Report on Knowledge Manthan Held on 8th Jan 2022

Date of Event	**08.01.2022**
Name and Type of Event	**Knowledge Manthan** On "A Meta-Heuristic Approach For Optimization Of Solar Air Heater Parameters".
Conducted by	Dr. Anupam Kumari
Number of Participants	**32**

The Resource person **Dr. Anup Kumar** is Assistant Professor of the School of Engineering and IT, ARKA JAIN University, Jamshedpur.

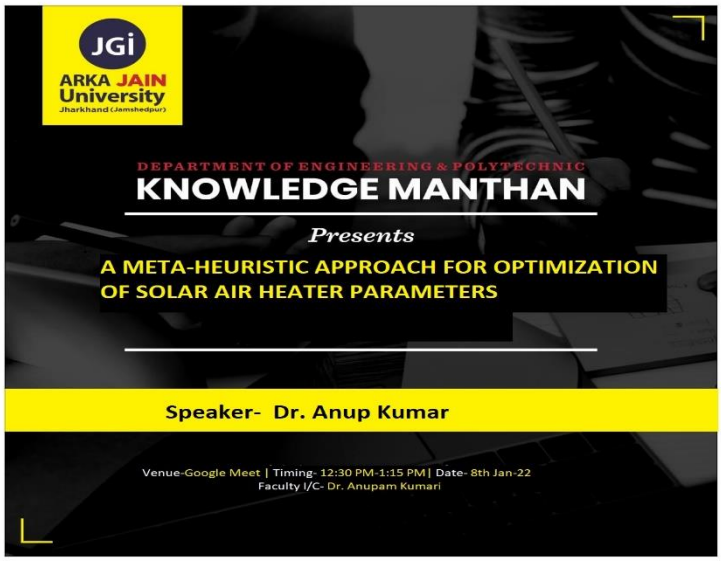
The speaker gave informative and illuminating lecture with valuable content. The session was very valuable for Faculties, Researcher and Students. Energy is a basic requirement for human being and also influences the economic development. The rapid depletion of fossil fuel resources forced human being for a search for non-conventional energy resources.
Out of alternative energy resources, solar energy is available freely and abundance on earth in the form of radiation. Solar collectors are widely used for utilization of solar energy for various applications. Solar air heaters are simple to design and no complicated tracking mechanism.
The present work showed an attempt to estimate the optimal thermal performance of a smooth flat plate solar air heater (SFPSAH) with various operating parameters and also to determine the most effective parameters through TBLO technique.This work helps to find out that how actual experimental set-up is far away from the optimized set of crucial parameters.

About the Speaker:-

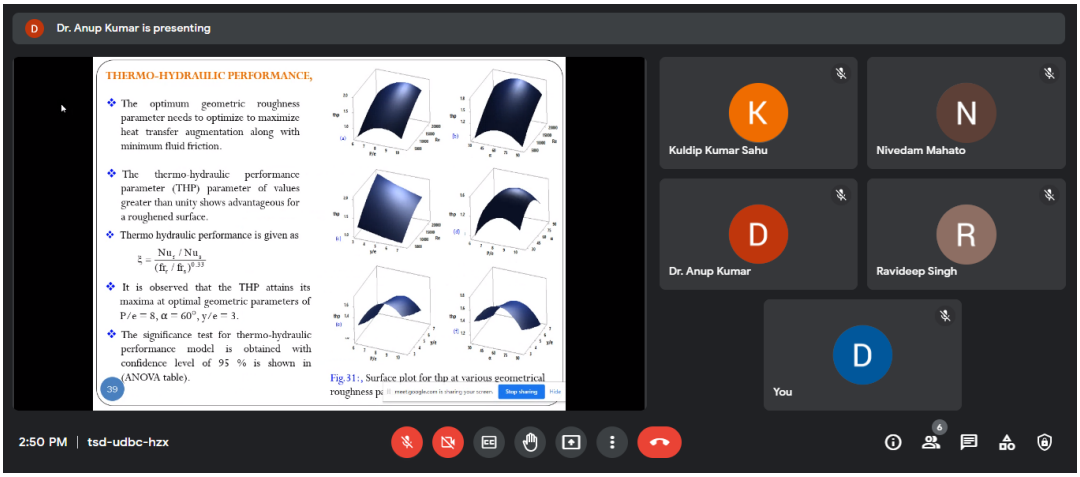
Dr. Anup Kumar is Assistant Professor of the Dept of Engg, School of Engineering and IT, ARKA JAIN University, Jamshedpur..

