Schools). The training is given until the 3D printing stage. Early exposure not only can grow their interest but also prepared them with knowledge that is required for future technology.



Sevenoaks School in Kent (https://www.youtube.com/watch?v=IdMFvxJbT_s)

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ONLINE TEACHING: FEASIBILITY OF ONLINE EXPERIMENT FOR ENGINEERING STUDENT

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Introduction

Online teaching is believed become the future methods of teaching. It typically refers to courses that are delivered completely online, which means there are no face-to-face meeting or on-campus class sessions. There are many methods of performing online research including that involves experiment. There are many claimed names, for example a web-based experiment or Internet-based experiment. This technique can be described as an experiment that is conducted over the Internet. Unfortunately, these methods seem to be more appropriate for non-technical discipline. How about engineering works? This is because Engineering laboratory experiments can be classified as experiments which are performed with the intention to inculcate theory, and second, to provide hands-on experience (Nandana and de Mel, 2016).

Engineering Accreditation Council (EAC) is a delegated body by the Board of Engineers Malaysia as the only recognized accrediting body for engineering degree programmes offered in Malaysia. Start from 18th June 2009 the Board of Engineers Malaysia was accepted as the 13th signatory of the Washington Accord. The EAC was instrumental in ensuring Malaysia's EAC accredited engineering programmes are substantially equivalent to the engineering degrees of the signatories of the Washington Accord, all of this information can be obtained from EAC website <http://www.eac.org.my/web/>. Due to MCO, on 30th of March 2020, EAC have released a guideline in teaching and learning and assessment during Covid19 pandemic (<http://www.eac.org.my/web/document/EAC-ETAC%20CovidGuidelines.pdf>). Based on the guideline, section 3.3 had mention about the online laboratory as shown below;

3.3 Courses with Extensive Laboratory Work (Lab)

Courses where laboratory experiments cannot be implemented during MCO, they can be replaced later when the situation permits. Optional to the above, it is worth considering to reinforce learning via e-lab or simulation-based laboratory experiments.

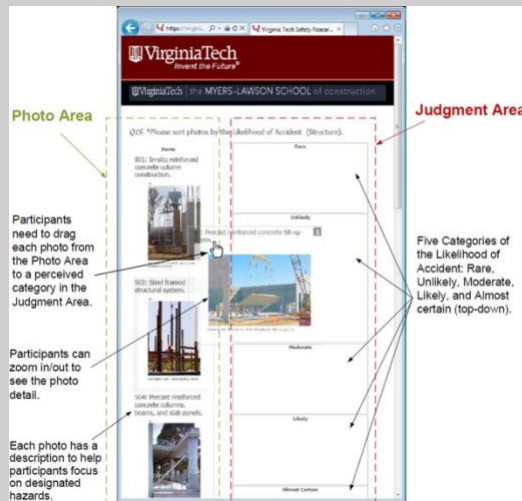
There are numbers of successful story of the online laboratory not only for undergraduate programme but also at work. Implementation of the online laboratory can be a step moving towards industry 4.0 and this may gives advantage to the institution or organization. Online lab or experiment is already practiced in distance learning for quite some time, one of the examples is by researcher from University of Bridgefort. In the control and automation lab involve 3 types of experiment, namely Festo Process Controller, RISCOT and Tele-operation of Movemaster. DTU Dortmund University located in Germany, initiated a technique called a remote laboratory for manufacturing technology. Their intention is to prepare future engineers for modern industry demand i.e. industry 4.0. Further information can be obtained from their website, <http://elli.tu-dortmund.de/wordpress/en/remote-laboratory-and-virtual-learning-settings/>. They have developed and tested various experiment including 3D-printing, bending operation and other forming processes. An overview of the approach, requirement of working 4.0 and its compliance to industry 4.0 have been comprehensively written in Terwosky et al (2019).

Forming processes in the virtual-reality-lab

During forming processes the forming- or process-field cannot be observed because of the tools or the machine itself. With the use of augmented- and virtual-reality new perspectives can be developed. Therefore, these new technologies enable a better view on forming-process and students can benefit by this new views.



Another technique use is integrated laboratory experiment setup (Nandana and de Mel, 2016). This approach combined face-to-face laboratory (FTFL), remote online laboratory (ORL) and multimedia demonstration. However it is impossible to fully replace all practical session by any methods, neither remote laboratory nor web-based experiment. This is because there is still a requirement for hands-on experiment to attain the psychomotor domain as an outcome of the course such as laboratory or engineering practice. Professor Lambertus from University of Stanford, believed that automation is the key. In their setup, which involve video recording and data analyses. Video recording is including setting up the test/experiment and pre-recorded result. Utilizing the LabVIEW features, hundreds on data set obtained and they found it similar in terms of quality compared to normal experiment (Wasserman, 2013). At work, there are few real case implementations on the application of online experiment, for example Zhao et al., (2016) developed a system in that can be utilized in a construction area. The system demonstrates the interface of the online experiment system. The system was developed using Qualtrics software. In the system, images captured within the construction area were analyze by dragging them into the interface and result in terms of risk category in the judgment area will be obtained. This online system offers great convenience for participants who were geographically located in various places to perform the test or experiment. As illustrated below, the system can be accessed online.



Summary

As summary the online experiment shows a great potential to be implemented not only due to lockdown situation. Even can be extended at higher level of study not only undergraduate. Advantages especially to those who are not afford to equip their labs with latest equipment. Other advantages of online experiment are less safety precaution needed and even less maintenance required. The challenge mainly on reliability of the setup, which requires series of validation.

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