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DEPARTMENT OF CIVIL ENGINEERING

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Department of Civil Engineering

Gharda Institute of Technology

A/P Lavel, Tal. Khed, Dist. Ratnagiri

Index

"USE OF FLY ASH AND WASTE PLASTIC IN PAVER BLOCK"

Submitted in partial fulfillment of the requirements of the degree

BACHELOR OF ENGINEERING IN CIVIL ENGINEERING

By

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CHAPTER-1

INDRODUCTION

Now a days concrete plays an important role in every construction Industry practices. Paver block is an attractive engineering and economical alternative to both flexible and rigid pavement in various countries.

If we use plastic in our construction purposed it will help to reuse of waste materials.As the plastic has longer life and longer services we can use it in paver block.

We are alternat in plastic and also reducing the amount of cement by replacing it with fly ash.

In this paper investigation, concrete paving blocks may be produced with locally available cement, aggregates, fly ash and plastic waste as the mineral admixture Different mix proportions are prepared using cement replaced by equal quantity of fly ashpowder.The study indicated that fly ash and waste be used as cement replacement without substantial change in strength.. The increase in strength up to 30 % replacement of cement by fly ash may be due to pozzolanic reaction of fly ash. Fly ash increases in strength over time, continuing to combine with free lime. Increased density and long term pozzolanic action of fly ash which ties up free lime results in fewer bleed channel sand decreases permeability.Fly ash combines with alkalis from cement that might otherwise combine with silica from aggregates ,thereby preventing destructive expansion. The ball bearing effect of fly ash in concrete creates lubricating action when concrete is in its plastic state. Waste fly ash when ground to a very fine powder , SiO_2 react chemically with alkalis in cement and form cementations product that help contribute to the strength development . Thus it can be concluded that30% was the optimum level for replacemen to fcement with fly ash

CHAPTER-4

Aim and Objectives

Aim-Use of Fly ash and Waste plastic in paver blocks

Objectives-Using fly ash and waste plastic in paver blocks has two main goals:

1.Environmental Sustainability: By incorporating fly ash and waste plastic into paver blocks, we aim to rethe amount of these materials going to landfills, thus lessening environmental pollution.

2. Improving Performance: The addition of fly ash and waste plastic can enhance the properties of paver blocks, making them stronger, more durable, and resistant to various environmental factors like water and weather.

Overall Results of Compressive Strength Of Paver Block

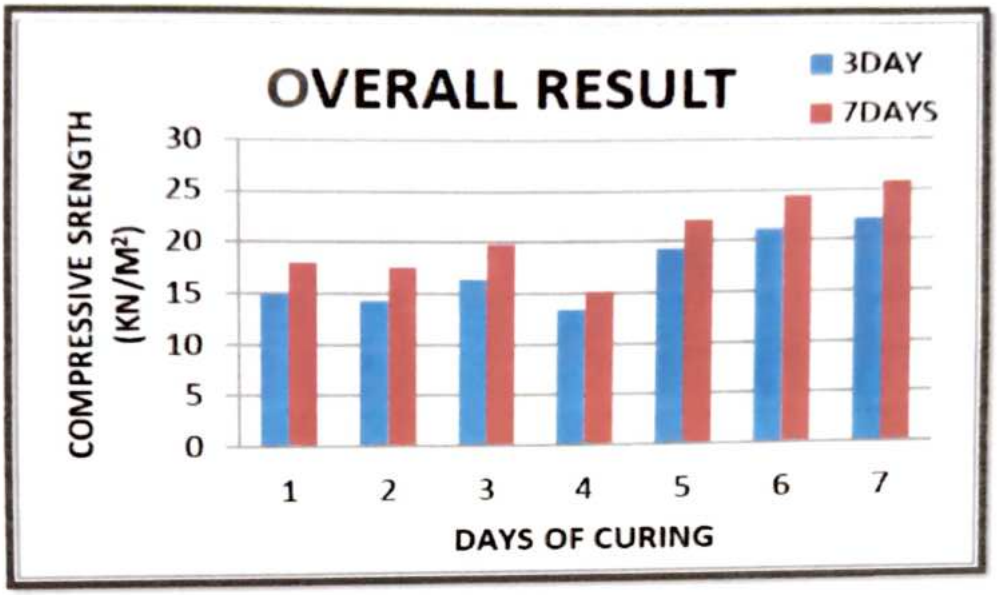

CHART - 8: Comparison of compressive strength for 3 days and 7 days curing of paver block for all above case.

