Present Scenario of Building Construction with Respect to Green Criteria's.

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Abstract— with the help of questionnaire data was collected on present scenario of residential building in Sangli, Islampure and Ashta city with the help of questionnaire. The questions in this questionnaire base on the green building rating system such as LEED, GRIHA, and SVAGRIHA. Data from this question give the information on rainwater harvesting in building, use of fly ash in construction, low water fitting, reduced water during construction, reduced water in landscape, reuse of material etc.

1 Introduction

With the help of questionnaire data was collected on present scenario of residential building in Sangli, Islampure and Ashta city with the help of questionnaire, which is located in Sangli district Maharashtra (India). The questions in this questionnaire base on the green building rating system such as LEED, GRIHA, and SVAGRIHA. Data from this question give the information on rainwater harvesting in building, use of fly ash in construction, low water fitting, reduced water during construction, reduced water in landscape, reuse of material etc.

2. Criteria's and Observation

2.1 In open space, how much percentage of greenery and hard pave present around the building.

Data was collected on the basis of how much percentage of greenery and how much percentage of hard paver provides in the open space. Due to plantation or greenery present around the building it automatic reduced heat gain and increases the thermal comfort of building. After data analyse it is found that in Islampur, Ashta and Sangli city only 35%, 41% and 33% respectively greenery present around the building.

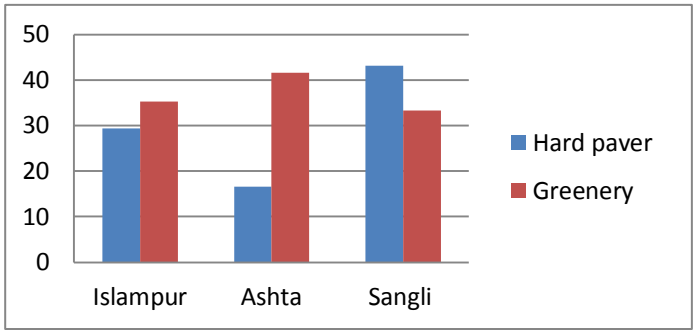

Fig.1 Percentage of open space and greenery around the building

2.2 Building layout according to site topography.

Was the building construct according to site topography or excess filling or excavation was done. Due to this it increases the erosion of soil. Also find the orientation of the building. If the orientation of building is proper it reduces the energy requirement. In Ashta almost 100% in Isalmpure and Sangli 80% and 65% respectively the building layout is according to site topography.

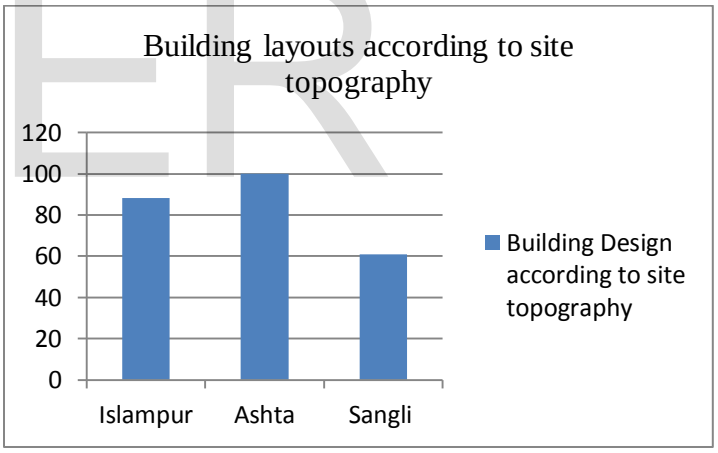

Fig.2 Building layouts according to site topography

2.3 Safety provision adopted during construction.

To avoid the accident on the site the safety provision is very much important. It directly relates to life of the labours. Only 22% of sites in Sangli, 14% in Islampur and zero percentage in the Ashta city make the provision for safety.

