AMITABHA BHATTACHARYYA

(12 November 1931 - 25 June 1992)

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A Bhattacharyya

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(1931 – 1992)

Elected Fellow 1979

AMITABHA BHATTACHARYYA was an eminent teacher of Mechanical Engineering (Machine Tools), Production Engineering and an equally distinguished researcher in these fields. He was a man of wide ranging and original expression, his forte covered a vast field and his experience encompassed a wide spectrum - from engineering education and research through planning and development work to administration and management. He made many a sacrifices for nurturing the Mechanical Engineering department and building the Production Engineering Department of Jadavpur University - his alma mater. While his research works were largely concentrated in the area of Metal cutting and Machine tools, his foresight helped to identify different thrust areas of research in Mechanical and Production Engineering. His academic involvements did not keep him away from performing social work actively.

EARLY LIFE, EDUCATION AND FAMILY

Amitabha Bhattacharyya was born in Dacca (now the capital of Bangladesh) on 12th November 1931. He was a bright student even in his school days so much so that he matriculated at an early age of 14. He joined St. Xavier's College and passed the I.Sc. examination in the year 1947.He joined National Council of Education, Bengal (now Jadavpur University) for studying Mechanical Engineering. He obtained the B.M.E degree in 1951 and was placed in First class with Honours. He joined academics and he obtained the ME degree of Calcutta University from Bengal Engineering College, Shibpur in 1956, and left for USA to study M.S. at the University of Illinois. This he did because he wanted to expose himself to the frontiers of Machine Tools engineering. After completion of his M.S. degree, he returned to India and commenced his research work under the supervision of Professor Gopal Chandra Sen, one of the pioneers of Machine Tool Engineering in the country. He investigated on the performance of controlled contact cutting tools. His pioneering work brought him national recognition. He was one of the few to obtain Ph.D in Engineering from an Indian University at that time. He obtained his Ph.D degree in 1962 from Jadavpur University and was the first recipient of such a degree in Engineering from the University. Professor Bhattacharyya was married to Jayati Bhattacharyya. They were the proud parents of his only son Nilanjan Bhattacharyya who is also a Mechanical Engineer. Professor Bhattacharyya himself strongly felt that it would not have been possible for him to contribute so significantly in academic and research activities with[out]

his wife's all round support and inspiration. He received a set-back in his family life with her untimely demise in 1976.

PROFESSIONAL AND ADMINISTRATIVE CAREER

Professor Bhattacharyya commenced his professional career in 1952 when he joined Bengal Engineering College, Shibpur as a Teacher of Mechanical Engineering. In the year 1961, at the young age of 30, even before obtaining the Ph.D degree, he was promoted to the post of Professor at Bengal Engineering College. In 1964 with the invitation of the then Vice Chancellor Professor Triguna Sen, he joined Jadavpur University as Professor of Mechanical Engineering. In 1965 he was elected a fellow of CIRP (International Institute of Production Engineering Research). In 1966, he was invited by the Pennsylvania State University, USA as a distinguished visiting Professor. Infact, he was the first Indian Engineer to receive such a prestigious offer. His fertile experience and expertise in the field of Metal cutting and Machine tools was soon requisitioned by several renowned Universities abroad like the Olivetti research school, Italy (1966), Technical University of Brno Chechoslovakia (1967) etc.

In 1969 he was offered the post of Director, CSIR but he declined to accept the same. His attachment towards academics and state of the art engineering research prompted him to accept the re-invitation from Pennsylvania State University in the same year. In 1971 he became a member of the Governing Council of NPC (National Productivity Council). In 1972 he was made a member of the West Bengal State Planning Board. In the following year he became a member of the Board of Commonwealth Engineering Council, London. His intellectual excellence, unique achievements, administr .tive skills and the farsightedness in his advice brought him the Chairmanship of the International Committee on Education and Training of Engineers for the term 1975 – 78 to which high office he had been the first Indian to be unanimously chosen by World Federation of Engineering Organization (WFEO) at its 5th general assembly at Tunis in June 1975. He continued to hold this post till his death. In the year 1975 he became the Director of IIT Kanpur. He was then only forty four and was the youngest to receive the prestigious post of the Director of an IIT. During his stay at the institute among other activities he took a strong initiative in the installation of a third generation computer. It will not be out of place to mention here that this decision of his indicates how confident he was about the role of computers in varied engineering research when many of his contemporaries failed to comprehend its importance.

