



## SHOWING THE ROPES

### Engineering and aerial transportation stalwart Shekhar Chakravarty stresses on small washeries as the way forward for India's coal industry

Coal Insights Bureau

Surrounded by his drawings, sketches and the memories on which he built his present company, Conveyor & Ropeway Services Pvt Ltd, sits octogenarian Shekhar Chakravarty, the Managing Director of the company. A pioneer in coal washing, being the first in India to introduce modular coal washing in the early 1980s at one of Bharat Coking Coal's (BCCL's) mines under the Indira Gandhi Science & Technology Grant, Chakravarty has another first to his credit, the CURVO Ropeway. This is an innovating concept, whereby, for

the first time in the history of aerial ropeway transportation, the same can curve or bend instead of moving in a linear manner and thus can be considered as an alternate means of urban transportation.

#### Early days

A chat with Chakravarty at his office in Kolkata, located on busy Park Street, takes me back to his early days. He dwells at length on how, being a science graduate, he had honed his engineering skills through an apprenticeship at mechanical works and the design office at Jessop & Company in

the 1950s, learnings that stood him in good stead, leading him to become the pioneer that he is today. He recalls how hands-on he had been at Jessop. He operated a 14-pound hammer, did filing and machining. In the foundry shops, he mixed sand with cowdung. The latter was especially used in dry sand moulding.

In the fifth year, his salary was a modest ₹72 per month. On completion of apprenticeship, finding him capable to be a member of Jessop, the company offered him a permanent job at a princely salary of ₹400! By that time, he had received his engineering diploma in Associate Member of Institution of Engineers (AMIE) part A and B while actually doing his apprenticeship.

He recalls fondly at that time, a lot of the technical competence of Jessop vastly depended on the expatriates since part of

the technology development and transfer happened from England.

### **BRECO break**

However, Europe beckoned his Bengali soul and he left India and Jessop in 1960 on being offered a job with an engineering company in Germany. But, his stay in Germany was short-lived since German technical terms differed widely from that of the British and he therefore sought his future in England where one did not need a visa to travel to in those days.

He remembers how he would take a daily newspaper and retire to the serenity of Hyde Park to scan for jobs. He landed one in barely three days!

“Based on my engineering experience and education in India I got a job with a ropeways company, British Ropeway Engineering Company (BRECO), a pioneer in its field, with a huge presence in India,” remembers Chakravarty.

BRECO was handling a huge sand winning contract in the Jharia and Raniganj areas, which are rich in coal. In the 1960s, much before coal nationalisation, the mining method had been mainly underground with the safety mandate under the then Coal Board.

Chakravarty worked with BRECO for more than 4 years and then was sent to India where the entire team faced severe challenges in that it had to do on-the-spot design substitution.

“In those days, there were no smart phones where we could take pictures, send them for further discussions and come to a decision. Thus, I was sent out as a Senior Resident Engineer-cum-Designer for the project in India in 1965. I had to carry out on-the-spot design substitutions, by taking spot decisions and executing the same,” Chakravarty delves into his memories.

At the same time, he was also responsible for the structural fabrication of the entire plant (4,000 tons). “We needed to sit

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through nights to re-design, which included high precision calculations,” reminisces the octogenarian.

Explaining sand winning, he says, “In underground mining, once the coal was taken out, a void was created which needed to be filled with sand, so that it did not collapse and, at the same time, the inflammable gas in the cavity cannot feed the risk of spontaneous fires.

Hence, we had to dredge the sand from the rivers Damodar and Ajoy for sand stowing. The sand used to be carried by trucks but because of several irregularities, the Coal Board of that time decided to invest in ropeways, dredgers, conveyors, storage bunkers, the entire infrastructure, at the Jharia and Raniganj coalfields.”

Material Ropeways were not popular then. They were employed mainly in coal, iron ore and other mines. BRECO projects included the Kudremukh iron ore mines, several limestone quarries in southern India and one in the Assam Bengal Cement Company’s cement plant in Chhatak, apart from several coal mines.

The Jharia and Raniganj projects together, worth around sterling 15 crore then, can easily be pegged at around ₹1,000 crore at today’s pricing, informs Chakravarty.

Meanwhile, since ropeway demand was increasing in India, Chakravarty, who had, by now developed good contacts in the coal industry, decided instead to partner with the third largest coal producer of that era, the K Worah Group, to start a new company, Indian Ropeway Engineering Company, in

1969. Since his partner owned more than 15 coal mines, the fledgling company received an immediate order for ropeways and coal handling plants for two of the Worah Group’s mines, one in the Raniganj field and another in Dhanbad.

