Reminiscences of an Indian Engineer

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As a school student in Cuttack in the State of Odisha, I read about the great visionary Jamsetji Nusserwanji Tata and his magnificent contributions to science, industry and society**.** Tata Steel then, as now, was a household name in Odisha and one of my elder brothers, a Chemical Engineer from IIT Kharagpur, who had taken summer training there, had mentioned that Tata Steel had a number of brilliant Metallurgists doing exciting work, mastering the flow of liquid iron that had the colour of ripe orange and imparting shape, strength and toughness to red hot solid steel.

This was the background in which I went to the Indian Institute of Science (IISc) in Bangalore in 1965, to study for a Bachelor of Engineering degree in Metallurgy, after receiving a BSc Honours degree in Physics from the Ravenshaw College. Back then, very few people in Bangalore City would call it IISc; it was far better known as Tata Institute, having also been founded by none other than Jamsetji Tata. In fact, arriving at the Bangalore Railway Station I had some confusing moments as the auto-rickshaw drivers told me that the only Institute they knew was the Tata Institute. The world-famous institution that it was, the IISc also embodied the value system of the House of Tatas and that touched me profoundly. *Years later, it was a proud moment for me to come back to the Indian Institute of Science to receive one of the Distinguished Alumni Awards presented on the occasion of its Centenary Year in 2008*. This time around the young driver of the Taxi who took me to the IISc campus, knew exactly where I wanted him to take me. He even commented that he had heard from his grandfather that in his time the whole of Bangalore was like the IISc campus, an Oasis City of gardens and flowers.

It is at the Indian Institute of Science that I learnt much about the charismatic Jehangir Ratanji Dadabhoy Tata, or, simply JRD Tata. In fact I also had the good fortune to shake his hands and speak with him, on one of his visits to IISc. Needless to say, in my generation he was an iconic role model for all of us. His urbanity, humanity, integrity and his love for the Indian Nation left indelible impressions in our young minds. *It would be my great privilege to receive the Fifth JRD Tata Award for "Excellence in Corporate Leadership in Metallurgical Industries" for the year 2012, from the Indian Institute of Metals.*

From Bangalore, my metallurgical ambitions, and a full scholarship, took me to the University of Illinois at Urbana-Champaign (UIUC) to pursue the MS and PhD degrees in Engineering. It was a stroke of good luck that I got to work for five years as a Research Assistant to Prof. Paul Beck, a pioneer of modern Physical Metallurgy and one of the founding fathers of the new inter-disciplinary field of Materials Science & Engineering. My experiments went down to the temperature of liquid helium, and on some occasions even below that. This itself was a magnificent challenge. Our research resulted in the discovery of *super-paramagnetism* in dilute alloys and also significantly advanced existing knowledge base on the phenomena of atomic short range order and that of magnetism in metallic systems. Subsequently *in 2010, I was delighted to be conferred with the Distinguished Merit Alumni Award from the Department of Materials Science & Engineering at UIUC.*

I returned to India in 1973, having been directly recruited from USA by the then Hindustan Steel Limited, now the Steel Authority of India Limited, to join as a "nucleus member" of the just-founded Research & Development Centre for Iron & Steel at Ranchi (RDCIS). Thereby began my 32-year long career at SAIL, including a 2-year sabbatical that I took at the Technical University at Aachen in West Germany, on receiving the *Alexander von Humboldt Fellowship*- till then very rarely awarded to persons like me engaged in industry. In Aachen I collaborated with the Prof. Kurt Luecke, the highly respected Director of the Institute of Physical Metallurgy and Metal Physics. Interestingly this internationally renowned Institute had never worked on body centred cubic metals like steels and he encouraged me to establish a strong program in ferrous research, which I was able to do in less than two years. Further, my work as Humboldt Fellow resulted in arriving at a far better understanding of the critical factors in the production of automotive steels and grain-oriented electrical steels and introduced new concepts like the *Texture Memory Effect* and the *Inheritance Model.*

Coming back to SAIL, I will always cherish my long innings in this august company. In the initial years, it gave me the opportunity to build, along with my peers, a world-class laboratory complex, formulate long term R&D plans, and along the way lead teams of very competent technologists to culminate in a plethora of new products and Patents, such as steels for domestic gas cylinders, high strength steels, corrosion resistant steels and specialty alloys. Then, in the second half of the 1980s, SAIL went through a significant make-over, through a multidimensional and comprehensive intervention called "*Priorities for Action"* and a few of us were hand-picked as facilitators, drawing us deep into a unique and intense engagement in corporate strategy and planning. It was very exciting for me. In later years I was actually called upon to head the Corporate Planning Directorate at SAIL's headquarters in New Delhi. I might add that it was during this period that an opportunity to work with Tata Steel also came up. In fact, as Chairperson of SAIL's Task Force on e-commerce, I was able to play a key role in creating, jointly with TATA Steel, one of India's first digital market places, namely, *metaljunction.com***.** It is a matter of satisfaction that re-engineered later as *mjunction,* it has grown rapidly to emerge as the *world's largest eMarketplace for steel.*

