PRE-CAST CONCRETE CONSTRUCTION IN BRAZIL

Concrete precast industry in Brazil is mainly dedicated to the production of structural components such as beams, columns and pre-stressed slabs.

Façade precast compounds production is still in development. In terms of facade solutions we consider that there are very few companies capable of developing “tailor made” components in precast concrete in Brazil.

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BRAZILIAN CONSTRUCTIONS STANDARDS

REGULATION

In regard to precast concrete structures the main local regulations are:

- NBR 9062 - Design and Execution of Pre-cast Meshes (1985) – Establishes rules for Design, Production and Quality Control of Precast and Precast Concrete;

- Other international standards are used in Brazil as reference for the production of prefabricated concrete facades, such as ACI 533R from the American Concrete Institute - Guide to Prefabricated Wall PanelsTechnical Report Precast concrete industry in Brazil Version 17th April 2018 4 (1993) and BS 7543 from the British Standard Institution - Guide to Durability of Buildings and Elements construction, products and components (1992);

- In the case of GRC panels - NBR 15306 (2005) - Prefabricated products of glass-fiber-reinforced building materials, which establish the requirements and criteria for the production of mortars and the methods of testing final products;

- NBR 6124 - Water absorption test;

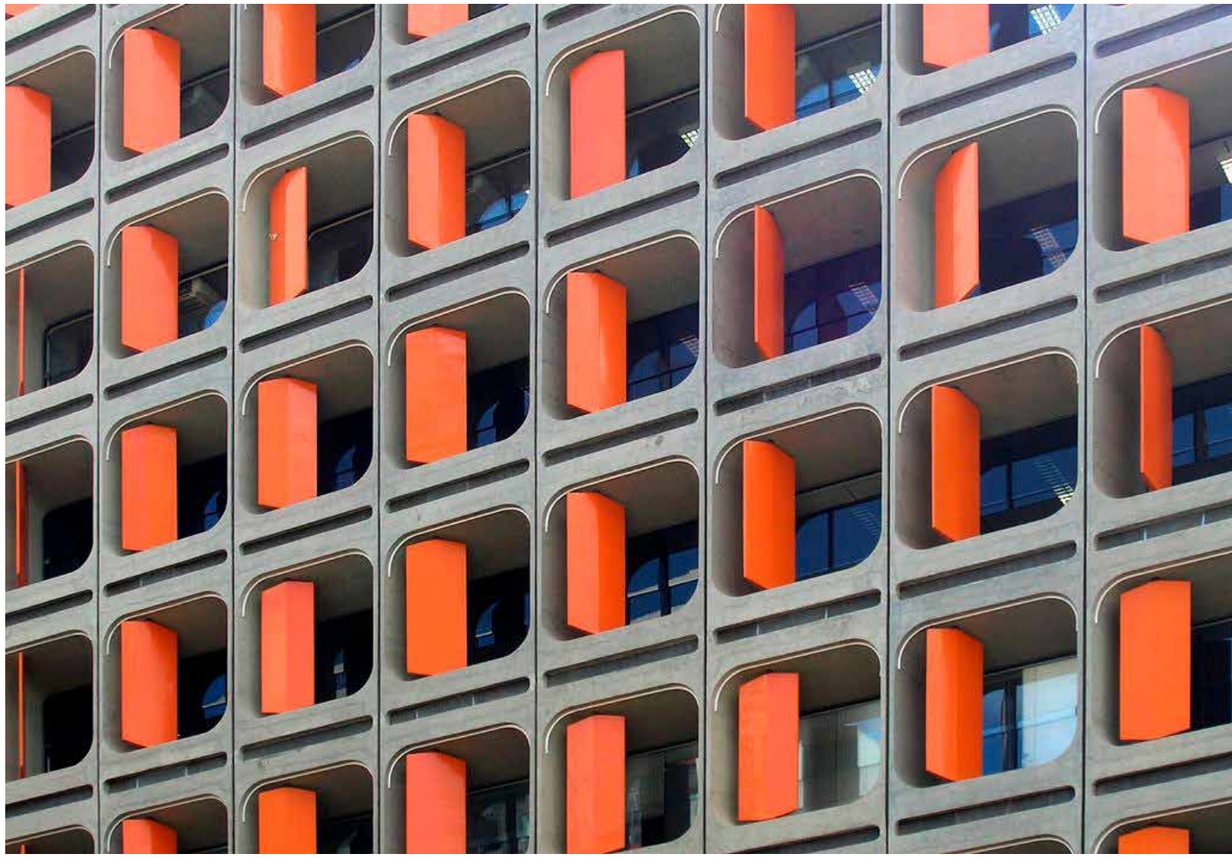
- NBR 12655 - Portland Cement - preparation, control and receipt;

- NBR 6.118 Design. Structural. Plain concrete. Reinforced concrete. Prestressed concrete. Concrete.

