Keynote lectures

Panel Buildings, Precast Or Conventional Low Cost Buildings, The Brazilian Experience and Reality

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Summary

At the end of 60 and during the years 70, Brazil has built 6.000.000 new houses and apartments of low cost, trying to suppress part of the existing deficit by that occasion. This has been possible due to new rules established by the military government in charge. We will show you our experience as Engineers, that have had a participation in this effort.

History

Brazil has inaugurated its new Capital (Brasilia) in 1960; in 1961 a new president was elected but resigned some months later and his Vice President (leftist) took his place. Three years later (1964), the Military forces took over and installed a new government.

From then, Brazil has had a tremendous development (up to 1980), always worried with the inflation that has grown to inconvenient levels with the construction of Brasilia.

This development pushed also the Construction Industry: some millions of new houses and apartments were built all over Brazil.

The basis for this construction boom has been the Habitation Finance System created in April 1964 and accomplished during 1965, using the experience obtained during the past year. It consists in a Fund that receives monthly deposits equivalent to 8% of the salary of each employee, paid by the employer. The employee, to buy his own house, could take a loan from this Fund, financed in 20 or 30 years. This kind of financing was used mainly by the lowerer classes; the medium class used more the Cooperatives, paying a little higher interest.

As Brazilian inflation by that time was around 30 or 40% a year, it has been necessary to introduce a monetary correction indexed to some parameters such as Living Costs, Construction Costs, etc. to keep a virtual currency that was used to deposits and draws on the Fund; this has worked fantastically up to the end of the seventies; the "Brazilian Miracle" brought to the country development rates (GDP) of 8% a year during 15 years (we had 11% in 1971, 12% in 1972 and 14% in 1973).

With the oil crisis from 1980 on, we have had a lot of problems: the inflation has grown, the development dropped dramatically; and of course the Politics have tried some "magic formulas" to fight this; they have chosen some solutions that went against the market laws, such as, e.g., to pre-index the inflation, and the plan went down in bankruptcy; today it means a deficit of USD 30 billion, banked by the government. So the Construction boom stopped, the Contractors have not invested anymore in this area, and the construction of new houses became very rare. Today we have a new Financing System based on the economic equilibrium that is our reality, with very low rates of inflation; our expectation is that we will have from now a good business to invest. We will be able to use our experience obtained on the seventies, adapted to the new technologies that came up during this period.

Construction Methods

During the epoch of the Brazilian Miracle, the engineers put their capacity to work. We needed some million of new houses and apartments to be built in a short period. The conventional way of construction would not be able to perform that; so came up the precast construction that was used already world wide.

Some contractors bought industrial plants for precast buildings (importing mainly from Europe, such as Camus from France and Farsura from Italy) and some created their own methods.

I will show you all the important methods used in the construction of those buildings; in some of them we have had personal participation as Structural Engineers. We will try to point out some important details; also the problems that have occurred and how they have been solved. You will see the evolution and the involution of the use of Panels for structural purposes, the comparison with conventional processes and the maintenance of the buildings.

We have started with cast in place panels, using metal forms; the evolution was the use of precast panels and then, partial concrete panels mixed to cast in place brick walls. Since the beginning the concrete slabs have been precast.

Conclusion

The low cost residential construction in Brazil became unliveable for funding reasons and almost stopped its activities. From now, with the new Financing Plan, we will have sufficient support to implement a valuable development again.

However we must keep in mind that our know-how on precast construction for residential buildings, will need to be adapted to the new technologies that came up during the last 15 years, having in mind that we still have a very low cost for the workmanship. The precast construction is only viable if the Contractor has an order to build a large number of units in the proximity.

Modern Building Activities in the Region of Moscow: Problems and Solutions

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Summary

Recent changes in Russian social and economic environments as well as their impact on town planning policy are discussed. The problems inherited from the command - administrative system, superimposed on a planning addressed-humanisation of built environment need urgent solutions which can now be reduced to three main points: new construction, based on modern human principles, abolishing of poor-quality mass panel buildings; saving and reconstruction of few-storey masonry buildings. The last problem is given a complex consideration in terms of feasible methods of reconstruction, allowing for their technical social city planning, architectural and financial aspects.

