

Report On

DST STUTI PROGRAM FUNDED 7-DAY TRAINING PROGRAM ON VIBRATION-BASED PRODUCT QUALITY AND CONDITION MONITORING SYSTEMS IN ADVANCED MANUFACTURING

Date: 18th – 25th April 2022

Venue: VIGNAN'S Deemed to be University, (VFSTR), GUNTUR, Andhra Pradesh.

INAUGURATION:

On April 18 at 10 a.m., the VIGNAN'S Foundation for Science Technology and Research (VFSTR), GUNTUR, in collaboration with the GITAM INSTITUTE OF TECHNOLOGY, GITAM Deemed to Be University, Visakhapatnam, inaugurated and started the DST-sponsored National Level Training Program (7-Day Training Program) on "Vibration-Based Product Quality and Condition Monitoring Systems in Advanced Manufacturing" as part of the STUTI Program-2021 (DST/RND/STUTI/2021/18).

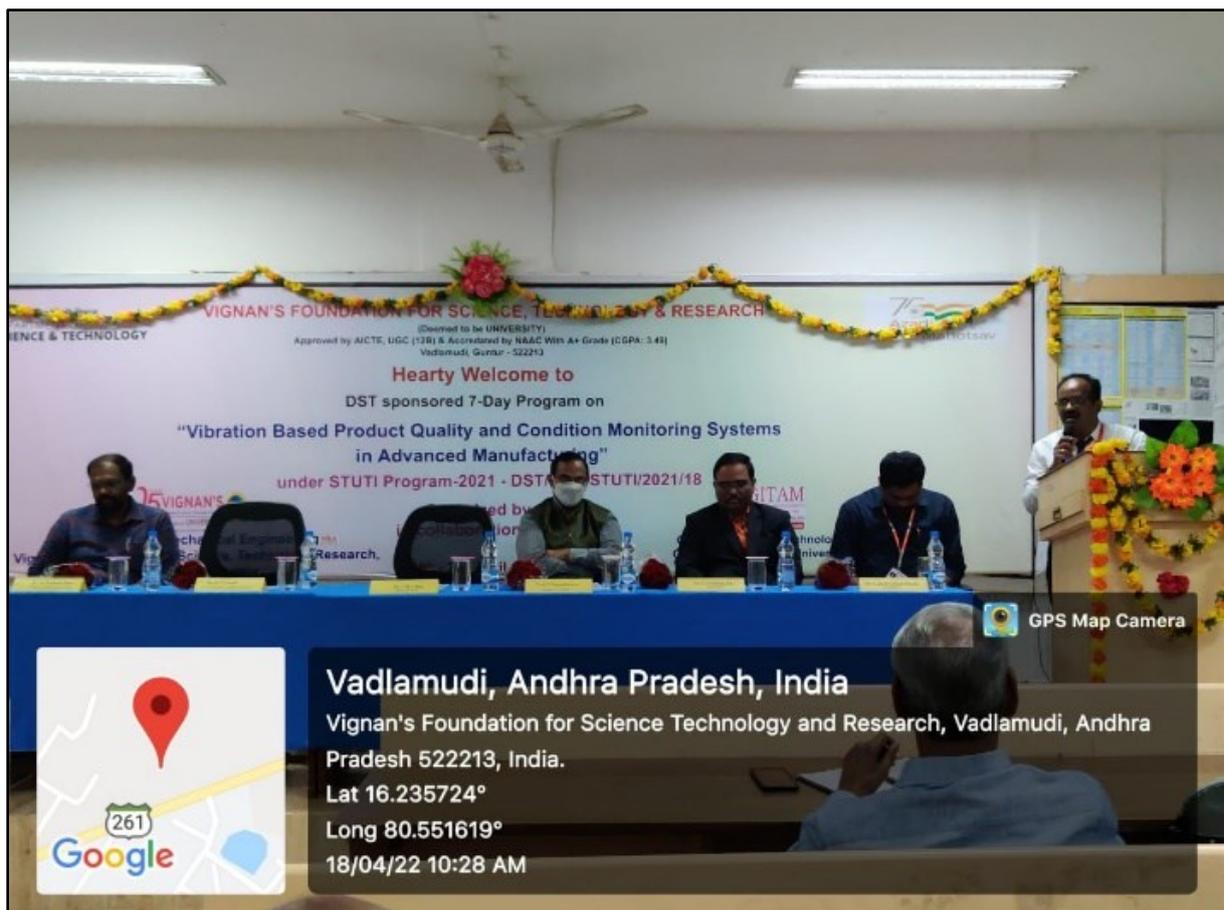


Figure 1. Inauguration of STUTI 7-Day training program at VFSTR, GUNTUR

Varsity vice-chancellor Professor P. Nagabhushan said on Monday. Speaking about the occasion, he said that we are conducting this workshop on "Vibration-Based Product

Quality and Condition Monitoring Systems in Advanced Manufacturing” under STUTI Program – 2021 in collaboration with GITAM, deemed university, Visakhapatnam. STUTI program coordinator Dr Balla Srinivasa Prasad, GITAM (Deemed to be University), was the chief guest at the event, said that students who have mastered the Vibration Level based equipment will have a bright future.

DAY 1 (18-04-2022)

TECHNICAL SESSION:

On the first day Session, **Dr G Srinivasa Rao**, Dean R&D, and HOD, EEE – VFSTR, presented a technical talk on *“Design and Fabrication of an Affordable Hybrid Autorickshaw”*. During his presentation, he explained the design aspects of an electric vehicle, especially a three-wheeler auto-rickshaw.



Figure 2. Session by Dr. G. SRINIVASA RAO, Dean R&D, VIGNAN, GUNTUR.

PRACTICAL SESSION:

In the noon session, hands-on experience measurement of vibrations using accelerometers is conducted participants actively participated in it. He discussed to used simulation, decision-making tools, theoretical graph algorithms, optimisation techniques, and software to solve problems.



