

Statement of Purpose

The desire for higher education was developed in me during my time at Khulna University of Engineering & Technology (KUET). At the present day when I look back to my university day all, I want to reminisce what I able to gain from my undergraduate program in ***Building Engineering and Construction Management (BECM)***. I am always pleased to remember the company of the most enthusiastic teachers and seniors who motivated and support me to accomplish my goal of becoming an academician. Fortunately, their support and my hard work all end up to succeed when I joined as a Lecturer at KUET. My interest in pursuing a Master's degree stems mainly from my career objective. My motivation for seeking admission in the master's program at the Indian Institutes of Technology originates from my desire to become a prominent researcher in ***structural engineering***, which can be achieved here with the presence of outstanding faculty members in this field. I want to combine my background in building engineering, skills in construction management and desire of improving accommodation facilities in Bangladesh through my research outcomes. It will be a great honor for me if I could be a part of this esteemed University.

My academic excellence before getting admitted to KUET is also very vivid. I got scholarships in every Board examination in the Country. From a very early age, I was interested in the architectural design of a structure and always in my subconscious mind, I want to be an ***Architect*** or a ***Civil Engineer***. To quench this thirst, after finishing college I decided to pursue formal studies in ***Building Engineering***. This purpose was to be fulfilled when I got the chance to pursue my B.Sc. degree in BECM course at KUET, one of the topmost engineering university in Bangladesh. However, I want to mention one event, the very beginning I used to be a general student with no long vision of higher study or no ambition of being a good researcher. When I was in Level - 1, Term -1, I secured the 3rd position in my class. During this time maximum student was struggling to cope up with their university life and cannot perform well. The result during this situation kicked my momentum to become the topper in the class. I prepared myself in all three avenues: academic performance, research exposure and leadership activities to maintain my topper position in the class. My determination is reflected in my CGPA of 3.91/4.00 and class rank of 1st among 56 of the country's best students. I was awarded university gold medal and Dean's list award for academic excellence.

My experience at different stages of my academic career has built and shaped my interest in structural engineering. I have always been interested in topics and scenarios that have a practical influence on day-to-day life. While choosing my topic for the undergraduate thesis, a very practical problem caught my eye. Nowadays, an ecological trend goals at limiting the use of natural raw materials in the construction field and an increased attention in the use of alternative materials (waste) from trade sector, from which significant improvement in economic and environmental terms is expected. I was fascinated by this challenge and instantly took it as my undergraduate thesis. Therefore, my Undergraduate thesis is on "Investigation on Self Compacting Concrete Using Glass as Secondary Coarse Aggregate" supervised by Dr. Md. Habibur Rahman Sobuz. After a long discussion with my supervisor, we decide to improve ***concrete technology***, a widely used building material. In my thesis work, the first challenge was to select suitable waste materials which can be replaced as concrete material, easily available and also cost-effective. Reviewing various waste materials, we decided to collect waste glass from suppliers, vendors and users. The main challenge was preparing the Self Compacting Concrete (SCC) mix design using waste glass aggregates as no strong references were found. During our trial mix, we failed several times to obtain satisfactory SCC characteristics. To tackle this problem, I go through a literature review and discover that the reason behind is the alkali-silica reaction (ASR). Then taking some preventive action we able to obtain a satisfactory SCC mix. After that the rheological and mechanical properties of the SCC mixes were investigated by various experiments and the outcomes were affirmative. The part of the findings was

published in the "**Australian Journal of Civil Engineering**" a reputed peer review journal in the field of civil engineering. Another manuscript describing the rest of the findings is already submitted to the "**Construction and Building Materials**" journal by ELSEVIER.

My research interests are in **Concrete technology: Self-compacting concrete, Ultra-high-performance concrete, Fiber-reinforced concrete, Advanced Materials, Construction Management (CM), Building Information Modelling (BIM), Earthquake Engineering, Sustainable Construction Materials, Structural Health Monitoring**. My interest to work in structural and materials-related issues came from working with Dr. Sobuz, who is a renowned researcher in the field of '*Structural and Materials Engineering (SEM)*'. I used to have lengthy discussions with him about the topics on concrete for new generation, advanced construction materials and structural health monitoring. Since my junior years this vast time spend with him, gave me fondness in this field and from my undergraduate research experience, I have gained the motivation and confidence to work further with SEM. My undergraduate department, BECM was designed with two major which are 1. Building Engineering, covers structural and architectural related issues and 2. Construction Management, covers overall management of a construction project. In my senior years from academic courses like '*Construction and Project Management*' and '*Building Information Modeling*' I got the initial idea, and I also have interest and caliber to work further with CM and BIM.

During my almost two years of a teaching career, I continued to work with Dr. Sobuz on several projects and thesis by our students. I assist Dr. Sobuz in his two supervision where we worked with SCC enhancement using rice husk powder with waste copper wire fiber and fiber-reinforced lightweight concrete using nylon fiber. The outcomes of the experiments have been very affirmative and we are working on our manuscript for publication. Recently I am working on various seismic resistant systems for a multi-story structure with a 3rd-year undergrad student. In my professional life as a Lecturer at KUET, I have been teaching some core subjects of civil engineering such as Engineering Mechanics, Numerical Analysis, Mechanics of Solids. I believe teaching is also an essential part of being an excellent researcher. because during teaching one tends to see the world from every perspective which is essential for a good researcher.

Besides academic works, I have also been involved in team co-curricular and leadership activities. I was the organizing secretary of the Institute of Civil Engineer, KUET Chapter from 2017-2019 and also a student member of ICE. I am also directly involved with arranging all the technical fest organized by the dept. of BECM. Working as a faculty member at KUET, seeing my students succeeding the ideas conveyed by me, I am confident about the innate ability to guide others and can take leadership roles in my career.

I believe that the research opportunities and resources present at the Indian Institute of Technology, Kharagpur will allow me to fulfill my dream by providing the facilities to learn from world-class professors and work with quality researchers. To be more specific, I am highly motivated by **Prof. Arghya Deb's** work. His work on understanding concrete behavior and characterization of concrete structural elements has inspired me. I am also familiar with **Prof. Sriman Kumar Bhattacharyya's** work on and sustainable building material and FRP-concrete composite systems, which is also interesting to me. **Prof. Nirjhar Dhang's** work on Structural health monitoring and structural engineering also present interesting research opportunities. I have a dream to become a leading academician in my research field and I strongly believe that I have the potential. These factors have led me to believe that investing the next two years in the pursuit of a Master's degree would be a worthy investment of my time. Therefore, I am presenting my application to be considered as a graduate student in the Department of Civil Engineering of IIT, Kharagpur. I sincerely, therefore, would request you to consider my admission to your esteemed university. I assure you that I will try my best to attain my goals in accordance with the expectations of the university. I am looking forward to being a part of your graduate program. I would be grateful and be always humbled if I get that opportunity from you.