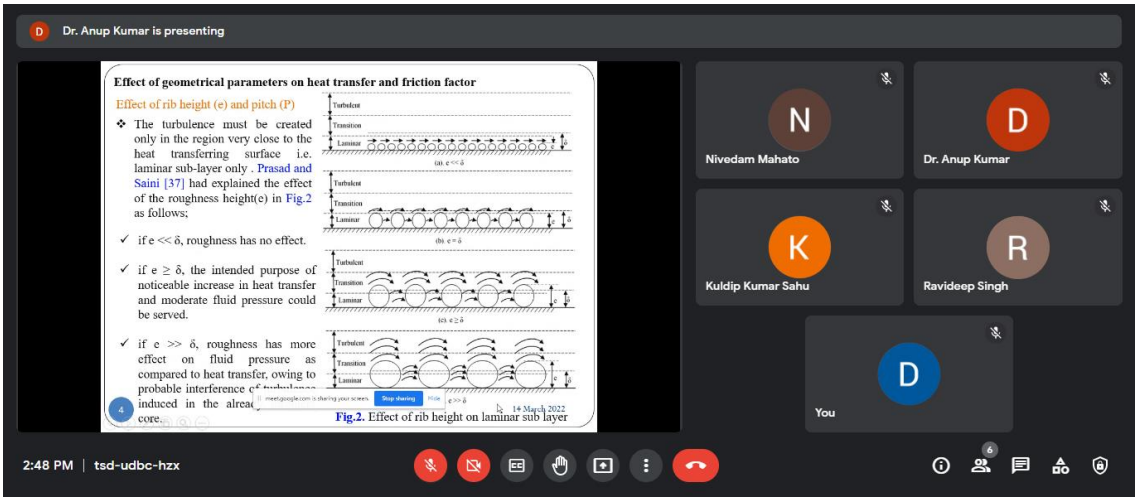
Venue and Participants:-
Knowledge Manthan was conducted online on Google Meet Platform. **Total participants attended were 35**