Figure 18: Hands-on training on measurement of vibrations using Accelerometer

DAY 2 (19-04-2022)

TECHNICAL SESSION:

Dr K Venkata Rao, Professor, Department of Mechanical Engineering Day 2 first session delivered “*Vibration-based tool condition monitoring in the machining of Ti-6Al-4V using optimisation*”. He discussed optimisation aspects during the machining of Titanium alloys that are difficult to cut metals due to their low thermal conductivity and chemical affinity with tool material.



Figure 5: Session by Dr K Venkata Rao, Professor

PRACTICAL SESSION:

The hands-on session was carried out with working and applications in the technology of Hydrogen fuel cells DST-funded project. The training comprised Hydrogen fuel cells (HFCs); the participants took the hands-on equipment and went through them.



Figure 5: Demo of Hydrogen Fuel Cell

DAY 3 (20-04-2022)

TECHNICAL SESSION:

Dr L Suvarna Raju, Professor, Department of Mechanical Engineering, took the session on *“Influence of ultrasonic vibration on friction stir welding”*. He discussed the importance of solid-state joining processing, friction stir welding, and ultrasonic vibrations-assisted friction stir welding and processing.



Figure 9: Session by Dr L Suvarna Raju, Professor, Dept of Mech.

PRACTICAL SESSION:

The hands-on session was carried out in the afternoon with the working and applications of sensors. Training also provided the concepts of sensor technology essential in machine automation.



Figure 10: Training on sensors and their working

DAY 4 (21-04-2022)

TECHNICAL SESSION:

On day 4, the *“Development and Testing of on-demand Hydrogen generation retro-fitment for automobile applications”* seminar was taken by Dr D. Vinay Kumar, Associate Professor, Department of Mechanical Engineering, VFSTR. In this session, recent development in hydrogen-based transportation engines is reviewed to scrutinise the feasibility of using hydrogen as a fuel.