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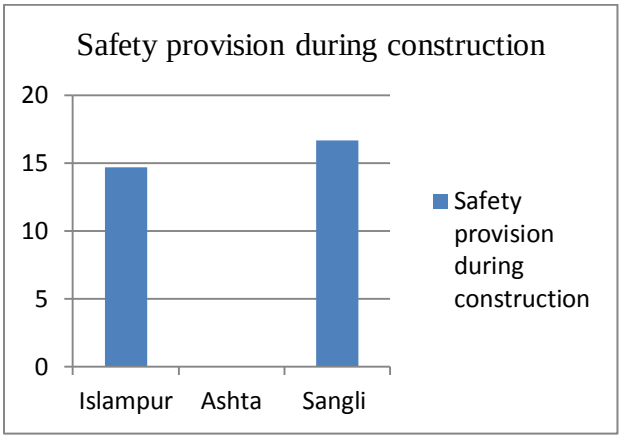
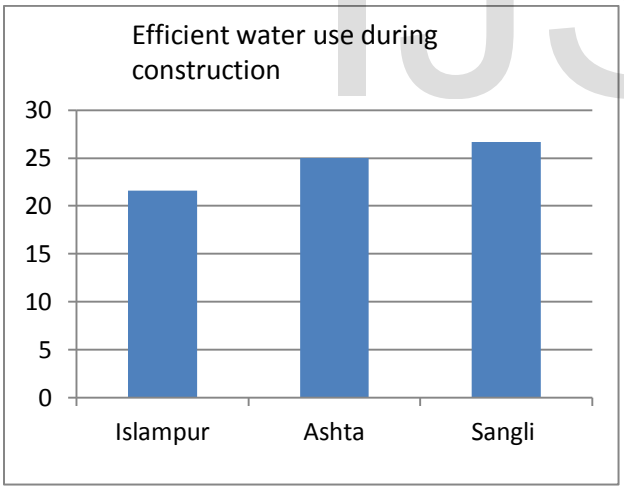


Fig.3 Safety provision adopted during construction.

2.4 Efficient water use during construction.

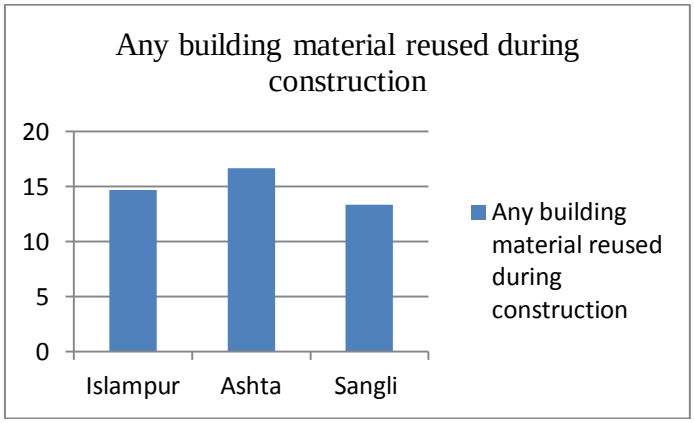
Construction industry's growth now a day is at a very fast rate. But it also increases the water requirement because almost in every activity in the construction water is needed. This water is taken from the municipal potable water or from the ground water. So it is required to minimize the water demand, or efficient use of the water on site without compromise in the quality of construction. In Sangli city more efficiently water is used as compared to other cities. Less efficiency water was use in Islampur city as compard to other cities.



Graph 4Efficient water uses during construction.

