

Indian National Academy of Engineering (INAE)

Recent Initiatives of INAE for meeting the National Needs and Strategic Priorities

INAE has been involved in the recent past in several initiatives which are of national importance. By and large these tasks are undertaken either based on the important national priorities or on the suggestions from various Government Departments like DST, NITI Aayog etc. The Academy has made considerable progress in some of the following areas and we are happy that as an Engineering Academy we are able to play a meaningful role in Nation building. The details on some of our contributions are summarised below.

1. Regional Transport Aircraft

With the announcement of the new civil aviation policy, and Udaan programme from the Government of India, the requirement for Regional Civil Aircraft in the Country is expected to become substantially higher in the coming years. Therefore, it was felt necessary to build a sound base for design and development of a Regional Transport Aircraft industry in the Country. Accordingly, Indian National Academy of Engineering (INAE) organised a high-level meeting with the presence of the top executives from all stake holders like, HAL, NAL, CSIR, ISRO, other subject experts and also experts from Industries like Tata and Mahindra. All pertinent issues related to the topic were discussed in detail and converged on a possible mechanism for managing the Civil Aircraft programme in the Country. This was also taken up as one of the themes during Engineers Conclave-2017, which is a flagship event of INAE. The fifth Engineers Conclave in 2017 organized jointly with CSIR-NAL, Bangalore addressed this issue on "Regional Air Connectivity" in detail. Further in association with the Ministry of Defence Production and Ministry of Civil Aviation INAE organized a one-day International Seminar on "Civil Aviation – Regional Air Connectivity" as a part of Aero India on 21st February, 2019 at Bangalore.

The recommendations had since been finalized and attempts were made to reach out to the right agencies in the Country. Presentations were made to NITI Aayog and implementation of recommendation on instituting a Special Purpose Vehicle are under progress. A note was also prepared and forwarded to the Secretary, Ministry of Civil Aviation through the office of Principal Scientific Advisor (PSA) to Govt of India.

On January 14, 2020, a meeting of INAE Delegation comprising of Dr Sanak Mishra, President, INAE; Dr BN Suresh, Immediate Past -President, INAE; Dr Kota Harinarayana, Former DG, ADA; Dr PS Goel, Former President, INAE and Lt Col Shobhit Rai (Retd), Deputy Executive Director, INAE was held with Hon'ble Minister of Civil Aviation, Shri Hardeep Singh Puri at New Delhi, to present the recommendations on the development of Regional Transport Aircraft in the country,

emanated from the various technical activities organized by INAE on the subject. The meeting was fruitful and relevant in the context of India having the largest market in the world for the class of Regional Transport Aircraft with 90-seater capacity. The Hon'ble Minister directed Directorate General of Civil Aviation (DGCA) officials participating in the meeting to slot a one-hour presentation on the subject shortly.

2. Study on “Pilot Project on Safe Laboratory Practices and Laboratory Waste Disposal”

During one of the DST-INAIE Consultative Committee Meeting, Prof. Ashutosh Sharma, Secretary, DST suggested INAE to undertake a Study to create an action plan for enhancing the awareness of health and safety issues and safe disposal of chemicals and solvents in chemical and biological laboratories in Indian universities, research institutes and colleges. Accordingly, INAE organized one day workshop with all stakeholders at Pune and further undertook a Study on “Pilot Project on Safe Laboratory Practices and Laboratory Waste Disposal”.

The Study was carried out by Dr. S Sivaram, FNAE as the Principal Engineering Investigator (PI) and Dr. G.S. Grover, Chief Scientist (Retd), CSIR-National Chemical laboratory, Pune; as Team Member and Consultant and Mr. Shankar B. Kausley, TCS Pune as Team member. As a pilot project, three institutes were identified to create an implementable action plan as well as establish best practices for the disposal of chemical and hazardous wastes in the chemical and biological laboratories. The three institutes identified for undertaking of the study are:

1. Savitribai Phule Pune University (SPPU), Pune
2. Institute of Chemical Technology (ICT), Mumbai
3. Indian Institute of Science Education and Research (IISER), Kolkata

Other than the above mentioned three institutes, the inputs were also received from other institutes who are doing a remarkable work in this area viz IIT Delhi which has developed a zero-waste campus wherein the entire waste is being used to generate bio fuel to run the vehicles within the campus and carry out other activities. A report on the proposed pilot project on Safe Laboratory Practices and Laboratory Waste Disposal, along with the project proposal, after duly incorporating all suggestions has since been prepared and submitted to Prof. Ashutosh Sharma, Secretary, DST for consideration and allotting a time slot for making a presentation on the subject.

