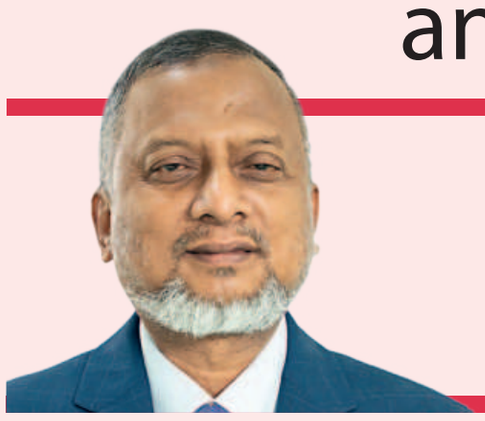
INTEGRATINGSAFETYFORASUSTAINABLE and Resilient Construction Industry



MOLLAH MOHAMMAD MAJNU,
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THE DAILY STAR (TDS): What measures do you recommend for ensuring general safety in construction, both in maintaining structural integrity and protecting workers on-site?

Mollah Mohammad Majnu (MMM): Safety in construction is a multifaceted issue that begins with proper planning and extends throughout every stage of a project. To maintain structural integrity, we emphasise the use of high-quality materials, adhering to proper mix designs, following construction codes, and conducting regular testing on cement and concrete mixes. Skilled labour and strict compliance with standards are also crucial to ensure structures can withstand environmental stresses like floods and earthquakes.

Crown Cement is the pioneer in the construction industry who has launched the "Nirmane Nirapotta" campaign for worker safety to raise awareness and safeguard contractors and masons working in projects using our cement.The initiative includes the free distribution of personal protective equipment (PPE) such as helmets, gloves, and goggles, as well as safety training and workshops to prevent accidents. Additionally, the campaign offers financial support in case of injuries or fatalities, providing non-recurring grants of BDT 100,000 for accidental death, BDT 50,000 for major injuries, BDT 30,000 for treatment staying at hospital and BDT 10,000 for general treatment. However, stakeholders must register under the campaign beforehand to access these benefits.

Crown Cement also ensures safe working environments through partnerships with contractors and builders. We promote site-specific safety protocols, proper scaffolding, and emergency preparedness measures. Our sub-teams actively visit construction sites to conduct safety inspections and awareness programmes. By fostering a culture of safety and continuously advocating for worker welfare, we aim to make safety an integral part of the construction process while supporting the development of a sustainable and resilient construction industry.

TDS: What types of cement or construction materials do you offer, and how do you ensure their suitability for different construction purposes while prioritising safety and environmental sustainability?

MMM: At Crown Cement, we offer a variety of cement types to meet the diverse needs of the construction industry. We have CEM-I, or Portland Cement (PC), which is ideal for special large-scale projects (e.g., 40-storey buildings) requiring early high strength, and CEM-II, or Portland Composite Cement (PCC), which is more versatile and suitable for everything from multistoried buildings to flyovers, roads and bridges.

CEM-II is more commonly used these days and has two variations: A-M and B-M. The maximum mineral content of B-M cement is 35%, while A-M contains 20%. The quality of this cement is highly dependent on the quality of the minerals present in it. We also produce a type 3 cement, which was specifically used in the Rooppur Nuclear Power Plant and was not distributed commercially.

Different types of cement are suited for different construction purposes. For instance, massive structures like the Burj Khalifa can use cement blended with slag (a mixture of silicon dioxide, calcium oxide, and iron oxide), which improves density, durability, and helps reduce corrosion of steel in concrete. Normal cement usually requires 28 days to gain strength, whereas slag cement takes 90 days to reach full strength. This type of cement is ideal for large multi-storey buildings and underground constructions as well.

In terms of environmental considerations, our PCC contains supplementary materials like fly ash and slag, which not only reduce the carbon footprint but also enhance the durability of the cement. Additionally, we've invested in energy-efficient manufacturing technologies that minimise waste and reduce greenhouse gas emissions. We are also committed to educating the market about the importance of using the right type of cement for specific purposes. For example, while PC might be more suitable for high-rise construction, PCC is often the better choice for general structures due to its lower environmental impact.

TDS: What technological advancements have you adopted to improve the quality and efficiency of your products? Furthermore, what are your future plans for innovation and sustainability?

MMM: Technological innovation is a cornerstone of Crown Cement's success. Unfortunately, we do not have the raw materials required for producing cement in our country, so we need to import them. We maintain a strict quality control procedure at every stage, from importing the raw materials to transporting them to construction sites. We use 'Analyzer' technology to examine the raw materials, which gives us accurate results regarding their quality and content. Maintaining this technology is quite costly.

Additionally, we have upgraded our manufacturing facilities with advanced machinery such as high-efficiency vertical roller mills (VRMs), which reduce energy consumption by 25% and cut pollution by around 70% compared to traditional ball mills (TBMs). We have installed VRM in our fifth and sixth production line to increase cost efficiency and make the production process more eco-friendly. We are committed to furthering innovation in the future, not just in production but also by driving sustainable and innovative industry practices.

Cementing Best Practices: Safety in Every Layer

Protective equipment is non-negotiable at a construction site. Helmets, gloves, steel-toed boots, and high-visibility vests form the first line of defense against common site accidents. For cement work specifically, add safety goggles and dust masks to protect eyes and lungs from cement particles, which can be harmful if inhaled.

