

Service Area in Large Panel Construction

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SYNOPSIS

Service area in large panel prefabrication presents special problems on account of variation in layout and typical plumbing fixtures. Various Systems in vogue, in the west, have given different solutions. But due to fundamental differences in the living pattern, these solutions are not applicable in our country. Keeping this in view, a systematic study was undertaken to evolve a suitable solution. The planning, production and assembly aspect of the scheme proposed are described here.

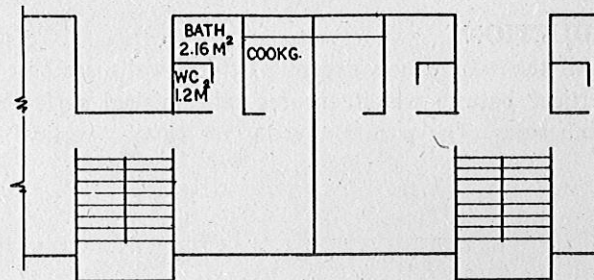
LARGE panel construction is a well accepted practice in European countries and has been adopted for mass-scale construction. It offers faster construction, reduced labour force and reduction in self weight of the building by about 25 per cent. At the Central Building Research Institute the on-site battery casting (1) for the production of large concrete wall/floor elements has been developed. An economical mass housing system of construction suitable for tropical countries has also been worked out in which the internal walls and floors are precast concrete panels, while the facade walls are insitu brick work.

Service area in large panel construction presents special problems on account of variation in layout and typical plumbing fixtures and appliances. In other countries special techniques like wet walls and heart units have been developed for the installation of services. In wet wall system, all the water supply pipes, waste pipes and ventilation ducts are accommodated in a single, factory finished prefabricated wall unit (2, 3). Sanitary appliances in each dwelling are as a rule located along the wet wall for direct connection. The wet walls may be of reinforced concrete with plaster board panels. The heart unit (4, 5) is a fully fabricated three-dimensional service unit. These units contain all sanitary appliances and are delivered at site completely prefinished. Sometimes the heart unit contains kitchen platform also. The units are produced in mechanised factories and require complex moulds.

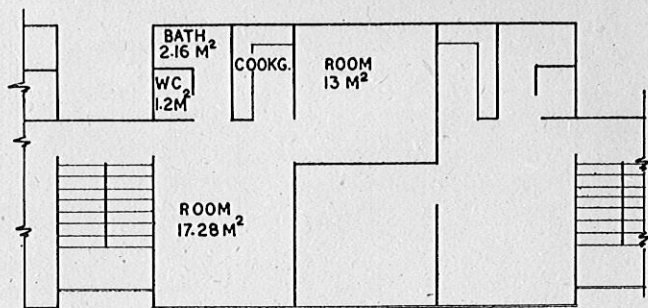
In view of the difference in living pattern and types of appliances used, the methods described above are not directly applicable in Indian conditions. As such a systematic study was undertaken to evolve a simple and economical solution.

Keeping to standardisation, typification of components and space requirements from functional consider-

ations, typical plans should be evolved which are prerequisite of a prefabricated system of construction. A number of plans for different categories of housing have been prepared and two typical plans are shown in Fig. 1. It will be seen that kitchen bath and water closet have been grouped together into a service unit, which besides economy in space leads to reduction in



BLOCK OF ONE ROOM DWELLINGS



BLOCK OF TWO ROOM DWELLINGS

NOTE: ALL DIMENSIONS ARE IN CMS.

TYPICAL PLANS USING STANDARDIZED SERVICE FLOOR PANEL
C. B. R. I. ROORKEE

FIG. 1

the cost of water supply and sanitary installations. In planning of the service unit care has been taken that the water closet and bath room have no direct communication with the kitchen. The standard service unit is shown separately in Fig. 2. For vast majority of construction, this unit can be adopted, however, for higher categories of houses, it may be suitably modified.

The details of the standardised service unit are also shown in Fig. 2. The internal load bearing cross walls and the facade walls are 12.5 cm. thick and the front longitudinal wall which forms internal wall of the house is 10 cm thick self load bearing. The thickness of partition wall is 5 cm. The floor slab is 12.5 cm thick with floor traps, W.C. pan and waste pipes embedded in it. A floor trap is provided in the kitchen to collect water from the sink as well as kitchen floor. The water is taken to the bath room trap through a 50 mm dia waste water pipe. The combined flow is then taken through a waste branch of 75 mm dia to the vertical stack provided on the facade wall. Water closet is connected to the main stack through P-trap and 100 mm dia. pipe. Single stack system of plumbing has been adopted, which results in considerable saving in the overall cost of piping (Fig. 3).