2.5 Any building material reused during construction.

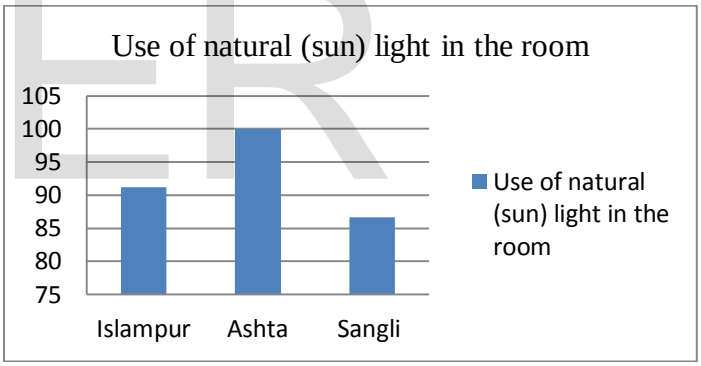
Reuse of old or waste material in building construction it decreases the embodied energy of the building. Also it decreases environmental impact due to building construction. In Ashta city most of such material was used as compared to other cities. Less reuse the building material in Sangli city as compare to other cities.



Graph 5 any building material reused during construction

2.6 Use of natural (sun) light in the room.

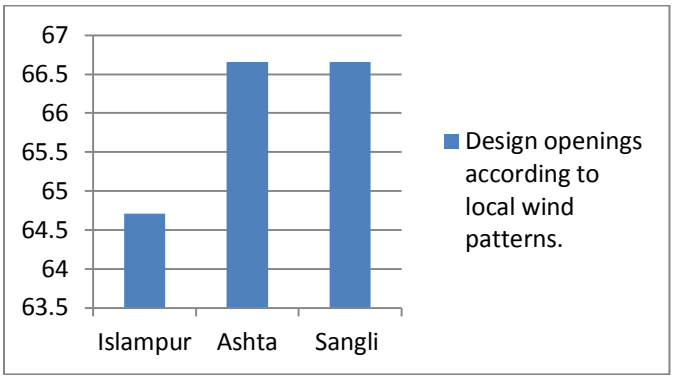
Use of the natural light effectively in the building reduces the demand of artificial sources of light. It is achieved by providing proper openings of window and providing good fenestration. Buildings in Sangli city have less natural light provision as compared to other cities, and in Ashta city it is more as compared to other cities.



Graph 6 Use of natural (sun) light in the room.

2.7 Design openings according to wind patterns.

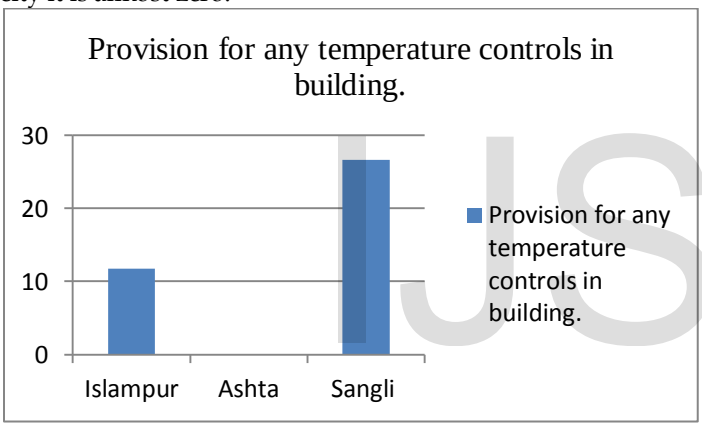
Opening of window should be provided according to wind pattern, it increases the natural ventilation in the building. Also it increases the thermal comfort in the building. Window opening in building according to local wind pattern. In Sangli, Ashta city almost the 66% and 65% in Islampur.



Grapha 7 Design openings according to local wind patterns.

