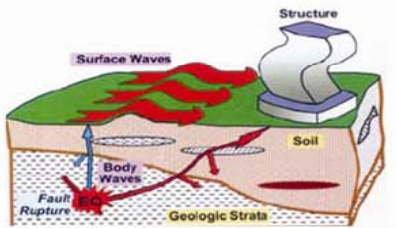


CONSIDERATIONS FOR ASEISMIC APPROACH IN DESIGN - ZONE V, SRINAGAR

LIVING CONCERNS IN GENERAL- FUNCTIONAL SATISFACTION (SOCIAL STUDY), THERMAL COMFORT, SUNLIGHT ENTRY, AIR MOVEMENT, SAFETY FROM RAIN & WIND PRESSURES, SAFETY FROM RODENTS, INSECTS & WILD, ENVIRONMENTALLY SUSTAINABILITY, **EARTHQUAKE**, LANDSLIDE & FLOODS.

1. UNDERSTANDING IMPORTANT CHARACTERISTICS OF EARTHQUAKES—



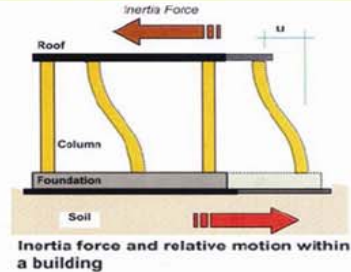
Arrival of Seismic Waves at a Site

1. Shaking of ground on the earth's surface is a net consequence of motions caused by seismic waves.
2. Horizontal Shaking along X & Y directions remain prime concern

2. UNDERSTANDING IMPORTANT CHARACTERISTICS OF EARTHQUAKES—



Effect of Inertia in a building when shaken at its base



Inertia force and relative motion within a building

INERTIA

More the mass, higher the force of inertia. Therefore **lighter buildings** sustain the earthquake shaking better.

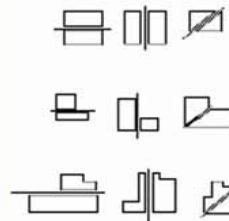
3. DESIRABLE QUALITIES OF A BUILDING FOR GOOD EQ PERFORMANCE

1. LIGHTNESS
2. TENSION RESISTANCE
3. ADEQUATE SHEAR RESISTANCE
4. ADEQUATE LATERAL STIFFNESS
5. DUCTILITY
(Large energy absorption capacity)

4. SYMMETRY IN BUILDINGS -

STRUCTURAL SYMMETRY MEANS THAT THE CENTRE OF MASS & CENTRE OF RESISTANCE ARE LOCATED AT THE SAME POINT.

SYMMETRY IN PLAN



SYMMETRY IN ELEVATION



1. Symmetry is a valuable configuration characteristic to **avoid torsion**.

2. More mass placed on one side of the building causes the floors to twist.

5. STRUCTURAL SYSTEMS -

BRACED FRAMES ACT IN THE SAME WAY AS SHEAR WALLS, BUT PROVIDE LESS RESISTANCE & BETTER **DUCTILITY**. DUCTILITY MUST BE DESIGNED TO BRACING SO THAT IT WILL DEFORM BUT NOT SNAP.

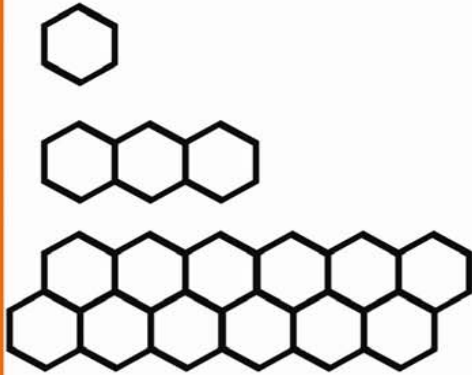


In moment resistance **frame structure** lateral forces are resisted by bending in the beams and columns which are connected by moment connections. **Joints become highly stressed and so details of their construction become important.**

