

Technical Suitability of Locally Available Materials for People Housing Program in Triyuga Municipality, Udayapur District, Nepal

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ABSTRACT

Purpose: *The Janata Aawas Karyakram (People Housing Program) is the public authority of Nepal initiative to satisfy the target of furnishing in reverse segment of society with lodging facilities, from the Financial Year 2066/67 to give lodging by building minimal expense current lodging facilities for Dalit and denied Muslim families. Let's assure the Technical Suitability of locally available materials based on strength, weather-resistance, fire-resistance, workability, durability, availability, and aesthetic appearance for the construction of Janata Aawas with reference to Triyuga Municipality in Udayapur District.*

Design/Methodology/Approach: *The results obtained from laboratory tests and the corresponding theoretical values from IS Codes, Literature, and Theories were compared and the hypothesis was set up to depict the relation between them using Chi-Square Test.*

Findings/Result: *The Storey-height as designed and recommended in Current Janata Aawas Programme needs to be revisited. In terai, it is desired to provide substantial story-height to avoid the heat factor. As the Current Janata Aawas Programme does not include the work of Plaster, the final product seems to be unfinished and doesn't provide good aesthetic appearance. This too becomes the reason of criticism and complaints from the concerned stakeholders accusing the employee of Implementing Agency for Negligence and corruption. Hence, The Plaster Works also needs to be incorporated in the estimate for the construction of Janata Aawas Programme. The thatch roof, due its unavailability, owed to the fact that the agro-forest area has been reducing day in and day out, and also due to its low fire-resistance, cannot be used as roofing material for Janata Aawas Programme.*

Originality/Value: *The Construction Materials that were used in Janata Aawas Programme was technically sound enough to be used as construction materials.*

Paper Type: *Research paper.*

Keywords: Lab tests, Material strength, Weather-resistance, Fire-resistance, Workability, Durability, Aesthetic appearance.

1. INTRODUCTION :

People Housing Program is popularly known as Janata Aawas Program (Mishra, A. K. & Aithal, S. & Saremi, H., (2020): Parajuli, Parajuli & Mishra, A.K., (2020) [1&2]. Considering the significant number of people from marginalized groups and under poverty, it remains the due responsibility of the nation to address the basic needs of Food, Shelter, and Clothes (*Gaas, Baas ra Kapaas*) of these groups of people. The need of house is being fulfilled by introducing and implementing *Janata Aawas Karyakram* by the Government of Nepal since Fiscal Year 2066/67 (DUDBC, 2014) [3]. *Janata Aawas Programme* is an initiative from the Government of Nepal during its introduction and starting phase, but now it is being implemented by the Provincial government since 2076 BS. Under this programed, the beneficiaries will be poor people from dalits, muslims and the marginalized communities. They will be

provided with a housing unit worth NRs. 3,50,000.00, which comes with a string attached, i.e., the beneficiaries need to construct a toilet on their own to get the housing unit facility (UDBO 2022) [4]. To satisfy the target of furnishing in the reverse segment of society with lodging offices, the public authority of Nepal has carried out Janata Aawas Karyakram (People Housing Programme) from the Monetary Year 2066/67 to give lodging by developing minimal expense present day lodging offices for Dalit and denied Muslim families, which contains a sum of 2274 houses in the repayments of 17 towns of Siraha, Saptari and Kapilvasu regions, which was begun with the spending plan of Rs. 30 crores being allotted to Branch of Metropolitan Turn of events and Building Development (DUDBC) under its yearly program of FY 2066/67 (DUDBC, 2014) [3]. Thinking about the fame and value of the program, this program incorporated the settlements of Chepang, Raute, Kusunda, and other minimized bunches under this program.

