Event Report

Hybrid Lecture Programme on "Laser Based Joining of Exotic Materials – Experience Sharing"

Organized by IEI Tiruchirappalli Local Centre & The Indian Institute of Welding, Tiruchirappalli Branch

In Association with: SQF (IEI, New Delhi), CSI, IIM, IIIE, IIPE, ISNT, IWS, and Kumari Ariviyal Peravai

Date: 1st April 2025 | Mode: Hybrid (Online & Offline)

Introduction

On **1st April 2025**, the IEI Tiruchirappalli Local Centre (IEI TLC), along with **The Indian Institute of Welding (IIW), Tiruchirappalli Branch** and in association with multiple professional societies, organized a **hybrid lecture programme** on the topic **"Laser Based Joining of Exotic Materials – Experience Sharing."** The event was conducted at **6:00 pm** in **Dr. APJ Abdul Kalam Lecture Hall, IEI TLC Building, Tiruchirappalli**, and was simultaneously accessible via Zoom for online participants.

The aim of the lecture was to enhance participants' understanding of the **use of laser technology in welding and joining processes,** particularly in handling **exotic and advanced engineering materials.**

Resource Person

The lecture was delivered by **Dr. B. Shanmugarajan, Sr. Deputy General Manager, Welding Research Institute, Bharat Heavy Electricals Ltd., Tiruchirappalli.**

Dr. Shanmugarajan, with his extensive expertise in welding research and advanced manufacturing techniques, shared valuable **practical insights and industrial experiences** related to laser welding applications.

Programme Highlights

The lecture focused on the **principles, advantages, and challenges of laser-based joining techniques**, with special emphasis on **exotic materials** used in high-performance engineering applications such as:

- **Nickel-based alloys** used in aerospace and power generation.
- **Titanium alloys** for defense and biomedical applications.
- **Duplex and super-duplex stainless steels** for marine and chemical industries.
- **Advanced composites and high-strength steels** used in specialized manufacturing.

Key points covered during the lecture included:

- **High precision and control** offered by laser welding compared to conventional methods.
- **Reduced heat-affected zones** leading to better mechanical properties of the joint.
- **Challenges in parameter optimization** for exotic materials due to differences in thermal conductivity and metallurgical properties.
- Case studies from **Welding Research Institute (WRI)** projects demonstrating successful applications in industrial sectors.

Participation and Interaction

The hybrid format of the programme enabled wide participation from across India. **Students, faculty, and industry professionals** attended both physically at the venue and virtually through Zoom.

The interactive session was particularly engaging, with participants asking questions about:

1) Industrial adoption of laser welding in India.
2) The cost-benefit balance of using laser joining techniques over traditional methods.
3) Future scope of laser welding in energy, aerospace, and medical device industries.

Dr. Shanmugarajan addressed these queries with real-world examples, making the session practical and relatable.

Key Takeaways

The session provided participants with:

- A deeper understanding of **laser welding fundamentals** and its unique advantages.
- Insights into **welding challenges of exotic materials** and methods to overcome them.
- Awareness of **industrial case studies** where laser-based joining enhanced performance.
- Knowledge of **emerging research opportunities** in advanced welding technologies.

Conclusion

The hybrid lecture on **"Laser Based Joining of Exotic Materials – Experience Sharing"** was a highly informative and technically enriching event. It successfully demonstrated how **modern laser technologies are transforming welding practices, especially for advanced and exotic materials.**

The programme highlighted the importance of combining **theoretical understanding with industrial experience,** thereby encouraging students and professionals to pursue **research and career opportunities in welding and advanced manufacturing technologies.**

The session concluded with a note of thanks to the resource person and organizers. Participants also received **e-certificates** as recognition of their active involve

ment.

The Institution of Engineers (India)

TIRUCHIRAPPALLI LOCAL CENTRE

BHEL Main Office Road, Tiruchirappalli -620 014, Tamil Nadu, India.

CERTIFICATE OF PARTICIPATION

This is to certify that **Shubham Balasaheb Yadav** has actively participated in the National Convention Day Webinar on Theme:**"laser based joining of exotic materials-experience sharing"** Organized by **The Institution of Engineers (India),** held virtually on 01-04-2025.

Dr. S. Ravimaran.
Chairman

The Institution of Engineers (India)

TIRUCHIRAPPALLI LOCAL CENTRE

BHEL Main Office Road, Tiruchirappalli -620 014, Tamil Nadu, India.

CERTIFICATE OF PARTICIPATION

This is to certify that **Ekta Prakash Davande** has actively participated in the National Convention Day Webinar on Theme:**"laser based joining of exotic materials-experience sharing"** Organized by **The Institution of Engineers (India),** held virtually on 01-04-2025.

Dr. S. Ravimaran.
Chairman