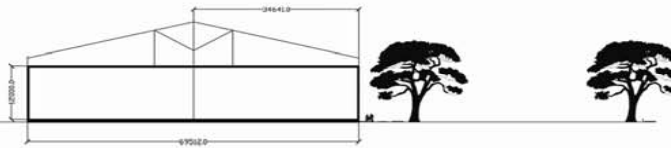
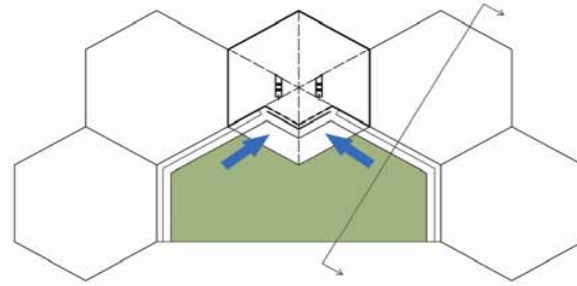
6. TRADITIONAL CONSTRUCTION V/S RCC STRUCTURES

	DHAJJI DEWARI SYSTEM	RCC SYSTEM OF CONSTRUCTION
STRUCTURAL SYSTEM		
THERMAL COMFORT	↑	↓
COST EFFECTIVE		
ECO FRIENDLY		
AESTHETICS		

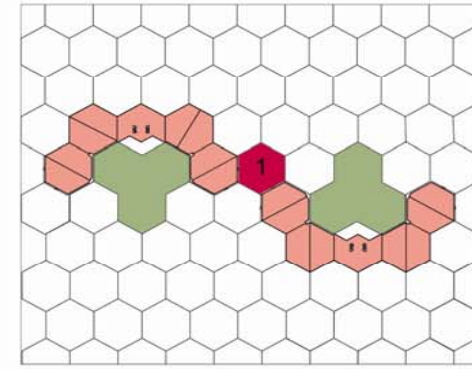
SHIFT IN PLAN FORM FROM SQUARE/ RECT- ANGLE TO HEXAGONS



EXPLORING THE DHAJJI DEWARI CONCEPT IN THE LATTICE STRUCTURE FORMED BY HEXAGONS & CHOOSING A SUITABLE ARRANGEMENT OF HEXAGONS FOR **LOW COST PREFAB HOUSING** (SUPPORTED BY GOVERNMENT)



ALTERNATIVE 1

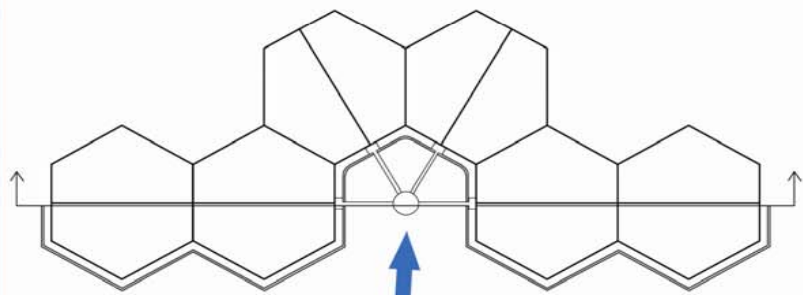


1 COMMON SPACE LINKING THE REST OF THE TWO **FOUR STOREY STRUCTURES** AT SECOND FLOOR .THIS IS TO AVOID **POUNDING** DURING AN EARTHQUAKE .