This program had been executed, at first, through DUDBC, which is a substance under central government, to give lodging to Dalits, adibashi, Janajati, minority, in reverse and minimized different gatherings. In the mean time in the current day, this program is given over to Province Government, which presently executes the related errands. This program is worried about giving lodging offices by developing minimal expense current lodging for minimized unfortunate families. The program was achievement since it esteemed the neighborhood development material and innovation thinking about the vernacular engineering of the nearby local area. Besides, the expense adequacy and support of locally accessible labor for the development helped its notoriety alongside progress. A literature on "Financial Mobilization Status of People Housing" authored by Mishra and Aithai was primarily focused more on the financial aspect associated with the People Housing Program and less on the technical and technological aspects associated with it (Mishra, Aithal & Saremi, 2020) [1]. Similarly, the next article related with the People Housing Programme entitled "Review on Global Practice of Housing Demand Fulfilment for Low Income Group People" and authored by A. K. Mishra [5] maneuvers with the social aspect of Housing concerns of the Low Income Group (Shah & Mishra, 2018) [6]. Similarly, the next related literature "Low Cost Community Housing Program" authored by S. Parajuli and A. K. Mishra to addresses the socio-economic aspect (Parajuli & Mishra, 2020) [2]. Likewise, the next related article "Housing Needs Fulfillment of Low Income Group" by A. K. Mishra revolves round on squatter settlements along the Bagmatii river and doesn't provide insight to Janata Aawas Program (Mishra, 2019) [5]. The next Literature entitled "Estimating Housing Unit for Low Income Group of People of Kathmandu, Nepal" authored by A. K. Mishra and S. K. Shah just states the housing needs of slum and squatters of Kathmandu in quantity. No any descriptions have been made regarding the technical aspect (Mishra & Shah, 2018) [7].

2. STATEMENT OF PROBLEMS :

The Public authority of Nepal has sanctioned the Right to Housing Act 2075, which came into force on 18 September 2018, to give a regulative system to the execution of the option to lodging ensured under Article 37 of the Constitution of Nepal of 2015 (The Constitution of Nepal, 2015). It has been expressed that it will be the obligation of the state to ensure the arrangement of social and monetary security including the land and house for those gatherings that are socially and financially in reverse (NLC 2018).

Meanwhile in the context of Nepal, despite enacting Housing provisions in Legislations, it is still not gaining momentum as required. Nepal is a country consisting of a large number of poor families NPC (2021) [9]. Moreover, Nepal is a poor nation in itself. Hence using sophisticated and imported materials as a construction material to provide housing facilities will further increase the cost of the project making the limited number of beneficiaries. Hence, locally available materials that is suitable to be used and utilized as construction material if considered, will help to make the project economical, which in turn aids to increase the number of beneficiaries and in some way help to reduce quantity of the homeless families and the situation is not much different in other nearby countries like Bangladesh but Nepal is stressed more by earthquake 2015 also, provide the urgency of this research [10-14].

3. OBJECTIVES :

The research aims to assure the Technical Suitability of locally available materials based on strength, weather resistance, fire-resistance, workability, durability, availability, and aesthetic appearance for the

construction of Janata Aawas with reference to Triyuga Municipality in Udayapur District of Nepal.

4. METHODOLOGY :

The construction materials that are used in Janata Aawas Programme are concerned with ontology. To assess the technical suitability of Locally available construction materials, related IS Codes, Test methods and procedures and concerned laboratory tests will be carried out along with the study of the different related literatures.

4.1 Study Area:

The houses that are built under the program of JANATA AAWAS, which was implemented by Department of Urban Development and Building Construction (DUDBC) of Federal government some years back and by Urban Development and Building Offices of the Provincial government as of now is kept under the matter of study. The Study Area is the various wards of Triyuga Municipality of Udayapur District. According to the 2021 Nepal National Census, Triyuga Municipality had 104,375 inhabitants (Nepal National Census, 2021). It is divided into 16 wards. Triyuga Municipality was established on Chaitra 13, 2053 (26 March 1997). It was named after Triyuga River. A river which flows through the town. Triyuga is the 3rd largest municipality in Nepal and 1st largest in Province No. 1 in term of size (area). The total area of the municipality is 547.43 square kilometres (211.36 sq mi) (Triyuga Municipality, 2022) [15].

4.2 Data Collection:

The Drawing, Design & Guidelines (*Kaaryabidhi*) were collected to study the on-going practices of Janata Aawas Programme. Besides, to collect data related to technical aspects, the various laboratory equipments and methods were applied. The extensive lab works were conducted to derive out the technical properties of construction materials. The different properties associated with different construction materials as shown in the following table were endeavored for lab tests in the laboratory. For the conduct of laboratory tests to obtain the technical strength of construction materials, the IS Code 516-1959, IS 516-9013, IS 2185.1.2005 were followed. For the technical properties of construction materials, this study desires to find out the experimental values associated with technical parameters like strength, weather-resistance, fire-resistance, workability, durability, availability and aesthetic appearance. But due to the unavailability of Laboratories which conducts all of the above stated tests, only the strength values are taken from the results of laboratory tests.