CONCLUSION AND FUTURE SCOPE

We can conclude from the above discussion that the use of plastic can be possible to improve the properties of concrete which can act as aoneof the plastic reusable method.

[1] Eco friendly
By using waste plastic in paver block 1– 3% of plastic may reduce, it is also dangerous to environment and wildlife

[2] Strength increases up to 30-35%
Strength could be increased by using this plastic in the paver block by 30 to 35% by normal paver block and also help in reducing waste by 1- 3%.

[3] Economical
As the plasticizer are not used in plastic concrete paver block the cost of plasticizers is reduces also plastic is zero cost material hence it also reduces the cost of plastic at some extend.

[4] Increases properties of concrete.

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MAKING BRICKS FROM CONSTRUCTION AND DEMOLISHED WASTE.

Submitted in partial fulfilment of the requirements

Of the degree of

Bachelor of Engineering (Mini Project , Semester VI)

by

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ACADEMIC YEAR: 2023-24

Introduction:

The disposal of sewage wastes comprises as one of the major worldwide environmental problems as these wastes make the environment unfriendly. The growing demand for waste utilization has made solid wastes like sludge and demolition waste an essential composition of this study. The possibility of reduction of the production costs provides a strong logic for use of this waste.

C and D waste are usually found whenever any civil related activity take place, like Construction of bridges, flyovers, roads etc. it comprises mostly of inert and non-biodegradable material such as sand, gravel, concrete, metal, plastic, glass etc. Demolition wastes are heavy, bulky, and have high density and take up loads and space. So what if try to recycling of these wastes.

Artificial aggregates, and cement like properties is a win win strategy as it not only recycles the wastes product, but also alleviates the problems of waste disposal. Recycling such wastes by incorporating them into building materials is a practical solution for pollution problems.

o Importance of construction & demolitions waste: -

Landfill method is not the most effectively method for the disposal, as precious land is used up as landfill site. Development of a novel method for the disposal is required so that these can be utilized as construction materials, thereby lowering the price of construction and making low income housing possible.

The various importance of construction and demolition waste are as follows :

- Preserve the natural resources: So as to preserve the natural resources like fine particles (river sand).
- Shortages of dumping sites: The major important thing Land gets wasted due to dumping of these wastes.
- Reducing the construction cost: To reduce the construction cost thus resolving housing problems faced by the low income society of India.
- Ingredients: The very basic solid coarser aggregates ingredients are available already in this waste.

Preliminary Observation/Results:

- The weight of the bricks is approximately 4KG.
- The size of the bricks is 190mm x 90mm x 90mm

Sr. No.	Materials	Content in percentage	Content in gm
1.	C and D waste	40%	800
2.	Crush Sand	30%	600
3.	Fly ash	10%	200
4.	Cement	20%	400

❖ **Compressive strength test :-**

- **Date of Casting :- 28-March-2024.**
- **Date of Testing :- 30-April-2024.**

Sr.No.	Sample No.	Cross section area (mm^2)	Age in days	Compressive load (KN)	Compressive strength (N/mm^2)	Average compressive strength (N/mm^2)
1.	1	19000	28	446.30	23.489	29.57
2.	2	19000	28	649.20	34.168	
3.	3	19000	28	590.25	31.060	

Result:- The average compressive strength test is 29.57 N/mm^2

❖ **Ultrasonic Pulse Velocity Test :-**

Bricks Length :- 190mm

Bricks	Pulse velocity in concrete (km/sec.)	Average
Bricks 1	3.09	3.33 km/sec.
Bricks 2	3.57	

Result:- Plus velocity is 3.33 km/sec. hence, Satisfactory but loss of Integrity is suspected

❖ **Water Absorption test :-**

Sr.No.	Sample No.	Size of bricks in mm	Oven dry mass of brick (W1)	Mass of wet bricks (W2)	Percentage of water absorption
1.	1	190mm x 100mm x 80mm	4.50	4.58	1.77 %
2.	2	190mm x 100mm x 80mm	4.17	4.32	3.59 %
3.	3	190mm x 100mm x 80mm	4.02	4.28	6.46 %

Result:- 1.The Water absorption test for sample 1 is 1.77%.
2.The Water absorption test for sample 2 is 3.59%.
3.The Water absorption test for sample 3 is 6.46%.