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Cement is one of the key ingredients in making concrete, which is the most used construction material worldwide. It gives strength to concrete through a chemical reaction called hydration that takes place when it is combined with water. This inorganic powder possesses the power to shape entire skylines and requires careful handling. When used correctly, cement lays the foundation for marvels of engineering; when mismanaged, it can lead to structural flaws and hazardous consequences.

"Maintaining safety on a construction site requires supervision by someone knowledgeable about the proper use, storage, and handling of cement and construction materials, along with a clear understanding of Building Code. Ensuring safety doesn't demand extensive expertise; a basic level of knowledge can go a long way," commented Engr. Md. Shamsul Alam, Principal Structural Engineer at The Designers and Managers (TDM).

The Basics of Construction Safety

Before diving into cement-specific guidelines, it is essential to understand the broader context of construction safety. Protective equipment is non-negotiable at a construction site. Helmets, gloves, steel-toed boots, and high-visibility vests form the first line of defense against common site accidents. For cement work specifically, add safety goggles and dust masks to protect eyes and lungs from cement particles, which can be harmful if inhaled. Regular training sessions should be held to reinforce safety protocols, address new risks, and remind workers of best practices.

A Guide to Different Types of Cement

There are mainly two types of cement which are commonly produced in our country, namely CEM I and CEM II. "Different areas or buildings require specific types of cement. Unfortunately, consumer awareness is quite low in our country. Selecting the appropriate type of cement is crucial to ensuring the durability of your construction," mentioned Mollah Mohammad Manju, Managing Director of Crown Cement.

CEM I is known as Portland Cement (PC), which comprises 95% of clinker and has no SCM (Supplementary Siliceous Materials such as fly ash, slag, silica fume) added to it.

CEM II cement is known as Portland Composite Cement (PCC), where a portion of clinker is replaced by different mineral admixtures or combinations of different mineral admixtures, such as fly ash, slag, limestone, silica fume. The amount of replacement clinker varies from 20% to 35%. There are nineteen sub-class of cement in this category. Among them, the CEM II/A-M and CEM II/B-M subclasses are commonly produced in Bangladesh.

It is important to note that the quality of mineral content plays a critical role in PCC (CEM-II) cement. The quality can vary depending on the sources of the mineral admixtures. "Understanding properties of different cement is essential for proper use. Key aspects such as fineness, setting time, and strength should always be considered, and both workers and engineers must remain vigilant about these," added Principal Structural Engineer, Alam from TDM.

In short, PC offers rapid strength for quick-setting needs, while PCC ensures durability against environmental challenges like exposure to sulphates and chlorides. Additionally, structural design engineers may specify particular types of cement for specific structural elements within the design drawings.

Storing and Handling with Care

Improper storage and handling of cement can compromise cement quality and pose risks. Even a small amount of moisture can cause cement to clump and lose its binding properties. "In general, a bag of cement should be used within 60 days after production, however, if the storage condition is good, it is possible to store for 90 days or more," said an expert from Crown Cement. In case of any doubt, cement should be tested before use.

Dry and Elevated: Cement should be stored in a cool and dry area, preferably on wooden platforms to keep them off the ground. The platform should be at least 200mm (8") above the floor and 300 mm (12") away from the brick walls. This prevents moisture from seeping in from any side.

Stack Wisely: Maximum height of the stack shall be 15 bags and width not more than 4 bags.

Difference between PCC sub-classes in terms of compressive strength

PCC Sub-class	2 Days Strength	28 Days Strength
CEM II/A-M	16-20 MPa	45-48 MPa
CEM II/B-M	13-16 MPa	42-45 MPa

SOURCE: **CROWN CEMENT**

If stacks are more than eight bags high, the bags should be arranged alternately in length and crosswise.

FIFO Principle: Follow the FIFO (First In, First Out) method. Older cement should be used first to prevent it from exceeding its shelf life.

Lift with Care: Since cement bags are heavy, use proper lifting techniques to avoid back injuries, or employ mechanical aids where possible. Hooks should not be used during movement of cement.

Avoid Contact: Direct skin contact with cement can cause burns or rashes. Always wear gloves and long sleeves when handling it. If cement enters into the eye, immediately wash with enough water, and seek advice from a doctor. Workers must use protective hand and face coverings at the construction site.

While cement is essential, it is also a major contributor to CO_2 emissions. Incorporating sustainable practices, such as using blended cements with fly ash or slag to reduce carbon footprints, disposing excess cement responsibly, and mixing only daily requirements to minimise waste, not only benefits the planet but also improves site safety. Moreover, eco-friendly production process that reduces energy consumption and advanced technologies which cuts health hazards and pollution must be made mainstream within the industry.

Key differences between different types of cement

Cement Type	Clinker (%)	Types of Minerals	Mineral Content (%)	Key Properties
CEM-I	95-100	Gypsum	0-5	Gives early strength Makes construction faster More heat of hydration Performs better in sulfate free environment
CEM-II/A-M	80-94	Fly ash, slag, limestone etc.	6-20	Gives higher long-term strength Makes concrete denser and reduces permeability
CEM-II/B-M	65-79	Fly ash, slag, limestone etc.	21-35	Lower heat of hydration High chemical resistances against seawater, chloride and sulfate

SOURCE: **CROWN CEMENT**