2.8 Provision for any temperature controls in building.

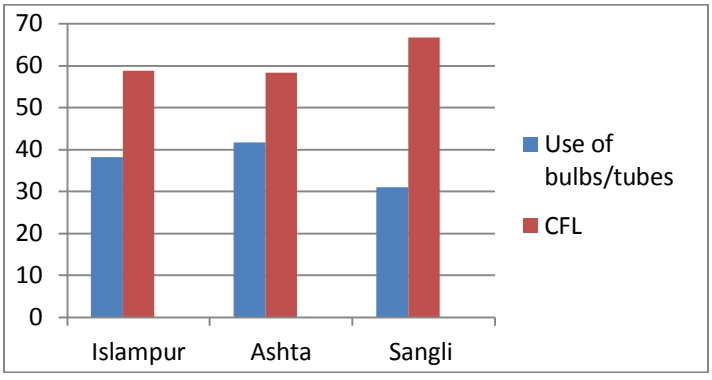
Temperature control in the building was done by plantation of the trees around building. Also other method used such as geothermal ventilation is provided in the building. In Sangli city maximum provision was done in building temperature control as compared to Islampur city. In Ashta city it is almost zero.



Graph 8. Provision for any temperature controls in building.

2.9 Artificial lighting system.

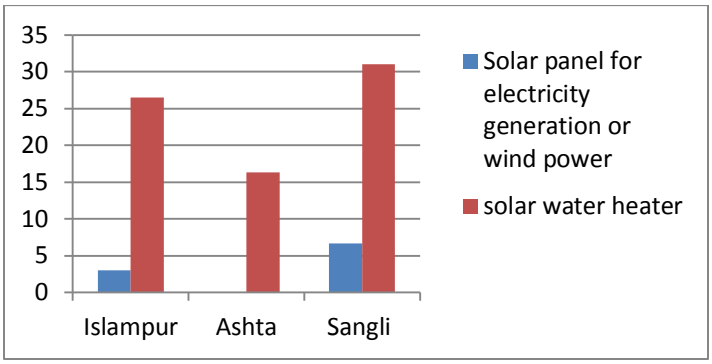
Building artificial lighting demand can be minimized by using LED or CFL light. But the use of LED light is almost zero in this city. CFL are used up to 65% in sangli city 58% in Islampur and Ashta city. Other used conventional bulbs or tubes for artificial lighting in the building.



Graph 9.Artificial lighting systems.

2.10 Use of renewable energy.

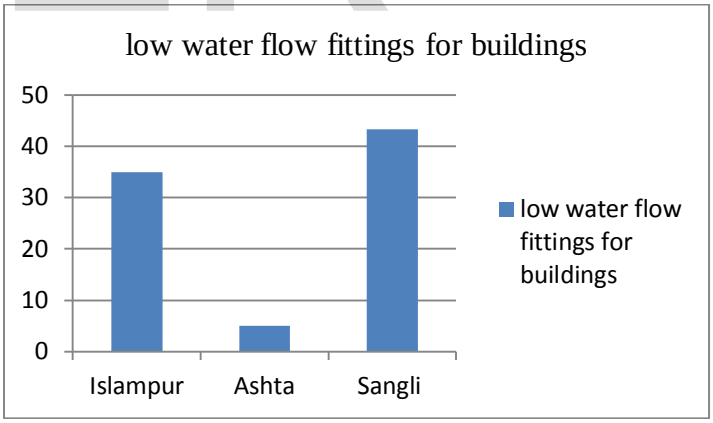
Renewable energy used in the building that is solar energy for electricity generation and for water heater. Also wind energy used for electricity generation for building. Use of solar water heater in Sangli is 31% in Islampure it is 27% and Ashta it is 16 % only. Use of solar panel for electricity generation in building in Sangli is 6% in Islampur it is 3% and in Ashta it is almost zero.