4.3 Data Analysis:

For the technical properties of construction materials, this study desires to find out the experimental values associated with technical parameters like strength, weather-resistance, fire-resistance, workability, durability, availability and aesthetic appearance. But due to the unavailability of Laboratories which conducts all of the above stated tests, only the strength values are taken from the results of laboratory tests. The results obtained from laboratory tests and the corresponding theoretical values were compared and the hypothesis was set up to depict the relation between them. The hypothesis provides the extent to which the laboratory tests results matches the corresponding theoretical value. Laboratory results matching the corresponding theoretical values indicates that the construction materials that has been practiced and used in Janata Aawas Programme are technically justifiable.

Besides, the remaining technical properties of construction material that were not feasible to get tested in laboratory and derived from the literatures, were analysed to ascertain if the construction materials are suitable to be used as construction materials for the Janata Aawas Programme.

4.4 Setting up Hypothesis:

Setting up Hypothesis for relation in between Strength Values from Laboratory Tests (Observed Values) with Standards (Expected Values)

- Type of Test Statistics: Chi-Square Test
- Purpose of Test: To check goodness of fit i.e. to test how well a sample of data matches the well-established quality standards for low-cost house construction works.
- Null Hypothesis H₀: There is no significant relation between Observed and Expected Strength

Values.

- Alternate Hypothesis H1: There is significant relation between Observed and Expected Strength Values.

5. RESULTS AND DISCUSSION:

5.1 Assessment of the Technical Suitability of Locally Available Materials:

The different properties associated with different construction materials as shown in the following table were endeavored for lab tests in the laboratory. For the conduct of laboratory tests to obtain the technical strength of construction materials, the IS Code 516-1959, IS 516-9013, IS 2185.1.2005 were followed [16]. The laboratory test results and corresponding strengths derived from the study of literatures/theory is shown below in table 1.

Table 1: showing the Laboratory and Theoretical Strength values of Construction Materials

S. N.	Materials	Technical Parameters	Strength from Laboratory Tests N/sq.mm	Corresponding Theoretical Strength N/sq.mm
1	Cast Iron	Ult. Compressive Strength	609	615 (Jash Metrology, 2016). [17]
2	Local Wood	Ult. Compressive Strength	39.5	35 (Harte, 2009). [18]
3	2nd Class Brick	Ult. Compressive Strength	7.14	7 [16]
4	1st Class Brick	Ult. Compressive Strength	10.55	10.5 [16]
5	Stone	Ult. Compressive Strength	104.50	100 (Cakir, Durmus, Seker & Dogagun, 2014). [19]
6	Concrete, Grade M20	Ult. Compressive Strength	24.05	20 (Engineering Toolbox, 2008). [20]
7	Hollow Concrete Block	Ult. Compressive Strength	11.5	9 (Hasan, Saidi, Sarana & Bunyamin, 2021). [21]
8	Bamboo	Ult. Compressive Strength	39.25	35 (Fahim, Harris, Khan & Zaman, 2022). [22]

Similarly, the technical properties of construction materials that were not feasible to get tested in lab, but whose properties were ascertained referring to different literature are tabulated in table 2.

Table 2: showing the Technical Properties of Construction Materials

S. No.	Materials	Technical Parameters	Respective Property	Is Technically Suitable to be used as a construction material ?	Remarks
1	Thatch	Weather-Resistance	Weather-Resistant	yes	Since most of the properties favours to be used as a roofing material, we can proceed with the choice of Thatch Roof.
		Wind-Resistance	Wind-Resistant	yes	
		Water-Absorption	Low Water-Absorbant	yes	
		Versatility	Versatile as can be used for irregular roofs as well	yes	
		Fire-Resistance	Low Fire-Resistance	no	
		Rot-Resistance	Low	no	
		Weight	Low Weight, meaning less timber is required for roof structure	yes	
		Durability	Average	yes	
		Porosity	Non-Porous	yes	
		Workability	High	yes	
		Environment-Friendliness	Environment-Friendly	yes	
		Appearance	Aesthetic	yes	
Availability	Adequate	yes			
2	Bamboo	Weather-Resistance	Weather-Resistant	yes	Since most of the properties favours to be used as a construction material, we can proceed with the choice of Bamboo for Roof Truss.
		Wind-Resistance	Wind-Resistant	yes	
		Water-Absorption	Low Water-Absorbant	yes	
		Versatility	Versatile as can be used for various applications	yes	
		Fire-Resistance	Low Fire-Resistance	no	
		Rot-Resistance	Low	no	
		Weight/Specific Gravity	Light. Hence, good material for roof truss.	yes	