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Rooftop Rainwater Harvesting Potential in GIT College using Google Earth Pro and QGIS

Submitted in partial fulfillment of the requirements

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ACADEMIC YEAR: 2023-2024

Introduction:

Water plays a very important role in accomplishing the essential needs of all living beings. The most important aim of rainwater harvesting is to supply water for future needs. Rainwater harvesting is mainly essential in arid, urban and water scarce areas. Generally, harvesting rainwater is two types one is Surface runoff harvesting and the other is Rooftop rainwater harvesting (RTRWH).

In rooftop, rainwater harvesting rainwater runoff is collected from various roof surfaces which typically offer dirt free water that can be used for drinking. The harvested rainwater is used for different non-potable applications as flushing, cleaning, gardening, and laundry washing etc. Rainwater harvesting, besides being eco-friendly, is an economic practice as well. The collection of rainwater may reduce flooding in certain areas as well. It also reduces the demand for Groundwater and the Water Bills. Setting up rooftop rainwater harvesting facilities is an economical way of water conservation, especially in the educational and commercial sectors as consists of large building rooftops which serve as a catchment for rainwater runoff.

Methodology:

The methodology involves the following steps to achieve the objectives of the study:

Step-1: Digitization of rooftops using Google Earth Pro

Step-2: Calculation of the area of various types of roofs using QGIS

Step-3: Estimation of Rainwater Harvesting Potential, Water demand

Step-4: Daily discharge and storage tank volume calculation

Conclusion:

In this study, analysis is made to estimate the potential of rooftop rainwater harvesting to meet the general demands of water in the study area. To achieve the objectives of the study the applications of Google Earth Pro was used for digitizing the available rooftops in the institution and QGIS was used to estimate the area of roofs. Rooftop rainwater harvesting Potential in the study area has estimated by using Gould and Nissen (1999) Formula. The geospatial applications like Google Earth Pro, Bing Maps and software's like QGIS are essentially helpful in the works wherever extensive field works are involved.

The results showed that the volume of water can be harvested from various rooftops are observed as 14983896 liters to the total annual water demand 6570000 liters. Hence the total drinking water demand is completely satisfied considering 3 lpcd and the remaining 47% water can be used for Basic hygiene practices considering 15 lpcd for institutional purpose. Thus the mentioned work concludes emphasizing that, Rooftop Rainwater harvesting system is the suitable alternative available to meet the increasing water problems, in the study area.

Rainwater Harvesting contributes to reduce the pressure on groundwater therefore; it should be promoted to the maximum possible extent. Planning Roof Water Harvesting is a very cost-effective solution for educational institutions as its buildings will have huge roof surface and the amount of water which can be stored will give a promising solution to the water demand.

LIGHT WEIGHT NATURAL AGGREGATE CONCRETE

Submitted in partial fulfillment of the requirements of the degree

BACHELOR OF ENGINEERING IN CIVIL ENGINEERING

By

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ABSTRACT

The present research project entitled "**Light Weight natural aggregate Concrete**" lightweight concrete canbe defined as a type of concrete which includes an expanding agent in that it increases the volume of the mixture while giving additional qualities such as nailbility and lessened the dead weight. It is lighter than the conventional concrete. The use of light weight concrete has been widely spread acrosscountries such as USA, United Kingdom and Sweden. The main specialties of light weight concrete are its low density and thermal conductivities. Its advantages are that there is a reduction of dead load, faster building rates in construction and lower haulage and handling costs.