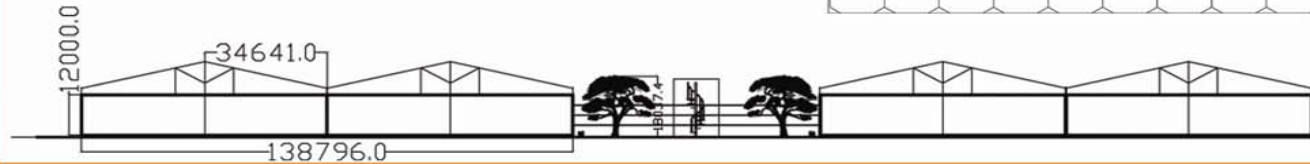
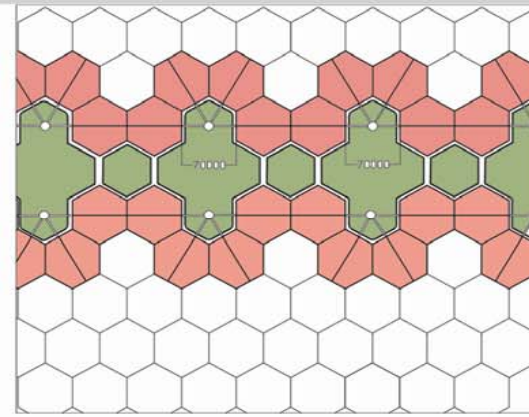
INSPITE OF ALL THE ADVANTAGES, DHAJJI SYSTEM HAS BEEN SACRIFICED TO MAKE WAY FOR THE RCC STRUCTURES IN A VAIN ATTEMPT AT MODERNIZATION OF KASHMIR.THE BEAUTY & WISDOM CARRIED IN THE TRADITIONAL TECHNIQUE IS ERODING WITH TIME.

OUR AIM IS TO REINTRODUCE THE BUILDING/STRUCTURE BACK INTO LIFE & INTEGRATE IT WITH EVERYDAY COMMUNITY LIFE.ADOPTING THIS SCHEME SOLVES DUAL PURPOSE.FIRSTLY, IT SERVES THE COMMON MAN OF THE CITY AS IT IS CHEAPER THEN CONVENTIONAL STRUCTURE.SECONDLY, IT WOULD HELP IN MAINTAINING THE WISDOM IT CARRIES.

ALTERNATIVE 2



SPIRAL STAIRCASE BRIDGING ALL THE TWO ENTRANCES OF EACH HEXAGON



OBSERVATIONS

SINCE THIS IS A LOW COST HOUSING (PLANNING) SCHEME, IN BOTH THE CASES WE ARE CONSIDERING THAT THERE IS **NO NEED FOR PARKING SPACE**. **CHINAR TREES** CAN BE PLANTED WHICH GOES UP TO THE HEIGHT OF 25M SHADING A LARGE AREA.

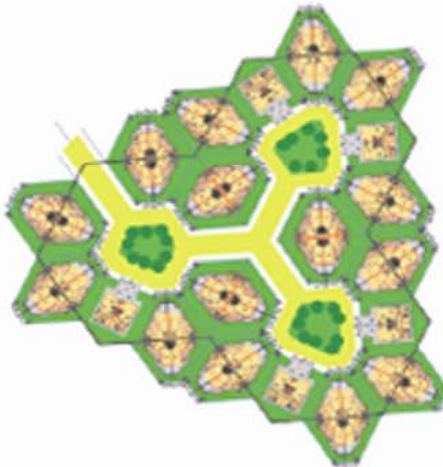
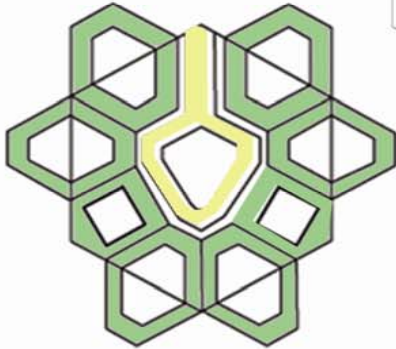
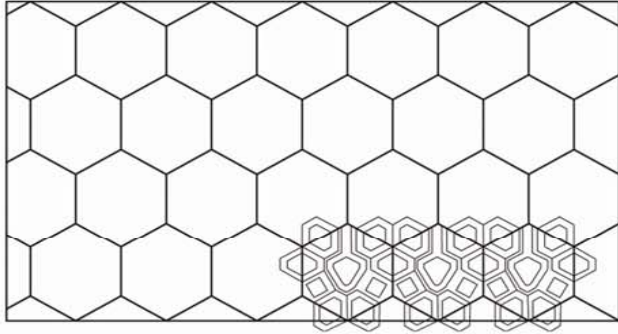
ALSO THESE ARRANGEMENTS WILL CREATE LARGE CHUNKS OF GREENS(ALMOST EQUAL TO THE BUILT UP NEXT TO IT WHICH IS TAKING TOO MUCH OF AN AREA.

