

## AN OVERVIEW OF PADMA BRIDGE: A DREAM PROJECT OF BANGLADESH COMES TRUE

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### Abstract

Padma Multipurpose Bridge is the most ambitious project Bangladesh has ever undertaken. The construction of the longest bridge in South Asia has facilitated a direct linkage between the nation's capital city and the southwest region of the entire country. Numerous challenges were successfully surmounted to achieve the dream of millions of people. The dream turns into reality, and it becomes a marvel in bridge construction. This multipurpose bridge will enrich the lives of people who do not have ease of access to the capital across the Padma River. It will strengthen the country's GDP, stimulate business, attract foreign investors, create jobs, boost tourism, and advance education and health services for the people in the southwest part of Bangladesh. This paper is intended to present an overview of this magnificent project, Padma Multipurpose Bridge, including the backdrop, difficulties, and how it became a reality under the vibrant governance of the Honorable Prime Minister of People's Republic of Bangladesh, Sheikh Hasina. This paper also emphasizes the impact of Padma Bridge on the socioeconomic development of Bangladesh.

**Keywords:** Artificial Intelligence, Constructional Challenges, Data Processing, Padma Bridge, Padma River, Socioeconomic Impacts.

### 1. Introduction:

Bangladesh is a highly populated country located in South Asia. It is principally characterized by its riverine geography and encompasses a shoreline of approximately 580km (360 miles) along the northern littoral of the Bay of Bengal. Notably, a significant portion of Bangladesh's land lies below sea level. The Padma, Jamuna, and Meghna are the three primary rivers that divide the country of Bangladesh into four distinct regions: northwest, southwest, eastern, and northcentral. The Padma River, spanning a distance of 100 kilometers, flows in a south-eastern direction through central Bangladesh, originating at the confluence of the Jamuna (or Brahmaputra) and Ganges rivers. It eventually merges with the upper Meghna river, which is referred to as the Lower Meghna downstream of this point <sup>[1]</sup>.

The Padma River serves as a geographical divide between the southwest region and the capital city, resulting in the need for lengthy ferry journeys to access important destinations. The transfer of passengers and freight across rivers was predominantly handled by launches, boats, and ferries. However, it is worth noting that these modes of transportation suffer from significant shortcomings in terms of both capacity and service provision. The ferry infrastructure exhibits prolonged and inconsistently lengthy waiting periods at terminals that lack sufficient amenities. In addition, these systems are vulnerable to suspension or termination

in the event of flooding, fog, and inclement weather conditions. The lack of convenience associated with this situation has a negative effect on the quality of life for individuals residing in this particular region of the country. The development of the Padma Bridge expects to improve the reliability of Cross-Padma transportation, leading to substantial decreases in both travel times and expenses <sup>[2]</sup>.

The design of the groundwork of the core bridge was developed considering numerous obstacles. On top of the hefty persistent loads, it needs to bear substantial ecological forces and circumstances, but not limited to gusts, tremors, and exceptionally deep river scour. The occurrence of wind speeds, range of greatness of seismic activity, and complexities of scour were extensively researched and the likelihood of manifestation of these adversities at the bridge location was established to construct a workable design tactic <sup>[3]</sup>.

The Padma Bridge serves as a vital infrastructure connecting the regions of Louhajang in Munshiganj to Shariatpur and Madaripur, so establishing a crucial linkage between the southwestern and northeastern parts of the country. This spectacular two-level steel truss bridge transmits a four-lane freeway on the higher level and a lone track railway on the bottom level. Comprising 150m composite superstructure spans on each of its decks (Warren type steel truss girder and concrete on higher Deck), an overall length of 6150m, and an upper deck 22m wide, it is country's biggest bridge in terms of both span and overall length in the Padma-Brahmaputra-Meghna river basins <sup>[4]</sup>.