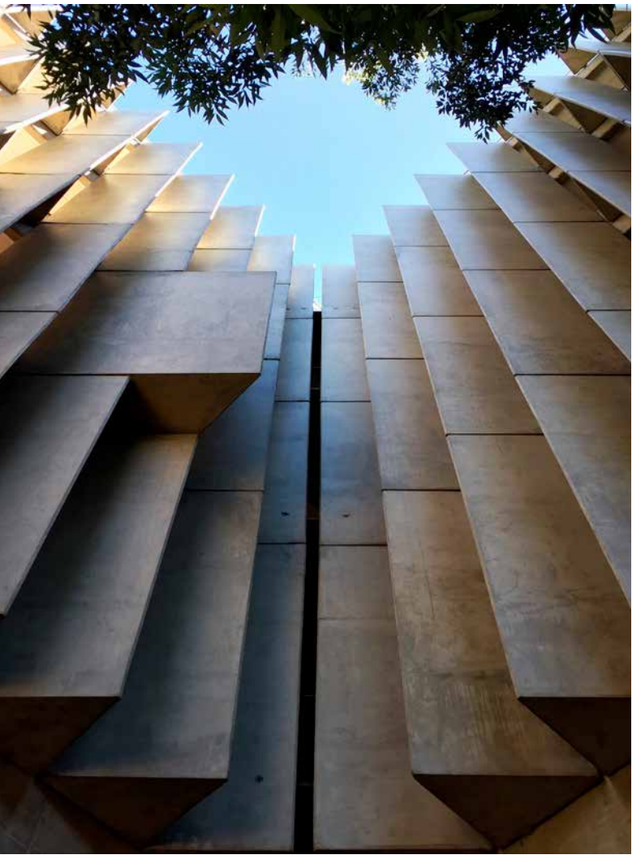
TRANSPORTATIONS ISSUES

it important to observe that in Brazil there are some limitations in regard to the transportation. In this case both the Brazilian Traffic Code and the Industry responsible for production shall be consulted.

It is especially important to observe regulations in regard to maximum dimensions and weight of trucks. Attention must be given to the fact that the total height of loaded trucks should not exceed the maximum of 4 meters to avoid issues when crossing under bridges. Moreover, trucks that are too large or too long may have traffic restrictions to circulate in Brazilian highways.



Morro Vermelho Building's Façade, Brasília



DENIT Brasília Headquarters' Intern Façade
cover image

EVOLUTION OF BRAZILIAN MARKET

Some preliminary cases of precast - beginning of the1960s/1970s;

- "Brazilian Miracle" – Brazil, the country of the future - investments in new technologies;
- Beginning of the 80s:
  - Execution of a great number of Industrialbuildings;
  - Prefabrication is starting to be known in theconstruction market;
  - Consolidated use of folded plates roof elements;
  - Equipment importation to be used in the production of hollow core slabs;
- Due to the good performance of the system at the end of the 1980s, the use of precast slabs had started in housing (beam-block slabs, hollow core slabs, floor-plates and massive slabs);
- Early 1990s – Hollow core slabs used in buildings greater than three floors, trying to extend the span capability;
- Construction speed, organization, practicality, economy and architectonic identity standardization – large use in the supermarket sector;

Finishig Possibilities. Cortesy by STAMPA.

BRAZILIAN MARKET NOWADAYS

- Consonance with architectonic liberty.
- Hollow core architectonic panels versatility.
- Vertical buildings (multi-storey buildings).
- Mixed structures.

- Last 8 -10 years precast façade = architectonic sophistication.

- Today, the Brazilian precast market is capable of offering a complete system, that goes from the structure to the façade.

