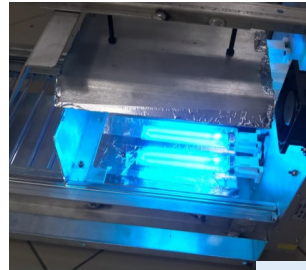
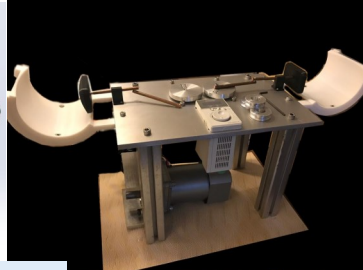


Project 1



Project 2



Project 3

COVID-19 Response Projects by AMMP Centre & Faculty of Engineering, UM

MAY 2020 - The Coronavirus (COVID-19) pandemic has brought an unprecedented global challenge, affecting the lives, health, and economic wellbeing of the many people in Malaysia. University of Malaya, alongside other universities in the country, has started on various initiatives to leverage the expertise of academicians and researchers in helping to solve the immediate challenges of public health response, and to assist in formulating solutions for the "new-normal". AMMP Centre together with the Dept. of Mechanical Engineering, Faculty of Engineering, UM have collaborated on three COVID-19 response projects throughout the MCO (Movement Control Order) period from April to June 2020. These projects were mooted based on the immediate global rally for engineering-based solutions in preparation for large number outbreaks and issues of shortages of equipment and PPE.

Project 1 : Automated pumping mechanism for manual –hand ventilator

Project leader: Dr. Mohd Ridha bin Muhammad

Some COVID-19 patients may require respiratory care, such as oxygenation and breathing assistance. Critically ill patients may also be recommended to be intubated, and their breathing subsequently controlled using a ventilator. Although most hospitals are equipped with several ventilators, most are extremely underequipped in the event of sudden surges in demand. The team from AMMP has successfully design and fabricated a portable ventilator based on the pumping mechanism for bag valve mask (BVM). Although it is not designed to replace dedicated ventilators, it can be utilized for a viable emergency

The team took 14 days to design, machine and assemble the first prototype of the portable ventilator using readily available components and 3D printed parts.

Project 2 : UV-C Mask Sterilizer

Project leader: Dr. Mohd Ridha bin Muhammad

The team, in collaboration with researchers from the US, has developed an apparatus that uses ultraviolet (UVC) light to sterilize protective masks for reuse during the COVID-19 pandemic. The apparatus uses a quartz platform to prevent shadows and blocking of UVC light to ensure total disinfection of the mask. The apparatus was successfully assembled in the Faculty of Engineering within 21 days and currently undergoing testing in the Faculty of Medicine.

Project 3 : On-demand design and fabrication of jigs and components fixtures to support COVID-19

Project leader : Dr. Mohd Sayuti Ab Karim

Completed project : Face mask band attachment

The prolonged wearing of facemask, especially for those on the frontlines, imposes painful pressure on the outer ear caused by the stress of the elastic band of the mask. This 3D printed attachment allows relief by holding the elastic band behind the wearer's head and allows comfortable wearing of the mask for an extended period. In collaboration with MyCRO Sdn Bhd, the team has produced and distributed around 2,000 units of the band attachment to target recipients in Universiti Malaya and the

Welcome Back to AMMP Centre!

APRIL 2020 - AMMP Centre welcomes back our research officer, Mr Mohd Fadzil bin Jamaludin, who has reported for duty after the completion of his 3 years study leave at Universiti Sains Malaysia, Penang. He has undertaken his PhD studies under the supervisions of Associate Professor Ir. Dr. Ahmad Baharuddin Abdullah and Associate Professor Dr Zahurin Samad from the School of Mechanical Engineering, Universiti Sains Malaysia (Engineering Campus) in Nibong Tebal, Penang. His research project is entitled " Mechanical and formability analysis of AA5052-H32 dan AA6061-T6 low power laser welded tailored blanks (Analisa Mekanikal dan Kebolehbentukan Gabungan Aloil Aluminium AA5052-H32 dan AA6061-T6 Terkimpal Laser Kuasa Rendah) ".

Mr Fadzil will recommence his role at AMMP as the Senior Research Officer, overlooking both the administration and research activities of the Centre. He will also be responsible for the management of laboratories and facilities of AMMP, specifically at the Precision Engineering Laboratory and 3D printing machines. In addition, he would be reappointed as the strategic advisor for Zectron Sdn. Bhd, a spin-off company of University Malaya.. AMMP Centre

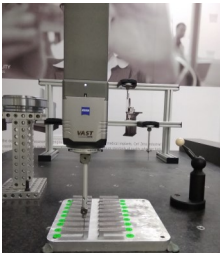
Brief Biodata

Mohd Fadzil bin Jamaludin is a research officer with the Centre of Advanced Manufacturing and Material Processing (AMMP Centre), University of Malaya. He obtained his Bachelor of Engineering (CAD/CAM) and Masters in Engineering Science (M.Eng.Sc) from University of Malaya in 2003 and 2010, respectively.

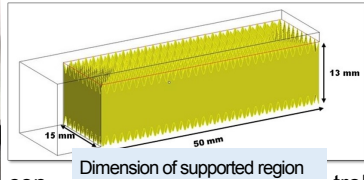
His research interest is in Precision Joining Technology, Product Design and Additive Manufacturing. With over 15 years experience in research administrations, he was one of the founding member of AMMP Centre, a leading engineering research centre in University of Malaya. He has co-authored 29 research articles and is a co-inventor of 10 patents.



