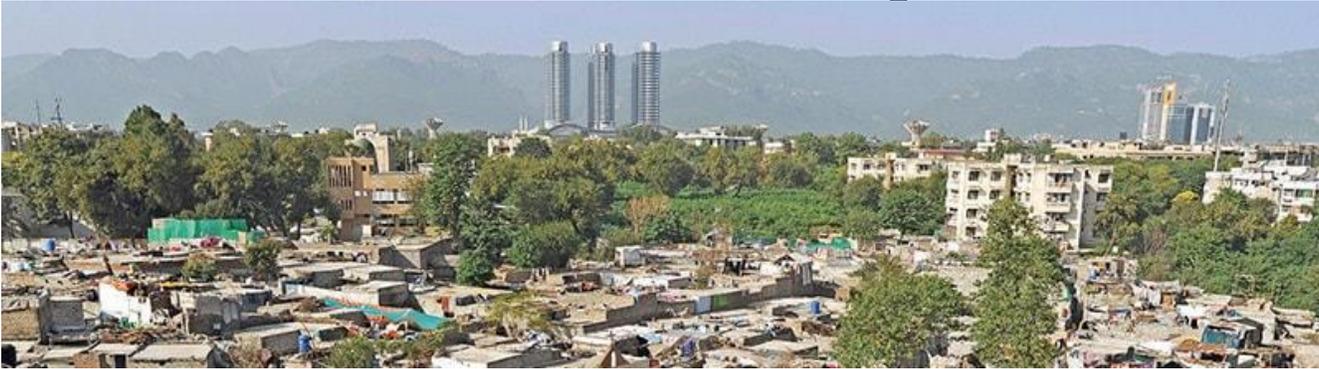


Slum Rehabilitation with Fast Track Construction Techniques



Islamabad slum

Introduction: Slum is an area with heavy population living in substandard housing which lacks basic and civics amenities. Urbanization, growing population and migration pressurizes cities leading to overflowing infrastructure, increase in urban poverty. The rehabilitation of slum is necessary to provide fair and affordable houses to slum dwellers.

1. Tunnel form Technique
2. Rapid wall Technique
3. Alu-form Technique

These techniques are described in following pages.

1. Tunnel Form Technique:

Tunnel form is a formwork system that allows the contractor to cast walls and slabs in one operation on a daily cycle. It combines the speed, quality and accuracy with the flexibility and economy of in-situ construction. Tunnel Form System brings speed, quality and accuracy to concrete construction and provides big savings in finishing and M&E works. Hi-tech technologies for steel formwork production make tunnel forms strong & durable. The system creates efficient load-bearing structures which are known as the most earthquake resistant structures. The result is a cellular reinforced structure, the surfaces of which are sufficiently high quality. It is particularly effective in projects suited to repetitive cellular construction such as residential blocks, hotels, student accommodation, barracks and prisons.

Main Features of Tunnel Form Technique are:

(A) According to its economic:

- Low cost adaptation to the other similar projects .
- It is managed by a limited number of highly qualified foremen, their assistants and regular workers and is also cost saving in labor cost.
- The cost of financing the construction capital is considerably decreased since it speeds up the construction period compared to the classical systems.

(B) Fast and reliable:

- It is a formwork system that allows the contractor to lay wall and slab concrete at a time.
- It can be laid up in the spans required by the project.
- It is the most reliable system, which is well known to be resistant against earthquakes and storms.

(C) Safe:

- It has integral working platforms and edge protection systems.
- In addition, the repetitive, predictable nature of the tasks involved encourages familiarity with operations, and, once training is complete, productivity improves as construction progresses.
- The minimal requirement for tools and equipment when moving the tunnel form further reduces the risk of accidents on site.
- It is fire resistant.

(D) High Quality:

- It ensures the correct application and the completion of the Project in start-up quality.
- It is possible to build up to 40 story buildings by laying the wall concrete a little thinner on upper story.
- Since the measurement errors are almost non-existent during the production, it provides convenience in the applications of precast facade wall and panel interior wall.
- Since very smooth concrete surfaces are obtained from the formwork surfaces, wallpaper covering and painting works are carried out by minimum costs such that there is no need for plastering after concrete.

(E) Environmentally friendly:

- It is known to be environmentally friendly as no wooden material is used.
- Heating and air conditioning costs are considerably less compared to the conventional buildings.

