

### Sir Mokshagundam Visvesvaraya – A Visionary Engineer par Excellence

Bharat Ratna Sir Dr Mokshagundam Visvesvaraya, popularly known as Sir MV or MV was an engineer extraordinary, a statesman, a visionary and a staunch votary of industrialization. He became a legend in his own lifetime – lived a life filled with singular engineering achievements unparalleled by any one in India in the last century. What made him a unique person was his foresight and grand vision of industrial development which he considered extremely important to alleviate India's poverty. Effective utilization of water resources to provide safe drinking water and appropriate irrigation was his passion. He did not take up large engineering projects unless he was convinced of their techno-economic feasibility, adequate return on investment and serving a social purpose. He was also versatile. He not only designed and built large dams and water supply schemes, which was his forte, but also contributed to industrial development by planning a steel plant, railway system of Mysore, effective technical education for the posterity and even a reputed financial institution – namely the Mysore Bank.

MV was born on 22nd August, 1860 in Muddenahalli, a village at the foothills of Nandi Hills, 5 kms from Chickballapur a small town 56 kms north of Bangalore. MV had his early schooling in Chickballapur. He went to Wesleyan Mission High School in Bangalore and on completing his school education joined Central College in Bangalore. MV was unfortunate to lose his father when he was just 12 and had to support his own education which he did by giving private tuitions to students. As a hard-working, brilliant student who was always punctual, he impressed Charles Walters, the Principal of Cen-

tral College who noted that 'Visvesvaraya was a capital mathematician and a very good English scholar'. He graduated in 1881 with a BA from Madras University (to which Central College was affiliated) securing the first rank. This led to his being awarded a scholarship to continue his studies which he did at the College of Science, Poona, from where he obtained a degree in Civil Engineering in 1883. He again stood first in Bombay University and was awarded the prestigious James Berkley medal. He started his long and eventful career as a public works engineer in March 1884 with the Government of the erstwhile Bombay Presidency.

Taming rivers and optimally using water resources was his passion. As a young engineer in the service of Bombay Presidency he laid a pipe siphon under the bed of a stream which allowed water to flow to an irrigation channel on its opposite bank. Next, he surveyed, planned and executed a water supply scheme to cater to Dhulia town in Khandesh of present Maharashtra State. Recognizing his ability to visualize and successfully execute water supply schemes he was assigned the task of independently planning, designing and executing water supply and drainage system of Sukkur town in Sind province, a difficult task in a hot and arid region. On successfully completing this he was assigned the job of providing appropriate water supply scheme for Surat. By now his reputation as a talented and capable water resources engineer was well established. This led to his being assigned jobs to plan and design water supply schemes for a host of towns in Bombay Presidency, among which were Kolhapur, Belgaum, Dharwar, Bijapur,



Ahmedabad and Poona and outside India for Aden port, a British military settlement, during the colonial era.

An opportunity to demonstrate his innovative abilities arose when it was required to increase the storage capacity of Khadakvasla reservoir, near Poona, without raising the height of the dam. In 1903, Visvesvaraya invented and designed a system of 8 ft high automatic gates that open whenever water rises to full flood level and close when floods recede. Thus the full capacity of the dam is always utilized. This design was patented by MV and has been used in many other dams in India including Tigara dam in Gwalior and later in Krishnarajasagar dam across Cauvery in Mysore state. Another innovation which was not merely engineering but related to his ideas on proper water resource management was the Block System of Irrigation (BSI) – a method involving rotation of supply of water through canals and equitable rationing of supply which prevents misuse of water and benefits a maximum number of agriculturalists. This system known as BSI proved a great success in the canal system of Deccan.