IN THE **FIRST CASE** THERE IS WASTE OF SPACE;LESS UNITS PER AREA.INEFFICIENT CORE IS ANOTHER PROBLEM.THE GROUND FLOOR CAN BE USED AS A COMMUNITY SPACE BUT ON THE UPPER FLOORS-TOO MUCH OF CIRCULATION SPACE IN THE CORE AREA

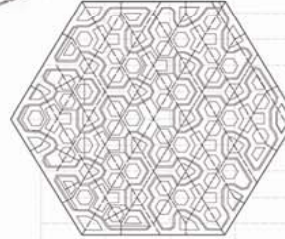
IN THE **SECOND CASE**, THE ZONING OF CORE IN THE CENTRE SAVES A LOT OF SPACE.**STRUCTURE** IS FAR MORE STABLE .



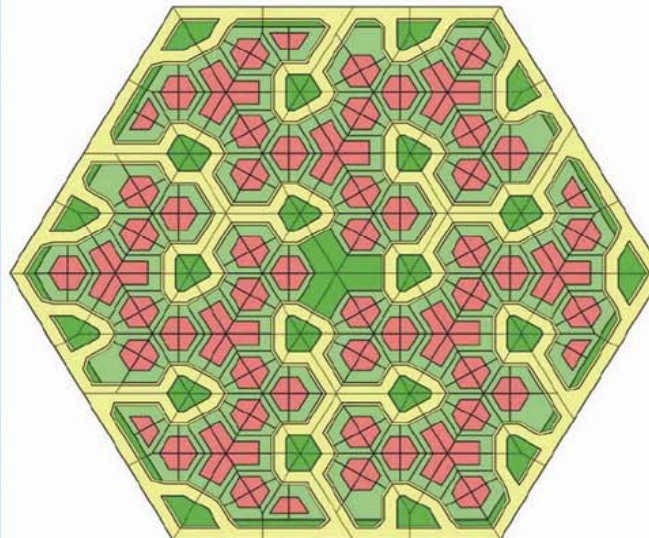
EFFICIENT AND LAND SAVING ARRANGEMENT



A HONEYCOMB PRECINCT



THE NEIGHBOURHOOD CAN BE ARRANGED IN AN INTERLOCKING PATTERN



In **Honeycomb layout** houses are arranged in a circular fashion around a central space to form a small neighbourhood of between 5-16 houses.

The central spaces are linked to each other and to the main distribution roads by short connecting service roads.

The central space - a kind of open courtyard- consists of a cul- de-sac looping around a common garden.

All the houses face the garden like friends sitting around a table.

These houses can be called as quarter-detached houses (**quadruples**) because there are **four houses under one roof**.

Based on a **Hexagonal grid** such structures are common in the structure of inorganic forms for example those of gems & snowflakes. On the other hand very few examples of rectangular shapes in nature.

This layout is for sure more efficient than regular square/rectangular housing & can accommodate more housings units per acre of land than regular housings.

The traditional Dhajji Dewari construction technique would be used for these low cost housing as it vernacular & holds the identity of the place.

One addition in the traditional technique would be to hold the walls with wire mesh with concrete filling in it or holding the walls with bamboo. In both the cases the intention is to prevent the harm to the human life due to the abrupt fall of stones from the walls.

Common man in this city which **survives on tourism** cannot afford RCC structures.

