

REINFORCED OR PRE-STRESSED CONCRETE SEMI-PREFABRICATED
BUILDING STRUCTURE

OBJECT OF THE INVENTION

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The invention relates to a structural system conceived for reinforced or pre-stressed building structures formed by semi-prefabricated beams and inferior arrangement concrete reinforcements and slabs having an edge
10 thickness in the order of 4 to 5 cm assembled with plates and pillars by means of a planking platform secured to the pillar planking or to the pillar itself.

This form of attachment provides an economic solution for any type of structural tie, either straight, angled,
15 non-aligned, or for hanging, edge, or corner beams, or yard, or three or four beams, etc.

This structural system is of a universal character in regard to use, serving for houses, commercial galleries, car parking buildings and industrial buildings, with or
20 without a false ceiling and with a plastered, directly painted or visible concrete finish.

BACKGROUND OF THE INVENTION

25 The currently used systems for building structures are classified in three types:

- unidirectional,
- reticular and
- prefabricated.

30 The unidirectional framework or structure is the most extensively used for block buildings or single-family houses, and it is based in the use of girders or slabs to form the framework; since they transmit their loads in one single direction, they are known as unidirectional.

35 The girders transmit their load to the beams, which in

turn transmit the whole weight to the pillars and through these to the foundation. At present, this is the least expensive house building system.

5 Reticular frameworks are different from the above in that they transmit their load in two directions, forming a reticule with their load nerves. The loads are finally transmitted to the pillars through this reticule. They are used particularly for office buildings, car parking buildings and commercial centers, and allow for more
10 spacing between the pillars than with girder and slab frameworks. This system is now starting to be competitive in price, in relation to the unidirectional system, as from 7-meter spans between pillars.

Prefabricated frameworks are presently used for large
15 commercial centers and car parking buildings. Although they are more economical, they present a drawback in that the grid formed by the pillars must have a very regular shape which does not allow for great architectural design variations.

20 In order to perform a girder and slab unidirectional structure, which is the least expensive and most adaptable to architectural requirements involving 4 to 6 meter spans, the location of the house pillars are first laid out on the floor, then the planking is put in place
25 and the pillars are filled with concrete.

The pillar planking is removed the next day, and the planking of the main load beams is started. The planking consists in placing two wooden or metal beams (crosspieces) parallel to the future beam and separated
30 80 to 100 cm from each other; panels are then placed on top of these two crosspieces to form the bottom of the beam planking. The crosspieces are suspended in the air by means of metal struts installed in pairs every one meter. In order to avoid movement, the planking is
35 secured to the pillars, and iron rods are then installed



in one pillar after the other.

The structure is completed by means of girders and slabs which rest on one beam panel and reach out to another beam panel to cover the whole previously empty surface in order to complete the structural plate. The girders must be propped-up every meter and a half or so, since they are not self-supporting.

The edges of the structural plate require that metal or wooden partitions be placed over the panels which form the bottom of the edge beams, so as to give the structural plate perimeter its shape and serve as an on-site mold for the concrete poured over the plate.

Before pouring on the concrete, steel members for supporting the structure's negative flexion moment and a mesh are installed in order to join the whole plate together. The pouring of the concrete completes the execution of a floor structure.

The crosspieces and panels may be removed three days later, although the plate struts must be left in place up to 28 days, after which all the material is removed, the plate being ready for masonry work.

The applicant is not aware that a system similar to the one proposed is in use, at least on the basis of the inventor's five year experience in structure design and calculations and from data obtained from documentation used in companies engaged in building structures.

DESCRIPTION OF THE INVENTION

The innovation of the invention lies in combining a series of known classical elements which determine certain new effects which allow for greater speed in the execution of the structure and savings in planking material, thus reducing the price of the structures and consequently of the house.



This structural system for reinforced or pre-stressed concrete building structures is formed by semi-prefabricated beams with reinforcement and concrete slabs that are coupled onto the plates and pillars by means of
5 a planking platform secured to the sheet of the pillar or to the pillar itself.

The semi-prefabricated beams rest on a planking platform located in the proximity of the pillars, and absorb all the defects in regard to tolerance and laying
10 out at the work site.

