

FLYASH-BUILDING BLOCKS FOR THE FUTURE INTRODUCTION

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At this time India is witnessing a new phase in development. with rapid economic growth and high rate of urbanisation. Construction provides the direct means for the development, expansion, improvement and maintenance of human settlements is particular and economic growth in general. Construction activity accounts for more than 50% of the development outlays in India. Building construction costs are increasing at rates which are So per cent over inflation. This is primarily due to the increase in the cost of basic building materials like burnt brick, steel, cement, timber, etc. As a result, the cost of construction using conventional building materials and construction forms range from As. 40001- to As. 6000/- per sqm even for normal housing. Construction costs of this order is beyond the affordable capacity of the economically Weaker Section and Low Income Group and a large cross section of the Middle Income Groups, whose income levels have not increased commensurately. This has become all the more relevant in the macro context. due to the large volume of housing to be done in both rural and urban areas and the limited resource of building materials and finance available. According to the projections for the Ninth Five Year Plan, there will be a shortage of 6.6 million houses in urban areas and 12.76 million houses in the rural areas at the end of year 2001, inspite of all the Governmental efforts and resources.

However, it also needs to be recognized that construction also adversely affect the environment, through physical disruption. the depletion of key renewable resources like fertile top soil, forest cover and excessive consumption of energy. Therefore, there is a strong need to adopt cost-effective, environmentally appropriate technologies by upgradation of the traditional technologies and also using local materials as well as using appropriate and intermediate technologies using modern construction materials with efficient, effective technology inputs. Building materials is an area where enormous amount of innovation for cost reduction, can be achieved. May bricks being the most important area for innovation as the total demand of clay bricks, as an challenged walling material in India, is estimated at 180 billion per annum causing the depletion 540.000 metric tonnes of fertile soil.

In the above background, Flyash, basically a waste material, has a dear edge over the other construction material as it can be converted to a resource with minimum amount of investments. Further, it can help to increase the speed and quality of construction and thereby helping in enhancing the efficiency of housing delivery mechanism.

AVAILABILITY OF FLYASH

Total flyash generation in India from Thermal Power Plants is estimated at about 60 million tonnes per year, which may increase to about 110 million tonnes per year by 2010 AD. India utilise only 3-4% of the flyash generated as compared to more than 40% utilisation in Europe, China and America etc. The Government has indicated a clear willingness to achieve 50% flyash utilisation by the turn of the century at its enlarged level of 90 million tonnes per annum. A variety of experiences are now available to us on the scenario at different levels of manufacturing of flyash bricks.

Tiny Scale

The production of Fal-G based building material industries indicate a considerable promise. These units are coming up at tiny and small scale sector along the coastal

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of HUDCO and West Bengal Power Development Corporation Limited (PDCL). The Building Centre is resposed manufacturing 25 lacs bricks per year (6 months working period) using conventional technology since January 1991 where 50% ash is mixed with clay. A significant proportion of bricks thus manufactured have been consumed by Bharat Heavy Electrical Lid. West Bengal Infrastructure Development Corporation Lid.. Bharat Petroleum Corporation Lid. Public Works Deptt. Govt. of West Bengal. Kolaghat Thermal Power Station, Minapore Zilla Parishad and Panchayats alongwith large number of families from low and middle income group of housing. The technology so far practiced has been demonstrated before a good number of private brick manufacturing units and so far forty private brick manufacturing units have applied this process successfully.

Medium Scale

Various efforts have been made in different pans of the country to utilise the flyash in medium level industries. However, these efforts appear to be quite exclusive and are quite capital intensive.

Practically entire focus is on use of flyash with sand and lime etc. The production cost of these flyash sand lime bricks etc. works out higher as compared to conventional walling material available in the market. The most automatic and large scale production unit of M/s Pulver Ash Ltd. is also giving adverse messages as the unit is said to be working at a capacity of only upto 25% due to marketing problems. Another such example is of Autocalaved Aerated Concete plant set up by M/s Ballarpur Industries Ltd. at Palwal (Haryana) near Delhi, which is also not fully successful in generating enough market.

OTHER USES OF FLYASH FOR WALLING MATERIALS

Flyash can also be used for making a variety of building products, some using simple low cost processes and others involving high investment processes high quality walling material. The present state of art in manufacture of flyash products is outlined below.