LIMITATIONS OF TUNNEL FORM TECHNIQUES:

1. It is not suitable for small projects, and if there are many variations in design.

2. High initial investment of formwork and other machineries.
3. Imported formwork, need 5 to 6 months early finalization of plan.
4. Need to design building suitable for system.
5. Due to speedy construction, high cash flow management required.
6. Basement storey cannot be constructed by using tunnel form work system.

Following are representation of tunnel form techniques:



2. Rapid Wall Technique:

Rapid Wall is a single panel walling system that serves as both the internal and external wall and eliminates the need for bricks, blocks, timber and steel wall frames and plasterboard linings. It is the most ecologically sound and technologically advanced building product available in the world today.

Rapid Wall is a prefabricated walling panel with broad construction applications. It is suitable for load-bearing walls for individual domestic cottages as well as for multi-story residential buildings formwork for suspended concrete floor structures and for most other purposes for which traditional building materials are currently used. Rapid wall is manufactured in a mounding process using glass-fiber reinforced, water-resistant gypsum plaster and water proofing additives.

All panels are up to 12 meters long and 3 meters high. The panels are cellular in form and 124 millimeter thick. The formed cells can be used to accommodate building services such as plumbing and electrical conduits or they can be filled with insulation, for increased thermal performance, or with concrete for increased load bearing structural capacity.

International Recognition of Rapid Wall Technique:

Designed and developed in Australia in the early 1990s Rapid Wall was awarded the prestigious "2009 Global Gypsum Product of the Year" award and was recognized as a "Good Practice" by the United Nations Habitat business awards for sustainable urbanization.

Environmentally Friendly:

In a process that will change forever the way buildings are constructed Rapid wall takes natural gypsum or by-product, chemical waste gypsum and turns it into a 12m x 3m glass-fiber gypsum plaster, single panel, load bearing walling system. It is 100% Recyclable and also the lowest energy embodied building product in the world today and is eligible for Carbon Credits.

Scientifically Tested:

In India Rapid wall has been rigorously tested by the University IIT Madras and certified by Structural Engineering Research Centre (SERC) for use in the construction of buildings in earthquake. In Australia testing has been undertaken by Adelaide University and University of South Australia. In China testing has been undertaken by the University of Hong Kong and the University of Tianjin, School of Civil Engineering in Shandong.

Sustainable Development:

The panels which are extremely strong lightweight, compared to other building methods, are ideal for a wide range of building applications from high-rise, residential, commercial and industrial building construction to low cost relocation housing. Windows and door openings and the panels themselves are pre-cut in the factory and delivered on-site, ready to erect. This reduces cost and significantly cuts down building time.

In the development of new low energy, low cost, environmentally and ecologically sound housing solutions for the 21st century Rapid wall is the ideal product for re-housing and for new housing or industrial construction.

Key benefits to the building industry:

1. Prefabricated Rapid Wall means faster overall construction time.



2. Reduced workforce means safer working environment.



3. Rapid Wall speed of assembly reduces labour costs.

4. Clean construction reduces potential damage and finishing time reduced radically.

5. Fire, cyclone, hurricane and earthquake resistant.

6. Water and rot resistant, termite resistant, sound resistant.



7. Rapid wall panels are 100% recyclable, virtually carbon neutral and environmentally friendly.



8. Eliminates the need for bricks, blocks, timber wall frames and plasterboard linings.

3. Alu-form Technique:

Alu-Form system is light-weight aluminium frames and latest innovation in building technology that makes the construction process faster with high degree of perfection. This helps highly consistent casting of external and internal walls, stairs, floor beams, columns, slabs and other parts of a concrete structure. Alu is a short form of aluminium and the technology is not only helps to merge the slab panels and walls into a seamless unit due to drastic reduction of form-jointed sections the final products are highly resistant to wear and tear or degradation.

This new method is cost-effective, eco-friendly, high-grade construction along with our continuing commitment to the principles and practice of sustainable development. The architectural designed and the pre-designed aluminum panels are used for all concrete elements of the building's superstructure. This technology helps to achieve high degree of design efficiency in all internal electrical fittings and plumbing work and also in the overall building plan. This reduces the possibility of plumbing and electrical failures.

Advantages of Alu-Form Technology:

- This method of construction involves efficient, flexible and lightweight materials.

- It cuts down the need for complex and messy brickworks, use of conventional and polluting construction.
- The technique one of the most environmentally friendly construction methods.
- This technology significantly reduces the possibility of asymmetrical aesthetics and construction irregularities and houses get sophisticated look and feel.
- Another major advantage of this technology is 're-usable' factor.
- Alu-Form technology does not require skilled labour and conventional construction materials. It is also ideal for the speedy completion of low-cost homes or flats.





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