3. Clean Coal Technologies

Department of Science and Technology (DST) had requested INAE to provide engineering interventions required for research in the field of ‘Clean Coal Technologies’. Accordingly, a Round Table meeting on “Clean Coal Technologies in India: Current Status, Demands and Aspirations – Pathways to Achievements” was conducted in June 2016 wherein about 35 domain experts from Industry, Academia and R&D participated. Based on the deliberations, the topics requiring technical interventions and the domain experts were identified. During the final session of the workshop, it was decided to prepare a comprehensive report highlighting the specific areas, gaps if any, and further actions needed to bridge the gaps, including the

identification of research areas where further funding can be considered. The specialists were also identified to prepare the report and the inputs have since been obtained from the authors on the topics identified during the subject Round Table. The meeting to finalize the comprehensive report containing inputs from all the authors on the selected topics in the area of Clean Coal Technologies identified earlier; was held on Oct 26, 2016 at New Delhi. The meeting was attended by 25 experts in the area of Clean Coal technologies. Based on the deliberations, the areas for undertaking research had been identified and the report along with 11 proposals for R&D projects submitted to DST. DST is funding some of the research proposals based on the recommendations of INAE.

4. Engineers Conclaves

Engineers Conclave is one of the very important initiatives started in 2013 by INAE essentially to find the engineering solutions to many of the problems faced by society and the Country. These Conclaves are organised in collaboration with major engineering institutions/strategic departments, on rotation basis, each year. Two important themes which are of National importance are selected for each Conclave and the deliberations are carefully structured to recommend suitable engineering solutions. Specific actionable recommendations are formulated and submitted to the concerned government department and industry for implementation. Engineers Conclave has tangible delivery in suggesting possible engineering solutions to the policy makers of the country. Some of the important themes where INAE has made tangible recommendations are Smart Cities, Engineering Education, Regional Transport Aircraft, Green Energy Solutions, etc.

5. Frugal Innovation (National Innovation Council, DST)

Considering the importance of promoting the innovation in the Country INAE undertook an initiative to give thrust to frugal innovation. Besides the core activities of INAE, one of the objectives of the Academy is to pursue academic activities to addressing 'Engineering challenges' that the country is facing. In line with this objective INAE undertook one of the major initiatives of organising a two-day Workshop jointly with National Institute of Rural Development and Panchayat Raj (NIRDPR) on Frugal Innovation on July 7-8, 2017 at NIRDPR, Hyderabad.

Further a "Frugal Innovation Nurturing Programme" (FINP) was instituted under the aegis of INAE in August 2018 with an objective to nurture prospective frugal innovations which have reached prototype stage to scale up and commercialize them for greater exploitation. For this purpose, Innovation Promotion Committee (IPC) was constituted for implementation of the Programme under the Chairmanship of Dr. V Bhujanga Rao, FNAE. Frugal Innovation Nurturing Programme (FINP) has also joined hands with National Innovation Foundation (NIF) to identify some innovations that have reached prototype stage and have been successfully tried in the field, but were limited in out-reach in terms of infrastructure/means available with the inventor. Frugal Innovation Nurturing Programme (FINP) has since identified four such innovations during 2018-19 and one of them was scaled up from TRL-4 to TRL-9. After gaining experience in 2018-19, this year in 2019-20, 13 such innovations have been identified for greater exploitation and commercialization.

6. Role of Hydrogen in India's Energy Strategy

Prof. K VijayRaghavan, Principal Scientific Adviser (PSA) to Govt. of India on the sidelines of the R&D Conclave held on 17December 2019 in Delhi expressed his willingness that INAE should prepare a concept paper on Hydrogen based approach for India's Energy Strategy. For this a Round Table Interaction of domain experts on "Role of Hydrogen in India's Energy Strategy" was organized by INAE Pune Local Chapter on February 15, 2020 at Pune, which was attended by domain experts from INAE, Academia, R&D organizations and Industry. The invited experts shared insights on the current and future global situation about use of Hydrogen as an energy source; discussed the overall situation in India with respect to technologies, capabilities and affordability for Generation, Storage, Transportation and Usage of Hydrogen and concluded on the approach to be followed by INAE in forwarding recommendations to the Government. Subsequent to the deliberations, the recommendations in the form of a White Paper containing all the pertinent issues related to Role of Hydrogen in India's Energy Strategy are under compilation and shall be submitted to Prof. K VijayRaghavan, Principal Scientific Adviser (PSA) to Govt. of India