PRODUCTION

All the wall panels except partition walls are cast in vertical battery which ensures self finished surface on both sides. The partition walls are cast in vertical

on both sides. The partition walls are cast on tilt mould. In the absence of tilt mould, they may be cast on horizontal platform and shitable strengthening devices may be fixed on them to take care of the handling stresses at the time of lifting from the casting platform.

For casting the service panel floor, a masonry platform with concrete topping is made with a profile to accommodate kitchen trap, waste water pipe and WC pan and P-trap assembly (Fig. 4). Side shuttering is hinged with the platform for ease in assembly and demoulding. To ensure quick and easy release of the cast slab, a thin coat of wax emulsion is applied over the casting platform (6). Before every casting mould oil is applied over it. The reinforcement cage is placed in position and then all fittings are properly arranged and jointing done. Then concreting is done in one operation. Different stages of casting are shown in Fig 5 (a & b). After 7 days of curing, the slab is jacked up to break the bond (Fig. 6). It is then lifted and stacked properly in horizontal position for further curing.

ASSEMBLY

The wall panels are placed in their respective positions with the help of a crane. The load bearing cross walls and longitudinal walls are each supported by two props before the crane is relieved. The props are subsequently used to bring the panels to true plumb. For partition walls these inclined props cannot be used due to limited space. For this purpose plumbing cum

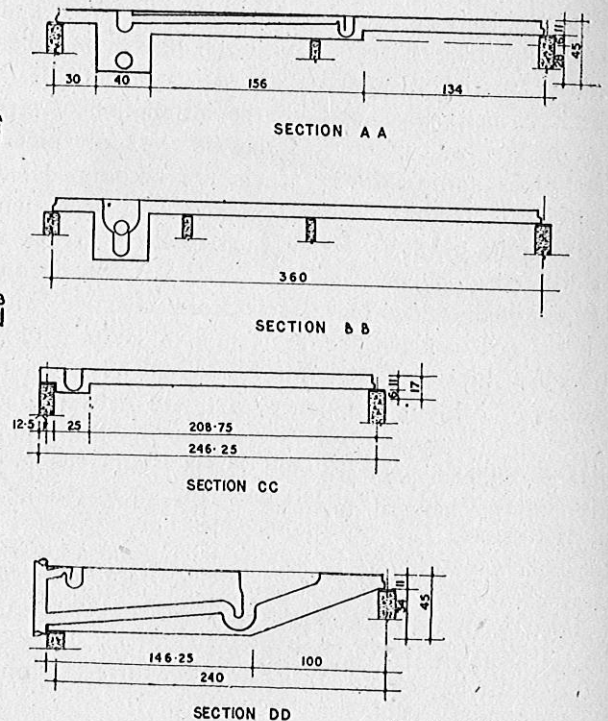
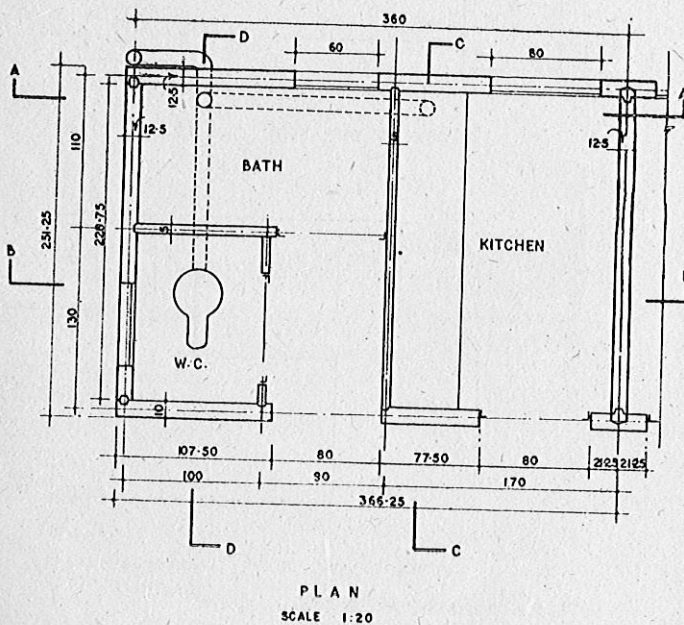


