Innovation in Cement Grinding line

Apart from technological innovation, Fresh cement has been sourcing raw materials especially the clinker from CONH, China & TPI, Thailand, the very renowned sources in Asia region as well as the world.

CEMENT sector is the largest growing sector in Bangladesh. Bangladesh is self-sufficient in fulfilling local market demand for cement. Even so, installed production capacity is higher than local demand.

The major cement manufacturers are importing raw materials from abroad and using grinding technology to produce cement. Unique cement industries also following this principle.

Polycom Grinding Technology - from ThyssenKrupp, German

Unique Cement is a unit of Meghna group of industries and is situated at group's Industrial park at Meghnagaht, Sonargaon, Narayanganaj.

As a part of continuous efforts towards becoming the business leader, the Meghna Group Industries (MGI) has been investing in technological innovation since the beginning. Thus the company has set up a latest German Polycom technology from ThyssenkrUppin 2013 in cement grinding line. The technology is high - pressure grinding mill to produce superior quality cement, in the name of Fresh brand.

The grinding elements of the high-pressure grinding roll are two counter-rotating rolls, between which the material is crushed. The required comminution is transmitted by a hydraulic system. During operation of the PLOYCOM machine it is possible to alter the pressure and thus change the products fineness. The grinding action of a tube mill involves a mixture of compressive and shear forces whereas the POLYCOM imposes virtually pure compressive force on the layer of material between the rolls. The compression stress thus caused in a particle of material is more than five times higher than shear stress would be.

This technology has proven to be extremely effective for the grinding of cement clinker, blast furnace slag, lime stone and other raw materials. ThyssenKrupp Industrial Solutions is the worldwide market leader for this energy efficient technology.

This type of mill offers the benefits: safe process technological design which protects resources and environment; deliver maximum productivity; product that has a higher percentage of fines and least residues (< 2.5%) than could be achieved in a conventional crusher mill; low operating expenses due to power consumption and costs of wear parts are significantly lower.

Apart from the innovative work, the company is continuously upgrading the existing manufacturing facilities like air classifier, electronic packer and so on.

Fresh cement has started its operation in 2002 with production capacity of 2000 MT per day and grown up gradually according to market demand. Presently it's capacity is 12000 MT/day which is 2nd largest volume in Bangladesh. This progress is identical to the country's economic development. The recent cement consumption per capita in Bangladesh is around 115 kg whereas world average consumption is 525 kg. Bangladesh is continuing to grow up with excellent economic growth rate successively, over a 6 percent, so the country has still has enough space to run with cement sector. Needless to say that huge urbanization and construction of many large infrastructure projects support this observation.

Apart from technological innovation, Fresh cement has been sourcing raw materials especially the clinker from CONH, China &TPI, Thailand, the very renowned sources in Asia region as well as the world. Fresh Cement has excellent backward and forward linkage, say, own mothebr vessel & lighter carrier for raw materials carrying, Power plant for uninterrupted power supply (captive use), Bag plant, , ulk carrier, portable silo, extensive cement distribution system throughout the country. These linkages contribute to make quality assurance plan, uninter-

Behaviour of RC building with beam supported slab and flat plate slab

IN Bangladesh, different types of floor system, such as edge supported slabs (One way, two way), column supported slabs (Flat slab, flat plate slab), ribbed slabs, waffle slabs etc. are commonly employed in reinforced concrete building structures. This study was undertaken to carryout inelastic pushover analysis of buildings with different slab systems such edge supported slabs and column supported slabs using ETABS. The analytical results obtain from buildings having edge supported slabs compared with the same having column supported slabs and also to conduct a parametric study on the lateral strength of buildings with different aspect ratio. Eighteen reinforced concrete buildings of different numbers of stories with two different slab systems 1) Edge supported slab; 2) Column supported slab are designed model building for the study. All the buildings are designed following Bangladesh National Building Code (BNBC-1993). The buildings are designed for gravity loads at first step. The responses of the buildings are verified for lateral loads in the subsequent steps according to the code UBC-97. Inelastic pushover analysis is carried out for all model buildings to know the lateral strength of the building.