TYPES OF STRUCTURAL SYSTEMS NOWADAYS

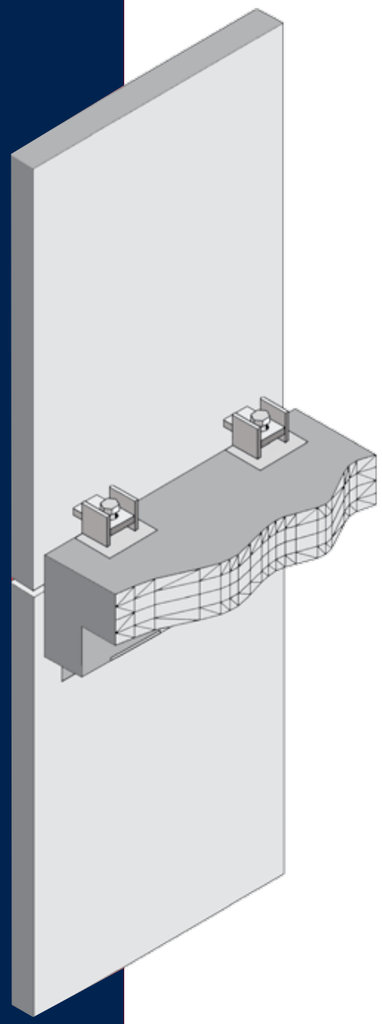
- Frame systems where stability is provided either by the cantilever action of the columns and its foundations by moment resisting connections or by flexural and shear continuity in the frame members. The floors and roof can act as diaphragm (FIB Handbook).

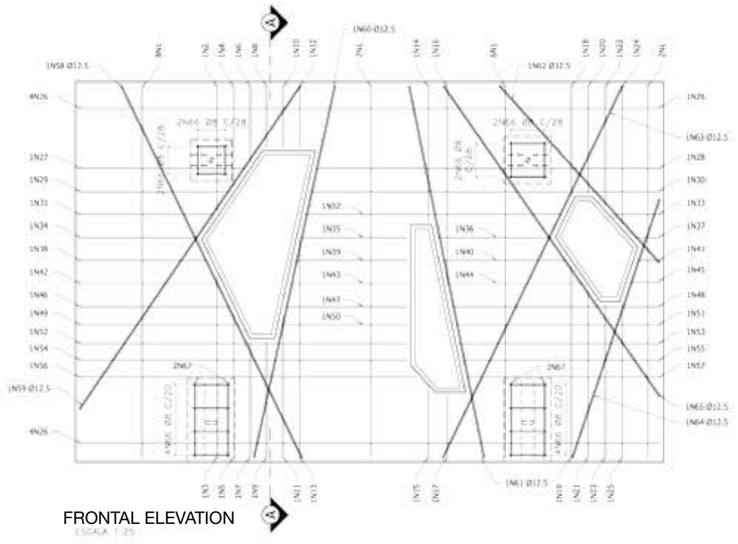
- Braced skeletal structure. Stability is obtained by shear cores, shear walls, etc.

- Bearing walls and/or facades.

- Structural masonry combined with hollow-core, massive floors, beam-block floors and reinforced composite floors.

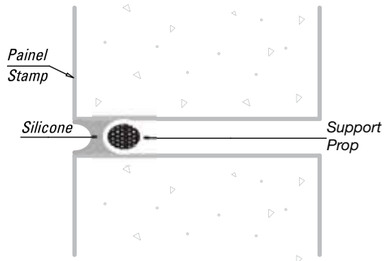
Camargo Corêa e Morro Vermelho Buildings, Braília.



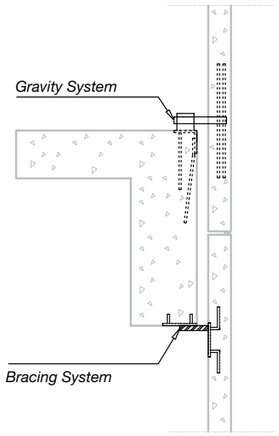


FRONTAL ELEVATION

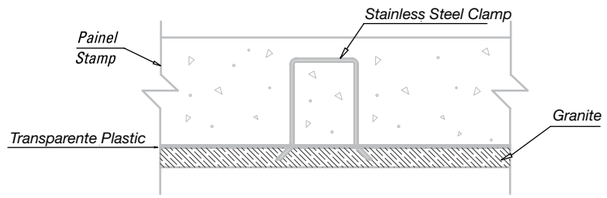
GROUTING



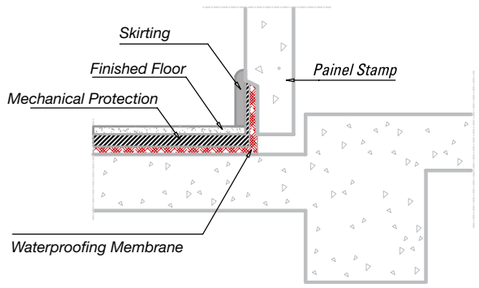
FIXATION SYSTEM

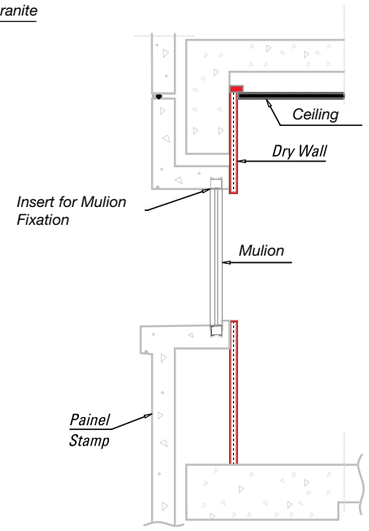


FIXATION ON GRANITE DETAIL



TYPICAL DETAIL FOR WATERPROOFING





Typical Details. Cortesy by STAMPA.

