

## Chasing a Dream



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When invitation from the INAE President came for contributing an article for the INAE newsletter, I was not sure of what to write in the beginning. Given a fair bit of liberty on the subject matter, I was almost certain that I should not take the opportunity to write about my research or my achievements. With such self-imposed constraints, trouble started almost immediately as I was lost in the ocean of thoughts about the theme of my write-up. I soon realised that writing a research article is far easier than to develop an easy flowing, convincing story that is intended to leave a mark or two in the mind of the readers. To identify an appropriate theme, frame an inspiring story and narrate the same in a creative style thus became a full time business for me ever since I received the mail from the President. I started to look back in time, frantically searching for a series of incidents that could be interwoven, made engrossing and narrated in a readable style. It was a remarkable and gratifying experience as I travelled decades back to my student days to dig out moments and a series of incidents to develop the present narration. Having prepared a sketchy outline, I discussed the same with several of my friends at IIT and outside, who enthusiastically supported my idea to send it out for the INAE Newsletter.

I have not become a metallurgical engineering professional by accident neither have I become a Professor of Steelmaking by chance. In grade ten, I was a reasonably bright student and my father wanted me to take up physics and become a teacher. My father, patriarchs like most traditional Bengali head of the family in those days wanted to see his son study physics to become a Professor and daughter, well versed in music, in particular, Rabindrasangeet ! I, however, had a different take on the matter and was not much interested to pursue pure science and instead, wanted to become an engineer. My father was a Mechanical engineer and having spent most of his life time on the shop floor certainly did not want me to follow his footsteps. Naturally therefore, he kept on seriously discouraging me from considering engineering as a possible career option beyond grade twelve. After all, in mid-seventies, engineers in the country were not doing too well. Nonetheless, I was determined, though not sure of the engineering discipline that I would like to pursue. Interestingly, a train ride from Howrah to Mumbai, during a trip to my maternal uncle's house in Navy Nagar, Colaba, helped me move in a direction and decide on my future career plans.

Immediately after the school leaving certificate examination, in March 1973, for about three months there was no school and no studies! I was to spend time with my uncle and his family in Mumbai and one fine morning started my journey from a small town in Assam to proceed to Mumbai via Calcutta (now Kolkata). After a brief stopover for a few days at Kolkata, I boarded the Howrah Mumbai express, which used to leave Howrah rail station at about 12 noon to reach Mumbai after about 42 hours! I had no clue about the train route or stoppages en route, but remained reasonably calm during the journey since my uncle would be there at Bombay VT station to receive me. At about 5.30 in the evening, the train stopped at Tatanagar rail station for about twenty minutes or so. I took the opportunity to stretch my legs and walked towards the nearby door of the sleeper coach I was travelling in to catch a

glimpse of the outside. It was nearly sunset time though the sky surprisingly appeared very bright and fiery as if, a huge fire had set-in the vicinity. It was a remarkable interplay of light and colour and I got thoroughly engrossed wondering what might be happening. I had no clue of steelmaking processes then and barely knew that there was a steel plant of the Tata's, somewhere in Jamshedpur. It was years later that I came to know of the Bessemer steelmaking process and could rationalize my observation, a manifestation of blowing of air through molten pig iron. The twenty minutes experience at Tatanagar rail station kept me mesmerized and left an everlasting impression on my young inquisitive mind. I returned home from Mumbai after about a month and started to gather more information on the subject of iron and steelmaking from my elder brother's inorganic Chemistry book. Around the same time (i.e. 1974 ), Professor H.S.Ray, who was then teaching at IIT Kanpur, wrote a feature article on blast furnace ironmaking in Science Reporter, a popular science magazine for college students. I read through Prof. Ray's article and found the subject fascinating. These experiences helped me understand and appreciate the science and technology of processing of metals at elevated temperatures. By the time I was in Grade twelve, I made up my mind and expressed my interest of pursuing metallurgical engineering to my father. I thank him for not trying to impose his ideas on me or influence my thinking at that stage!

Living in a remote Assam town I had difficulties in gathering information. Yet, I had reasonable idea of various Engineering Institutions in the country imparting education in metallurgical engineering. Things however did not work out favourably for me as all Assam College Teachers' Association (ACTA) launched a massive state wide strike immediately before the +2 final examinations in 1975. In the process, final examination was delayed and by the time results were announced, it was middle of August or so. July admission session in the country was practically over; my father did not want me to waste a complete year and thus I was left with no option but to wait for possible December admission to BITS Pilani! I was not keen as there was no Metallurgical Engineering program in BITS but eventually succumbed to the fear of losing one full year! After about a fortnight of my stay at Pilani, I received a letter from my father informing me of my selection to the four year engineering program at RIT Jamshedpur (now an NIT), where academic session was unduly delayed due to the JP movement in Bihar. I was delighted and saw this as a golden opportunity to fulfil my dream of becoming a Metallurgical engineer. Many of my friends dissuaded me, since RIT was a lesser known college, not a preferred destination, and metallurgical engineering was not a priority choice for good students. But I was determined, took a final call myself without even consulting my father, and one early morning, packed up my meagre belongings to proceed to Jamshedpur so as to be there on the date of counselling. It was an amazing experience and journey as I had little left over cash in my pocket and no clue how to reach Jamshedpur from Pilani. But my spirit was high and I made it to Jamshedpur on time and selected metallurgical engineering absolutely on the basis of my own conviction and desire to study steelmaking and nothing else. Incidentally, I was short of fund for paying my admission fees and had to enact a drama to win special favour from the Principal for a deferred payment of the college fee. Thus finally began, in early 1976, my journey to become a Metallurgical engineer!