The use of inelastic static analysis in earthquake engineering is traced to the work of Gulkan and Sozen (1974) or earlier, where a single degree of freedom system is derived to represent the multi-degree of freedom structure via an equivalent or 'substitute' structure. The load-displacement curve of this substitute to the real structure is evaluated by either finite element analysis or hand calculation to obtain the initial and post-yield stiffness, the yield strength and the ultimate strength. Simplified inelastic analysis procedures for multi-degree of freedom systems have also been proposed by Saiidi and Sozen (1981) and Fajfar and Fischinger (1988).There are several publications that review the advantages and disadvantages of pushover analysis, with varying degree of success. They all, however, utilize global response parameters, namely top displacement versus base shear. Lawson et al. (1994) discuss in some detail the range of applicability, the expected realism for various structural systems and highlight the difficulties encountered. The latter study is both conceptual and applied, rendering it specifically valuable. In the course of describing recent trends in seismic design, Krawinkler (1995) discusses pushover analysis as a prelude to capacity spectrum applications. The author mentions a contentious point, which is that 'in most cases the normalized displacement profile at a first estimate of the target displacement level is utilized for these (defining the shape vector) purpose. Attempts at improving the procedure have been made, with varying degree of rigor and success. The simplest and most pragmatic of which is the work of Sasaki et al. (1998). This comprises running several pushover analyses under forcing vectors representing the various modes deemed to be excited in the dynamic response. The pros and cons of the procedure were also discussed by Krawinkler and Seneviranta (1998). They concluded that not all analysis of the same structure under a set of district earthquake records are predicted by pushover analysis, a rather obvious conclusion that did not require inelastic dynamic analysis to prove.

In order to conduct a parametric study of the lateral resistance of eight, ten and twelve storied buildings having two different types of slabs:

Flat plate slab
Beam slab

Three model buildings are adopted in this study. The buildings have three length/ breath ratios: 1, 1.5, 2.0 all the buildings are designed using Bangladesh National Building code (BNBC-1993).It is worthy to mention that the buildings are designed for gravity loads at first step, and subsequently verified for lateral loads using UBC'97.The materials, loading and the designed sections of different basic components are described in the following sections.

Pushover analysis is a static, nonlinear procedure using simplified nonlinear technique to estimate seismic structural deformations. It is an incremental static analysis used to determine the force-displacement relationship, or the capacity curve, for a structure or structural element. The analysis involves applying horizontal loads, in a prescribed pattern, to the structure incrementally, i.e. pushing the structure and plotting the total applied shear force and associated lateral displacement at each increment, until the structure or collapse condition.

By pushover analysis variation of displacement with base reaction for different slab system and different parameter of buildings are given below:

Table 1 Analysis of Eight Storied Building

Plan Dimension	Beam supported slab		Flat plate slab without edge beam		% of resistance higher than flat plate slab	Average Of Percentage
	Lateral resistance (KN)	Displacement (mm)	Lateral resistance (KN)	Displacement (mm)		
18.3mx18.3m	467.57	45	363.03	45	28.80	25.5
18.3mx27.45m	600.15	45	480.92	45	24.80	
18.3mx36.6m	739.09	45	600.15	45	23.10	

Table 2 Analysis of Ten Storied Building

Plan Dimension	Beam supported slab		Flat plate slab without edge beam		% of resistance higher than flat plate slab	Average Of Percentage
	Lateral resistance (KN)	Displacement (mm)	Lateral resistance (KN)	Displacement (mm)		
18.3mx18.3m	462.06	45	353.68	45	30.64	27.5
18.3mx27.45m	598.19	45	469.22	45	27.48	
18.3mx36.6m	730.37	45	587.07	45	24.40	

Table 3 Analysis of Twelve Stored Building

Plan Dimension	Beam supported slab		Flat plate slab without edge beam		% of resistance higher than flat plate slab	Average Of Percentage
	Lateral resistance (KN)	Displacement (mm)	Lateral resistance (KN)	Displacement (mm)		
18.3mx18.3m	456.54	45	344.58	45	32.50	29.5
18.3mx27.45m	596.15	45	457.52	45	30.30	
18.3mx36.6m	721.65	45	574.04	45	25.70	

Graphical representations for different types of slab system where base reaction is varied for different story, i.e. Eight, Ten & Twelve