TYPES OF CONNECTIOS USED FOR MULTI-STOREY BUILDUNGS

FOUNDATIONS TO COLUMNS

- Pocket foundation with concrete joint;
- Projecting bars;
- Base plate (welded or not);

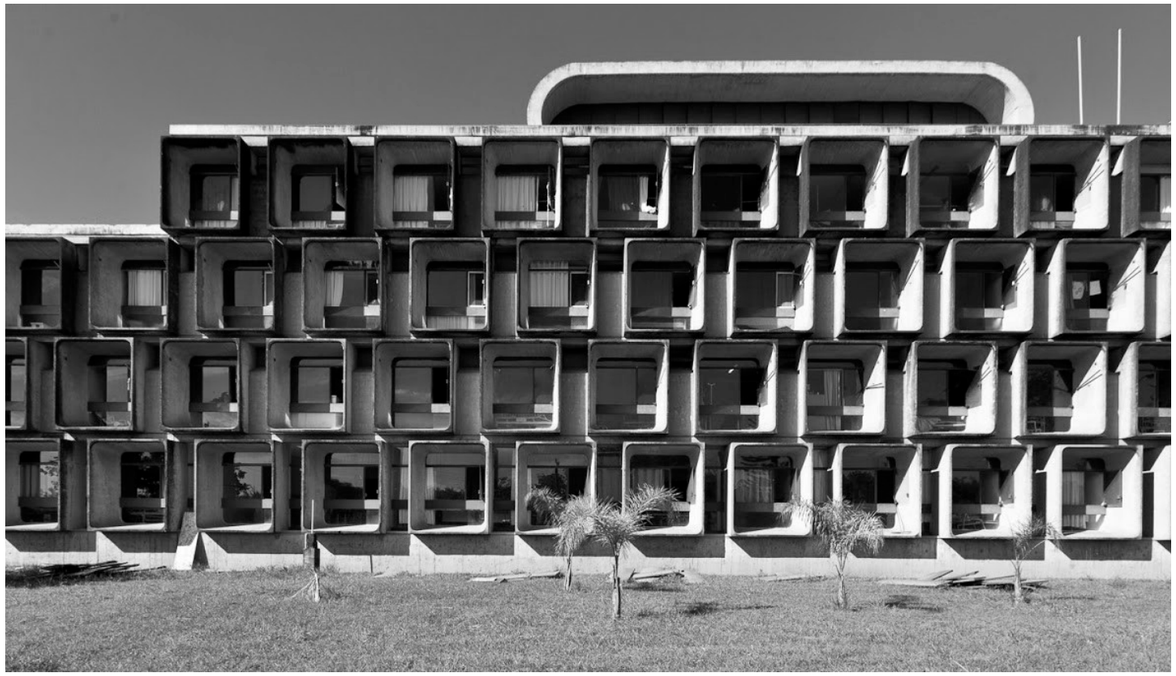
COLUMN TO COLUMN:

- Projecting bars;
- Base plate (welded or not).
-

BEAM TO COLUMN:

- Bolt or grouted dowel;
- Protruding reinforcement bars;
- Welded connection plate (steel plates).

Taguating hospital, Brasília.



FURTHER INFORMATION:

Specialized Reference Industry Institutions

There are two main institutions specialized in precast concrete construction, as follows:

IBRACON
http://www.site.ibracon.org.br

Associação Brasileira de Construção Industrializada ABCIC
http://site.abcic.org.br

Structural Precast Industry Suppliers

There is a great number of Brazilian suppliers for precast concrete components, but only a few will be able to develop facade panels. Some are listed below:

https://www.protendit.com.br/produto/1

http://www.leonardi.com.br/painel-de-concreto/

http://www.rotesma.com.br/produtos.html

The 3 suppliers listed above produce only flat panels and need to be consulted to check their interest / flexibility / technical capability to develop and produce a special facade element.

Among the firms, STAMP is capable of developing a facade precast solution:

http://www.stamppfa.com.br/