The restless spirit of Visvesvaraya was too constrained in the colonial British administration with its penchant for reserving top jobs to British Engineers. He took voluntary retirement in 1908 when he was only 48 and decided to be a freelance consulting engineer. Before embarking on his new career he wanted to broaden his outlook and toured Europe to study various projects there in the areas of water resource development, industrial enterprises and general technical education. On his return, the Government of the Nizam of Hyderabad requested him to be its consulting engineer specifically to pro-

tect the city of Hyderabad from devastating floods in the Musi river which had badly affected the city and to ensure good water supply to Hyderabad. The famous tank bund of the twin cities of Secunderabad-Hyderabad was planned by him as part of the overall solution of creating a number of tanks surrounding Hyderabad to store water flowing in Musi and other streams in the vicinity.

In the meanwhile Visvesvaraya also got an invitation to join as Chief Engineer of the erstwhile state of Mysore. Before accepting he stipulated that he should have broad responsibilities besides just public works – particularly opportunities to implement his ideas on technical education, industrialization and techno-economic studies of large engineering projects. This was readily accepted by the then Dewan of Mysore and Visvesvaraya joined Mysore State Government service on 15th November 1909. It was during his tenure in Mysore that he really blossomed and exhibited his foresight, vision and versatility. Many of the projects he took up for the development of the State of Mysore succeeded due to the active encouragement given by a very enlightened Maharaja of Mysore, Sir Jayachamarajendra Wodeyar. On assuming charge in Mysore he was given several other responsibilities including the departments of industry, educational and railway development. Besides these he was also appointed as the Chairman of the Mysore economic conference whose terms of reference was to chart out ways to improve existing industries and initiate new industries of economic value to the state.

On assuming charge he surveyed Cauvery basin and immediately had the vision of creating a multipurpose dam on the model of the Tennessee



Valley Authority in USA. It was designed not only to provide irrigation to Mandya district of Mysore but also generate ample power for industries in Mysore. In particular the Kolar Gold Fields was hungry for power and the requisite power was to be provided by Krishnarajasagar. The initial budget to carry out this project was over Rs.10 crores, a huge outlay in the 1900s for a small princely state. After initial hiccups he was able to convince the Maharaja of Mysore to sanction the project by pointing out that the direct return by selling power will be at least 3% per annum on the investment – which was a conservative estimate. As it turned out the direct and indirect return from this project was Rs.1½ crores per year – a return of 15% on investment – a fantastic return by any standard! In designing Krishnarajasagar dam, Visvesvaraya used his innovation of automatic sluice gates. Full details of this project are given in his own words in the Classics section of this issue.

Soon after completing the Krishnaraja Sagar Dam, Visvesvaraya was appointed as Dewan of Mysore. In princely states, Dewan was the primary executive authority reporting directly to the Maharaja and wielded enormous power. The state of Mysore had a number of visionary Dewans before him but Visvesvaraya was singularly successful in rapid industrialisation of the state and expanding educational opportunities for its citizens. Among the notable industries he started was the Mysore Iron & Steel Works in Bhadravathi 1918. This plant used the rich iron ore deposits in Karnataka and its forest wealth as charcoal fuel for smelting. The plant was able to produce steel very economically and was even exporting pig-iron to America! He convinced Messers Walchand Hirachand and Company to

establish an aircraft factory in Bangalore, which is Hindustan Aeronautics Ltd. today – the only aircraft factory in India.

Expanding educational opportunities in the State was another priority. He established the Mysore University at Mysore, an engineering college in Bangalore (now called University Visvesvaraya College of Engineering), and an Agriculture College (now called University of Agricultural Sciences) at Hebbal, now a suburb of Bangalore. He was convinced of the need for high quality technician education and established, using his personal resources, the Jayachamarajendra Wodeyar Polytechnic at Bangalore. He also presided over the court of Indian Institute of Science – its highest policy making body – till 1947.

He was the recipient of many honours during his lifetime. Commander of the order of the Indian Empire (CIE) in 1911, Knight Commander of the order of the Indian Empire (KCIE) in 1915, i.e. a Knighthood. Independent India bestowed on him its highest civilian award – namely Bharat Ratna in 1955.

Visvesvaraya lived a full life – a disciplined life replete with achievements in a host of areas – till the ripe old age of 101 years 6 months and passed away on 12th April, 1962.

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