Think to do Something

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If you think and try to do something honestly, you will get everything and if you think to achieve something, you will get nothing except frustration. I used to hear these words from my father and many other successful persons. Now I have also full faith in these miracle words.

I belong to a middle class family of a small town of Bihar, inherited honesty, self-discipline, faith in goodness and kindness from my parents, rose to a respectable position in Govt. R&D sector where at present more than 600 people are working and also honoured with many awards. My primary education started at home along with the stories of various religious books including Ramayan & Mahabharat. My schooling started from Std. VI.

During my early school days, I was in the habit of reading various story books and latter I started reading fascinating stories of various scientists and their achievements. These stories encouraged me to do something new. During our time, science, arts and commerce classes were separated from Std. VIII. I joined science classes, because I was fascinated by the stories of various scientists and the words of my father to do something. After completion of my school education from Govt. Zila School, Chapra & Part-I of B.Sc (equivalent to Intermediate) from Rajendra College, Chapra, I appeared for Bihar Engineering entrance test. In those days there were only 365 seats in the entire state of Bihar which included Jharkhand also. Competition was very tough, but fortunately I scored good rank in the entire state and got admission in Muzaffarpur Institute of Technology (MIT) with Mechanical Engineering as per my choice and completed my engineering in December 1979 with Distinction.

After B.E (Mech), I joined BARC Training School as a Trainee Engineer (which was my dream, because scientist's works were fascinating to me). Getting selected in BARC was also one of the challenges, because that time only one attempt was allowed. After completion of my training course, I was posted in Central Workshops (CWS) currently known as Centre for Design and Manufacture (CDM). How and why the name was changed is also an interesting story which is mentioned latter. That time CWS was one of the largest Divisions of BARC consisting of six independent sections (Design, Planning, Machining, Fabrication, Maintenance, and Inspection & Quality Control). More than 1000 persons were working in three shifts. But Design Section of CWS was not considered to be a very good Section and officers working in that Section were getting promotion with one or two years delay. Knowing the situation of Design Section of Central Workshops, I just remembered my parent's work "Think to do something better" and I opted for Design Section with a hope that I may bring up the Design Section.

For initial three years (1982 to 1985) my work was to assist my seniors in designing various types of instruments for conducting the experiments with Neutron beam and also special purpose equipments required for research reactors and power reactors. During that period, we successfully completed one "Triple Axes Neutron Spectrometer" for KOREA.

After 1985, I started working independently as Design Engineer. My first job was to develop a Multichannel Raman Spectrometer, which was completed successfully. Design of this instrument with experimental result was published in" Indian Journal of Pure and Applied Physics".

Successful completion of this optical precision instrument & publication in journal gave me a lot of confidence & encouragement. After this I developed many other types of monochromators for different purposes. This was the beginning of my career as independent Design Engineer. After successful completion of these jobs, the then Head of the Division assigned me four more important & challenging jobs at a time. All four were unique & of different types. These jobs were:-

(a) Development a "Helium Cryostat of 1.0 meter in diameter & 1.2 meter in length" to house four R.F. Resonators to accelerate the energy of the heavy ion beam coming out from the Pelletron Accelerator for Tata Institute of Fundamental Research (TIFR). That time this was one of the first largest size of cryostat to be developed in India.

(b) Development a "Triple axes Neutron Spectrometer" for Bangladesh as per design parameters given by Bangladesh. As this job was for export, it needed to be completed within defined time frame.

(c) Developing an "Air Cushioned based Neutron Spectrometer" for Dhurva Reactor (BARC)

(d) Development a "Neutron Radiography Rig" for neutron radiography of irradiated object for IGCAR Kalpakkam.

That time, as I was not having sufficient experience, I was hesitant & reluctant in accepting the entire design job alone. But my Head of Division having confidence in me encouraged me. He showed his faith by saying “you can do this". His encouragement worked like a miracle and all four jobs were completed and delivered on time along with many other jobs. All the above mentioned jobs were completed between 1988 and 1993. As these were of great importance, many prominent Officers of BARC including Dr. R. Chidambaram (Ex-Chairman, DAE), Dr. B.A. Dasanacharya, (Ex-Director Physics Group), and Shri S.K.Mehta, Ex-Director Reactor Group) visited CWS to see these jobs. They were surprised to see the design capability of CWS.

Shri S.K.Mehta, (Director Reactor Group) had said that people used to think that CWS is just a Workshop. So to reflect the kind of high quality design work being carried out, the name ought to be changed. However, due to various reasons, the name Central Workshops was changed to (CDM) in 2000 only.

In 1993, one more difficult job was assigned to Central Workshops, i.e. development of a special purpose machine to remove one coolant channel from Narora Atomic Power station (NAPS). Romoval of coolant channel from working power reactor was one of the most difficult tasks, because maximum operations had to be done remotely with minimum exposure to human beings. To complete this task, a working Task Force was constituted consisting of two design engineers & other five supporting members. I was one of the Engineers of that team. We faced a lot of problems, but were able to solve all these and completed the task successfully.