Keywords: city planning, existing buildings, addressed humanisation, built environment, reconstruction.

Presentation

Recent social and economic changes in Russia have led to reforms in town planning policy. For several decades it had reflected the processes, pertinent the command-administrative political system. At present, in the framework of developing market economy, new dynamic requirements to architecture and town planning, including space forms and structural systems, high-quality materials and built environment as a whole, should be met.

The new policy has to be conducted under a number of unfavourable factors, such as relatively low wage of the majority of population, still operating out-of-fashion panel producing plants, high rate of automobilisation, absence of living areas for citizens' re-accommodation from reconstructed blocks of flats as well as a lack of centralised financing etc.

Modern town planning in Moscow allows for most of these conditions; the document named "Major Goals for Town Planning in Moscow and Moscow Region till 2010" has outlined a programme of key social, economic and ecological problems of the mega-city to solve, aiming at

an increase in Muscovites' living standards. The problems mentioned need a complex solution in terms of both new construction and reconstruction of existing buildings.

A principle of "addressed humanisation of built environment" has been used as a basis for the new construction. Special attention has been paid to high architectural qualities of districts and flats, providing also all kinds of services, new jobs nearby etc. However the new rather expensive construction may provide but partial solution of the housing problem. Principal merits can be achieved by means of complex reconstruction as a triple task: to intensify city area utilisation; to upraise quality of existing buildings; to form sufficient areas for the re-accommodation.

It should be pointed out that most prestigious now zones of Moscow were developed during the "housing boom" of 50s and 60s and built by five-storey blocks of flats, made of prefabricated panels as well as of masonry. Living area of the zones reaches 20 million square meters, i.e., one ninth of the total one. These zones possess a complete city infrastructure: transport and supply systems, service objects, etc. A total cost of the territories is higher than the cost of poor-quality buildings themselves, many of which, by the way, have been badly maintained. Thus, the decision to abolish these blocks of flats has been made. However, the majority of the masonry "five-storeys" have been in a good condition, so their complex reconstruction is reasonable.

At first stage four methods of the reconstruction have been put forward, as follows:

1) superstructures and mansards on the masonry buildings
2) the same on a platform over the masonry (or the abolished panel) building
3) secondary building, expanding width and height of the existing one
4) parallel construction near the existing "five-storey".

The parallel construction promotes an application of traditional industrial construction potential. So called "starting" multi-storey (>10) panel blocks of flats are erected near the existing building to house its residents. Traditional type buildings are being built as the "starting" ones so far; however, it is clear that advanced high-quality projects should be applied in this case.

Reconstruction without the re-accommodation can be fulfilled according to 1) and 2). The first one is effective in elite zones of dense buildings, provided the bearing structures and foundation are of sufficient strength to bear extra 2-3 storeys. However, the increase of population in a district because of the reconstruction leads to overloads on supply systems, needs extra parking and sports areas, etc. A special study of the problem carried out at Moscow State University of Civil Engineering(MSUCE), aimed at a solution of this new complex task, including: optimal density of buildings and population; ecological expediency of the project; ultimate loads on existing structure and foundation; improved roof durability; reconstruction technique (without re-accommodation); illuminance, insulation, aerodynamics, noise regime, fire-resistance influence on architectural and planning parameters of the modernised buildings with superstructures and mansards; providing and modernising supply systems, areas for parking, waste elimination, etc. The analysis showed that effectiveness of the method is the higher the more active municipal investments. The results may be used as a base for design, legislative and technical standards as well as for cost determination (per 1 square meter).

The method of reconstruction, utilising reinforced concrete platform as a basement for the superstructure, seems very attractive in terms of private investments. After superstructure erecting and tenants' re-accommodation, the existing privatised panel "five-storey" can be dismantled and replaced with a high-quality building. Whether the superstructure is erected on a masonry building, either it or the building can be privatised depending upon the contract conditions.