S. No.	Materials	Technical Parameters	Respective Property	Is Technically Suitable to be used as a construction material ?	Remarks
		Durability	High	yes	
		Workability	High	yes	
		Environment-Friendliness	Environment-Friendly	yes	
		Appearance	Aesthetic	yes	
		Availability	Adequate	yes	
		Hardness	High	yes	
		Toughness	High	yes	
3	Iron	Weather-Resistance	Weather-Resistant	yes	Can be used as a construction material for Doors & Window Works.
		Wind-Resistance	Wind-Resistant	yes	
		Water-Absorption	Low Water-Absorbant	yes	
		Versatility	Versatile as can be used for various applications	yes	
		Fire-Resistance	Good Fire-Resistance	yes	
		Rot-Resistance	High	yes	
		Weight/Specific Gravity	Heavy	yes	
		Durability	High	yes	
		Workability	High	yes	
		Environment-Friendliness	Environment-Friendly	yes	
		Appearance	Aesthetic	yes	
		Availability	Adequate	yes	
4	Local	Weather-Resistance	Weather-Resistant	yes	Can be used

S. No.	Materials	Technical Parameters	Respective Property	Is Technically Suitable to be used as a construction material ?	Remarks
	Wood	Wind-Resistance	Wind-Resistant	yes	as a construction material for Doors & Window Works.
		Water-Absorption	Low Water-Absorbant	yes	
		Versatility	Versatile as can be used for various applications	yes	
		Fire-Resistance	Low	no	
		Rot-Resistance	Low	no	
		Weight/Specific Gravity	High	yes	
		Durability	High	yes	
		Workability	High	yes	
		Environment-Friendliness	Environment-Friendly	yes	
		Appearance	Aesthetic	yes	
		Availability	Adequate	yes	
		Hardness	High	yes	
		Toughness	High	yes	
		Rustability	High	no	
5	CGI Sheet	Weather-Resistance	Low	no	Can be used as a construction material for Roofing Works.
		Wind-Resistance	High	yes	
		Water-Absorption	Low Water-Absorbant	yes	
		Versatility	Versatile as can be used for various applications	yes	
		Fire-Resistance	High	yes	
		Rot-Resistance	High	yes	
		Weight/Specific Gravity	High	yes	
		Durability	High	yes	

S. No.	Materials	Technical Parameters	Respective Property	Is Technically Suitable to be used as a construction material ?	Remarks
		Workability	High	yes	
		Environment-Friendliness	Environment-Friendly	yes	
		Appearance	Aesthetic	yes	
		Availability	Adequate	yes	
		Hardness	Medium	yes	
		Toughness	Medium	yes	
6	2nd Class Brick	Weather-Resistance	High	yes	Can be used as a construction material only if economy has to be achieved. 2 nd class brick has lesser strength values in comparison to 1 st class brick.
		Wind-Resistance	High	yes	
		Water-Absorption	Medium	yes	
		Versatility	Versatile as can be used for various applications	yes	
		Fire-Resistance	High	yes	
		Rot-Resistance	High	yes	
		Weight/Specific Gravity	High	yes	
		Durability	High	yes	
		Workability	High	yes	
		Environment-Friendliness	Environment-Friendly	yes	
		Appearance	Aesthetic	yes	
		Availability	Adequate	yes	
Hardness	Medium	yes			
Toughness	Medium	yes			
7	1st Class Brick	Weather-Resistance	High	yes	Can be used as a construction
		Wind-Resistance	High	yes	

S. No.	Materials	Technical Parameters	Respective Property	Is Technically Suitable to be used as a construction material ?	Remarks
		Water-Absorption	Medium	yes	material for Super-structure wall.
		Versatility	Versatile as can be used for various applications	yes	
		Fire-Resistance	High	yes	
		Rot-Resistance	High	yes	
		Weight/Specific Gravity	High	yes	
		Durability	High	yes	
		Workability	High	yes	
		Environment-Friendliness	Environment-Friendly	yes	
		Appearance	Aesthetic	yes	
		Availability	Adequate	yes	
		Hardness	Medium	yes	
		Toughness	Medium	yes	
8	Stone	Weather-Resistance	High	yes	Can be used as a construction material for sub-structure wall.
		Wind-Resistance	High	yes	
		Water-Absorption	Low	yes	
		Versatility	Versatile as can be used for various applications	yes	
		Fire-Resistance	High	yes	
		Rot-Resistance	High	yes	
		Weight/Specific Gravity	High	yes	
		Durability	High	yes	
		Workability	High	yes	
		Environment-	Environment-Friendly	yes	