2.10 Use of renewable energy.

2.11 Low water flow fittings for buildings.

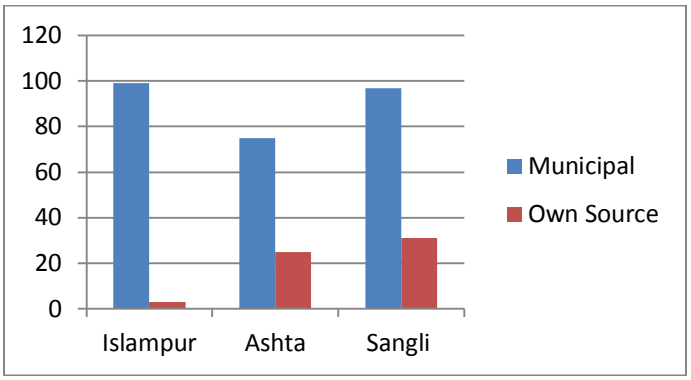
Low water fitting are used in building to minimise water demand. It is minimising the water demand for bathing, toilet and for kitchen. Maximum low water fitting are used in Sangli city as compared to Islampure and Ashta. Minimum it is used in Ashta city.



Graph 11 Low water flow fittings in buildings.

2.12 Source of drinking water.

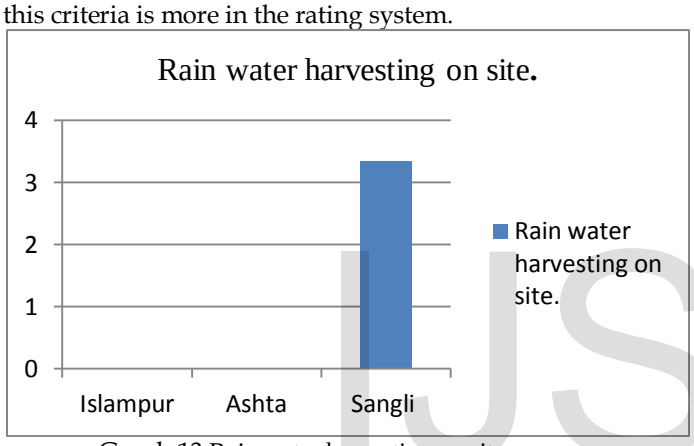
In Sangli and Islampur city almost 100% municipal potable water is used for drinking purpose. In Ashta it is 80% municipal potable water used for drinking purpose. Own source of drinking water, that is bore well, in Sangli 22% and in Ashta 21% buildings use their own source of water for drinking.



Graph 12 Source of drinking water.

2.13 Rain water harvesting on site.

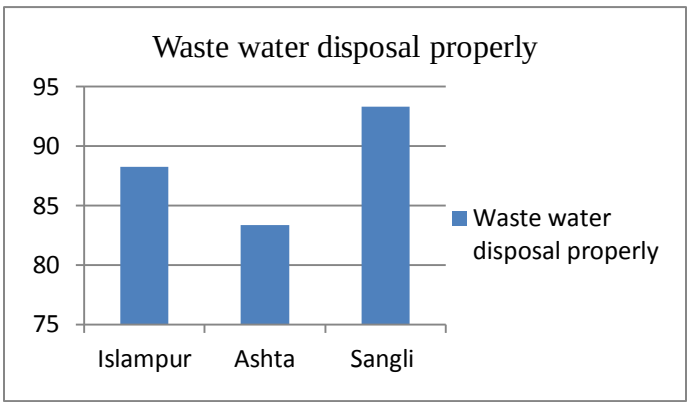
Only 3% rain water harvesting is done in Sangli city and in Ashta, Islampure it is zero percentage. So weightage of this criteria is more in the rating system.



Graph 13 Rain water harvesting on site.

2.14 Waste water disposal properly.

In Sangli 94% ,in Ashta 83% and in Islampure 88% waste water disposed properly in the open trench municipal drainage. Mostly the building drainage is connected to municipal drainage so it makes disposal of waste water properly.