1. Stabilized Mud Fly Ash Bricks

Compacted mud fly ash blocks stabilised with lime, cement or other chemicals can be easily made. The problem of getting dry fly ash at the site, makes adoption of this technology somewhat difficult.

2. Cellular Light Weight Concrete

Cellular Light Weight Concrete (CLC) can be manufactured by a process involving the mixing of flyash, cement, coarse sand, fine sand and a forming agent in a mixer to form a thin slurry. The slurry is then poured in moulds and allowed to set. The blocks are then removed from the moulds and are cured by spraying water on the stack. The bulk density of the product varies from 400 to 1800 kg/cum. These blocks are especially useful in high rise construction reducing the dead weight of the structure. The compressive strength of these blocks depends upon the density of the blocks. M/s DLF Universal Ltd., New Delhi are using these blocks in their construction projects for the last two years. This technology is also not cost intensive and involves few lacs of rupees for on site production of light weight concrete blocks.

3. Flyash-Lime-Gypsum Product named 'Fal-G'

A process of blending flyash, lime and calcined gypsum for making a useful product, named Fal-G has been developed by Bhanu International, Visakhapatnam. Phosphogypsum, a waste product from fertilizer plants is washed and refined followed by calcination. Flyash lime mix is mixed in predetermined proportions with calcined gypsum which produces Fal-G having strong binding proportions and can be used as a cement. It can be mixed with sand and/or aggregate to produce building bricks of any desired strength. This technology has great potential and needs promotion.

More than 200 units have already been set up using technology. CPWD, the nodal Government of India organisation in the building industry is tailing a lot of interest in this production process. The specifications and Schedule of Rates for Flyash Lime Gypsum Bricks are also being prepared by CPWD on priority.

HUOCO'S EFFORTS IN PROMOTING FLYASH BASED BUILDING MATERIALS

Various efforts are being made to manufacture flyash based building materials from the level of medium sector to tiny sector units. Since HUDCO has assigned a role for itself for promoting the waste based materials, therefore, in the context of crying need for supporting alternative options of Building Material Industries using industrial waste like flyash coming from Thermal Power Stations, HUDCO has been giving all priority to support Building Material Industries using flyash, by providing term loan assistance at 16.5% per annum rate of interest in the debt equity ratio of 2:1.

Besides term loan assistance, HUDCO also provides R & D assistance in view of advancement and developments taking place in the field of building construction, technologies and materials and to encourage such activities through the public, private and non-government agencies. To promote and support the use of Flyash, HUDCO also involves itself in organising the seminars, exhibitions setting up of Building Material Technology Exposition Centres etc.

There is also a scheme of setting up of Building Centres all over the country to promote the use of appropriate building materials. The Building Centre Movement was started in

May, 1988. As on December 1998, it has been possible to establish 560 building centres with a total grant assistance of about Rs. 20 crores so far, out of which 324 building centres are fully functional.

The main objective of setting up of Building Centres is to transfer from lab to land various environment friendly, energy efficient and cost effective building materials and technology preferably using local, natural or waste resources at grass root level all over the country. This includes skill upgradation through training of masons, carpenters, professionals and entrepreneurs. It will be appropriate to quote the example of Building Centre at Visakhapatnam set up by INSWAREB which has also organised a National Workshop on Fal-G, a product name given to the blend of flyash, lime sludge and phosphogypsum, which can be effectively used for manufacture of bricks, blocks ~ binder mix. The Fal-G technology is also effectively being used by the other building centres in the State of Andhra Pradesh thereby promoting the use of flyash.

CONCLUSION

There is an imperative need to produce more building materials for various elements of construction and the role of alternative *and* innovative options would come into sharp focus, considering the short supply, increasing cost and energy and environment considerations for traditional and conventional materials. The possibility of using innovative building materials and technologies, more so covering waste material like flyash have been considered as a felt need.

Series of institutional support for land, for land, finance, regulatory, media, marketing support, testing support and awareness creation would be needed and some of the existing initiatives would have to be substantially strengthened, more importantly, entrepreneurship for the production of appropriate flyash based walling, roofing and flooring materials including Portland Pozzolana Cement and other cements to achieve better strength, energy saving, conservation of natural resources besides cost efficiency, would have to be increasingly supported and developed.

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