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School of Mechanical Engineering, Universiti Sains Malaysia

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Active Grants

Title: Formability analysis of tailor welded blanks of steel and aluminium alloys.
RUI (2018 – 2020)

Title: Bearing strength and progressive failure analysis of punched hole under tensile loading.
Bridging Grant (2018-2019)

Publication

M Fadzil, AB Abdullah, Z Samad, F Yusof, Y HP Manurung and SD Sabdin. Implementation of stochastic processing parameters in a general finite element analysis of a laser welding process. Paper presented at the 1st International Joint Conference on Advanced Manufacturing Technology & Simulation (IJCAMTS 2018), 8-9 August 2018, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia. pp 371-374.

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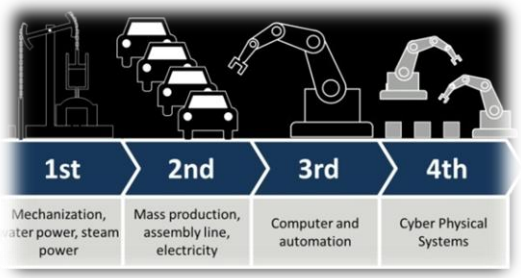
Preface

Industrial revolution 4.0 or IR4.0 now became the topic of the crowd and everybody is trying their best to implement this technology to stay competitive in the industry. All industries may have impact on the digitalization of the processes and methods. What about metal forming industries? Are they affected?



Note that, metal forming industries are the supplier or Tier 2s, for the original equipment manufacturer or OEM. End product produce by metal forming industries not involve any assembly or inspection. Therefore, it may not affect much on the transformation of the factory facilities as compared to the OEM, who is at the Tier 1s level. Traditional metal forming processes such as forging, rolling, stamping, extrusion, bending, deep drawing and shearing are expected to continue as they are.

Viva Voce

Congratulation to Mohd Safie Abdullah, one of our group members for his achievement in viva-voce on Friday, 10th of August 2018. He managed to submit his thesis within minimum period of study, as he starts his Master in Mac 2017 and submit his thesis on May 2018. His project is on Precision Hole Making Technology on Composites Panel and part of his project was published in the International Journal of Advanced Manufacturing Technology a Q2 rank journal. This project is sponsor by University Sains Malaysia through RU Grant. On behalf of the group, I would like to congratulate Mohd Safie for his success and acknowledge his contribution to the group. Hopefully his success may motivate other colleagues in the group to complete their study within minimum period or graduate on time (FOT)

Research Summary

Name: Rafiah Abdul Rani (MSc)

Title: Evaluation of dissimilar Aluminum-Steel laser welding for automotive application

One of the approaches in reducing fuel consumption and air pollution is by using lightweight metal and alloys in spacecraft, airplane and automotive industries. Therefore, in the need of reducing the automotive part weight, greater demands comes from joining steel and aluminium has been initiated by tailor welded blank method. However, there will be problem in joining dissimilar materials because of much different in physical and mechanical properties such as melting point of both metals. Know that temperature of aluminium alloy that allow for joining at the weld zone is lower compared than mild steel. Another problem is the formation of intermetallic compound. There are many advantageous of welding compared than other types of joint such as rivet and adhesive. In this project, feasibility of a low power pulsed laser welding used in joining thin aluminium alloy strip and mild steel based lap joint configuration will be assessed. The performance of the joint is based on the mechanical properties and formability of the welded blank. Effect of the penetration depth to the strength of the joint will be observed. In addition, the effect of laser welding process parameters to the integrity and formability of the joint will be optimized by Taguchi method.

Conference Info.

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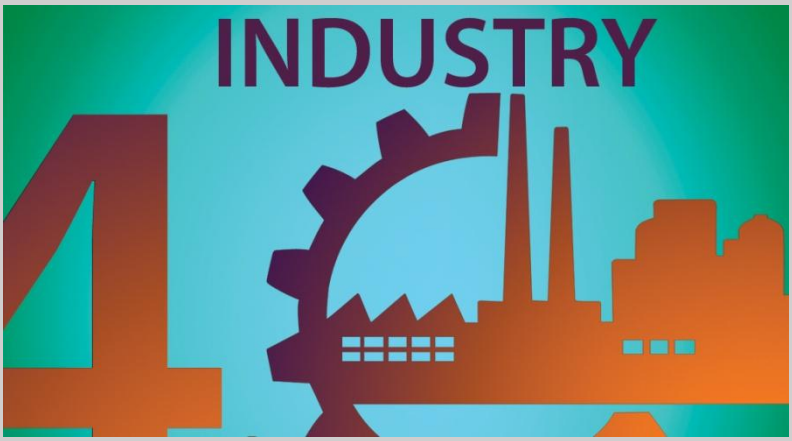
Industry 4.0 in Metal Forming – What Industrial Player Said

Everybody is talking about Industry 4.0 or IR4.0 and its effect to the world. Metal forming industries is one major player in the manufacturing industries. What would be the effect to the industry if IR4.0 is fully implemented? How to stay competitive?

Industry 4.0 is the evolution to cyber-physical systems, representing the fourth industrial revolution on the road to an end-to-end value chain with Industrial IoT and decentralized intelligence in manufacturing, production, logistics and the industry. "The human interface would be minimum as regular processes would be largely governed, managed, and executed through artificial intelligence". **Dr. Laxminarayan. K, Regional Manager Technical, DesignTech Systems Ltd**



"With Industry 4.0, machines are becoming smarter and users are able to interact with these smart machines in similar way we interact with smartphones. Machine tools industry is working on adopting Industry 4.0 by developing smart machines for metal forming industry which are able accessible over cloud. Industry 4.0 or the fourth Industrial Revolution is the current trend of automation and data exchange in manufacturing technologies. It uses cyber-physical systems and cloud computing. Machines are meant to improve quality productivity and cost efficiency" **Sameer Kelkar, CEO and R&D Head, Grind Master Machines Pvt Ltd**

"We need to upgrade our technology and be at a par with the global practices. Then only we can think of Industry 4.0 for metal forming. It is more relevant when we adopt the total automation using transfer press and allied technology. As such it is too early to foresee the impact of Industry 4.0 on Metal forming industry in India. In the first place we need to answer whether we really need Industry 4.0? And can we afford it? If yes, then we think of 2nd step". **Vivek Nanivadekar, Executive Director, FIBRO India Precision Products Pvt Ltd**

"Industry 4.0 is a significant step closer to reality, paving the way to profitable plants with high availability". **Maulik Patel, Executive Director, Sahajanand Laser Technology Ltd**

"Ensuring the delivery of right products at the right price to the right person through a process of improved sophistication" **Pradeep Patil, Managing Director, TRUMPF India (P) Ltd**

"What the average fabricator may not realize is that Industry 4.0—the emergence of more automation and data exchange between machines in the manufacturing arena—can help welding operations of all sizes meet expectations from even the most demanding of customers. In this interconnected world, a small shop can be as reliable and as responsive as its largest welding competitors". **David Clond, System Engineer, Fronius USA LLC**

"A major factor driving Industry 4.0 is the increasing importance of the supply chain integrating customers and suppliers with high levels of transparency. Not only will this demand the delivery high levels of Overall Equipment Effectiveness (OEE), which will be made possible with the implementation of Industry 4.0 principles, but for those manufacturers that take up the challenge, it will engender loyalty and significantly higher value business from their customers". **Rob Powell, Commercial Director of Lantek Systems Ltd, Science Park, Geraldine Rd, Malvern WR14 3SZ, United Kingdom,**

References

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