

## Sailendra Nath Roy Chaudhury (1923–2016)

Air Vice-Marshal Sailendra Nath Roy Chaudhury who was the Founder Director of the Gas Turbine Research Establishment in Bengaluru between November 1961 and March 1981, passed away in the city on 18 May 2016 at the age of 93 years. His demise has left deep impression which will remain forever among the aeronautical fraternity in the country. It would be appropriate to recall the various facets of the subject of gas turbine engine technology which he pioneered and nurtured till the end.

The gas turbine engine technology prior to 1950s was largely commanded by very few countries such as USA, UK, Russia, Germany and France. India did not figure in the map.

In the private sector, M/s Walchand Hirachand established the Hindustan Aircraft Limited (HAL) in collaboration with companies in the UK and Russia. After India's independence, the Government of India (GoI) took over HAL as a public sector undertaking. That was the time when under the leadership of the Defence Minister, the late V. K. Krishna Menon, with full support of the Prime Minister, Jawahar Lal Nehru, it was envisioned to have an indigenous base for developing gas turbine engines for aircraft, to be produced by the new set-up at HAL. At that point of time, Sailendra Nath Roy Chaudhury, a fresh Air Force pilot, trained at the Cranfield Institute of Technology, UK, in the field of propulsion, was identified by the Ministry of Defence, GoI to take the lead for nurturing gas turbine technology in the country.

The story begins in 1959, when the Gas Turbine Research Centre (GTRC) took birth at the Air Force Station in Kanpur, where Roy Chaudhury was posted as a Squadron Leader after his return from Cranfield, UK. It had eight engineers/scientists and about 20 technicians. The dedicated team under Roy Chaudhury leadership developed and tested the first indigenous centrifugal-type gas turbine engine of 1000 kg thrust at the Kanpur base on 4 April 1961. Both Nehru and Krishna Menon witnessed the testing at Kanpur.

The same year, i.e. 1961, GTRC was relocated at Bengaluru under the Defence Research and Development Organisation, and renamed Gas Turbine Research Es-

tablishment (GTRE). The team at GTRE took up re-engineering of the RD-9F Russian engine, a candidate power plant for the HF-24 in association with the HAL team. Subsequently, a 1700 K reheat system was developed for Orpheus-703 engine to meet the power requirement of HF-24. Roy Chaudhury's contribution towards thrust augmentation of Orpheus-703 engine designed and developed, and also development of type-certified reheat system at GRTE was indeed a satisfying professional achievement for him.



During early 1970s, a series of research projects, mostly related to the development of advanced components and systems, such as transonic compressor, annular combustor, high-temperature turbine, catalytic ignition for 2000 K reheat system and control system were sanctioned and monitored by the AR&DB propulsion panel. These projects led to thrust augmentation of basic Orpheus-703 engine by introducing transonic first stage to existing axial flow compressor and suitable re-engineering of downstream combustor and turbine. The upgraded Orpheus-703 engine (TS-16) with improved performance was demonstrated in the newly established test cell at GTRE. Under Roy Chaudhury's leadership, the team was motivated to take up further projects of developing GTX series engines, i.e. GTX-37U and GTX-37UB with innovative flat rating concept, which was successfully demonstrated during the 1980s. GTRE thus emerged as a full-fledged laboratory

committed to the development of aero-gas turbine engine systems suited to specific Indian requirements. GTRE now has facilities for full-scale engine tests, testing engine components, mechanical analysis, experimental stress analysis and vibration engineering.

Roy Chaudhury remained active towards the betterment of GTRE. He was instrumental in starting the annual gas turbine seminar at GTRE. He invited prominent personalities like the late Bob Fieldon (Director General of British Standards Organisation), the late A. H. Lefevre (Head of Propulsion, Cranfield Institute of Technology, UK), Boudique (Technical Director of Snecma Moteurs, France), and Pierre Young (Engineering Director, Rolls Royce, UK) for suggestions and advice. Their input was of immense value at different stages of development and made all scientists and engineers confident in taking up any developmental task. From a mere 20 to 30 personnel at GTRC (Kanpur) in 1961, the strength of GTRE increased to almost 1600 engineers and technicians by the time Roy Chaudhury superannuated in 1981.

He was a firm believer in the utilization of bio-energy for tackling energy deficiency and uplifting rural economy. In the post-retirement phase, from 1981 he was passionately involved in the application of bio-energy for rural development. His persuasion resulted in the approval, by the Department of Non-Conventional Energy Sources of the Ministry of Science and Technology, GoI of a demonstrator project on the use of small gas turbine for Mandya Sugar Mill in Karnataka, using total energy concept. This project was successfully completed by installing a small gas turbine of 500 kW capacity, IMI 831-800, obtained from Garrett Turbine Engine Company, USA, as an experimental case. The project demonstrated successfully the use of alcohol from the sugar mill to run the engine while the power generated was used for running the bagasse dryer. The hot gas exhaust from the drier was used for drying the bagasse and, in turn, the dried bagasse was burnt in the boiler for steam generation for various process applications, increasing the thermal efficiency to the extent of 34–36%. This was demonstration of the real merit of using

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total energy concept – new to our country then. The concept of decentralization and co-generation using small gas turbine fuelled by biomass, biogas, etc. to make the rural population of India energy-sufficient was close to Roy Chaudhury's heart.

His passion for doing something for the benefit of people never stopped till the very end. He set up a small laboratory at home in Koramangala, Bengaluru to demonstrate the use of a small set-up for generating electricity for a rural home. He also developed an electronic gas-flow meter with distant reading facil-

ity and auto-billing. He wrote a book, *Restoration of Split Milk* to bring out the complete dimension of his efforts, deeds and persuasion to achieve his goals.

Roy Chaudhury was the first Indian Air Force Fellow of the Royal Aeronautical Society, London, UK; Honorary Fellow of Energy Institute, UK, and Fellow of the Indian Academy of Sciences, Bengaluru. He was awarded the prestigious J. Omprakash Bhasin Award in 1984.

A man with a strong vision, tenacious, hard-working, a great team leader, dedicated task master and kind-hearted, Roy

Chaudhury will be remembered by the entire GTRE family and everyone who knew him. He is survived by his wife, two sons, a daughter and their families.

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