



Letters to the Editor

Use of pre-engineered aluminium formwork for mass housing

This has reference to the paper titled "Use of pre-engineered aluminium framework for mass housing" by Mr D.V. Kulkarni, published in the March 2001 issue of ICJ. This paper is to be highly appreciated for introducing us to a new method of construction which saves construction time and gives quality work. It produces reinforced concrete (RC) flats eliminating brickwork altogether in the superstructure. It also eliminates plastering work in the superstructure. It only uses random rubble masonry in foundation. The wall thickness being less the carpet area of rooms will be more compared to the conventional masonry buildings. Further, this system is very efficient for resisting horizontal loads like wind or earthquake taking box-action in plan. The conventional masonry buildings also form boxes in plan and they are efficient in resisting horizontal loads if the height of the building is limited and it is approximately engineered to take care of horizontal forces.

However, there are a few reservations in my mind about this system and the author is requested to kindly clarify the following points.

- (i) Flats are likely to be warm inside during summers and cold during winters as the RC walls are of lesser thickness. It will affect the thermal compatibility and hence the quality of living.
- (ii) Fig 1 (Page 34) of IS 456 : 2000 requires more thickness for slabs and walls for fire resistance requirements.
- (iii) Walls need to be designed for slenderness effects.
- (iv) Concrete mix in all RC works is M 20 as per Fig 5 of the paper; but elsewhere M 25 is also mentioned.

- (v) The cost of the flats may kindly be given and we hope it is compatible with that given for the conventional masonry construction in the area.
- (vi) Any precautions taken to get crack-free concrete surfaces against temperature and shrinkage effects.

This is an excellent paper and I wish to thank the author for sharing his valuable experience with the engineering community.

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The author replies:

I appreciate the interest shown by Mr Varyani. My response is given below.

- (i) This system of construction is being used in Mumbai or for that matter in the country for the first time. Thermal comfort in a building is dependent on various factors such as orientation of doors and windows, direction of wind, available headroom, etc, and may not be just on the thickness of the wall or material of construction. However, we firmly believe from what we have noticed here in Mumbai as well as from the information collected from similar constructions carried out in South East Asian countries that there is no marked difference in thermal comforts with the adoption of the new system.
- (ii) For the particular project highlighted, the consultants did not consider the fire resistance requirements.

- (iii) Slenderness effects are taken into account when walls are designed.
- (iv) Regarding concrete mix, I have stated that the structural requirement of concrete is only M 20, whereas the durability considerations for a structure subjected to severe conditions necessitated water-cement ratio to be maintained at 0.45 and the minimum cement content to be 350 kg/m³.

From the Fig 5 of the paper on pp. 211 it will be noticed that all concrete for a duration as much as 2 months has shown consistent concrete strength of 350 to 400 kg/cm². Thus, the durability considerations superseded the structural strength requirement.

- (v) It is not possible for us to give the representative cost of a flat and its comparison as our job was limited to the construction of tenements from foundation to terrace including finishing. There will be many other items like cost of land, its development, landscaping, etc, which form a part of the cost of a flat, but they do not fall under our purview.
- (vi) Special precaution for concrete to be crack free has been taken by providing reinforcement of smaller diameters in both directions.

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