**Figure-1:** Padma Bridge <sup>[5]</sup>

## **2. Background of the Padma Multipurpose Bridge:**

Honorable Prime Minister Sheikh Hasina first presented the dream of linking the flanks of the Padma River when she was unveiling the Bangabandhu Bridge erected across the Jamuna River in 1998 <sup>[6]</sup>. The Awami League administration analyzed the pre-feasibility of the Padma Bridge in 1999 <sup>[7]</sup>.

On July 4, 2001, Honorable Prime Minister Sheikh Hasina placed the cornerstone for the Padma Multipurpose Bridge Project (PMBP). However, since the Awami League was defeated in the voting in October of that year, the project was unable to proceed on schedule.

The government headed by Honorable Prime Minister Sheikh Hasina decided to build the Padma Bridge. At that juncture, a decision was made to do a survey for the Padma Bridge. The appointment of Dr. Jamilur Reza Choudhury as the leader of the expert team overseeing the construction of the Padma Bridge was announced. In 2004, the Japanese government was requested to conduct an investigation into the potential of the river. The selection of Mawa

Point was made by a delegation from the Japan International Cooperation Agency (JICA) after conducting extensive surveys, and a comprehensive investigation. When the feasibility study finished in 2004, the government sanctioned the venture in 2007, estimating expenditures of Tk.10161 Crore. Following the completion of the bridge's comprehensive design, the Awami League-commanded government completed negotiations with the World Bank, securing a \$1.2 billion mortgage for the project in 2011. The project encountered a significant setback in 2012 when the loan from the World Bank was rescinded. According to a briefing published on 29 June 2012, the bank asserted that it possessed substantial evidence, supported by multiple sources, indicating the existence of a corruption conspiracy involving high-ranking Bangladeshi government officials, executives from SNC Lavalin (a Canadian implementing organization), and private individuals in relation to the Padma Multipurpose Bridge project. In a similar vein, the Asian Development Bank (ADB) and the Japan International Cooperation Agency (JICA) also withdrew their backing. Bangladesh consistently denied the allegations made by the World Bank, and in 2017, a Canadian court acquitted SNC-Lavalin executives of conspiring to offer bribes to Bangladeshi officials in order to obtain the Padma Bridge project. The Bangladesh Anti-Corruption Commission scrutinized the incident in 2015 and unearthed no evidence to support the World Bank's assertion. The bank disallowed the investigation anyway claiming it was anything but veracious. Following the withdrawal of the loan, Honorable Prime Minister Sheikh Hasina said that the Padma bridge project will be funded entirely from domestic resources. In parliament, she declared that construction of the Padma Bridge would start from the financial year 2012-13. In 2014, the erection of the service roads and toll plaza began.

On 17 June 2014, Bangladesh signed a Tk.12133 Crore agreement with China Major Bridge Engineering Company for the erection of the Padma Bridge. The Padma Multipurpose Bridge's primary construction was initiated in 2015, with Honorable Prime Minister Sheikh Hasina inaugurating the main bridge on 12 December 2015. The Padma Bridge's first span was completed in 2017. The remaining 40 spans took three years and two months to install. The 41st span was installed on 10 December 2020, making the complete 6.15-kilometer bridge visible from Munshiganj's Mawa to Shariatpur's Zajira.

In 2008, ECNEC approved a budget of Tk.10162 Crore for the Padma Bridge project. In 2011, expenditure was seen to increase to Tk.20507 Crore. The expenditure was Tk.28793 Crore after the second phase of budget modification in 2016. In June 2017, the budget was upstretched to Tk.30193 Crore.