Light weight concrete maintains its large voids and not forming laitance layers or cement films when placed on the wall. This research was based on the performance of aerated light weight concrete. However, sufficient water cement ratio is vital to produceadeuate cohesion between cement and water. Insufficient water can cause lack of cohesion betweenparticles, thus loss in strength of concrete. Likewise too much water can cause cement to run off aggregate to form laitance layers, subsequently weakens in strength.

Therefore, this fundamental report is prepared to study activities and progress of the light weight concrete. Focused were on the properties of light weight concrete such as compressive strength, water absorption and density and its applications in various fields of civil Engineering construction

3. Aim of the Micro Projects:-

Light weight natural aggregate concrete

To reduce weight of structure by using or preparing natural aggregate light weight concrete.

4. OBJECTIVE OF PROJECT

- ✓ To develop an M30 mix with natural aggregate.
- ✓ To compare the flexural behavior reinforced beams with lightweight concrete.
- ✓ To study the feasibility of replacing natural coarse aggregate with lightweightAggregate.
- ✓ Strength improvement of the optimum mix using fly ash.
- ✓ Finding the optimum mix.

9. CONCLUSION

1. From the study it is concluded that the usage of light weight cinder aggregate to Some extent (25%) has proved to be quite satisfactory strength when compared to Various strength studied
2. It can be conclude that due to porous nature cinder aggregate"s quality is low in Comparison with normal aggregates.
3. 25 % is our optimum mix
4. The result indicate that the split tensile strength is decrease with increase in Percentage of cinder.
5. The compressive strength of concrete reduced with the increase of cinder in Concrete. However there was no drastic change in strength beyond 50% Replacement. Major change in strength was observed only up to 25%
6. There was no sudden failure of the specimen when cinder was introduced in higher percentages in flexure. Cracks were observed before failure. Low density Has several advantages compared to normal concreters. In the present Investigation, low densityconcrete was obtained by replacing both coarse and Fine aggregate by alternate lightweight material. Though the strength reduced as Also suggested by previous researchers, the goal of obtaining the light weight Concrete was achieved.

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LAND USE AND LAND COVER FOR VASHITHI BASIN

Submitted in partial fulfillment of the requirements

of the Second Year

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ACADEMIC YEAR: 2023-24

OBJECTIVES

- The objective of the present study is to generate a high accuracy land use/cover classification map for vashishthi river in Ratnagiri district located in the state of Maharashtra, India using recent period high resolution data.
- To the best of our knowledge, such classified map of the recent period derived from high resolution satellite data has not been attempted.
- The available maps are quite old. In the current time of rapid urbanisation and changing land use patterns, such input is essentially required for several studies.
- The main objective of this project is to determine the land use changes in the area under study from 2016 to 2022.
- To understand the various functionalities used in QGIS.
- To apply various tools of QGIS to map, identify and analyze the changes between two time periods.
- Provide information to help users to understand the current landscape.

CONCLUSION

- Understanding and monitoring land use and land cover are essential for effective land management, environmental conservation, and sustainable development.
  - 52% area is covered by barren land
  - 37% Area is covered by forest
  - 5% Area is covered by Built-up Area
  - 2.7% area is covered by Crops
  - 2.14% area is covered by Water Body
  - 0.065% area is covered by vegetation
  - 0.00021% area is covered by Damping Yard

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UTILIZATION OF WASTE PAPER PULP IN COMBINATION OF FlY ASH,SAND AND CEMENT TO DEVELOP LIGHT WEIGHT BLOCK

Submitted in partial fulfillment of the requirements

of the degree of

Bachelor of Engineering (Major Project Stage I, Semester III)

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ACADEMIC YEAR: 2023-24

1.2 AIM AND OBJECTIVE

Aim of the project :-

To introduce a waste product which is to be used in construction industries for sustainable development and low cost housing.

Objective of project :-

1. To utilize the waste materials like paper, fly ash in the process of manufacturing new type of eco-friendly block namely light weight paper pulp block.
2. To compare the properties of this block with conventional block and standard paper pulp block.
3. To develop light weight blocks that passes superior strength to weight ratio, thermal insulation properties and durability, while minimizing their environmental impact.
4. To prepare the estimate of G+1 residential building by using fly ash paper pulp block.

