

Flexible Internal Spaces to Enhance Functional Efficiency of Residential Dwelling Units with Changing Occupants

Dr. Ravi Kumar Bhargava

Solutions to flexible planning of residential units

Nature of Jobs of employees of Central/State Government, Public sector Undertakings, Banks, Defense Services etc. is transferable. Employees of the above organizations are transferred from one place to another after every 2 to 4 years. A particular family occupies the accommodation provided by the employing organization only for a certain period of time. After one employee is transferred from one place to another, family of the new occupant occupies the same premises/dwelling unit. Functional requirements of the new occupants might be different from the earlier occupants. These dwelling units are designed to suit the broad general requirements based on certain assumptions. The standard design of the dwelling units may or may not fulfill requirements of a particular family due to different family structure, different cultural backgrounds or different lifestyles. In case the same family continues to occupy the same dwelling unit for many years, the dwelling unit loses its functional efficiency with the time due to change in family structure, change in life style, change in style, in vogue/technology, availability of new materials etc. One is forced to occupy and use the same unsuitable dwelling unit because easy

additions/alterations are not possible due to the rigid nature of the construction, internal sub divisions and services. The resulting situation can not be appreciated as it adversely affects the quality of life of the occupants. Flexible internal arrangements and design can provide an effective solution by making it possible to change numbers, sizes, locations/positions of Internal Spaces and services to suit changed or different requirements.

INFERENCES

Based on the Inferences derived from User's Survey, the author is of the strong opinion that there is a need to develop a suitable system and method of Flexible Interiors with provision to alter and change the same when the situation demands. The probable solution lies in :

- a) Identification of the need for psychological and physiological Space division.
- b) Identification of various Space dividing elements.
- c) Identification of various functional requirements required in partitions between different spaces.
- d) Study of different conventional/unconventional partitions/screens and other space dividing elements and their suitability in different

The accordion type is also an example of fixed partition.
They have guide tracks at the bottom.



← Accordion Type →



← Collapsible



Movable Detail of top hung fixed partition →

- situations.
- e) Functional analysis of Traditional and New materials.
- f) Development of suitable technique to make dismantlable, flexible partitions with necessary fixing details.

- g) Development and identification of suitable method to provide the following:
- h) Creation of openings and desired locations and blocking of the openings if they are not needed.
- i) Providing and shifting Electrical

- points and switch boards at desirable location.
- j) Development of a suitable method to shift location of Kitchen, Washing place and Toilets with possible connection for water supply and drainage.

COMPARTMENTIZATION OF SPACES

A large space could be divided into small divisions to suit nature of activities and purpose. Functional requirements of different Space Dividing Elements are different, depending on the space and the activities required to be segregated.

SPACE DIVIDING ELEMENTS

Elements and components like walls, partitions, screens and curtains, storing cup boards, almirahs, show cases, Blinds, furniture etc. can be used as

space divider. These space dividers have their own limitations and they may or may not fulfill functional requirements like physical and or psychological barrier, Visual and or acoustical privacy etc. Psychological barrier also plays an important role in defining a space. Such elements may not be physically present but have an impact and can effectively divide a space into two or more compartments. Under this category change in floor, wall, and ceiling colour, texture and level can be included. Different colour, texture and pattern on floor, wall and ceiling can

