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Cranking It Higher

Abir Pal

On the face of it, it's as Old Economy as they come: Glowing furnaces, overhaul-clad workers tending conveyor belts supervised by hard-hat supervisors, the crash and shudder of heavy duty presses and through the dust, heat and grime, neat stacks of forged steel making their way to waiting trucks.

But peel back a layer of epidermis at **Bharat Forge's** sprawling 80-acre plant at Mundhwa, Pune and what you unearth is something completely different. What MIT-trained engineer turned entrepreneur Baba Kalyani refers to as "driven more by brain power than muscle power".

As Chairman and Managing Director, Kalyani heads the 43-year-old engineering firm that's already the world's second largest forging manufacturer. Today, it turns out a capacity of 100,000 tonnes annually, which will be doubled over the next few years. Its appetite whetted by organic growth, **Bharat Forge** recently acquired CDP, one of largest forging companies in Germany.

A peek into the first floor Engineering and Design Centre throws more light on what Kalyani's talking about. "It's the brain and heart of the plant," informs Senior Vice President, Shyam Takale. In the harsh fluorescent light 40-odd engineers sit peering at swirling colourful shapes on 21" monitors, interspersed with frantic clicks on the mouse and furious calculations.

Bharat Forge supplies crankshafts, axle beams, steering knuckles and assorted transmission parts for auto manufacturers across the world. Now, just how much technology can be needed to hammer and mould a slab of steel into a flat motor part? Takale, a US-trained engineer who's been walking shop-floors for over 15 years, steps in to provide the answers: The heart of the production process is the "die"-an unassuming partially hollowed out metal block. From the kind of metal to be used to the designing to the contours of the indentations, everything has to be got just right. Because not only will 4,000-5,000 pieces have come off each die, but dies often have to bear loads as staggering as 16,000 tonnes of pressure.

Since the quality of the final forged product is a function of the quality of the die, **Bharat Forge's** Virtual Manufacturing Process-using the latest in cad/cam and modeling software-continuously maps and monitors critical parameters like forgability, load capacity, die deflection and stress levels. Lately the tool room has also been integrated, which means that the entire die production process is now automated. "Sitting here in the control room we control everything-accuracy levels, machine utilisation, operator efficiency," elaborates Takale. Furthermore, computers are online with international clients like Ford, Volvo and Daimler-Chrysler. This means requirements, specifications and even 3-D machine models can be swapped, making design a continuous and iterative process.

Bharat Forge has invested Rs 630-crore in upgradations since 1990. The improvement is visible in the tool room, where high-speed machines have boosted productivity. Manufacturing expenses as a percentage of income have come down from 19.6 to 16.7 per cent and manpower costs from 6.9 to 6.1 per cent.

Product development, which earlier used to take six-to-eight months, today takes only two-to- three weeks, a front axle beam die, which earlier took 130 hours to make, now only takes 13 hours. First-time success rates are as high as 98 per cent and design time has been cut down by a tenth. Accuracy of die has been brought down to 0.05 mm (from 0.4 mm), draft angles narrowed to half-a-degree and a glistening surface finish of 3 microns has been achieved. And don't forget that at any point in time **Bharat Forge** is juggling with inventory of 600-700 product variants ranging from a 350-kg crankshaft manufactured for Cummins to a 50-cm transmission part for Toyota. "There's so much of demand, we often find it difficult to keep up," is how Kalyani sums it up.

LIVING WITH DIES

Makes crankshafts, axle beams, steering knuckles and assorted transmission parts for auto majors like Daimler Chrysler, Ford, and Volvo

Entire die production process is automated, and computers online with global clients

High-speed machines and automated production lines have boosted productivity

Product development takes just two to three weeks, as against six to eight months earlier

Manufacturing expenses and manpower costs reducing by the day