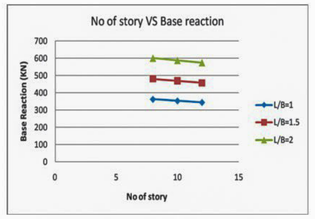

Fig. 1 No. of story VS Base reaction for flat plate slab

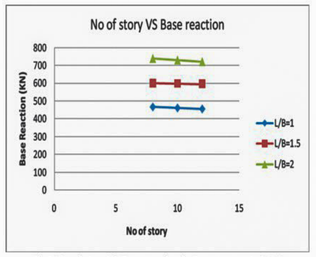

Fig.2. No. of story VS Base reaction for beam supported slab

Graphical representations for different types of slab system where base reaction is varied for different L/B Ratio, i.e.1, 1.5, 2.0

Eight Storied Building

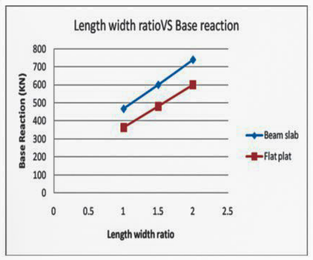

Fig.3. Length width ratio VS Base reaction curve for flat plate slab and beam supported sla

Ten Storied Building

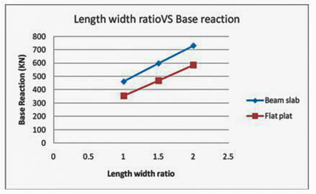

Fig.4. Length width ratio VS Base reaction curve for flat plate slab and beam supported slab

Twelve Storied Building

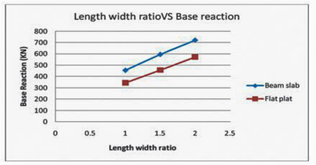

Fig.5. Length width ratio VS Base reaction curve for flat plate slab and beam supported slab

Lateral strength of eighteen reinforced concrete buildings with two different slab systems (1) beam supported slab; (2) flat plate slab

Base reaction is increased when L/B is increased.

When L/B is 1, 1.5, 2.0 then lateral load resistance capacities at beam supported slab is higher than the flat plate slab.

When the storey height is increase the base reaction is decrease.

For plan size 18.3mx18.3m, beam supported slab has 28.8% (For 8-storied), 24.8 % (For 10 storied) and 23.1% (For 12- storied) higher strength than that of the buildings with flat plate slabs.

For plan size 18.3mx27.45m, beam supported slab has 30.64% (For 8- storied), 27.48% (For 10- storied) and 24.4% (For 12- storied) higher strength than that of the buildings with flat plate slabs.

For plan size 18.3mx36.6m, beam supported slab has 32.56% (For 8- storied), 30.30% (For 10- storied) and 25.7% (For 12- storied) higher strength than that of the buildings with flat plate slabs

An analytical study on the lateral strength several storied buildings with two different slab systems (1) beam supported slab; (2) flat plate slab is carried out.

The buildings are designed for gravity loads at first steps and subsequently verified for lateral loads. The conditions drawn in the study are as follows:

It is found that the buildings with beam supported slabs have higher lateral strength than with flat plate slab.

It is found that the lateral strength is decreased when the storey height is increased in both cases of two different slab systems.

Differences in lateral strengths are obtained for different length width ratio of the buildings.

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Innovation in Cement ...

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delivery and competitive price for a best product which is customer's choice. Currently, multinational cement companies are facing intensive competition with local companies.

Quality division is an extensive process of producing Fresh cement. It is not limited to the quality control activities in state of the art laboratory of plant. It is under quality assurance plan from raw materials sourcing to finished product delivery. Each and every stage is being monitored for a super quality product. The company has separate silos to ensure unmixed product.

Fresh cement has been using in some important projects like 2nd Bhairob Railway project, Moghbazaar-Mouchak Fly over, Shikalbaha power plant, Shahjibazzar power plant and so on. Moreover, Fresh is focusing on upcoming iconic projects in Bangladesh. Finally Fresh Cement consumption has steadily been rising due to growing demand in both the local and foreign markets. The company is producing 3 types of cement for local market complying BSTI/EN standard; Fresh Super (Portland cement, CEM I, 52.5 N which is OPC in ASTM standard) and Fresh Special (Portland Composite cement, PCC, CEM II/A-M, 42.5 N)&Fresh(PCC CEM II/B-M, 42.5 N).And Fresh, Portland Pozzolan Cement (PPC) for export market only.

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