

**Zeitschrift:** IABSE reports = Rapports AIPC = IVBH Berichte  
**Band:** 77 (1998)

**Artikel:** Panel buildings, precast or conventional low cost buildings; the brazilian experience and reality  
**Autor:** Valle, Gilberto Do  
**DOI:** <https://doi.org/10.5169/seals-58172>

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

**Gilberto DO VALLE**  
Civil Engineer  
Project Cons. e Proj. S/C Ltd.  
Rio de Janeiro, BRASIL

Gilberto do Valle, born 1932 received his civil engineer degree from the Catholic University of Rio de Janeiro in 1954. He is the founder and head of Project Consultoria e Projetos S/C Ltd, a civil engineering consulting firm, with more emphasis on structural projects.

### 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.