I continued to perform exceptionally well in my discipline throughout my undergraduate years. By the end of third year, I used to fancy many degrees after my name and started to even daydream, becoming a Professor, teaching steelmaking someday. I was not quite happy with the academic seriousness and the quality of education at RIT and went on to express my willingness to the Head of the department, Professor Mahabir Ram, to pursue higher studies. Professor Ram was a dynamic person and a teacher par excellence. The style with which he

used to communicate complex issues at ease, used to fascinate me. I developed a great sense of appreciation and admiration for his ingenuity in teaching. Professor Ram who was aware of my inclination towards higher studies only suggested that I move to IIT Kanpur to pursue graduate studies with Professor Ahindra Ghosh, a well renowned professor in the subject of iron and steelmaking. From third year onwards at RIT, I gradually geared up myself to do a master degree at IIT Kanpur and started to work seriously in that direction. I was so passionate about the idea that I did not even sit for a single job interview in the final year of my studies. Instead, I motivated many of my friends, who were good in studies, to move to IIT Kanpur for higher studies.

Graduate study at IIT Kanpur was far too intense and we had to put in enormous efforts to come up to the expectations of the Professors, who were leaders in their respective fields. Rigorous course work mixed with research helped strengthen our foundation and removed deficiencies in our training received at RIT. Working with Professor Ghosh, as a young graduate student, was extremely gratifying, as I learnt beyond steelmaking, several basic values of life. Discipline, punctuality, honesty and integrity used to be the hallmark of training under Professor Ghosh. It was working with him that my conscious journey to be a good human being truly began and I started to learn different values of life seriously. Simple life styles of Professors, their holistic living and the beautiful campus of IIT Kanpur, influenced me profoundly. Stay at IIT Kanpur largely motivated me to pursue education farther, becoming eventually a professor and I started to consciously work in that direction. However, I was well aware that to accomplish my objectives, finishing a good Ph.D. from a well reputed school abroad as well as post-doctoral experiences were a must. With his continuous mentoring, strong recommendation and my excellent grades at the under graduate and graduate levels, by the end of the third semester, I was successful in getting admission with full research assistantship in two different universities in USA and Canada. I decided to move to Canada to pursue my Ph.D. with Professor Rod Guthrie at McGill, who was working on the frontiers of process metallurgy.

Getting a Visa to Canada was initially difficult due to a childhood surgical intervention. The medical board created a problem and the Canadian embassy was not convinced with my explanation. Fortunately, my father could dig out the fifteen year old hospital discharge certificate, which finally did the job and I was granted a VISA to study in Canada. I landed at McGill around early March of 1983 to pursue my dream of completing a doctoral degree and eventually becoming a Professor of steelmaking. I was received at the Mirabel airport by my would be supervisor, Professor Guthrie. Remarkably, arrangements for my first night stay were made by him in the downtown Holiday Inn! Thus began my association with a very eminent Professor and one of the finest gentlemen in a prestigious North American University, in the wonderful city of Montreal.

With Professor Guthrie, I enhanced my skill considerably and turned out to be an excellent researcher. The academic liberty that he extended to all his students helped them grow and mature considerably. The teacher student relationship in North American University is very different from the one in this country. We discussed everything under the Sun, exchanged views on diverse issues and even shared a drink or two occasionally during happy hours on select Fridays. Professor Guthrie and I had similar views on many fronts and thus developed liking foreach other. The teacher–student relationship thus blossomed over a short period of time into a warm friendship that both of us even cherish today! It is with him I learnt to execute research work meticulously and in a time bound fashion. He highlighted the importance of industrial research in steelmaking which I have tried to emulate throughout my

professional career. It is the training that I received from Professor Ghosh and Professor Guthrie helped me carry out research with passion and remain highly focussed throughout. Within two years and four months of my stay, Professor Guthrie suggested that I should wind up and submit my Ph.D. thesis. I simply could not believe my ears. I defended my thesis in August 1985 and returned back to India for a brief holiday with my parents. I was happy to have made them proud! I continued to work with Professor Guthrie as a post-doctoral fellow for some more time before I finally decided to return back to India in early 1987. I was offered positions at IIT Kanpur, IISc, IIT Mumbai and IIT Kharagpur. I, however, decided in favour of my Alma Mater to fulfil my long cherished dream!

Although a very strong moral, spiritual and intellectual foundation of my life was laid early by my father, my teachers too, at High school (particularly, Ashish-daa), at RIT, at IIT Kanpur as well as at McGill, played pivotal roles in shaping my career and personal life. They all taught, inspired and motivated me to be what I am today. It is gratifying that I continued on their footsteps to become an educator. Their high values have always guided me and helped steer my professional career and personal life in the right direction. One needs to be truly fortunate to be associated with and guided by enlightened teachers during the formative years of one's career. I feel utterly blessed and thank my stars!!

It has been and is less fashionable to study metallurgy and to make a career in metallurgical engineering. Many of us tend to believe that metallurgy is an ancient discipline, much is known and very little or no challenges exist. This is a myth and is far from the reality. In fact, this mind set has to change to perceive the reality. Once a friend of mine, in-charge of Sony Erickson operation in the States asked me the question sitting in his Fremont house "Dipak, do you regret that you studied metallurgy when you had the option to go in for more popular engineering disciplines?" I spontaneously replied "Not a bit! I enjoyed and continue to enjoy Metallurgy with the same enthusiasm even to this date". At the end, it does not really matter what one does but more so, how it is done. Excellence and creativity result only when there is passion, there is conviction.

The author, Dipak Mazumdar currently holds the Ministry of Steel Chair Professorship at IIT Kanpur. He has been teaching and conducting research in steelmaking for over three decades.