

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

Organised by the Mechanical Engineering Technical Division, IEM

BEM Approved CPD/PDP Hours: 2 Ref No: IEM16/HQ/450/T

Date : 8 December 2016 (Thursday)  
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

### 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 socioeconomy 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, 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 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 Weld Fatigue Integrity 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).

Ir. Dr. Kannan M. Munisamy  
Chairman  
Mechanical Engineering Technical Division, IEM

### ANNOUNCEMENTS TO NOTE:

- Preferential admission to talk shall be accorded to IEM members (pre-registration and online registration are NOT required). Telephone and/or fax reservation will NOT be entertained.
- 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.
- For members of affiliated organisations, there will be no registration fee payable. However, they are requested to produce their membership card as proof of membership. For the list of affiliated organisations, please refer to IEM website at [www.myiem.org.my](http://www.myiem.org.my) under International/MoU.
- Limited seats are available on a "first come first served" basis (maximum 100 participants).
- IEM members are required to produce membership cards for confirmation of attendance (CPD purpose).
- Latecomers will not be allowed to enter if the lecture hall is full nor be entitled to CPD.
- ***IEM members who fail to produce their membership cards will be charged a fee of RM25.00. GST is inclusive.***

### ADMINISTRATIVE FEE

- Kindly be informed that an administrative fee of RM15 is payable for talks organized by IEM. GST is inclusive.
- The fee would be used to cover overhead costs, building maintenance expenses as well as contribute to Wisma IEM Building Fund.
- All contributions will be deeply appreciated by IEM.
- Student Members are however exempted.

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