CHAPTER 5: CONCLUSION

1. Using the paper pulp block in a building total cost will be reduced from 20% to 30%
2. The weight of this block is less compared with the weight of conventional concrete block. Due to less weight of this block the total dead load of the building will be reduced.
3. This block are potentially ideal material for earthquake prone areas as they are lightweight and flexible.
4. This blocks are not suitable for water logging and external walls. It can be used in inner partition walls.
5. Paper pulp block can be developed as a material which is suitable for low-cost housing and temporary shelters and offices and can help reduce carbon footprint.

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TO STUDY THE USE OF DISCRETE FIBER IN ROAD PAVEMENT TO INCREASE THE QUALITY OF THE ROAD PAVEMENT.

Submitted in partial fulfillment of the requirements

of the degree of

Bachelor of Engineering (Major Project Stage II, Semester IV)

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ACADEMIC YEAR: 2023-24

1.2 AIM AND OBJECTIVE

Use of Discrete Fiber In Road Pavement construction to increase the quality of road pavement.

OBJECTIVES -

1. **To study the variation in compressive strength in concrete pavement with the incorporating the mixture of different amount of fibres.**
2. **To control the cracking due to drying shrinkage which is the major problem in the concrete pavement.**
3. **To study the changes in tensile strength in concrete pavement with the addition of mixture of different amounts of polypropylene and polyester fibres.**
4. **To compare the changes in strength in concrete with and without fibre.**

1.3 Methodology

Introduction of methodology:

The methodology used to follow the successful completion of project or our objectives consits of the following steps and the methodology used is discussed below.

Point wise methodology:

1. The methodologies use to follow the successful completion of project or our objective consist of the following steps are discussed below.
2. To do the survey about the avability of the material Collecting the material which are used for mixing proportion.
3. To study the different cases of the fibre and fibre mix concrete.
4. A fiber mix commonly involves more vibration to unite the combination.
5. The alike equipment and procedure as used for standard concrete also can be used.
6. The fiberes used in the mixture Of concrete is polyester and polypropylene fibre.
7. Study the different properties of the polyester and polypropylene fibre.
8. All these specimen are compared for their mechanical properties.

CHAPTER 6 : CONCLUSION

- We study The Compressive Strength of Normal concrete mix is less than the rest of the three mixes but the mix of concrete with polyester and polypropylene increased the most compressive strength of the concrete.
- We studies the different cases of the fibres used in the construction works.
- Studied The flexural strength of Normal concrete is less than the other three mixes but the concrete mix with polyester and the mix with both the polypropylene and polyester showed a great increase in the flexural strength in the concrete mix.
- The split tensile strength of Normal concrete mix is less than the other three but only the concrete with polyester fiber of 5% and the mix of both polypropylene and polyester increased the strength.
- The addition of polyester fiber in concrete showed a great increment in the strength than the polypropylene fiber.
- The difference between the strength increments in concrete mix with polyester fiber and the concrete mix with both the polyester fiber and polypropylene fiber is not so much high.

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LOW COST HOUSING

Submitted in partial fulfillment of the requirements

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Bachelor of Engineering

by

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ACADEMIC YEAR: 2023-2024

ABSTRACT

Low Cost Housing is a new concept which deals with effective budgeting and following of the techniques which help in reducing the cost construction through the use of locally available materials along with improved skills and technology without sacrificing the strength, performance and life of the structure. In todays life housing is a basic need of human being. But this is out of the means of low income householder who constitute majority of the population in the country. Moreover, the government of India has a vision "Housing for all". Low cost housing becomes most important topic in civil engineering. In this report some methods of low cost housing are given. This report is mainly concentrated on chapter construction materials. A few low cost materials are also discussed in this report. This report also includes important specifications. The material required for real construction of houses are also specified. Today, there is no awareness in people as well as engineers and contractors about this of low cost housing. So we hope this project could be a suggestion for any construction authority or the local contractors. So, that in the time of high land cost as well as costly construction period, a common man can have such kind of property. In this report various government schemes related to low cost housing are also mentioned with their details. Owning an asset, such as, a house protects the poor from the vicissitudes of life. It is one of the basic needs for most poor households and is important to ensure safety and health. For poor people who work out of their homes, such as micro-entrepreneurs, home improvement may have positive implications for income generation. As such, low-income housing is an area of interest for NGOs and financial institutions that serve the poor since not only is this an important need for the well-being of poor people, it is also something for which there is a clear willingness to pay for secure housing or land title.