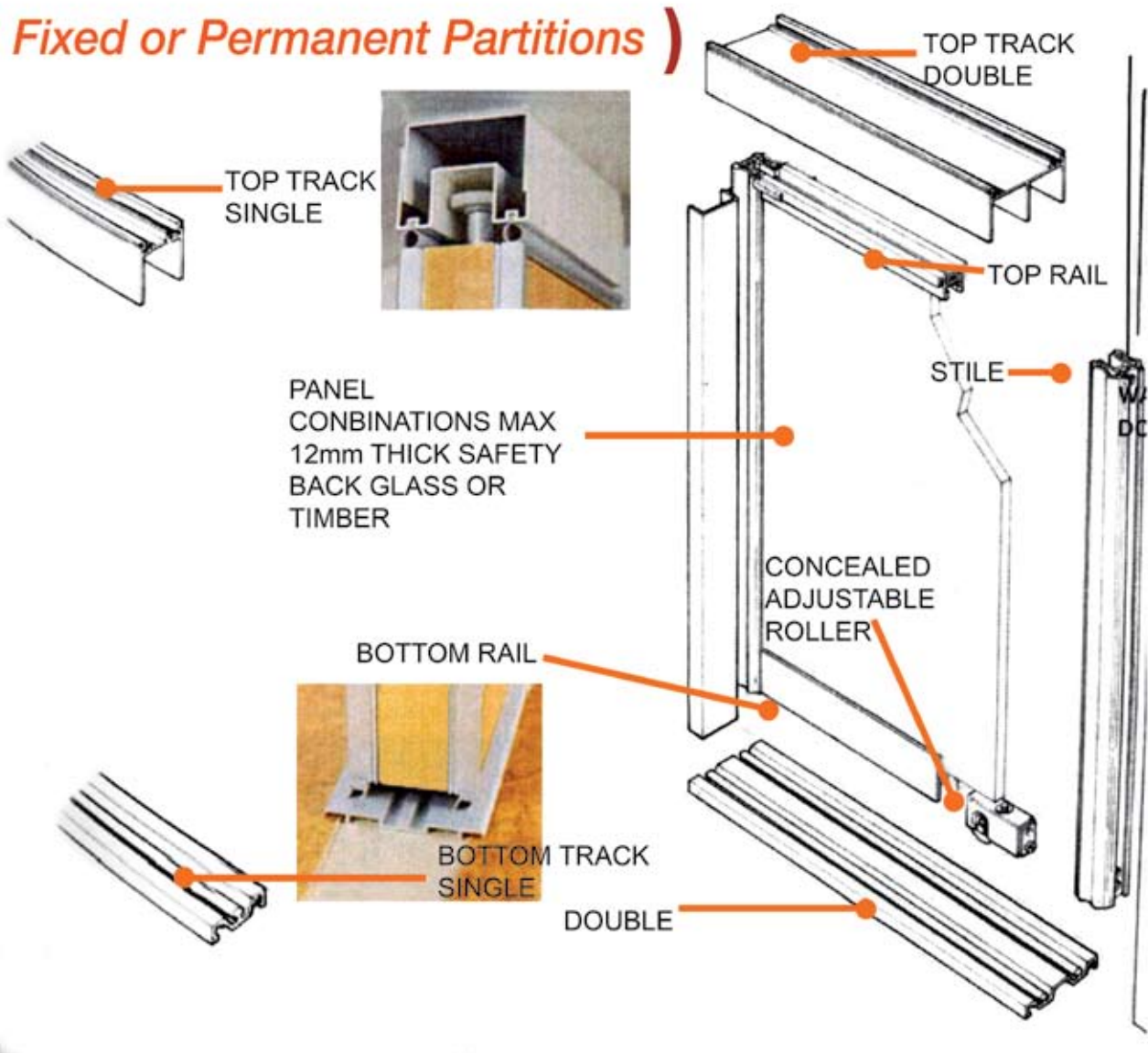
effectively define spaces, highlight the activities and can separate one space from another. Change in level is also an effective Space Divider.

SUGGESTED SOLUTION

The author has developed and designed a system in association with Ar. Ravi Nafde and Ar. Shailja Sakharkar for Dwelling units with Flexible Internal Spaces.

Organizations intend to provide residential facilities to its employees should provide a column free suitable floor area in tenement blocks as per

Fixed or Permanent Partitions



class/category of the employee. The undivided floor space could be divided with suitable Modular Partitions as per the Requirements of the occupying family.

