BANGLADESH PAINT INDUSTRY

# Painting the future bright

MD FAZLUR RAHMAN

THE paint industry has continued its sound growth in recent years thanks to a rise of consumption in semi-urban and rural areas boosted by consumers' increasing purchasing power and move towards diverse and premium products.

In 2015, the size of Bangladesh's decorative paint market was about Tk 2,550 crore, according to a number of paint manufacturers and Bangladesh Paint Manufacturers Association (BPMA). Average growth was around 8 to 10 percent in the last five years. At present, annual consumption stands at about 120,000 tonnes.

"The sector is growing at a healthy pace, but there is still huge room for growth," said MA Rahman, vice-president of BPMA, which has 33 paint manufacturers as its members. He cited per capita paint consumption in Bangladesh as the lowest in the region.

Some 40 companies operate in the country. Among them, 10 to 12 companies contribute nearly 85 percent to the market. Bangladesh is largely dependent on foreign multinationals which meet about 90 percent of the demand.

Berger Paints (BD) Ltd is the market leader. Other national major companies are Asian Paints, Roxy Paints, Elite Paints, RAK and Pailac Paints. Moon Star Paints & Chemical Ind. Ltd, Nazrul Brothers Paint Industries (Ujala Paint), and Al-Karim Paints & Chemicals Ltd have strong presence in certain regional markets.

Recently the market has experienced the entry of global players such as Akzonobel from the Netherlands, Nippon Paint from Japan and Jotun Paints from Norway.

The sector is expected to grow by 10 to 12 percent per annum as there is scope for increase in consumption backed by economic growth, according to a note of Berger Paints.

Md Nazrul Islam, general manager for sales and marketing of Chittagong-based Moon Star Paints & Chemical Ind. Ltd, said the demand of paints largely depends on the overall economic activities in the country.

He said the paints sector faced troubles in recent years because of the slowdown in the real estate sector.

As the real estate sector has started to tide over the slowdown in recent months, the demand for paints is also growing, said Islam.

Islam said his company is exploring opportunities in new areas such as industrial and marine paints.

Mahadi Hasan Chowdhury, senior brand manager of Roxy Paints Ltd, said the demand is growing as more and more housing and industrial projects are being taken up across the country.

He said companies are bringing in new types of paints that can be used at hospitals and other colour sensitive areas. Paints are even being used to douse fire whenever a fire incident happens.

Key products that hold the major market shares are: plastic emulsion, distemper, outer coat (weather proof), synthetic enamel, etc.

Plastic emulsion and distemper are close substitutes of each other. Emulsion is basically used in high-end residence all over the country and distempers are economy class products having a demand in semi-urban and rural markets. Weather coat is growing very fast and presently holds a significant market share.

The paint Industry is playing an important role in the infrastructure development of the country by ensuring protection to fixed assets.

The protection enabled by the paint coatings contributes to the longevity of the structure, resulting in GDP growth of the country.

MA Rahman said there is a misconception in Bangladesh that paint is a luxury item. "It is a necessary item."In developing countries, annual cost of corrosion amounts to nearly 2 to 3 percent of GDP, which is caused due to lack of protection of infrastructure like buildings, roads, highways and bridges, vehicles and shipping vessels, industrial structure and machinery, etc, according to Berger Paints. "So, we have to paint our structure properly," said Rahman, the managing director of Anchor Paint Industries (Pvt.) Ltd.

Industry people also point to 5 percent supplementary duty (SD) for the slow growth of the consumption. They say the SD is not acceptable as by painting the structures, be it houses or industries, people are actually elongating the longevity of the structures and thus contributing to national savings.

A number of sector people also said the government should take steps so small manufacturers can survive in the face of entry of a number of multinational companies and imports.

**THE WRITER IS SENIOR CORRESPONDENT, *THE DAILY STAR*.**

# Building Vulnerability Assessment Process in Bangladesh

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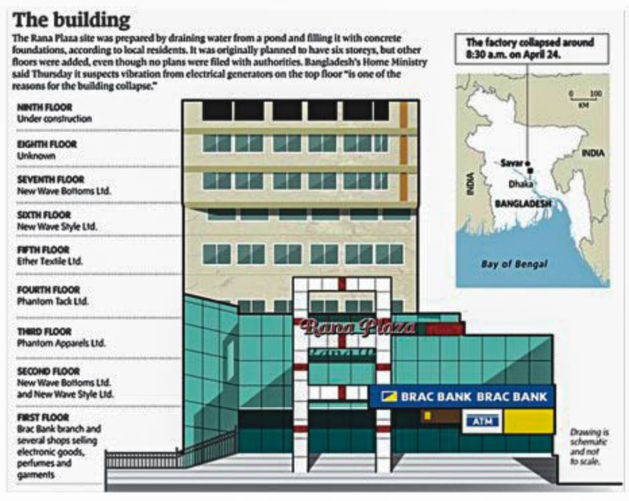
*In Bangladesh ready-made garment (RMG) industry is one of the most important export-oriented business sectors, which is facing challenges to ensure workplace safety. Rana Plaza collapse in Bangladesh is the consequence of such non-compliance. The accident resulted in different local and global initiatives to address the challenges. One such initiative is the EU initiated Sustainability Compact. One of the main actions recommended by this initiative is assess to the structural and fire safety of all active export-oriented RMG and knitwear factories and initiate remedial actions. This paper describes the structural assessment process followed by National Tripartite Action Plan (NTAP) to fulfill the action recommended by the Sustainability Compact.*




