Superior Steel, Safer Structures

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The foundation of any safe construction lies in its structural components, among which steel plays an indispensable role. It forms the backbone of modern construction, ensuring stability, durability, and resilience against environmental stresses such as earthquakes, storms, and floods.

Bangladesh's steel industry has witnessed significant growth in recent decades. The country has numerous manufacturers offering high-quality materials that meet international standards. Trusted local manufacturers have supplied steel for many of Bangladesh's mega projects, ensuring quality and reliability. "The steels available in Bangladesh adhere to strict standards, such as ISO 9001 and BSTI certifications. BSRM, AKS, KSRM, and GPH Ispat are some of the manufacturers producing high-quality steel. Modern technologies such as Quantum Electric Arc Furnace have made it possible to produce high-quality products, ensuring the first step in the safety process," said Engr. Md. Shamsul Alam, Principal Structural Engineer of The Designers and Managers (TDM).

Key Factors in Choosing the Right Steel
Selecting the appropriate steel for construction is a critical decision that impacts the safety, durability, and performance of any structure. Below are the key factors to evaluate when choosing the right steel:

1. Steel Grade and Standards
Ensure that the steel meets international and local standards such as ISO 9001, BSTI, and BNBC guidelines. Grades like Fe-415, Fe-500, and Fe-550 are commonly used in Bangladesh and are suitable for varying structural requirements. Understanding the grade ensures that the steel aligns with the project's load-bearing and environmental needs.

2. Tensile and Yield Strength
The tensile and yield strength of steel determine its ability to bear loads and resist deformation under stress. These properties are crucial for structural integrity, particularly in high-rise buildings or seismic zones where the steel must endure dynamic and static forces.

3. Ductility
Steel's ability to withstand deformation without cracking is essential for earthquake-resistant structures. High ductility steel absorbs seismic energy, minimising structural damage and ensuring safety during earthquakes.

4. Environmental Factors
Consider the environmental conditions of the construction site. High-quality steel should be resistant to environmental stresses such as wind, water, and temperature fluctuations.

5. Manufacturer Reputation and Certification
Choose steel from trusted manufacturers with proven track records for quality assurance. Brands like BSRM, KSRM, and GPH Ispat in Bangladesh are known for adhering to global standards and employing advanced technologies.

6. Compliance with Safety Codes
Following the Bangladesh National Building Code (BNBC) is essential to ensure the safety and resilience of any construction. BNBC outlines specific requirements, such as minimum diameters for rebars used in critical structural elements like columns, beams, and slabs. These guidelines ensure that the steel reinforcement can adequately handle dead loads, live loads, and environmental stresses, including wind and seismic forces.

Corrosion Resistance
In Bangladesh, the humid climate and salinity in coastal regions pose significant challenges to infrastructure due to corrosion. The demand for corrosion-resistant steel is, therefore, steadily increasing. To ensure the longevity of structures, it is essential to treat and maintain reinforcement rods effectively, enhancing their resistance to corrosion and weathering.

One prominent example of corrosion-resistant innovation is BSRM Centura, which offers Fusion Bonded Epoxy Coated Rebars (FBECR) specifically designed for structures in coastal regions. GPH Quantum range is another trusted name, known for its reliable performance against corrosion.

Earthquake Resistance
Bangladesh, located in a seismically active region, faces a constant risk of earthquakes. Building earthquake-resistant structures is essential to reduce damage and ensure the safety and resilience of communities in the event of a quake. The seismic resistance of concrete structures largely depends on the properties and arrangement of rebar (reinforcing steel). Key engineering properties of rebar for seismic design include: a) unit weight – the weight of a 1-meter rod, b) yield strength – the stress level at which the rod elongates proportionally, c) ultimate strength – the maximum stress the rod can withstand before breaking, d) elongation – the percentage the rod stretches before fracture, e) bend test – how easily the rod bends without breaking, and f) deformation measurement – the surface pattern of the rod.

For seismic resistance, yield strength, ultimate strength, and elongation are critical. Yield strength must meet or exceed the rated strength without exceeding it by more than 125 MPa. For Grade 420 rebar, the range should be 420 MPa to 545 MPa. The ultimate-to-yield strength ratio must be at least 1.25, and elongation should be 12%-14% over 200mm. Only a few MS rod brands meet these standards, so testing from a reputable lab is strongly recommended.