EFFECT OF SUPPORT STRUCTURE TOWARD PART BUILD USING SELECTIVE LASER MELTING

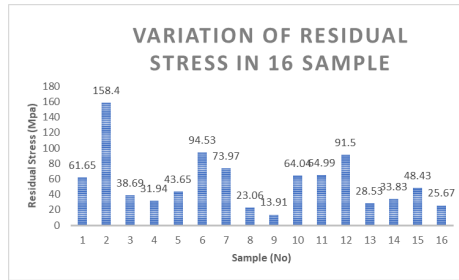
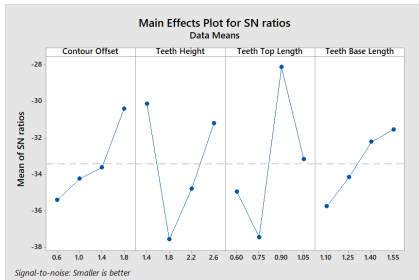


Measurement of sample using CMM Accura II 9148



Selective Laser Melting (SLM) is a metal Additive Manufacturing (AM) process used to synthesize three-dimensional object in which successive layers of material are formed under computer control to create the object. To successfully produce metal parts by SLM, additional support structures are needed to support overhanging surfaces in order to dissipate process heat, minimize geometrical distortions induced by internal stresses and hold the work piece in its place. In this work, an experimental investigation was carried out to optimize

the parameter of contour support structure which is contour offset, teeth height, teeth top length and teeth base length. The design of experiments was conducted using Taguchi's L16 orthogonal array. The effect of support structure parameter toward the deformation of part, volume of support, build time and support removal time were investigated. Furthermore, a statistical tool analysis by utilizing signal-to-noise response and analysis of variance (ANOVA) was used to obtain the optimal and significant support structure parameter. The results showed that teeth height and teeth top length has the significant effect toward the amount of residual stress trapped inside the part and contour offset have the greatest effect toward the build time and support removal time, while for volume of support all parameter are significant. The optimum parameter to obtain minimum residual stress is contour offset is 1.8mm, teeth height



Main effect plot for residual stress 1.4mm, teeth Variation of residual stress in 16 samples top

RESEARCHER PROFILE



Assoc. Prof. Dr. Farazila Yusof

BIODATA

Assoc. Prof. Dr. Farazila Yusof is currently serving the Department of Mechanical Engineering in University of Malaya as Deputy Dean of Post-Grad Studies. She is a PhD graduate from Nagaoka University of Technology, Japan in 2011. Her research interest includes joining & welding technology, powder metallurgy, advanced materials processing, additive manufacturing and product design. She has published more than 25 technical papers. She has also completed supervision 11 PhD and 3 Masters students. In addition, Dr. Farazila actively participates as technical committee for treads and screws under SIRIM. She has also won several awards at numerous international/national exhibitions pertaining to her research

CURRENT RESEARCH

- Metal (Powder Metallurgy, Additive Manufacturing)
- CAD/CAM/CAE Applications
- Advanced Materials Joining

SELECTED PUBLICATIONS

- Micro-arc oxidation of bioceramic coatings containing eggshell-derived hydroxyapatite on titanium substrate. CERAMICS INTERNATIONAL (ISI-Indexed)
- Poh, AH; Jamaludin, MF; Fadzallah, IA; Ibrahim, NMJN; Yusof, F; Adikan, FRM; Moghavvemi, M 2019. Diffuse reflectance spectroscopic analysis of barium sulfate as a reflection standard within 173-2500 nm: From pure to sintered

Preliminary research article regarding this title can be found at:

- 1) https://link.springer.com/chapter/10.1007%2F978-981-13-8297-0_30
- 2) https://doi.org/10.1007/978-981-13-8297-0_30



By Muhammad Rafi bin Sulaiman
(kga170021@siswa.um.edu.my)
M.Eng Sc Candidate
Supervisor : Assoc. Prof. Dr. Farazila Yusof

Graduation of post-grad student, congrats!



Congratulations to Mr. Moktar Hussein for passing his viva presentation with minor correction. Mr Moktar undergo a Master Research Program with his research titled 'Performance Evaluation of Electrical Discharge Machining Using Cerium Oxides Nanofluid And Multi-Metal Oxide As Powder Mixed Dielectrical Fluid'. He was supervised by Dr. Mohd Sayuti Ab Karim during his studies in UM. We wish him all the best of luck in his future endeavors.

AMMP Centre was established in 2003 with the aim of strengthening research activities in advanced manufacturing and material processes. The team has evolved from a small discussion platform of like-minded researchers to a fully operational research and consultation group in University of Malaya. Throughout the years, AMMP Centre has secured substantial research funding and commercialization grants from both local and international sources. In addition, the Centre has completed a number of consultation work with the industry in developing customized apparatus and solutions for their needs.. The AMMP Bulletin is produced periodically. It is distributed among lecturers, students and staff of University Malaya. By following our quarterly bulletin, you will be kept up to date with the latest AMMP Centre news and activities. See our website for further details: <https://ammpcentre.um.edu.my/> or email ammp@um.edu.my. For research enquiries, please contact us at 03