As a recognition, BARCOA (Bhabha Atomic Research Centre Officers Association) had honored us with BARCOA Award and Department also honored us with Group Achievement Award in 1994. On the same topic, we had presented a technical paper in AIMTDR (All India Machine Tool Design & Research) Conference. Our paper was adjudged the Best Paper in the Conference.

After this, I spoke to my Head of the Division for making a team of design engineers, and he readily agreed. Now my next responsibility was to make a team of efficient Engineers, but selection of Engineers was not in my hand. So I started giving good grading to my Engineers to attract good intelligent Engineers for my team. This idea worked and after a few years I started getting good intelligent & sincere Engineers.

In 1994, I got one more challenging assignment which was to develop an automatic welding machine for welding the fuel tube & end cap. Wall thickness of fuel tube was 0.4 mm & end plug thickness was of 5.0 mm. Earlier many had tried it, but their machines were not accepted for nuclear grade welding. I along with one more Engineer from user Division accepted & completed the job successfully. Our machine qualified for nuclear grade welding.

By this time, I had established myself as a good engineer of BARC & may be best in Central workshops. So new challenges came to me, like developing various types of optical & mechanical instruments for Synchrotron beam line for INDUS-I & INDUS-II storage ring. I was given the task of designing & developing the instruments for three Beam lines of INDUS-I & latter seven beam lines of INDUS-II. Synchrotron radiation is an electromagnetic radiation which comes out as energy, released from the fast moving charged particles. Synchrotron radiation has a very wide spectrum (consisting of Infra Red (IR), ultra violet (UV), Vacuum ultra violet (VUV), X-Ray & Gamma ray also) so it is known as versatile tool for fundamental research and also for many other applications. Instruments of Synchrotron beam lines were different from the instruments of Neutron beam line. Each beam lines consists of many (Ultra High Vacuum) UHV compatible optical (Mirrors, Gratings & Single Crystals) & mechanical instruments and also experimental station for conducting the experiments. As the technology was new, I was deputed to BESSY, Berlin, Germany in July 1998 for four months to study the design of various types of instruments. There I got the opportunity to work in an operational storage ring & also got the exposure of various types of Optical & Mechanical instruments of very high accuracy. It was an excellent exposure for me.

In 2005, I got the opportunity to work with ISRO scientists, the most prestigious work of INDIA, which was designing, manufacturing, & installation of DEEP SPACE NET WORK (DSN) Antenna of 32 meter diameter for CHANDRAYYAN PROJECT. I felt proud when my Group Director selected me for this prestigious, work. This job was also completed on time and successfully used during Chandrayaan mission. Now the same is being used for MARS mission this year (in 2014). For this work & other challenging jobs, I was awarded DAE's most prestigious award i.e HOMI BHABHA SCIENCE & TECHNOLOGY AWARD of 2008.

By this time, I was having a team of good Design Engineers. After completion of Chandrayaan Project, another challenging job that I took was the development of Six-Axis Parallel Kinematic Positioning System (also known as Hexapod, & Stewart platform). There was great demand in India for the development of this instrument. Many academic institutions & robotic industries in India were working on this developmental work. Many users of DAE had requested me to take up this job because the cost of importing the hexapod was very high and also it was not easily available for BARC. We accepted the challenge and completed the task. Dr. R.K.Sinha (current Chairman of DAE) had visited CDM to see this job. Till now six numbers of Hexapods have been completed & six are under process. For this also DAE had honored us with Group Achievement Award.

Through-out my life, I am always thinking to do something best, never thought for achieving something or worried for promotions.

During my service life of 34 years, I have worked with full devotion, sincerity & integrity and department has also honoured me with many Awards. For this, I am thankful to our department. I have experienced different types of feelings, mostly sweet but sometimes sour too because of change in management. In last I would like to share a few points which are mentioned below with my young friends. At the same time I request them not to bother of about these small things & try to do your best, surely success & achievements will come to you.

1. When you take up a challenging task or are selected for a challenging task, colleagues will be watching you; if you fail they will laugh at you and if you succeed they will be jealous of you and only a few will appreciate you.

2. At the beginning of any challenging work, there will be a few persons with you and when you complete the work there will be a big crowd to take the credit & you may be lost in the whole crowd.

3. When you take up a new challenging and difficult task, in the beginning the people may react asking “can these people do it?” Once you complete the task, the same people may react, saying - “what is so great about this?”

4. When you confront a serious problem, it is only you who has to finally solve it. Do not expect others to solve your problem.

I am thankful to all my Seniors who always encouraged and supported me and given the opportunity to work on various important & challenging projects.