MANMADE industrial disasters happen frequently in Europe, resulting in adoption of minimum requirements for safety and health protection at the workplace to prevent accidents and occupational diseases. Without workplace safety compliance, it is almost impossible to ensure business sustainability and thus to survive in global market competition (Rajon, 2014). Despite the challenges in RMG sector in Bangladesh McKinsey, a global management consulting firm, described Bangladesh as the next hot spot in apparel sourcing (Berg et al., 2011). The firm forecasted that the export-value growth will be 7-9% annually resulting in increase of apparel export doubled by 2015 and nearly tripled by 2020, if the sector in Bangladesh can ensure total compliance with the international standard. Even after the Rana Plaza collapse, a study jointly conducted by the United States Fashion Industry Association (USFIA) and the University of Rhode Island (URI) revealed that, the US-based fashion companies are expected to boost their sourcing from Bangladesh by 2016 (Lu, 2014).

This work is about the progress of disaster risk reduction in RMG sector through addressing workplace safety issues with special focus on resilience of factory buildings. In this regard, this paper aims to review and discuss in detail about the action regarding structural assessments of buildings housing RMG factories in Bangladesh including its progress, implementation mechanism, and outcomes within two years after Rana Plaza collapse to bring out the progress of disaster risk reduction in this sector. Assessment of buildings is not an end in itself, which requires further study to take corrective measures accordingly. So, along with the discussion, some recommendations have been suggested in this study to be incorporated in the structural assessment initiative to make the weak factory buildings resilient by addressing the structural issues.

## RANAPLAZA BUILDING COLLAPSE

Just months after the fatal fire at Tazreen Fashions, Rana Plaza collapsed on 24 April 2013 at around 8:30 am, which was located at Dhaka-Aricha highway near Savar bus stand (Figure 1). It is the last most alarming accident in RMG sector in Bangladesh, which resulted due to the reluctant attitude of the stakeholders towards the compliance issues.

Rana Plaza housed five garment factories employing around 5,000 people, 300+ shops, and a bank. It was a 9-storied industrial building with a single basement. Figure 1 shows the schematic diagram, of the building and a photo before it collapsed. Instead of RAJUK (Capital Development Authority), local municipality (Savar) gave permission to the owner of Rana Plaza to construct a five storey commercial building with one basement in 2005 and later allowed the owner to extend it up to nine storey, without considering the structural design, though the foundation of the building was of 5 storey (Rahman, and Ansary, 2013). Moreover, the building was converted from commercial to industrial use, and power generators were placed at the higher floors. As a result of such violation in building construction, cracks developed on some pillars and a few floors of the building following a jolt on 23 April 2013, a day prior to the fateful day. After inspection of industrial police, they requested the building authorities to close the building and to suspend operations of the factories on that day. However, the building owner and top-management of the garment factories ignored the warning and forced the workers to work in the next morning of 24th April, 2013. As a consequence, the collapse resulted in the high death toll of 1,134 and more than 2500 people to be badly injured at the end of the rescue operation on 14 May 2013. It was a global tragedy emphasizing the importance of issues concerning millions of workers, employers, brands and consumers - the entire supply chain in the RMG sector of Bangladesh.

**Fig. 1 Rana Plaza collapse on April 24, 2013**

## STRUCTURAL ASSESSMENTS OF BUILDINGS HOUSING RMG FACTORIES IN BANGLADESH

*Progress of the Structural Assessment Initiative*

After Rana Plaza accident, work-place safety was considered one of the most important challenges to sustain RMG industry in Bangladesh. Thus actions regarding structural and fire safety assessment of all active export-oriented RMG factories were addressed in all the action plans. The supporting actions included up-gradation and strengthening of the Chief Inspector of Factories and Establishment office to a department, recruitment of additional labour, fire and building inspectors, arrangement of training programs to increase capacity of the inspectors, development of plan in consultation with the ILO to conduct effective inspections, initiation of remedial actions or close or relocate factories as appropriate, and creation of a publicly accessible database of all RMG/knitwear factories as a platform for reporting labour, fire and building inspections.