Then came coal nationalization, a process that was completed in 1973, and since it was difficult for private players to stay in the business without coal mines, the joint venture was liquidated and Chakravarty decided to strike out on his own in the very same year that coal was nationalised in India, with his company, Conveyor & Ropeway Services Pvt Ltd (CRSPL).

### **Material handling ropeways benefits**

Material handling ropeways came in useful for connectivity where there were steep gradients between a mine and the plant, or especially in remote areas where leave alone railway tracks, it was impossible for trucks to ferry materials. Other huge advantages included decreased cost (ropeway transportation was 50 percent less costlier than road transport), lower pollution levels and lack of labour union issues associated with truck transportation.

### **On his own**

Chakravarty’s company handled material handling ropeway projects for several leading companies in India. That apart, projects were installed at various state-owned thermal power plants’ captive mines, coal mines and several other mines across India.

He also built the first indigenous material handling ropeway for Maharashtra State Electricity Board’s Koradi thermal power station.

Another line of business he developed was the “modular coal washing plant”, based on a unique British process technology, which proved to be more responsive to reducing high ash content in Indian coal. The plant, a combination of barrel-cum-cyclone units, operating with self-generated slurry as media,

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washes coal at high efficiency. The company set up around 25 modular washeries across various mines.

These plants are unique, Chakravarty says, since they require little space, there is low capital outlay and running and maintenance cost, less power requirement (2 - 2.7 KW per ton of feed coal), quick installation (within 4- 8 months, depending on capacity) among other attributes.

However, over the 15 years, CRSPL's focus had shifted away from material handling to passenger ropeways because of three key challenges – threat from large trucks, and coercion from organised unions of truck operators and lack of enough trained personnel to run ropeways in material handling.

“The advent of huge dumpers edged out material ropeways. In those days the maximum size of dumpers was 10 tons. Today, these are huge and as a result demand for ropeway transportation ebbed out,” Chakravarty rues.

#### Future focus

But the octogenarian peeps up when he says his company is resuming its focus on material handling once again with a stress on modular coal washeries since he sees huge opportunities in India's expanded coal production targets and commercial mining policy.

Chakravarty's stress is on small washeries at pitheads rather than a thrust on large ones. The amount of saving incurred on every ton of coal through washing can be enormous, he says, elaborating that India at present produces around 600 mt of coal whose raw coal quality is at 45 percent or so, which is not acceptable by any power plant and that beneficiation is a must to make them compatible with new-age boilers by



removing the ash level to approximately 30-35 percent.

Presently, these targets are being achieved through Indonesian and other overseas coals.

He explains that a miner can wash the coal at a pithead modular washery, and transport clean coal to plants. The washery middlings and rejects, which will contain sizeable carbonaceous matter, can be utilised and sold to parties like brick kilns which do not require high calorific value coal, as an added revenue stream.

“Regular coal washing through small washeries will result in 40 percent or around 250 mt (of around 645 mt of India's coal production) of lesser coal transportation, which will entail huge savings for the exchequer. At the same time, the power plants will receive beneficiated coal,” he remarks.

“There are new mines which coal producers in India would be looking at in remote places where, leave alone train lines, there are not even proper roads for trucks

to ply on. In such areas, ropeways would be an ideal transportation mode for that clean coal,” reasons Chakravarty.

At present, several feasibility studies are under way, including one with a large steel producer which is experiencing higher costs of ₹65 per ton in transporting clean coal and middlings from its captive mine, because of outages.

If the same is transported by truck, then the cost works out to an even higher ₹150 per ton. CRSPL is looking to improve and revolutionise the existing washeries to make coal beneficiation cost effective, it is learnt.

#### Footnote

A patriot at heart and yet with a salute to his mentors from the overseas companies of vintage heritage, Chakravarty is a harmonious blend of the Orient and the Occident. Always yearning for excellence, he had become a student member of the premium professional body of the Institute of Mechanical Engineers while in England. Today, he is the Chairman, Southern Asian Region of IMechE, England.

The company has a good line-up of personnel in the field of technical and commercial activities.

The next generation is already hands-on in the business. Chakravarty's daughter, Rachana Mukherjee, a Director of the company, having learnt the ropes from none other than her father, has taken over control of the commercial side and aims to further his vision. ■

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