Professor Bhattacharyya had been a member on many specialist councils and professional societies the world over, but seen from the vantage point, his active, rather stubborn interest in the Institution of Engineers (India) is particularly fascinating. He became an Associate Member of the institute in 1959, a Member in 1968 and a Fellow in 1971. With an enormous wealth of ideas always in play, he had been a staunch champion of the Institution serving the Council and many if its important committees and panels for long. He had been a member of the Council since 1964, a Chairman of the Bengal Center in 1974 and had been Chairman of the Mechanical Engineering Division during 1973-75. He had also been the Chairman of the Production Engineering and Machine Tool Technology group in 1975. He had been a member of the Finance Committee during 1967 and 1974 and also had been a member of the Engineering Education and Research committee since 1966. Besides these, he had a prominent role in a number of other action-oriented committees such as the Journal review committee, Headquarters re-organization committee, Syllabus committee, Image committee etc.

formed by the Council. All these activities culminated into his being elected as the President of the Institute in 1976 for two terms (1976 – 78). He was the youngest President of the Institute in it's life of five decades.

In 1980 Professor Bhattacharyya became UGC Professor and established the Production Engineering department at Jadavpur University – the first of it's kind in the country. Now that he had become the founder head of Production Engineering Department, his commitment and involvement towards its efficient functioning had increased many folds. Still he managed to take up responsibilities abroad. In 1986 and 1987 he had been the President of FEISCA. In 1988 he acted as the Chairman of the First World Congress on Engineering education and training organized by FEISCA, WFEO and UNESCO. The same year he became the Vice President of WFEO and was the first Indian to hold this chair. In the year 1991 he superannuated and was offered the post of UGC Emeritus Professor. He continued to be associated with the same Department .He was also offered the Khursid Chairpost in Bangladesh University of Engineering. and Technology and the post of Director of the Research Institute of Pennsylvania, USA but he did not join. This clearly shows his attachment towards the Department he had created. He held this chair till death.

SCIENTIFIC CONTRIBUTIONS

Professor Bhattacharyya made extensive contribution to research and development in metal cutting and machine tools at a time when there was very little organized machine tools industry in India. Though a programme of intense industrialization, including manufacture of machine tools and other machines was launched during the fifties, the required research input, support, and a dynamic teaching programme in the field of metal cutting and tool design was lacking. In the mid fifties topmost priority was given to the rapid development of machine tools industry both in private and public sector, because it was felt that it would play a key role in bringing about a self generating economy in the country. It is at this juncture that Professor Bhattacharyya, guided by his teacher and colleague Professor GC Sen contributed significantly to the research and development in these areas which involved analysis of chip formation, cutting tool wear, cutting tool geometry etc. with the objective of enhancing productivity during high speed machining. He extensively worked on the analysis of static and dynamic rigidity of machine tools frames, development of new twist drills, new design of hobs and high production tools, advanced techniques of performance assessment and performance characteristics of newly developed materials.

A brilliant mechanical engineer, Professor Bhattacharyya made outstanding contributions to industrial and professional research too, both in India and abroad, like design of ceramic cutting tool for Carborandum Universal, Canada, core drill optimization for Waukesha Cutting Tool Co, USA, machine tool design for HMT and Kirloskar, development of retraced type high production tools, design and development of ultrasonic drilling machine etc.

Professor Bhattacharyya. authored over twelve text books and monograms. The stress on post-graduate studies during the sixties on Engineering and remodeling of the undergraduate five year integrated courses on modern lines coupled with extensive research activities in the fields of Machine tools necessitated an immediate introduction of a suitable text-book on Machine Tool Technology and Metal Processing. In the past a trade school approach was generally adopted, the emphasis being placed

mainly upon nomenclature, the mastery of machine manipulation and the learning of large number of disjointed empirical formulae. Such techniques did not offer the learners the chance to apply or utilize the fundamental concepts and analytical abilities. Professor Bhatacharyya in the above scenario converted the situation into an atmosphere of learning with a scientific basis using one's analytical abilities and the principles of mechanics. The purpose of the treatise authored by him was to present a systematic treatment of the theory of metal cutting and the basic underlying principles of machine tool design so as to unveil the basic fundamentals in a concise form. Emphasis had been given on logical analysis, and on providing up-to-date information on the researches carried out throughout the world in the field with suitable references so as to encourage the students to read the original works.

His two books on metal cutting, theory and practice and principle of machine tools are still being considered as one of the best in the respective areas and are not only read by the undergraduate and post graduate students but also are extremely helpful to those pursuing research works in these fields. He developed the GC Sen Memorial Machine Tool Research Laboratory at Jadavpur University where many a luminaries of Mechanical and Production Engineering carried out their post graduate and doctoral research under his blessed guidance.