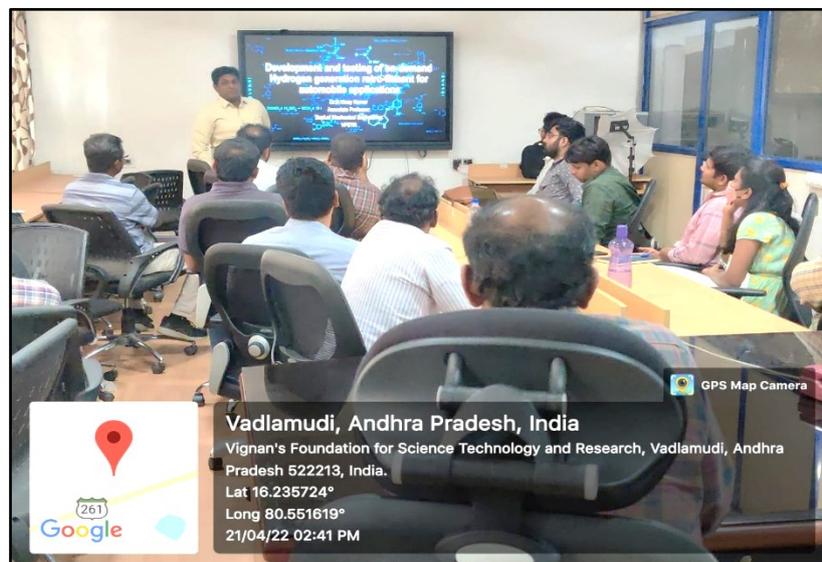


Figure 11: Session by Dr D. Vinay Kumar

PRACTICAL SESSION:

The hands-on session was carried out on VCR diesel engines and working applications. The training provided the concept that diesel engines operate by compressing air to high pressure/temperature and injecting a small amount of fuel into this hot compressed air.

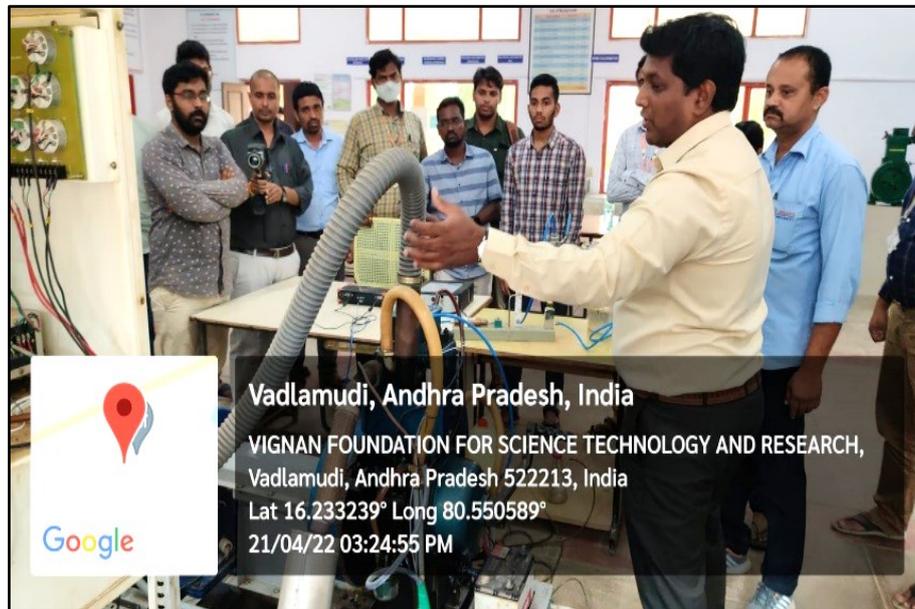


Figure 12: Demonstration of Diesel Engine Working and Monitoring

DAY 05 (22-04-2022)

TECHNICAL SESSION:

On day 5, the morning session was taken by Dr Sk Farooq, Assistant professor, Department of Mechanical Engineering, VIGNA University Guntur. He discussed ***“Experimental investigation of Iso-Stoichiometric GEM blends on a PFI SI engine”***.