The framework and even other load beams rest on the slab or sole of the semi-prefabricated beam; the framework may be formed by a slab with nerves or by the pre-stressed type provided with a ceramic, concrete,
15 porexpan, etc., slab.

The platform around the pillars may be created before removing the planking from the pillars (the concrete may even be poured into the pillars and the framework simultaneously).

20 Said platform anchored to the pillar's planking or to the pillar itself offers different construction solutions, and may be made of wood, plastic, metal plate, etc., to form a classic planking panel.

The structure's horizontal movement or bending is
25 completely avoided by means the pillars previously filled with concrete or by the pillar planking duly adjusted, plumb lined and propped-up.

The semi-prefabricated beams which rest on the platforms of two adjacent pillars are fitted with spaced
30 struts which support their own weight and that of the framework resting on the slab or inferior sole. The framework may or may not be provided with joists, depending on the type used.

The edge beams may have one of its sides fully finished
35 with the same edge as the structure plate, thus avoiding



the planking with partition at the work site. Finishing partitions are needed only in the proximity of the pillar and on the framework platform.

5 In classical beam and summer structural systems and unidirectional frameworks, the planking is removed once the concrete has been poured to form the pillars.

10 With this new system, the pillar planking construction may be used for supporting the prefabricated beams; said planking is not removed until the second or third day after pouring the concrete on the floor.

The pillar planking incorporates a height adjustment element to aid in the planking removal and in the adjustment of the floor height.

15 On removal of the planking, no material is damaged after being let down from the ceiling onto the floor, as in the case of classic summer plankings, and also the floors will be much less fouled-up; if semi-prefabricated frameworks are used, no slab pieces, metal strips, plastic pieces or pallets will be found laying around.

20 The greater execution speed, as compared to classic unidirectional summers and frameworks, results in a 30 to 50% reduction in the time currently required (depending on the type of forging used).

25 If the structure is used in a house that requires the beams not to protrude under the framework, a false ceiling must be installed, and this favors the design of facility and air conditioning installation. The cost of false ceilings is Pts. 600.- per m², comparable to stucco and plaster finishing. The proposed structural system
30 has a cost below Pts. 600.- per m², so therefore it should be readily acceptable in the market.

The advantages provided by the invention include time saving in planking operations, and therefore increased execution speed, solutions for all kinds of architectural
35 constructions of the structural plate (angle, hanging,



edge and support beams, elevator ducts, yards, projections, slants, etc.), tidiness at the work site, saving in nails and wood, time saving in planking removals in view that no planking panels and beams are involved, longer plank mold life in view that material damages are avoided during planking removals, and safer conditions provided to the planking installer.

DESCRIPTION OF THE DRAWINGS

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In order to complement the description set forth and to help in providing a better understanding of the characteristics of the invention, a set of drawings is attached to this specification, being an integral part thereof, wherein the following is represented in an illustrative and non-limiting character:

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Figure 1 is a semi-prefabricated beam comprising a reinforcement, a concrete slab and a slab-type framework with nerves.

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Figure 2 shows a pillar planking with work platform.

Figure 3 shows a semi-prefabricated beam with reinforcement and concrete slab over which rests a load beam.

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Figure 4 shows a semi-prefabricated beam resting in the two adjacent pillar platforms fitted with struts positioned at a given spacing in order to withstand the weight of the semi-prefabricated beam.

Figure 5 shows a meeting point of two beams, the pillar and the framework.

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Figure 6 shows an edge beam.

Figure 7 shows a meeting point of the edge beam, the framework and respective finishing and pillar partitions.

Figure 8 shows a meeting point of the beam, the frameworks and the finishing and pillar partitions.

35

Figure 9 shows a meeting point of a hanging beam,



another beam of a larger edge and a pillar.

PREFERRED EMBODIMENT OF THE INVENTION

5 In the light of the figures, it is evident that the invention consisting in a reinforced or pre-stressed concrete semi-prefabricated structure for buildings is composed of a horizontal planking platform (1) positioned over the planking (2) of the pillars or on the sides of
10 the pillars on which concrete has already been poured designed to support the semi-prefabricated beams (3) and framework (4), said semi-prefabricated beams (3) being formed by steel louvers or joist hangers (5) with a concrete slab or sole (6) on their lower part.

