

**TALK ON**  
**"LIFE EXTENSION TECHNIQUE FOR WELDED STRUCTURE"**

Organised by the Mechanical Engineering Technical Division, IEM  
 BEM Approved CPD/PDP Hours: 2 Ref No: IEM17/HQ/024/T

Date : 8 March 2017 (Wednesday)  
 Time : 5.30 pm – 7.30 pm (Refreshments will be served at 5.00pm)  
 Venue : C&S & TUS Lecture Room, 2<sup>nd</sup> Floor, Wisma IEM, Petaling Jaya, Selangor  
 Speaker : Assoc. Prof. Dr.-Ing. Yupiter HP Manurung CEng IMechE

**SYNOPSIS**

Failures due to fatigue in welded structures continues to be topic deserving wide focus due to its contributions to loss of life and substantial costs each year all over the world. Fatigue is still the principle cause for breakdown of welded structures in steel bridges, ship structures and offshore structures. Fluctuating loads during in-service conditions are constantly subjected to these types of structural details and components. The ever substantial improvement of the socio-economy has led to the need of structures with longer life cycles, better performance and lower weight. This will shore up an extensive use of accurate and more efficient fatigue improvement methods and these methods must be connected to quality requirements which can be understood and managed during production.

The determination of the fatigue life cycle of particular welded structures has led to the invention and development of various fatigue enhancement methods. The most notable methods are shot peening, hammer peening, TIG dressing and burr grinding. However, the past decade has seen a remarkable development in the high frequency mechanical impact method (HFMI) as a reliable, effective and user-friendly method for post-weld fatigue enhancement technique for welded structures. Based on researches, investigations and applications, it can be summarized that:

- New improvement method HFMI can increase fatigue life, fatigue strength and stress corrosion resistance.
- HFMI can be used for preventive and corrective maintenance or for rehabilitation and repair (atmospheric and underwater).
- HFMI can be used for optimization of new design and material usage.
- HFMI can be used on layer-by-layer welding to reduce residual stress and distortion.
- HFMI can be carried out based on FEM, past experiences or weld/suspect details.
- HFMI strengthens metals through cold work which can increase sub-surface hardness providing increased resistance to wear and abrasion.
- HFMI strengthens welded joint of the structure metals through cold work even though using the unmatched consumable to the parent metal.
- Selection of HFMI devices is essential such as quality assurance methods (certification, inspection method), safety awareness and working potential/voltage (esp. for confined or wet area).
- Various applications of HFMI were reported ranging from offshore (duplex flow line, pontoon, aging rigs, FPSO, ship-shaped FPU etc), underwater structure, stainless steel boiler, train bogies, cranes, steel bridge up to heavy industrial component.

**BIODATA OF SPEAKER**

Dr. Yupiter HP Manurung is a Chartered Engineer (CEng IMechE) and an Associate Professor at Faculty of Mechanical Engineering UiTM Shah Alam since 2005. He has more than 15 years experience in R & D and Industry in Germany, Malaysia and Indonesia. Dr Yupiter graduated his A-Level, BSc, MSc and PhD in Manufacturing Technology from German universities. He is a certified International Welding Engineer and Laser Technologist. Since 2013, he is appointed by German industries as consultant in the field of Life Extension Technique and Virtual Manufacturing. Dr. Yupiter and his postgraduate students have been publishing high-impact scientific papers in various international journals. He is Graduate Engineer (BEM) and Graduate Member (IEM).

**ANNOUNCEMENTS TO NOTE:**

- **Non members** may also attend the talk but will need to pay a registration fee of **RM50** and an administrative fee of **RM15**. GST is inclusive.
- Limited seats are available on a "first come first served" basis (maximum 100 participants). **To secure your seat, kindly register online at [www.myiem.org.my](http://www.myiem.org.my).**

**ADMINISTRATIVE FEE**

- Kindly be informed that an administrative fee of **RM15** is payable for talks organized by IEM. GST is inclusive.
- Student Members are however exempted.

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