The GoB has already upgraded Chief Inspector of Factories and Establishment office to Department of the Inspection for Factories and Establishments (DIFE), sanctioning 679 new staff positions including 392 new inspectors and also started organizing training program for the newly recruited inspectors for capacity building. Bangladesh University of Engineering and Technology (BUET) and two private engineering firms TUV SUD Bangladesh (Pvt.) Ltd and Veritas Engineering & Consultant on behalf of the NTC, the Accord, and the Alliance are responsible for conducting the assessments of the structural integrity and fire safety of RMG factory buildings. To undertake the structural assessment of factory buildings with common approach, Guidelines for Assessment of Structural Integrity and Fire and Safety including harmonized standards were developed the technical experts (structural engineers, fire safety experts, etc.) from the BUET on behalf of the NTC, the Accord, and the Alliance. A review panel along with a review mechanism was also established to handle urgent safety issues in garment factories. Finally on November 2013, assessments of the structural integrity and fire safety of RMG factory buildings officially commenced led by engineers from BUET. The BGMEA and BKMEA agreed to share necessary documents related to factory design and layout with the Committee to facilitate a smooth assessment process. A publicly accessible database of all RMG factories has also been created as a platform for reporting labour, fire and building inspections.

Implementation Mechanism of the Structural Assessment To undertake the structural assessment of factory buildings with common approach and standard, ILO brought together the technical experts (structural engineers, fire safety experts, etc.) from the BUET on behalf of the NTC, the Accord, and the Alliance. NTC endorsed 'Guidelines for Assessment of Structural Integrity and Fire and Safety' including harmonized standards developed by technical experts from the BUET, the Accord and the Alliance. The common steps for structural assessment of buildings housing RMG factories by team of expert are described below:

Visual inspections of factory building are done for identification of existence of any distress in the structure of a building.

The design drawings and soil investigation reports of the factory buildings (if available) are reviewed to assess the current use and loading pattern.

Assessment of immediate threat of collapse from current building use is done to take decision about further initiatives required to make the factory buildings resilient. For the assessment of immediate threat of collapse from current building use, the surveyors firstly highlight key columns and carry out simple calculations of working stresses to find out Factor of Safety (FOS), which is Column Ultimate Strength, divided by the Column Working Stress. Here, the Column Working Stresses are calculated comparing data set values and trigger points developed. Column Ultimate Strengths of the key columns of RMG factory buildings are calculated using equation (1) according to Bangladesh National Building Code (BNBC) (1993).

**$P_n = 0.8?[0.85f?c(A_g-A_{st})+f_y A_{st}]$ (1)**

**Where,**
**Pn = Ultimate Strength of a column**
**? = strength reduction factor (= 0.7)**
**f?c = compressive (cylinder) concrete strength**
**Ag = gross area of concrete section**
**Ast = area of reinforcement**
**fy = steel strength**

To decide on Column Ultimate Strengths, firstly the key columns are checked for brick or stone aggregate concrete. In case of unknown column material, brick aggregate is assumed. Due to the absence of any compressive strength data for existing RMG factory buildings, equivalent compressive (cylinder) concrete strengths (f?c) are used for preliminary analysis. For the key columns with stone aggregate concrete and brick aggregate concrete, equivalent compressive (cylinder) concrete strength (f?c) are assumed 16.3 MPa (2365 psi) and 14.1 MPa (2045 psi) respectively. These two equivalent concrete strengths were estimated on the basis of the cylinder test results conducted at BUET Concrete Laboratory between 2003 and 2009 using equation (2).

*f ?c=Mean of concrete strengths -*
1.34 x Standard deviation of concrete strengths (2)

After deciding on concrete strengths of the key columns, the order of reinforcement is checked with a ferroscanner to calculate the area of reinforcement (Ast). In case of unknown number of reinforcement bar, it is assumed 1% of gross area of concrete section. For the buildings constructed before 2005 and after 2005 the steel strengths (fy) are assumed 40 ksi (276 MPa) and 60 ksi (414 MPa) respectively. After deciding on all these information, Column Ultimate Strength is calculated.

Finally FOS is calculated from Column Ultimate Strength and Column Working Stress. Based on FOS, four color codes have been proposed to be used indicating the level of vulnerability of the factory buildings and the required actions within certain time frame to overcome the vulnerable condition. Table 1 shows the color codes based on FOS of columns along with required actions within time frame. Thus, preliminary assessment of immediate threat of collapse from current building use is carried out.

After each inspection, preliminary assessment reports are prepared including the findings along with required recommendations for the building owner and user according to the assessment results. After assessment if any factory building is notified as hazardous, the respective assessment teams let the review panel of Bangladesh government know about those factory buildings to carry on further assessment by inspection team and take final decision regarding the closure of the factory.

For factory buildings falling under red and amber category, Detailed Engineering Assessment (DEA) is carried out. Other issues triggering DEA are: concerns with structural issues, i.e. extensions, lateral system, flat plate punching capacity and slender columns, and state of documentation and approvals. DEA of the buildings involve soil investigation, other non-destructive tests and 3D building modeling.

Core tests are essential actions for factory buildings falling under red, amber and yellow category to gradually improve the state of building and reach to green category. For the purpose of core test at least four, three inch diameter core samples are required to be collected and tested and ACI 562 (2013) is used to estimate equivalent concrete strength from the core data.