15 Over the concrete slab or sole (6) rests the framework (4), which may be of any currently known type and may also serve to support other load beams (7).

 The semi-prefabricated beams (3) resting on the platforms (1) of two adjacent pillars are supported by
20 struts (8) positioned at a given spacing, designed to withstand their own weight and that of the framework (4) resting on the lower slab or sole (6).

 The semi-prefabricated beams may be edge beams (3') which show an inferior L-shaped slab (6') positioned in
25 its lower surface and which covers one of the sides.

 The finishing is performed around the pillars using partitions (9) and wood over the planking platform (1).

 The pillar plankings incorporate a height adjustment element (10) to aid in the planking removal and the
30 adjustment of the floor height.

 This description need not be more extensive for an expert on the subject to understand the scope of the invention and the advantages deriving therefrom.

 The materials, shape, size an arrangement of the
35 elements are liable to variation provided the essence of



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the invention is not altered.

The terms used in the description of this specification must at all times be taken in an ample and non-limiting sense.

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CLAIMS

1. Reinforced or pre-stressed concrete semi-prefabricated building structure, essentially
5 characterized in that it is composed of a horizontal framework platform (1) positioned over the planking (2) of the pillars or on the sides of the pillar on which concrete has already been poured and designed to support the semi-prefabricated beams (3) and framework (4), said
10 semi-prefabricated beams (3) being formed by steel louvers or joist hangers (5) with a concrete slab or sole (6) fitted on the lower part thereof and over which rests the framework (4).

15 2. Reinforced or pre-stressed concrete semi-prefabricated building structure according to the previous claim, characterized in that the semi-prefabricated beams may be edge beams (3') provided with an L-shaped lower slab (6') positioned on its lower
20 surface and which covers one of the sides.

3. Reinforced or pre-stressed concrete semi-prefabricated building structure according to claim 1, characterized in that it comprises finishing pieces
25 around the pillars which consist in partitions (9) located over the horizontal framework platform (1).

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MODIFIED CLAIMS

(Received by the International Office on August 26, 1996
(26.08.96); claims 1-3 are replaced by modified claims 1-
5 2 (1 page)).

1. Reinforced or pre-stressed concrete semi-
prefabricated building structure comprising semi-
10 prefabricated beams (3) formed by steel louvers or joist
hangers (5) with a concrete slab or sole (6) fitted on
the lower part thereof, essentially characterized in
that:

- a horizontal framework platform (1) positioned over
15 the planking (2) of the pillars or on the sides of the
pillar on which concrete has already been poured allows
pillar laying out errors and semi-prefabricated beam (3)
length fabrication errors to be absorbed,

- the semi-prefabricated beams (3), resting over the
20 platform (1),

- framework plates (4) consisting in a slab with nerves
which rest on the semi-prefabricated beams (3),

- finishing partitions (9) positioned over the
framework platform (1) and around the pillars.

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2. Reinforced or pre-stressed concrete semi-
prefabricated building structure according to the
previous claim, characterized in that the semi-
prefabricated beams which rest on the platform (1) can be
30 edge beams (3') with a lower L-shaped slab (6').

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STATEMENT UNDER ARTICLE 19

- 5 - Claim 1 has been modified, incorporating as state of
the art those aspects previously claimed which are
contained in document FR 2056732 and which refer to a
definition concerning the forming of the semi-
prefabricated beam. Therefore, in page 10, line 4,
between "... building" and "essentially characterized
10 ..." the following text is added: ..."comprising semi-
prefabricated beams (3) formed by steel louvers or joist
hangers (5) with a concrete slab or sole (6) on its lower
part"...
- 15 - Claim 1 is re-structured by mentioning the originally
described elements which constitute the semi-
prefabricated structure, with a few clarifying phrases
concerning the function associated to the elements
forming it and its interdependence with the rest of the
20 elements (phrases included in the description), providing
the intended assembly concept throughout the description
of the invention and which the initially presented claim
1 did not reflect.
- 25 - Claim 1 includes the contents of claim 3 originally
presented.
- Claim 2 is re-defined in other terms, its main content
remaining unaltered.
- 30 - Claim 3 has been removed and its content incorporated
to claim 1.

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