**Table-1:** Work Timeline of Padma Multipurpose Bridge <sup>[6]</sup>

Year	Activity
2003-2004	Feasibility study done
2007	Cost estimated at Tk.10161 Crore and approved be ECNEC
2010-11	Detailed design completed
2012	Loan withdrawn by World Bank
2012	Decision taken to construct the bridge with country's own funds; 2015 set as a deadline
2012	Cost estimated at Tk.20502 Crore after rail link added in the design
2015	Cost reviewed to Tk.28794 Crore; deadline revised to 2018
2018	Cost went up to Tk.30193 Crore; December 2019 fixed as new deadline
2019	The Deadline extended to June 2021
2020	Proposed deadline December 2022

25 June  
2022

## Inauguration of Padma Bridge

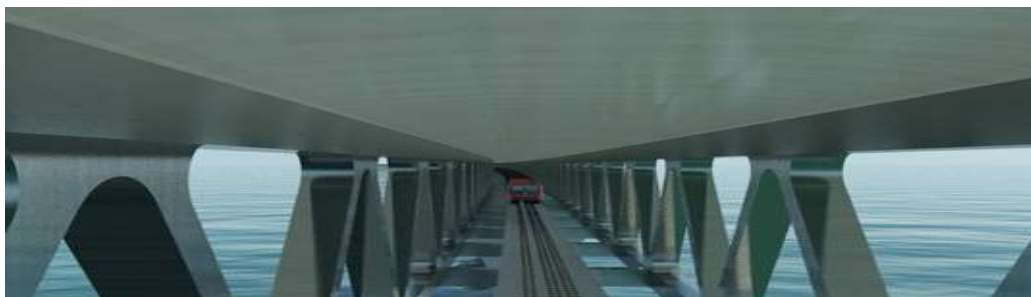
**3. Constructional Design of Padma Bridge:**

The Bangladesh Bridge Authority has engaged the services of AECOM as the Design Consultant. Prior to conducting a comprehensive analysis of various potential bridge structures, AECOM conducted a meticulous examination of previous studies pertaining to bridge design<sup>[8]</sup>.

Not only will the bridge carry a major roadway, but it will also encompass a train track serving as a dedicated freight link to India. The bridge can be characterized as a versatile structure, encompassing essential features such as electricity lines, gas pipes, and telecommunications cables at the intersection<sup>[9]</sup>. The complete design policy of the Padma Multipurpose Bridge was overseen by a delegation of international and national specialists, with AECOM leading the efforts. The QMS is intended to keep track of all of the team's progress. At the start of the project, a Design Management Plan specific to this venture was prepared. In March 2009, the Bangladeshi administration asked AECOM to speed up the design process so that construction could be concluded within 2013.

This mandated placement of surplus members dedicated to the design team. The Bangladesh Bridge Authority (BBA) formed a globally acknowledged jury of Specialists, made up of five national and international experts each, to examine the design consistently. Furthermore, an Independent Checking Engineer, Flint & Neill, was tied up in appraising the design benchmarks, specifications, and sketches provided by the design crew to certify the design attained the project requirements and to commence an autonomous inspection of the thorough design of the core- bridge and river training works. The integration of Bangladeshi counterparts into the design team was a key feature of the detailed design, allowing for the efficacious preparation of a large sum of Bangladeshi workforces in all facets of the project and the consequent transference of the top-notch technology applied to this large and intricate project.

The pivotal effort is being executed by China Major Bridge Engineering Company Ltd., while river training is being performed by Korean Expressway and is being administered by a different Chinese company, Sinohydro Corporation Ltd. Abdul Monem Limited, and Malaysian Highway Construction Management are working together on the approach roads. Abdul Monem Ltd. is also in charge of the service area-2 project. Consultants have included the Bangladesh Army's Special Works Organization and Korean Expressway. Labor on the approach road and service area is also superintended by the army<sup>[10]</sup>.