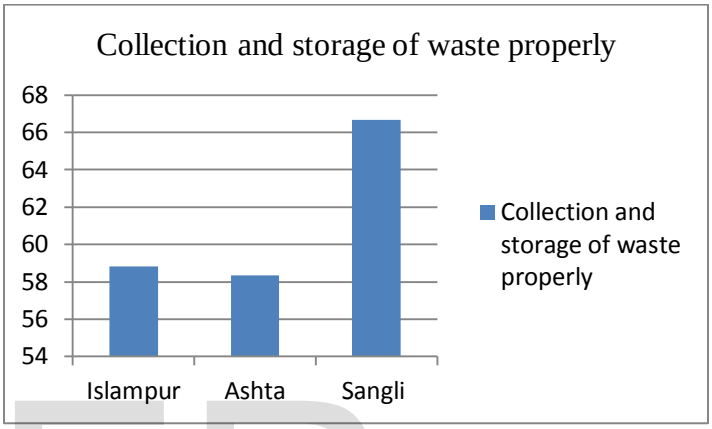
Graph 3.14 Waste water disposals properly.

2.15 Use of fly ash or any other material during the construction.

Islampur, Ashta and Sangli city the use of fly ash in construction is almost zero percent. So the weightage of the flyash criteria is more.

2.16 Collection and storage of waste properly.

Waste generated from the building must be stored in different coloured dust bins. This different coloured dust bin used for wet and dry waste collection. In Sangli 66 %, Ashta 58% and Islampur 58% storage and collection were done properly.



Graph 15 Collection and storage of waste properly

3. Conclusion

Investigation of existing scenario of buildings in the municipal areas was done with the questionnaire. It is done in Sangli, Ashta and Islampur city. Questions which are included in it are related to greenness criteria of the building. From the collection of data following serious observation are made-

Provision of rainwater harvesting in buildings is only three percent in Sangli city and almost zero in the other cities.

Use of fly ash during the construction of the building is also zero percentage.

Greenery present on open space around the building, efficient use of water during the construction, use of solar energy for hot water and electricity generation, is below 40 percent in all cities.

Safety provision during the construction of building is below 20 percent in all three cities.

From above observations it is concluded that there is a need to promote and create awareness among the people for use of maximum renewable resources and minimize use of the nonrenewable resources in the building. Which will reduce the environmental impact because of building footprint.

References

[1] A. K. Garg "Financial aspect of green buildings" journal of engineering, science and management education, Vol-4, 2011, pp 12-15.

[2] Gang Liu1, Ingo Nolte1 (2010) "comparison of worldwide certification systems for sustainable building" 9thinternationalconference on sustainable energy technology, china.

[3] Warren L. Paul, Peter A. Taylor (2008) "A comparison of occupant comfort and satisfaction between a green building and a conventional building" Building and Environment 43 procedia engineering (2008); 1858–1870.

[4] The Energy and Resources Institute (TERI) renewable energy and energy efficiency partnership New Delhi, India.
[5] Energy conservation building code (ECBC) (2011) "energy conservation building code user guide" USAID ECO – III New Delhi, India.

[6] The Energy and Resources Institute "Volume 1: Introduction" 2011, Teri press, New Delhi.

[7] The Energy and Resources Institute "Volume 2: Technical manual for trainers on sustainable site planning, health and well-being during construction" 2011, Teri press, New Delhi
.
[8] The Energy and Resources Institute "Volume 3: Technical manual for trainers on building and system design optimization, renewable energy application" 2011, Teri press, New Delhi.

[9] The Energy and Resources Institute "Volume 4: Technical manual for trainers on water and waste management, sustainable building materials, health and well-being of building occupants, building operation and maintenance" 2011, Teri press, New Delhi.

[10] Indian Green Building Council "Green Building Rating System for New Construction & Major Renovations (LEED-NC) Version 2.1, February 2011.

[11]The Energy and Resources Institute "SVAGRIHA", version 1.2.Teri press, New Delhi.

[12] Energy conservation building code "Building Lighting Design" Version 2.0 March 2011.

[13] Bureau of Indian Standard "Code for Basic Requirements for Water Supply, Drainage and Sanitation" 4th revision New Delhi.