The rapid development in the field of materials in the seventies had given an impetus to the modern manufacturing technology processes to develop, modify and discover with a view to achieve results i.e. sustained productivity, high accuracy and versatility of automation that were far beyond the scope of the existing conventional or traditional manufacturing processes. In the background of such development Professor Bhattcharyya felt the need of new strategies of machining which could safely and conveniently process materials. He contributed substantially to the research works on non-conventional machining techniques like Electrochemical Machining (ECM), Electro Discharge Machining (EDM), Ultrasonic Machining Processes (USM) etc. grouped under 'New Technologies' during this time for providing effective solution to the problems imposed by the increasing demand for high-strength-temperature-resistant alloys, the requirements of parts of intricate and complicated shapes and materials so hard as to defy machining by conventional methods. He developed an advanced laboratory of non-conventional machining processes at Jadavpur University and also guided a number of Doctoral thesis in this field.

Professor Bhattacharyya was not only a great researcher and dedicated teacher but also a champion of dissemination of knowledge and experience. He had the vision to look ahead of his time for the trend and modalities of future research, development and teaching in years to come. He was among the very first, to develop, encourage and guide research and teaching in the area of Robotics, CAD-CAM, Ergonomics, FMS, etc. The Robotics and Ergonomics laboratories set up by him at the Production Engineering Department of Jadavpur University were among the first in India. His school of teaching offered learners the chance to apply and utilise the fundamental concept and analytical abilities and supplied the spark needed for effective teaching and research programme.

AWARDS AND HONOURS

A reputed scholar, researcher and an acknowledged authority in the fields of Production Engineering, Metal cutting and Machine tools Professor Bhattacharyya has been honoured with many coveted national and international awards for his outstanding contributions to engineering. In 1961, he became

the first engineer to become a Premchand Roychand Scholar (PRS) of the University of Calcutta. In 1963, he was the first engineer to receive the Mowatt Gold Medal of Calcutta University for outstanding research. In 1965, he received the Chandra Prakash Memorial prize of the Institution of Engineers (India) for best contribution to Mechanical Engineering in India. Again in 1968 he received the same prize and this time his contribution was the best covering all disciplines of engineering. In 1966, he received the Sir RN Mukherjee Gold Medal of the Institute for outstanding paper in Indian journals. Professor Bhattacharyya received the President of India Gold Medal of the Institute for outstanding research contribution in Engineering in the same year. Professor Bhattacharyya was bestowed the Shanti Swarup Bhatnagar award for 1971 by the Council of Scientific and Industrial Research (CSIR) in recognition of his conspicuously important notable contributions to human knowledge in the special field of Mechanical Engineering. He received the FIE Award at Bombay for his outstanding endeavours and achievements to mould engineering and technology to serve humanity.

In 1971 he also received the KF Antia Memorial prize of the Institution of Engineers (India) for meritorious contribution to professional engineering bodies. In 1976, he received the Hindustan Steel Gold Medal as a best-Engineer award. Finally in 1979, he was elected Fellow of the Indian National Science Academy, New Delhi (FNA). He had also been a Fellow of Indian Academy of Sciences, Bangalore (FASc). He was also a Fellow of the Indian National Academy of Engineers (FNAE) and later became it's Vice President. In 1983, he received the Sir Walter Plucky Prize (London) and the FEISCA Award of the Federation of Engineering Institutions of South and Central Asia (including Japan). Commencing with a brilliant academic record as a student to winning of various National and International laurels was a product of his pioneering studies and stupendous personal involvement in flourishing research programmes which can very well make him a model to the young scientists of our country.

SOCIAL AND CULTURAL INVOLVEMENTS

Teaching, research and professional work could not stop Professor Bhattacharyya from getting actively involved in social and cultural activities. He was a staunch advocate for the development of indigenous technology for the welfare of the common people. He was the Founder President of the Kalidas Mullick Institute for Rural-Urban Interface Polytechnology, created for the dissemination of technical education down to the grass-root level. He often travelled widely for this cause.

An active and constructive social worker, he identified himself with the aims and aspirations of numerous social and cultural organizations and had been serving them with great distinction. He had been the Chairman of the Research Development Forum of the Institution of Engineers (India) and the guiding spirit of all major ventures and activities of the Institutions of Engineers (India). He was an eminent personality in the cultural front too. He had a long association with the Monimela and Brotochari movement.

LAST DAYS

By now, it is clear that Professor Bhattacharyya had an unconditional and selfless devotion. He possessed the qualities of expert leadership and dynamic accomplishment. He was an eloquent speaker

gifted with extra ordinary charisma. Being a persuasive teacher with a cordial and unassuming look and an uncommon warmth of spirit, he won love and esteem from his students and fellow colleagues.

His commitment towards research and his profession did not even permit him to enjoy a retired life and on the 25th June 1992, he breathed his last in Brussels (Belgium). With his death, he left behind a large number of established students who are well placed in various institutions both in India and abroad. In graceful appreciation of the monumental work done by him, the National Council of the Institution of Engineers (India) at its 563rd meeting held at Hyderabad during July 1992 resolved to institute the Dr. Amitabha Bhattacharyya Memorial Lecture to perpetuate his hallowed memory.

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