**Figure-2:** Padma Multipurpose Bridge Lower Deck<sup>[5]</sup>

The construction of the Padma Bridge has resulted in the establishment of several noteworthy achievements within the realm of contemporary architecture. There is no other bridge globally

that possesses such deep piles, measuring 128 meters in length, which is approximately equivalent to the height of a 40 to 41 storey building. According to popular belief, the accomplishment in question remains unparalleled until the construction of a bridge over the Amazon River. The utilization of very massive bearings, weighing 10500 metric tons (10500000kg), in the connection between the pillar and the span, is an unprecedented occurrence in the history of the world. The crane employed for the installation of the bridge onto the pillars was purchased from China, incurring a monthly rental cost of Tk.30 lakh. The cumulative rent for the duration of forty-two months amounted to Tk.12 Crore 60 lakh as of 2020. In a groundbreaking development within the realm of construction, an extended rental of a crane was employed for the purpose of constructing the aforementioned bridge. The acquisition cost of the crane in the open market would have amounted to Tk.2500 Crore [11].

**Table-2:** Details of the Padma Main Bridge [5]

Total Length (Main bridge)	6.150 KM
Span	41 numbers
Span Length	150 m each Composite Superstructure (Warren- type Steel Truss Girder and Concrete on Upper Deck)
Pile Details	Racked (Inclined at 1H:6V) Steel Tubular driven pile 6 numbers in each pier Pile Diameter=3 m Pile Length= 128 m Total number of piles in main bridge: Steel pile=40x6=240 numbers Vertical bored concrete pile=2x16=32 numbers (up to 80m depth)
Upper Deck	22m wide concrete deck slab (2.5m hard shoulder on both sides 4 lane road
Lower Deck	Single Track Dual Gauge Rail
Deck Height	13.6 m
Navigation Clearance	18.30 m
Viaduct	Mawa End (North bank): 19+20=39 span; Length=1478.03 m Janjira End (South bank): 23+19=42 span; Length=1670.03 m Total Road Viaduct:81 span; Total Length=3148.06 m
Rail Viaduct	Mawa End and Janjira End: 7+7 = 14 span; Length = 532 m
Utilities Through the Bridge	<ul style="list-style-type: none"> <li>• 760 mm dia Gas Transmission Line</li> <li>• 150 mm dia Fiber Optical &amp; Telephone Duct</li> <li>• 7 numbers High voltage Electric Platform in river over the pile</li> <li>• Foundation at 2 Km downstream of main bridge</li> </ul>

#### 4. Constructional Challenges and Solutions:

Consultants from AECOM encountered numerous and severe engineering obstacles while designing the bridge, particularly from the surrounding environment. In the course of downpours, the Padma River can become a raging one prone to intense scour, necessitating deep-piled foundations. The bridge spot is situated in a seismically active region, resulting in high seismic loads being imposed. Advanced computer analysis and engineering clarifications were used to build the bridge. The bridge will effortlessly handle all these adversities of nature during its long life because of the materials used.

According to scholarly sources, the river in question ranks second globally in terms of water flow, with the Amazon River holding the distinction of being the first. The Padma River, which has its origins in the Himalayas, traversed across India before reaching the region of Rajshahi. In the eastern region, the river converges with the Jamuna River in proximity to Goalanda, and with the Meghna River in Chandpur. Based on reputable sources, it has been determined that the Padma River has a maximum depth of 1561 feet (479 meters) and an average depth of 968 feet (295 meters). The pace at which water is released at Mawa Point in intervals of 20 seconds

is proportional to the daily water consumption of the capital city. The Padma River experiences a volumetric flow rate of 140000 cubic meters per second. Bedrock is typically readily accessible in foreign riverbeds. In the region of Padma, the bedrock was discovered at a significantly greater depth. The water level at the riverbed is comparable to the height of a building with 13 stories.

The construction of bridges over the Padma River presents considerable problems due to the complexities involved in the process of river training. According to Wang Kun, the utilization of PVC technology has been integrated into the procedure of rendering soft soils suitable by employing substantial levels of heat and energy. Moreover, the ground lock has been appropriately prepared through the utilization of chemical, mechanical, polishing, or CMP technology. The construction of the bridge was facilitated by the utilization of industrial robots. The utilization of welding robots has been observed in environments where the employment of human workers posed significant risks. A variety of innovative technologies have significantly improved the rate of data processing.