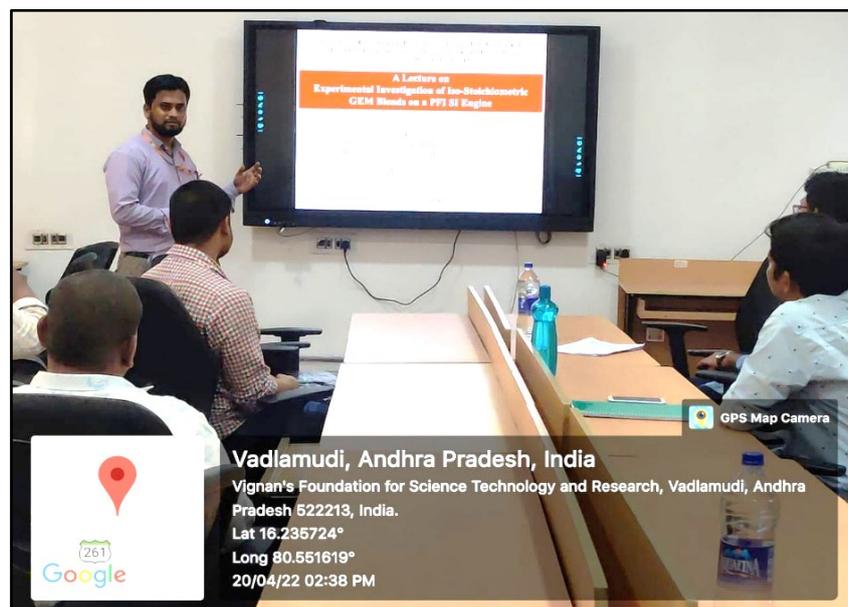


Figure 13: Session by Dr Sk Farooq

PRACTICAL SESSION:

The hands-on session was carried out on the PFI SI engine. It is desirable to avoid engine breakdowns for safety reasons, which has to be increased in engine condition monitoring and performance.



Figure 14: Training session on monitoring diesel engine console

DAY 06 (23-04-2022)

TECHNICAL SESSION:

On day 6, Dr M. Ramakrishna discussed “*Emerging trends in Composite Materials*” about “*Natural fibre reinforced polypropylene composites for low-cost applications*”. He discussed a growing interest in the study of lightweight composite materials.



Figure 15: Session delivered by Dr M. Ramakrishna

PRACTICAL SESSION:

A hands-on session was carried out on UV Assisted stir casting equipment and the execution of the machining process. The participants could practically operate the machine and know the stir-casting process.



Figure 8: Training session on UV-assisted stir casting equipment

DAY 07 (24-04-2022)

TECHNICAL SESSION:

On day seven session was taken by Dr K. Balamurugan, who discussed the concepts of “*Thermal Aspects in Machining*”. He explained that due to the complexity of machining mechanics, it is hard to predict the intensity and distribution of heat sources in individual machining operations.



Figure 17: The session was taken by Dr K. Balamurugan

PRACTICAL SESSION:

The afternoon session provided practical training to the participants on composites fabrication using drum winding. This session provided knowledge on operating drum winding equipment.



Figure 3. Training session on composites fabrication using drum winding

VALEDICTORY

The Valedictory was held on the last day of the 7-day training programme, which participants took part in with great enthusiasm. Program Coordinator of VFSTR, Guntur Dr K. Venkat Rao, Head of the Department Mechanical Dr L. Suvarna Raju, Professor and STUTI coordinators Dr Balla Srinivasa Prasad and Dr K. Suresh Kumar gave certificates of participation to the participants who had finished the training programme.



Figure 19: Distribution of Certificates to the participants

VOTE OF THANKS

We thank our vice-chancellor Professor P. Nagabhushan for attending the program and addressing the students about building their careers. We are very thankful to our chief guest Professor P. Nagabhushan for giving valuable information regarding academic careers and motivating students ethically.



Figure 20: Gathering of Participants in Valedictory

We thank the team coordinators, Dr Balla Srinivas Prasad and Dr K. Suresh Kumar, who conducted this program. We thanked all the faculty members, volunteers, and students for making the event successful. As program coordinators, Prof. B. Srinivas Prasad closed the event with advice and thanks notes.

Regards,
Dr Balla Srinivasa Prasad
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