Towards the end of the 1990s, globally the steel sector went through a major downturn. SAIL, with the baggage of several internal weaknesses, was badly affected and its

bottom-line eroded rapidly. Just before that, SAIL had been given the status of a Navaratna Company by the Govt. of India and naturally the Steel Ministry was deeply concerned that the Company must arrest the slide and bounce back at the earliest. SAIL chose, rightly, to undertake an ambitious and comprehensive revamp. I found myself roped in as the Head of the Office of Business Restructuring, specially created to drive the revamp process. Working closely with the Board of Directors and the Ministry of Steel, my team was able to contribute strongly towards SAIL achieving a major turnaround, and overall rendering the company to be far more efficient and sustainable. This eventually helped SAIL to achieve the Maharatna status from the Central Govt. In recognition of my contributions in SAIL, I was conferred the National Metallurgist Award by the Ministry of Steel in 2003.

In 2002, I was drafted as the Managing Director of the heavily loss-making Rourkela Steel Plant with the unenviable task of recovering it from the brink of possible closure. I was able to establish and institutionalise a new work culture, by resetting the minds of its 26,000-odd employees. A principal vehicle for the remarkable transition was a massive human resource intervention, named "**SAMSKAR"**, backed by a sustained, large-scale, interactive campaign called the "Mass Contact Exercise", in which sets of 500 different employees participated every week, thereby covering each employee once every year. Prof. Paul Argenti of the Tuck School of Business at Dartmouth, in his book **"***Strategic Corporate Communication*" has referred to this exercise as one *"that had no precedence in Indian corporate history*". More details of these efforts can be seen as a full chapter in "*Break Free",* a book on leadership authored by Prof. D. Chatterjee, Director, IIM Kozhikode, who had taught at Harvard University.

By design, the "SAMSKAR" movement was based on Vedic principles and focussed on ***reducing the distance between minds***. It centred around a unique code of leadership practice that ran through all levels of management, becoming in the process a model of good governance. The momentum of the "SAMSKAR" movement, together with several bold asset restructuring measures and major technological upgradations, which included the total reconstruction of its largest blast furnace, resulted in rehabilitating the steel plant as one of the most consistently profit-making industrial enterprises of India. In fact, *from a level of making a loss of Rs.3 crores a day in the financial year 2001-02, the steel plant started making a profit of Rs.3 crores a day by the middle of 2004*. The high level of profit- making regime has been sustained to this date.

In more ways than one, the transformation of the Rourkela Steel Plant was quite dramatic. At the same time, I was very conscious of the Steel Plant's responsibility to the Society at large and to the Environment. We took up a massive rebuilding and rejuvenation of Rourkela Steel City, involving infrastructural improvements and the promotion of education, sanitation, ecology, health, sports and culture. In the process, it also became one of the greenest and cleanest towns in the country. It received the prestigious Indira Priyadarshini Brikshamitra Puraskar from the Ministry of Environment & Forests in 2005, a rare recognition for an industrial township. On an equally strong footing we set into motion a major intervention in the societal development in the areas beyond Rourkela, which comprised mainly tribals. In the first step, we prepared, in association with the Ranchi-based Society for Rural Industrialisation, *SRI*, a long-term

Master-Plan called “Shankhadhwani” for peripheral development. Next we set up an Institute for Peripheral Development to carry out identified tasks, guided by a Memorandum of Understanding with the Basic Agro-industries Foundation, BAIF**,** Pune.

A bright memory that I have of my days at Rourkela Steel Plant was the visit in May 2003 of the then President of India, Dr. Abdul Kalam, who, amongst many other interests, was very curious to see what a blast furnace looked like. His child-like enthusiasm, to witness for himself how liquid slag and liquid iron coming out of the blast furnace were physically separated, was inspiring, to say the least.

Dr. Sanak Mishra with the President of India Dr. Abdul Kalam (May 2003, Rourkela)

In January 2006, I was hand-picked by the then Mittal Steel Company, as its Chief Executive Officer in India, to build up from scratch its Indian subsidiary. I also helped to install in Kolkata a global group facility, namely, the ArcelorMittal Design & Engineering Centre (AMDEC).

It is not possible to leave out INAE from any professional discussion. I owe much to it for what I am today. It is an institution which embraced me with open arms as a Fellow in 1997 and has nurtured me and supported me ever since. I was fortunate to be chosen as its Vice President for the years 2007&-08. *I received from INAE in 2010, the Jai Krishna Memorial Award.* I also feel a sense of pride to have served as the President of the Indian Institute of Metals for the year 2009-10. Like the INAE, IIM is a body of eminent persons of high distinctions who have contributed immensely to national cause in the metals and materials fields. I was privileged to receive its Honorary Membership in 2005 and the Platinum Medal in 2011. I have constantly been encouraged by the leadership of both INAE and IIM and inspired by the achievements of their illustrious Fellows.

In the final analysis, it was a magnificent life-time opportunity to work in India and for the prosperity of India. Looking back, I am glad that I chose the Engineering profession. All through my professional career I have had immense support from our great leaders in Science & Technology and Industry and I am much thankful for that.