Event Poster



Glimpse of the event




Dr. Anup Kumar is presenting
Effect of geometrical parameters on heat transfer and friction factor
Effect of rib height (e) and pitch (P)
❖ The turbulence must be created only in the region very close to the heat transferring surface i.e. laminar sub-layer only . Prasad and Saini [37] had explained the effect of the roughness height(e) in Fig.2 as follows;
✓ if e << δ, roughness has no effect.
✓ if e ≥ δ, the intended purpose of noticeable increase in heat transfer and moderate fluid pressure could be served.
✓ if e >> δ, roughness has more effect on fluid pressure as compared to heat transfer, owing to probable interference
induced in the
core.
Turbulent
Transition
Laminar
(a). e << δ
(b). e ≈ δ
(c). e ≥ δ
Fig.2. Effect of rib height on laminar sub layer
14 March 2022
Nivedam Mahato
Dr. Anup Kumar
Kuldip Kumar Sahu
Ravideep Singh
You
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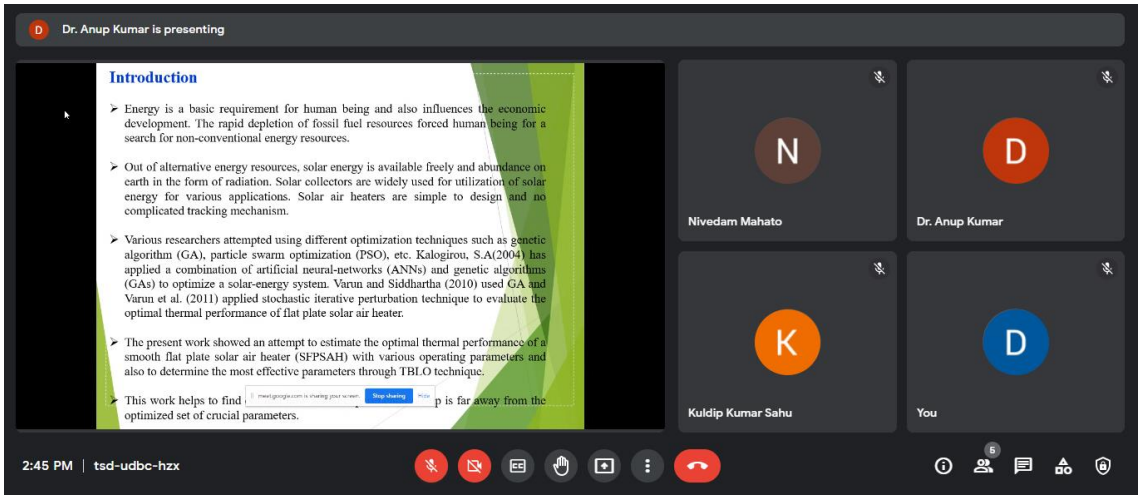
Dr. Anup Kumar is presenting
Introduction
➢ Energy is a basic requirement for human being and also influences the economic development. The rapid depletion of fossil fuel resources forced human being for a search for non-conventional energy resources.
➢ Out of alternative energy resources, solar energy is available freely and abundance on earth in the form of radiation. Solar collectors are widely used for utilization of solar energy for various applications. Solar air heaters are simple to design and no complicated tracking mechanism.
➢ Various researchers attempted using different optimization techniques such as genetic algorithm (GA), particle swarm optimization (PSO), etc. Kalogirou, S.A(2004) has applied a combination of artificial neural-networks (ANNs) and genetic algorithms (GAs) to optimize a solar-energy system. Varun and Siddhartha (2010) used GA and Varun et al. (2011) applied stochastic iterative perturbation technique to evaluate the optimal thermal performance of flat plate solar air heater.
➢ The present work showed an attempt to estimate the optimal thermal performance of a smooth flat plate solar air heater (SFPSAH) with various operating parameters and also to determine the most effective parameters through TBLO technique.
➢ This work helps to find
optimized set of crucial parameters.
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Nivedam Mahato
Dr. Anup Kumar
Kuldip Kumar Sahu
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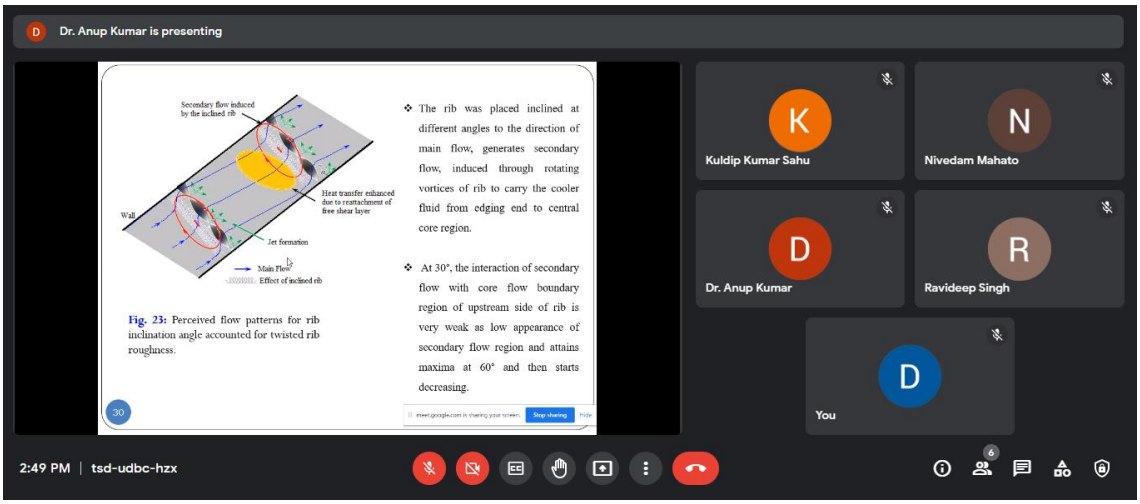
Dr. Anup Kumar is presenting
Secondary flow induced by the inclined rib
Heat transfer enhanced due to reattachment of free shear layer
Wall
Jet formation
Main Flow
Effect of inclined rib
Fig. 23: Perceived flow patterns for rib inclination angle accounted for twisted rib roughness.
❖ The rib was placed inclined at different angles to the direction of main flow, generates secondary flow, induced through rotating vortices of rib to carry the cooler fluid from edging end to central core region.
❖ At 30°, the interaction of secondary flow with core flow boundary region of upstream side of rib is very weak as low appearance of secondary flow region and attains maxima at 60° and then starts decreasing.
30
Kuldip Kumar Sahu
Nivedam Mahato
Dr. Anup Kumar
Ravideep Singh
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