

Statement of Purpose: Looking into the mirror

Taking proper decision at turning point of life is very important for a man. After a twelve year study at schools or colleges a student has to choose a specific field of study for his undergraduate education. This is one of the crucial turning points of ones life.

After my higher secondary certificate examination was over, I with some of my friends went for a visit in Sylhet, a beautiful city of Bangladesh, famous for tea gardens. Who knew that this journey would make a major impact in my life? During our journey, while passing through a place named Magurchara the train was decelerated and kept moving slowly. It was known to us that at about six month ago (June 15, 1997) there was a blowout at an oil extraction station there. The blowout was so severe that it damaged the adjacent areas, causing death of several lives and damaging the adjacent rail lines. After a fight of one week the fire was extinguished but we lost the high potential oil extraction area and obtained a bad environmental impact. We knew all of this information from newspapers and TV-shows. But at that dawn the horrifying nudity of the devastated site was in front of us.

Occidental (Oxy), a foreign company, was in charge of the oil-station as our country didn't have much expertise to do the job ourselves. Later it was obvious that negligence on the part of Oxy was responsible for the disaster. We were shocked and ashamed of the ignorance that caused the situation. Personally I was so moved by the fact that I choose not to study MBBS in Rajshahi Medical College or other subjects in Dhaka University, Bangladesh where I got selected in a higher position. I felt that my country needs some top quality engineers, basically in the field of Mechanical Engineering and I promptly chose this as the undergraduate field of education and got myself admitted in Mechanical Engineering Department, Bangladesh University of Engineering & Technology (BUET).

My undergraduate study in Mechanical Engineering, BUET was a great experience. I loved those courses on Statics, Dynamics, Strength of Materials, Design of Machine Elements, Theory of Machineries etc. I came to know how to analyze the bodies under load assuming them as rigid, what to consider if it is assumed elastic and then how to combine all these theories for designing machine elements. I learnt that designing machine element is not like applying some theories and equations to get some values, it's a sophisticated decision-making process. I discovered that "engineering is the art of applying the physical sciences to the problems of mankind" (*Design of Machine Elements*, 4th Edition, V. M. Faires).

When I started exploring the theories of fluid mechanics, the subject matters started to spell bound me. A wide field of study gave me new set of eyes to look into the engineering problems. I started learning the behavior of ideal fluid, viscous fluid behavior, properties of compressible fluid, characteristic of fluid machineries and lots of other things. Untwisting the problems of the exercise of *Fluid Mechanics* by F. M. White was one of my favorite things to do in my leisure. Our course tutor, one of the pioneers in Computational Fluid Dynamics Prof. Dr. A. K. M. Sadrul Islam is my inspiration for the study of computational fluid dynamics. His assignments during course work gave ample opportunities to learn solving fluid problems with the use of computers.

The environment of our university is very helpful for various kind of development that a student needs for his complete learning. I had started learning programming at 1997, before my classes at BUET started. During the second term of first year I got the

opportunity to test my programming skill in a computer programming contest held in BUET. In the contest titled "Intra-BUET Computer Programming Contest", we, the only one team from Mechanical Engineering Department stood fourth keeping behind other teams who were senior than us in terms of maturity and age. This was a great achievement for me to get involve into programming. I started to participate in computer programming contests and its related activities. I utilized the free times obtained due to academic session jot and other vacations by learning programming techniques and languages. In this way I learnt various computer programming languages including C/C++, Java, Visual Basic, C# and various other computer applications, for example Unix Networking, Microsoft Office Packages, AutoCAD etc. I had written several technical articles in some national monthly and daily magazines.

My programming contest activities were example of dedication and hard work. The activities includes the participation in the "*National Computer Programming Contest 2000*", preparation of computer programming contest problem for two successful live contests held online at <http://acm.uva.es/contest>. National daily "*Prothom Alo*" honored me as '*Udioman*' (*rising star*) in their weekly page on Information Technology. Monthly IT magazine "*Computer Tomorrow*" published a detailed interview focusing my programming contest activities. One of the problems formulated and solved by me was included in a book named "*Programming Challenges - The Programming Contest Training Manual*" by Steven S. Skiena, Miguel A. Revilla. Later, during my coursework I found my programming skill very useful.