FIG 2. TYPICAL STANDARDIZED SERVICE FLOOR PANEL FOR LARGE PANEL HOUSE C.B.R.I. ROORKEE

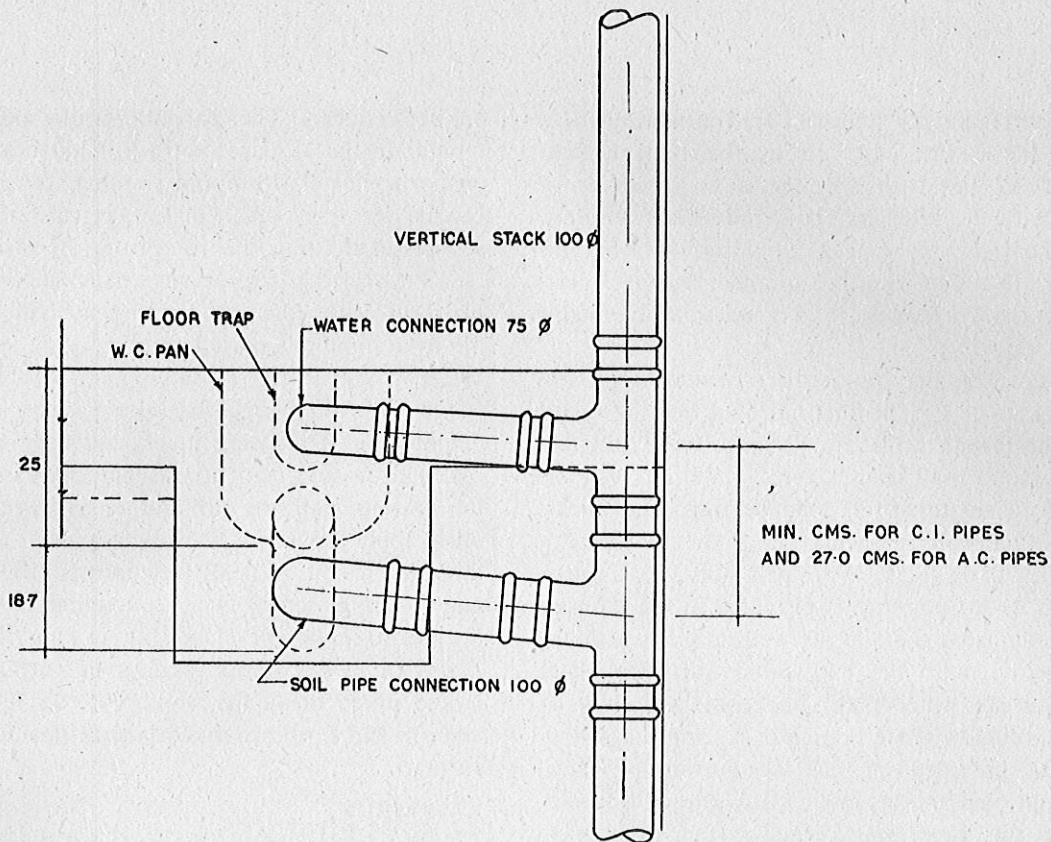


FIG.3 EXTERNAL ELEVATION OF SINGLE STACK

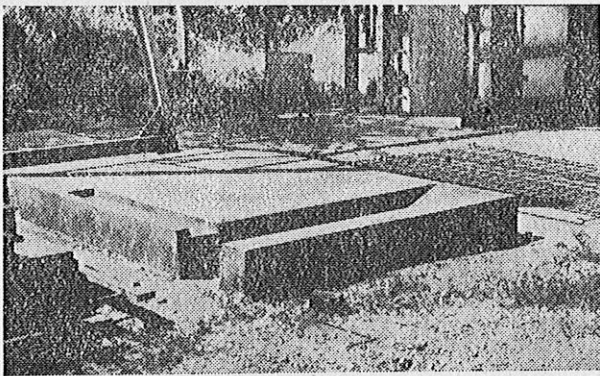


FIG. 4 CASTING PLATFORM

bracing gadgets designed and fabricated at the Institute are used. These gadgets are fixed on the top edge of the panel. The protruding steel bars provided in the panels at the top are welded by putting additional steel bar to join adjacent panels. Partition walls are welded at the bottom also. The floor slab is then placed on the walls and all the vertical and horizontal joints concreted.

A two bay prototype construction has been put up at the Institute. Different stages of construction are