Upon completion of the erection process, the supervision of the bridge will be undertaken by Artificial Intelligence (AI). An automated signal control system will be implemented to mitigate unintended difficulties. The utilization of AI (Artificial Intelligence) technology is anticipated to be employed within the railway administration system.

##### **5. The Padma Bridge- A Great Achievement of Bangladesh Awami League:**

The erection of the versatile Padma Bridge is one of the achievements of the grand alliance administration led by the Bangladesh Awami League. This is the most significant achievement under the dynamic governance of Honorable Prime Minister Sheikh Hasina. The construction of this bridge was a very challenging and difficult task. By suspending the Padma Bridge project based on false allegations, the World Bank put pressure on Honorable Prime Minister and Bangladesh. Many local and international specialists were skeptical of the project's outcome at the time. The Prime Minister, on the other hand, stood firm in her choice. Bangabandhu's daughter Prime Minister Sheikh Hasina is a strong woman who will not be broken. On her own initiative, she decided to construct the Padma Bridge. The claim, however, was later proven untrue in a Canadian court. This mega project will open numerous avenues to development, especially the economy of South Bengal, and strengthen the foundations of Bangladesh's economy. South Bengal's whole socioeconomic and infrastructure development is now centered on this dream bridge.

All the achievements of Bangladesh have come true due to the dynamic leadership and versatile thinking of Honorable Prime Minister Sheikh Hasina. In 2009, she founded the government with the goal of transforming Bangladesh into a "Digital Bangladesh" by 2021. Her vision of a digital Bangladesh has become a reality. Bangladesh is now a part of the fastest-growing digital economy on the planet. Bangladesh is also known as Asia's 'Emerging Tiger' in terms of trade. The International Chamber of Commerce-Bangladesh (ICCB) has regarded the implementation of the Padma Bridge project as a noteworthy achievement for the country of Bangladesh.

As per the editorial featured in the News Bulletin of the International Chamber of Commerce Bangladesh (ICCB) for the period of October-December 2020, the ICCB expressed its gratitude towards Honorable Prime Minister Sheikh Hasina for effectively showcasing Bangladesh's potential through the independent execution of a substantial project with its own resources. The realization of the Padma Bridge, a long-awaited aspiration, has finally been achieved. The International Chamber of Commerce Bangladesh (ICCB) expressed admiration

for the notable accomplishment of Bangladesh and commended the Honorable Prime Minister Sheikh Hasina for demonstrating to both development partners and the global community that Bangladesh possesses the capability to successfully execute a large-scale project utilizing its own resources. This statement was made in the ICCB's News Bulletin <sup>[12]</sup>.

### **6. Impact of the Padma Bridge on Socioeconomic Development:**

Padma Bridge helps to reduce the travel distance from Dhaka to 21 districts in the south. Total time is likely to be decreased by 2 to 4 hours. It helps to expand trade and commerce, facilitate the transport of resources, and increase production. Different categories of small, medium, and large businesses will therefore establish themselves in these districts, which are now directly connected to the capital city. Agronomy will flourish as farmers will get better commodity prices. The annual gross domestic product (GDP) of the southern region is projected to experience a significant increase of 2.0 percent, while the overall GDP of the country is expected to climb by more than 1.0 percent. The southern region of the country is set to be connected to both the Trans-Asian Highway (N-8) and the Trans-Asian Railway. Bangladesh is poised to establish connectivity with neighboring countries such as India, Nepal, and Bhutan. The construction of economic zones, high-tech parks, and private industrial cities on both sides of the bridge is expected to lead to an increase in investment opportunities and employment prospects. Furthermore, the tourism sector will be presented with a significant prospect for growth and prosperity. The Sundarbans, Kuakata sea beach, Bangabandhu Mazar, the sixty-domed mosque, and the resorts situated at Mawa and Jazira points are anticipated to draw the attention of both domestic and international tourists. Enhanced accessibility to education, healthcare, and various facilities will be experienced by individuals residing in the southwestern portions of the country <sup>[13]</sup>.