INTRODUCTION

Low cost housing is a new concept which deals with effective budgeting and following of techniques which help in reducing the cost construction through the use of locally available materials along with improved skills and technology without sacrificing the strength, performance and life of the structure. India is the one of the largest country in the world and possessing one of the largest population in the world. India has still lots of areas where it is behind in comparison with top most economy in world. To stay healthy one need a proper place to reside for the entire life and that is home. This is one of the important components of one's life. As we know the India has population about 1.4 billion and increasing at unbelievable rates. In developing countries such as in India, only 20% of populations are high-income earners. Low cost housing doesn't mean that the building materials are cheap. It means a concept of reduction in cost of construction without sacrificing the strength required for the strength required for the performance of building. Apart from financial measure the actual cost of housing can also be reduced by sharing the walls or smart design. Reducing cost of structure is also achieved by postponing finishing work. In low cost housing construction method of walling, roofing and lintel are compared. It is significant that against the annual population growth rate of 2% in the country, the number of residential building has increased at an annual rate of only 1.5%.According to the federation of Indian chambers of commerce and industry (FICCI), Keeping in view the existing housing crisis in the country, the present addition of 2.5 million units a year is hopelessly inadequate. Some 110 million housing units are required to be constructed annually for meeting the housing requirements of the country. the gravity of the housing situation in India urban as well as rural sector is discussed at length in the following pages. There are a few individual estimations of housing shortages that suggest shortages are much more than that of the government estimates. For instance, using the 2011 Census and NSS housing rounds (2008-09), It suggests that there is a housing shortage of more than 62 million units in rural India. In another exercise, the shortages have been calculated to the tune of 140 million Not withstanding the plausible methodology that these estimates use, even if we consider the a fact that rural India has an enormous conservative estimates of Working Group, it remains housing shortage of more than 43 million u Only a small number of the houses in rural India are pakka (built area of partly pakka house) and partly kachcha.

OBJECTIVES & ADVANTAGES

The objectives of low cost housing are

1. To study the housing requirements of people.
2. To study various Construction techniques which can be used to reduce the cost of construction.
3. Study of alternative materials which can be used for Low cost housing.
4. Cost estimation of normal building and the identifying the percentage reduction in cost for low cost building.

Advantages of Low Cost Housing are:

1. Use of cheap & locally available materials
2. Job opportunity for local people
3. Biodegradable materials
4. Energy efficiency and eco friendliness 5 – 15 times less energy consumed than fired brick and around 3 – 8 times less emission
5. Transferable technology
6. Import Reduction
7. Cost effectiveness
8. Minimum mortar required
9. Hollow provisions for laying vertical and horizontal reinforcements to improve the lateral load resisting capacity
10. Ease and Fastness in construction

CONCLUSION

1. It is now possible to built Speedy and Low Cost Housing for rural and urban areas without any compromises with the strengths or materials being used.

2. All the above stated techniques and method also help in saving energy .

3. The affordability of a Residential building can be brought to the range of Low and Medium class income people through adopting to Improved Building Technologies and proper usage of Natural resources.

4. The cost of a building can be reduced up to 25-30%

5. The strength of the building is not compromised in Low cost Housing and in fact the buildings are made more effective.

6. The low income people wish to have their house through Government schemes and the remaining through Loans and Own sources.

7. The chapter emphasized that the concept and different strategies of progressive development were based on the observation of the process of dwelling evolution in informal settlements. Progressive development in informal settlements is a reflection and, at the same time, a part of the household's needs. However, the study questions how dwelling evolution occurs under the conditions of progressive developmentprojects.

8. The review of existing studies in the area outlined important aspects of the evolution of dwellings in progressive development projects. In general, studies concluded that dwellings increased their area through additions and changes made to the existing dwelling. The use given to the additions and the sequence in which these were built revealed the household's needs and priorities. The place within the plot where additions were made was also relevant to the process.