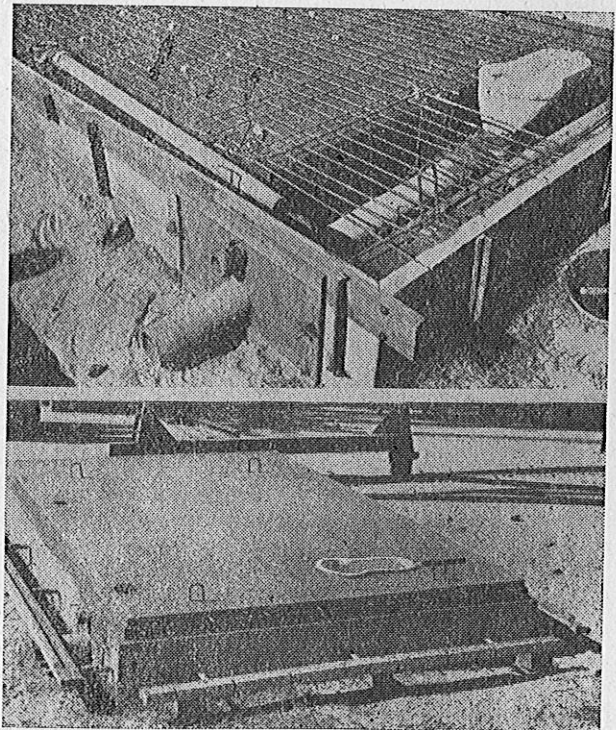


FIG. 5(a) TOP, REINFORCEMENT CAGE AND PLUMBING FIXTURES IN POSITION, 5(b) Bottom CASTING DONE, SIDES OPENED

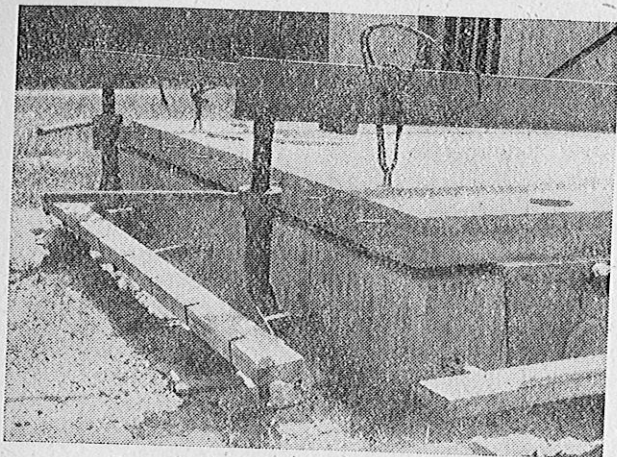


FIG. 6 FLOOR SLAB RELEASED FROM PLATFORM

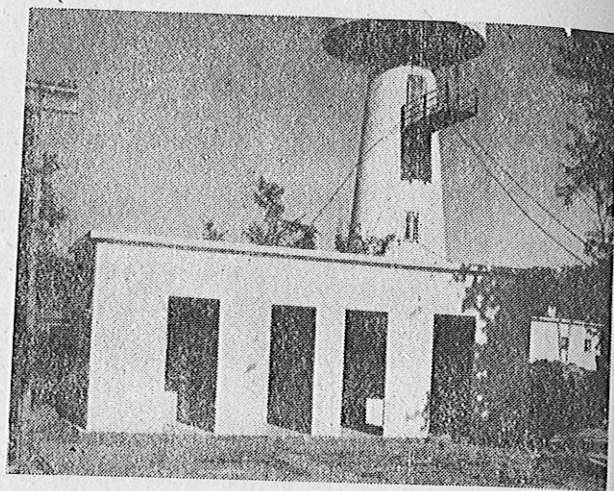


FIG. 8 PROTOTYPE CONSTRUCTION COMPLETED

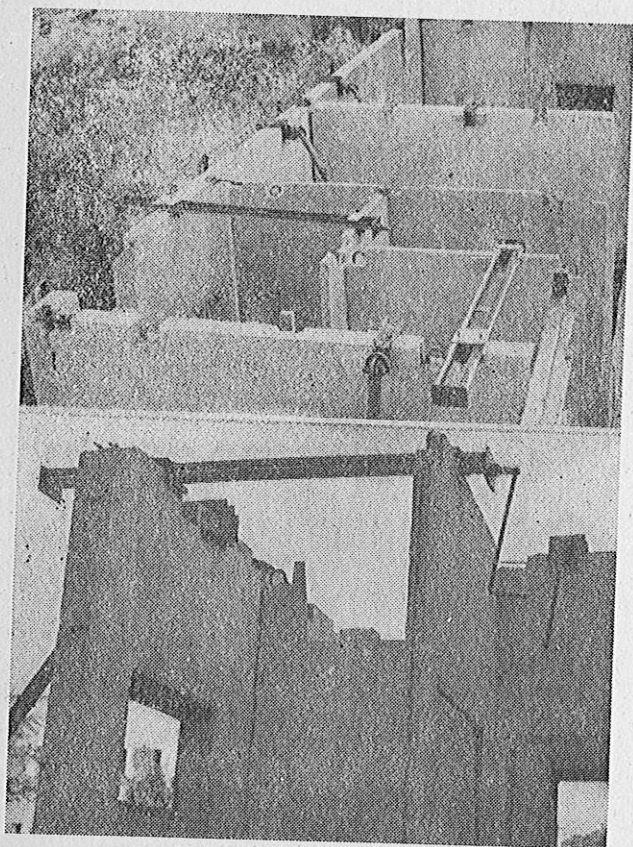


FIG. 7(a) (Top) WALL PANELS BEING ERECTED
7(b) (Bottom) PLUMBING-CUM-BEARING GADGET IN POSITION

shown in *Fig 7* (a, b). The complete structure is shown in *Fig. 8*.

ACKNOWLEDGEMENT

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