S. No.	Materials	Technical Parameters	Respective Property	Is Technically Suitable to be used as a construction material ?	Remarks
		Friendliness			
		Appearance	Aesthetic	yes	
		Availability	Adequate	yes	
		Hardness	High	yes	
		Toughness	High	yes	
9	TMT	Weather-Resistance	High	yes	Can be used as a construction material.
		Wind-Resistance	High	yes	
		Water-Absorption	Low	yes	
		Versatility	Versatile as can be used for various applications	yes	
		Fire-Resistance	High	yes	
		Rot-Resistance	High	yes	
		Weight/Specific Gravity	High	yes	
		Durability	High	yes	
		Workability	High	yes	
		Environment-Friendliness	Environment-Friendly	yes	
		Appearance	Aesthetic	yes	
		Availability	Adequate	yes	
		Hardness	High	yes	
Toughness	High	yes			
10	Concrete	Weather-Resistance	High	yes	Can be used as a construction material.
		Wind-Resistance	High	yes	
		Water-Absorption	Low	yes	
		Versatility	Versatile as can be used for	yes	

S. No.	Materials	Technical Parameters	Respective Property	Is Technically Suitable to be used as a construction material ?	Remarks
			various applications		
		Fire-Resistance	High	yes	
		Rot-Resistance	High	yes	
		Weight/Specific Gravity	High	yes	
		Durability	High	yes	
		Workability	High	yes	
		Environment-Friendliness	Environment-Friendly	yes	
		Appearance	Aesthetic	yes	
		Availability	Adequate	yes	
		Hardness	High	yes	
		Toughness	High	yes	
11	Hollow Concrete Block	Weather-Resistance	High	yes	Can be used as a construction material for super-structure wall.
		Wind-Resistance	High	yes	
		Water-Absorption	Low	yes	
		Versatility	Versatile as can be used for various applications	yes	
		Fire-Resistance	High	yes	
		Rot-Resistance	High	yes	
		Weight/Specific Gravity	High	yes	
		Durability	High	yes	
		Workability	High	yes	
		Environment-Friendliness	Environment-Friendly	yes	
		Appearance	Aesthetic	yes	

S. No.	Materials	Technical Parameters	Respective Property	Is Technically Suitable to be used as a construction material ?	Remarks
		Availability	Adequate	yes	
		Hardness	High	yes	
		Toughness	High	yes	

From table 2, based on the technical parameters as shown in the table, Thatch and CGI sheet for Roofing Works, Bamboo, Iron and Local wood for Roof Truss, Iron and Local Wood for Door & Window Works, 1st class brick masonry and Hollow-concrete block for super-structure wall, Stone masonry for sub-structure wall would be technically sound enough to be used as construction materials for the *Janata Aawas* Programme.

In any physical construction works, the lower the level of construction works; we desire heavier structure because it needs to withstand the entire load above it [23 & 24]. Therefore, we prefer the lowermost structure to have larger dimensions or heavier. Also, since cement mortar has higher binding property than mud mortar. Owing to this, the stone masonry in cement sand mortar as a sub-structure wall would be best. Besides, stone also doesn't decay or decompose on exposure to external environment unlike bricks.

Similarly, providing stone masonry as a super-structure wall would reduce the space of room as the section of stone masonry is larger in comparison to brick masonry. Again, second class brick masonry acting as a super-structure wall would be of low quality as it has very less strength compared to first class brick masonry. Also, 2nd class brick masonry has high water absorption rate. The preparation of brick in kiln constitutes emission of smokes from kilns, thereby polluting air. This makes brick less environment friendly. The Hollow Concrete block ensures faster and easier construction without any environmental disturbance; it outclasses all other materials to be used as a super-structure masonry wall construction material [25 & 26].