I was introduced with Mechatronic systems during a course on "Measurement and Instrumentation". I had developed a wind velocity measurement system as a course requirement and got interested with the development of such systems. A paper on the system was published in "*BSME-ASME International Conference Dec. 2001, Dhaka*". I chose "Mechatronics" as an optional subject at final year to learn more of it. I have designed and developed a data acquisition system with stepper motors: controlling 3-dimensional probe positioning and registering data from a sieve hole yaw meter for each position. The whole system can work independently through the customized computer windows software that I have developed. The system is in use in the turbulence laboratory of Mech. Eng. Dept. BUET under the supervision of Prof. M. A. Taher Ali. A M. Sc. student is using this at present.

Before the final exam of first term in BUET a political chaos delayed the examination schedule. In that time I got deviated from study and performed bad when the examination was resumed. I got an important lesson from it; never let a shadow to fall over your goal. Later during my coursework, I got several situations like this one, but this lesson helped me to overcome and carry on my study.

I have researched on "*Effect of Pressure Angle in the Gear Teeth: A Finite Difference Approach*" as my undergraduate thesis under the supervision of Dr. M. A. Salam Akanda. I must agree my way of thinking and analyzing was enhanced during the research period with Dr. Akanda.

During the undergraduate study I had worked as a trainee engineer in the 'Haripur Power Station' as a partial requirement of the fulfillment of undergraduate study. During that period a Hot Gas Path Inspection (HGPI) of a power generating unit was being carried out, which gave me the golden opportunity to watch the heavily engineered components of a 32 mega watt gas turbine generator. I was once again charmed by the beauty of Mechanical Engineering.

After I had finished my undergraduate studies I had promptly chose to study Mechatronics further as my M. Sc. major. The Mechatronics subject, an interdisciplinary area relating to the mechanical engineering, electrical engineering, electronics and computer science was introduced in Bangladesh about five years ago. This technology has produced many new products and provided powerful ways of improving the efficiency of the products we use in our daily life. I think this multidisciplinary subject well suit me perfectly.

A developing country like Bangladesh has many prospects in Mechatronics application. Many industries presently either uses Mechatronics system installed by some foreign industries or do not use any. Some of them are non-functional due to the absence of proper technology. Power plants, garment industries, food processing industries, chemical industries, household appliances, miscellaneous product design etc. are some prospective fields of application of Mechatronics system in our country. My choice of study in this subject will help to serve my country to meet the challenge of new era.

While I was approaching the end of my bachelor studies I started browsing different University web sites and found that Universities at United States are most advanced in the field of my interest. Especially I was charmed by the verities of research carried out at the Mechanical and Aerospace Eng. Dept. of Arizona State University. I liked the well equipped department with more than thirty laboratories, research activities divided in four well organized areas. The research activities on Intelligent Control of Mechanical Systems attracted me most among others. I hope that the selection committee will consider me as a potential research assistant for this field.

After I had passed my bachelor degree I started working as Software Developer at a private company named New Horizons, Dhaka with Microsoft dot Net Platform. I also got an opportunity in a textile industry, named Akij Textile, although I had chosen not to take the opportunity as the factory is located outside the city that could deviate my goal of higher study. Currently, besides doing my M. Sc. in Mechanical Engineer I am working as a Teaching Assistant under Prof. Taher Ali. I intend to apply for Teaching Assistantship and I hope that my experiences are worth noting in this respect.

Though Mechanical and Aerospace Eng. Dept. of ASU is a very competitive school and I hope that ASU will consider me as a student worth considering. I believe that I can work hard, sincere, determined, can work alone as well as in group under load and have a great desire to learn thoroughly. If I am given a chance to pursue my graduate study and perform my research here, I will do it with my utmost care and motivation. Moreover, I wish that the selection committee should consider me for any kind of scholarship available in the University. I look upon the graduate program in mechanical engineering department of your university as an avenue to sharpen my skills and to help me serve my country as well as the world.

S. M. Mahbub Murshed

June 25, 2004