Webinar Report
(Department of Mechanical Engineering)

As a part of webinar series, with an encouragement by Dr. L. Suvarna Raju, H.O.D, Department of Mechanical Engineering, the webinar on **"Fuel Cell Thermodynamics and it's Applications"** was held on **10th July 2021 from 2.30PM to 5.00PM**at AGF06, U-Block. The resource person was Dr. G. Naga Srinivasulu, Associate Professor, Department of Mechanical Engineering, NIT Warangal. The resource person has rich experience in fuel cell research area including good number of funding projects. The session was inaugurated by Dr. B. Nageswara Rao Prof & Director IES and (Dr). Sk. Farooq, Assistant Professor. Dr. Rao addressed the participants and explained the need of this kind of webinars also highlighted about the department strengths and facilities available. Basically, it is a kind of Emerging Technologies for the 21st Century. It was very interesting and informative. In fact, it was the highlight of the Webinar series at our Varsity. More than 650 participants from various parts of India and few of them from abroad, particularly more than 50 from industry. We were able to allow 150 participants and other registered participants about 500 facilitated the recorded video.

Now a days fuel cell technology has drawn the attention of numerous researchers, because of its two important features that is zero pollution and high energy efficiency in the tank to wheel process.Vehicles like Honda insight and Toyota Prius are some of the good examples falling under the class of HEV's

Basically, these two features of technology lead to the replacement of IC engine despite the recent launch of Honda fcx clarity Hyundai ix35 FC and the Toyota mirai, number of issues obstructing the FCHEVs from being challenging with IC vehicles. these are the cost and development of the fuel cell stack itself and the supply hydrogen storage infrastructure and transportation of hydrogen fuel.

Fuel cells do not need fossil fuels or gas and can therefore reduce economic dependence on oil producing countries. fuel cells have higher efficiency than diesel or gasoline engines hydrogen fuel cells are capable of generating electricity with up to 60% efficiency.

Dr. Naga Srinivasulu concentrated on Performance of a polymer electrolyte membrane fuel cell is, and explained with demonstration. It was found that the efficiency may be appreciably improved by flow-field geometry. He reiterated that naturally inspired flow channel designs enhance the fuel-cell performance also illustrated the relevant examples like plant leaves

and human lung structure. During his presentation it as shown that the lung channel geometry of bipolar plate is used in the fuel cell for the supply of reactants.

Dr. Naga Srinivasulu taken an example with assumed dimensions like 49 Cm^2 area with Nafion-117 membrane with lung channel bipolar plate and tested on the programmable fuel-cell test station and stated that it generates 25.62 W at 42.7 A current when it is operated at a temperature of 60°C, 1-bar pressure at corresponding temperatures The fuel cell with lung channel generates around 34% more power than triple serpentine flow field.

Also mentioned some issues that hydrogen storage containers are still to large bulky and very expensive hydrogen contains three times more energy per unit wise compared with gasoline vehicle cost fuel cell vehicles are right now too expensive to compete with hybrid vehicles and conventional gasoline and diesel vehicles automakers must Cutdown production cost particularly the cost of the fuel cell system and hydrogen storage

As a part of vote of thanks, Dr. B. Nageswara Rao, Coordinator of the webinar stated that It was found through feedback that each participant wants to express appreciation for his inspiring presentation through live demonstration of building fuel cell at Laboratory Level. His years of research experience and depth of understanding of user interfaces, and ability to present the subject in such an interesting way produced one of the most memorable webinar day for all of us. Thanked the Dr. Lavu Rathaiah Chairman of Vignan Group, Sri Lavu Srikrishnadevarayulu Vice Chairman of Vignan Group, Dr.M.Y.S Prasad Honorable Vice Chancellor, Dr. Cmde. M.S.Raghunathan, Registrar of Varsity for the motivation and continuous support to conduct this kind of programs.

----Webinar Coordinators