Similarly, local wood would be more suited than the imported iron material. Local wood has considerable compressive, tensile and flexural strength which makes it a good construction material. Also, from the aesthetic aspect too, wooden door and windows are above par to iron door and windows. Similarly for Roof Truss Works, despite the bamboo being local material, it has lesser strengths and lesser aesthetic value (as regular shape bamboo can't be acquired) compared to local wood and iron material. In between, Local wood and iron, iron has higher compressive, tensile and flexural strengths than Local Wood. Also, despite being the local material, attaining Local wood more difficult than attaining iron truss, owing to the fact that the forest area has been declining significantly. Besides, the fabrication works of iron is easier and faster than that of wood. Hence, from strength and time aspect, Iron material as roof truss would be better suited.

Finally, for the Roof cover material, Thatch despite being weather-resistant is not fire proof. Besides, dwindling forest area makes it difficult to attain thatch easily. Due to its unavailability, owed to the fact that the agro-forest area has been reducing day in and day out, and also due to its low fire-resistance, cannot be used as roofing material for *Janata Aawas* Programme. Similarly, RCC construction of RCC slab involves application of Concrete Mixer to mix concrete components and vibrating needle for compaction of concrete while laying. These are not local technology and also requires imported Diesel to operate. On the other hand, CGI Sheet, which involves the application of local skilled and unskilled manpower for its placing in roof, would help to aid local people generate income as well. Hence, CGI sheet acts as a better roofing material.

Besides, from field inspection and questionnaire survey, it is found out that the story-height as designed and recommended in current *Janata Aawas* Programme needs to be revisited. In terai, it is desired to provide substantial story-height to avoid the heat factor. As the Current *Janata Aawas* Programme does not include the work of Plaster, the final product seems to be unfinished and doesn't provide good

aesthetic appearance. This too becomes the reason of criticism and complaints from the concerned stakeholders accusing the employee of Implementing Agency for Negligence and corruption. Hence, The Plaster Works also needs to be incorporated in the estimate for the construction of Janata Aawas Programme, which increases the aesthetic appearance of the finished product.

5.2 Physical Understanding of Result from Test of Hypothesis:

The obtained statistics from the test of Hypothesis (χ^2 or Chi-Square) for the test of relationship between Observed strength values derived from laboratories and the corresponding theoretical values is shown in the table 3.

Table 3: showing the Statistics of Chi-Square Test

Hypothesis	Level of Confidence	χ^2 -calculated	χ^2 -tabulated	Decision
Test of relation between Observed and Theoretical Strengths.	95%	10.75	3.841	Reject Null Hypothesis and Accept Alternative Hypothesis.

Here, the tabulated value is less than calculated value. Hence, we reject the Null hypothesis and accept the Alternate hypothesis. This test of Hypothesis (χ^2 or Chi-Square) leads to the fact that there is significant relation between the Observed and Expected Strength Values. This means that there is significant relation between the Observed strength values derived from laboratories and the corresponding theoretical values. This justifies that these materials are technically sound to be used as construction materials for the building of house of *Janata Aawas*.

Hence, from the assessment of technical properties comprising Strength, Weather-Resistance, Fire-Resistance, Workability, Durability, Availability and Aesthetic appearance of construction materials that have been used in Janata Aawas Programme, derived from Laboratory Tests and study of literatures, along with the Chi-square test results, it is found that the construction materials that have been practiced in the Janata Aawas Programme is sound enough to be used as construction materials. This means, these construction materials are technically suitable to be used to construct the product, i.e., house for the *Janata Aawas* Programme.

6. CONCLUSION :

The study was carried out to sort out the strengths and weakness associated with the current practices of programme with respect to Technical Aspect. The Storey-height as designed and recommended in Current *Janata Aawas* Programme needs to be revisited. In *terai*, it is desired to provide substantial story-height to avoid the heat factor. As the Current *Janata Aawas* Programme does not include the work of Plaster, the final product seems to be unfinished and doesn't provide good aesthetic appearance. This too becomes the reason of criticism and complaints from the concerned stakeholders accusing the employee of Implementing Agency for Negligence and corruption. Hence, The Plaster Works also needs to be incorporated in the estimate for the construction of *Janata Aawas* Programme. The thatch roof, due its unavailability, owed to the fact that the agro-forest area has been reducing day in and day out, and also due to its low fire-resistance, cannot be used as roofing material for Janata Aawas Programme. Construction Materials that were used in *Janata Aawas* Programme was technically sounds enough to be used as construction materials.

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