The Padama bridge will connect the country's two maritime ports. The bridge is planned to revitalize the Mongla port, which is currently functioning at 20% capacity due to the present lengthy travel time to Dhaka or abroad. Padma Bridge will also complete a missing connection on the Asian Highway, improving regional connectivity <sup>[14]</sup>.

### **7. Conclusion:**

The prevalence of individuals residing in close proximity to the poverty threshold is notably higher in the southern region compared to other areas of the nation. This disparity can be attributed, in part, to the underdeveloped state of the communication infrastructure. It was essential to develop a prompt communication system and the Padma Bridge would be the solution. This multipurpose bridge will benefit millions of individuals who were previously unable to access the capital along the Padma River. Several foreign financiers, who were previously hesitant, will now enthusiastically invest in Bangladesh, which will shoot up the GDP of the country. It will create more employment, promote the tourism industry, and more educational institutes will become centered in the area. The standard of living will improve dramatically.

### **8. References:**

- [1]. Neill, C.R., Oberhagemann, k., McLean, D., Ferdouse, Q.M. (2010). River training works for Padma multipurpose bridge, Bangladesh. IABSE-JSCE Joint Conference on Advances in bridge Engineering-II, August 8-10, 2010, pp. 441-448.
- [2]. Wheeler, W.K., Aves, R.J., Tolley, C.J., Zaman, M., & Islam, M.R. (2010). Detailed design of Padma Multipurpose Bridge, Bangladesh- An overview. IABSE – JSCE Joint Conference on Advances in Bridge Engineering-II, Dhaka, Bangladesh, 08-10 August 2010. pp. 120-133.

- [3]. Sham, S.H.R., Yu, G.X., & Silva, S. D. (2010). Foundation design methodology for Padma Main Bridge. IABSE – JSCE Joint Conference on Advances in Bridge Engineering-II, Dhaka, Bangladesh, 08-10 August 2010. pp. 417-426.
- [4]. Islam, M.M, Hossain, A.S.M.F., Abbas, S.M., Silvy, S., & Hasan, M.S. (2020). A Study on Impacts, Construction Challenges and Overcomes of Padma Multipurpose Bridge, Bangladesh. ICCESD 5<sup>th</sup> International Conference on Civil Engineering for Sustainable Development, KUET, Khulna, Bangladesh, 07-09 February 2020.
- [5]. Available from: <http://www.padmabridge.gov.bd>
- [6]. Mamun, S. (2020). Padma Bridge: Dream becoming a reality against all odds. dhakatribune.com. 09 December 2020.
- [7]. tbsnews.net (2020). Padma Bridge: How the dream Project came true.
- [8]. Sham, S.H.R., & Tapley, M.J. (2010). The design of Padma Multipurpose Bridge-challenges and solutions in design of the river span. IABSE – JSCE Joint Conference on Advances in Bridge Engineering-II, Dhaka, Bangladesh, 08-10 August 2010.
- [9]. Tapley, M.j., Sham, S.H.R., Holmberg, R.A. (2010). Developing the operation and maintenance strategy for the Padma Multipurpose Bridge. . IABSE – JSCE Joint Conference on Advances in Bridge Engineering-II, Dhaka, Bangladesh, 08-10 August 2010.
- [10]. daily-sun.com (2015). Padma Bridge: A dream comes true. 07 January 2015.
- [11]. Rahman, M.M. (2021). Technical analysis of Padma Bridge. risingbd.com. 26 April 2021.
- [12]. financialexpress.com (2021). ICCB describes Padma Bridge as great achievement for Bangladesh. 31 January 2021.
- [13]. Khatun, F. (2020). Padma Bridge and the pursuit of inclusive growth. thedailystar.com. 14 December 2020
- [14]. Correspondent (2011). World Bank. Padma Bridge: Connecting People to Prosperity in Bangladesh. Worldbank.org. 24 February 2011