PROPOSAL

Buildings with Flexible Residential units will include the following rigid and flexible components.

RIGID ELEMENTS:

- Common entrance lobby with Staircase, Lifts and other necessary amenities.
- External walls of the Tenements with provision to create openings/windows at desirable location and to block undesirable openings.
- Floor area of each tenement (to be decided by the concern authorities).
- Main Entrance door of the Tenements opening in Main entrance

lobby.

- Detached structural columns on external periphery.
- Balcony projections.
- Fittings and fixtures inside the Toilet.

FLEXIBLE ELEMENTS:

- Internal Modular Partitions.
- Provision for Modular openings/windows in external walls.
- Position/location of Kitchen/Toilets and Washing place.
- Electrical and Water supply lines, fittings and fixtures.
- Sanitation and Water supply points.

IMPORTANT COMPONENTS AND MAIN FEATURES

FLOOR AREA: Rectangular, column free floor area with external peripheral walls.

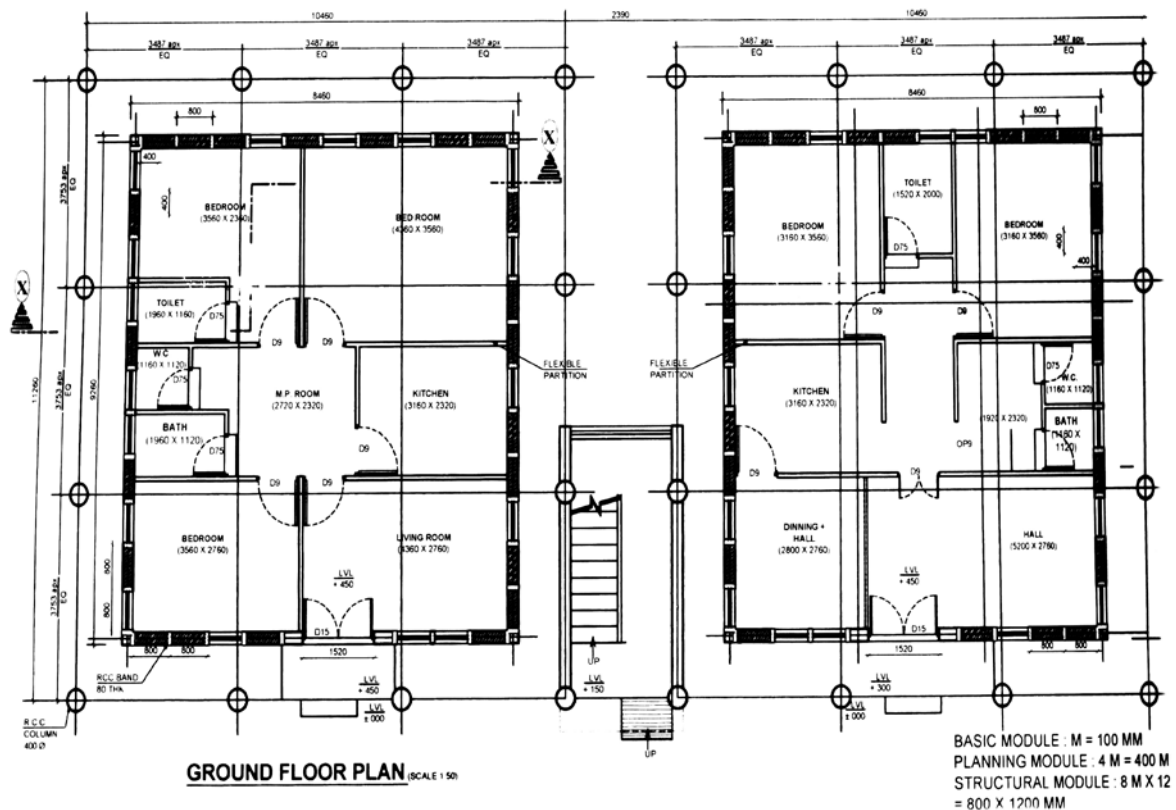
- R.C.C. STRUCTURAL COLUMNS: The

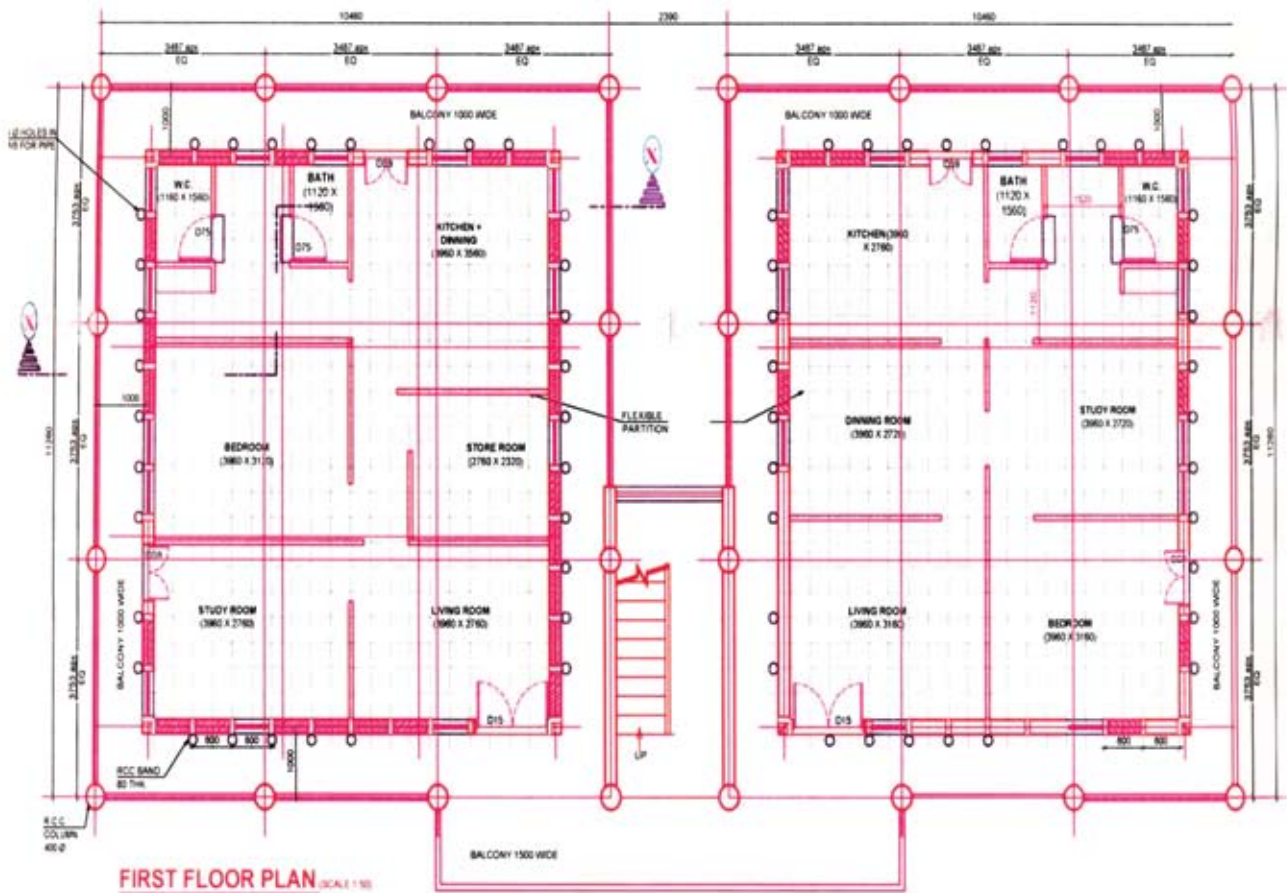
complete floor area of the tenements is column free. Internal columns are not provided to make Internal Sub Division more flexible. R.C.C. columns are provided only on the periphery and detached from the main external walls. These detached columns will also have provision to carry drain water and toilet pipes.

FLOOR/SLAB: Main floor slab is Pre-stressed, cast in situ R.C.C. Flat slab (without conventional beams) to make shifting and fixing of partitions, easy at desired pre determined locations

INTERNAL MODULAR PARTITIONS: 50 mm th. Composite, Insulated, modular Partitions with desired finish could be provided and fixed along both axis at

Examples showing different possibilities of Additions and Alterations in Planning regular intervals of





FIRST FLOOR PLAN (SCALE 1:50)

500 mm c/c. These light weight partitions could be made by using various composite materials to fulfill different functional requirements. For fixing the Partitions firmly with both flooring and ceiling, continuous channels are provided embedded in concrete both in flooring and ceiling at regular distance of 500mm c/c. These channels are provided in both direction forming a Grid. Portion of Channels not in use could be blocked with synthetic or Rubber Lining/Gasket.

TOILETS: Prefabricated Modular Toilet units made out of Glass Reinforced Plastic or other suitable materials and completed in all respect with all required fittings and fixtures can be placed at desired location along the external walls.

KITCHEN/Cooking facility: Pre-

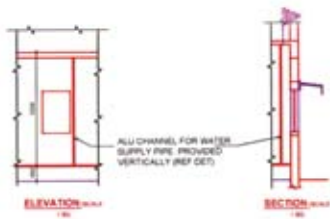
fabricated Modular Stainless Steel Cooking Platform including Sink and storage facilities could be placed along the external walls with possible water connection and drainage.

OPENINGS/WINDOWSONEXTERNAL WALLS: External walls on three sides are provided with provision to create openings in desired location between Sill and Lintel level. This was made possible by providing Detached columns away from external peripheral wall. Internal Partitions can be fixed between the two openings if desired. Openings intended to be used will be provided with louvered or other types of window/fenestration. It is possible to block openings not intended to be used.

ELECTRIC LINE FITTINGS AND FIXTURES: Electrical wiring will run

inside channels provided on ceiling at regular grid of 500 c/c. CFLs or other suitable Luminaries/ Light fittings could be slided and fixed in channels at desired location/position. Similar continuous channel with wiring can run on external wall from inside at 1500 mm or other suitable level from floor. Switch boards will also be provided and fixed in the channels on side walls. It will be possible to change the location of the switch board when desired.

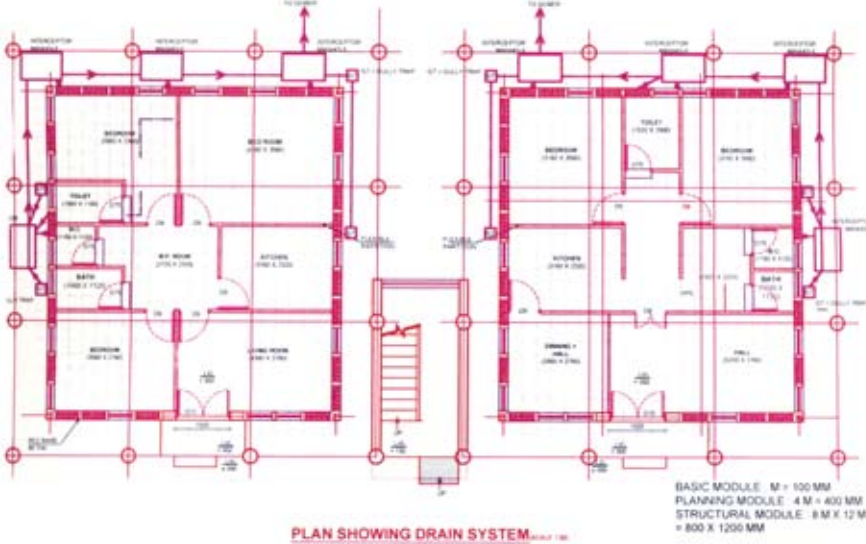
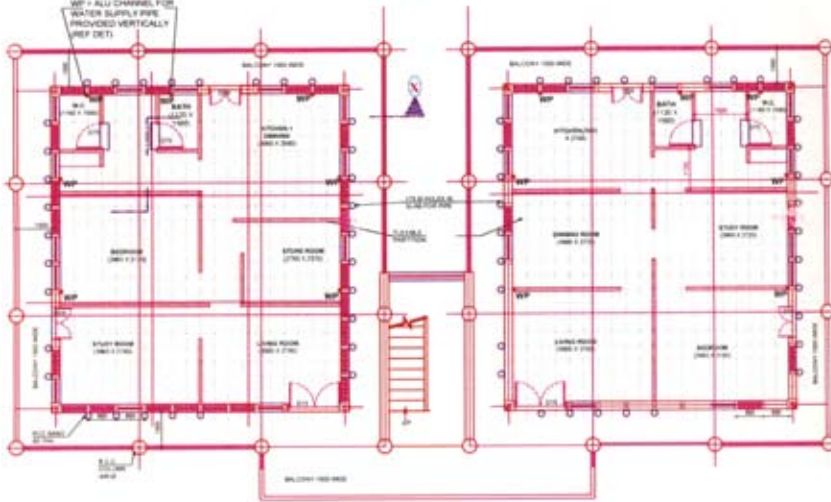
MAN HOLES/INSPECTION CHAMBERS and SEWER LINE: Multiple inter connected Man Holes/Inspection Chambers with gully Traps will be provided @ 2000 c/c on external periphery. This will make it possible to shift Kitchen, Wash and Toilets from one place to another.



stainless steel flexible water connector

Copper connector

1. Material: brass
2. straight box connector flexible metal conduit connector
3. Be any threaded, water and flame proof fitting



PLAN SHOWING DRAIN SYSTEM

BASIC MODULE: M = 100 MM
 PLANNING MODULE: 4 M = 400 MM
 STRUCTURAL MODULE: 8 M X 12 M
 = 800 X 1200 MM

those openings that not needed.

LIMITATIONS

- Author with his associates have developed and demonstrated the system using models.
- The system is yet to be adopted and used by any organization actually in the Residential accommodations these organizations provide for their employees.
- Any short comings or practical problems one might face when the system will be adopted in reality will have to be tackled and solved appropriately.

CONCLUSION

- Families with different family structure, age group, different social and cultural back ground have different functional needs and requirements.
- Rigid, inflexible sub division of internal spaces is unsuitable for changing occupants.
- It is possible to fulfill up to large extent, requirements of different families (within allotted floor area) with different social and cultural background and needs by adopting Concept of Flexible Sub-Division of Internal spaces.
- Judicious use and application of Flexible Internal partitions and services will make a space multi functional and will enhance Functional Efficiency of Residential Dwelling Unit with Changing Occupants. ■

RECOMMENDATIONS

- It is necessary to make Internal sub division Flexible.
- To make required Addns/Altns possible keeping in mind different requirements of different families develop following suitable system or adopt the system suggested by the author:
- Dismantlable, modular, flexible partitions fulfilling all functional requirements for Internal sub division.
- Alternative systems to provide and change as per requirement position/location of Electrical, Water and Sanitation connections, fittings and fixtures.
- Suitable system and method to create as per requirements Fenestrations/openings including those on external walls in different desired locations/positions and to block

**Dr. Ravi Kumar Bhargava is
 Principal of Bharati Vidyapeeth College
 of Architecture, Belpada Complex,
 Opp. Kharghar Station, Sector-7,
 C.B.D., Navi Mumbai-400614.**

Photographs: Courtesy the Author.