



e-ISSN: 2319-8753 | p-ISSN: 2320-6710

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International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 6, June 2021

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

**Impact Factor: 7.512**



9940 572 462



6381 907 438



ijirset@gmail.com



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# Case Study on “Use of Laterite Stone Quarry Dust as a Partial Replacement of Sand in Concrete”

Vilas V. Raut<sup>\*1</sup>, Vivekanand N. Pathode<sup>\*2</sup>, Yogesh M.Sinha<sup>\*3</sup>, Parag S.Jibhakate<sup>\*4</sup>,  
Devesh T. Chikhonde<sup>\*5</sup>, Swapnashil L. Meshram<sup>\*6</sup>, Abhijeet P Borkar<sup>\*7</sup>, Parag P.Koche<sup>\*8</sup>

Bachelor of Civil Engineering Student, Dept. of Civil Engineering, Madhukarrao Pandav College of Engineering,

Bhilewada Bhandara, Maharashtra India<sup>\*1,2,3,4,5,6,7</sup>

Prof.HOD of Civil Engineering Dept. of Civil Engineering, Madhukarrao Pandav College of Engineering, Bhilewada

Bhandara, Maharashtra India<sup>. 8\*</sup>

**ABSTRACT:** In the present era the infrastructure is developed rapidly and requirement of construction material is also increases so how to overcome the requirement and cost of construction is elaborate below. In this paper presentation based on the study on “Use of laterite stone quarry dust as a partial replacement of sand in concrete” We are known about concrete the admixture of Cement, sand, aggregate, water etc. In above sand is play main role because it is costly and not found easily in so to understand the requirement of sand is to use of laterite stone quarry dust as a partial replacement of sand (Fine aggregate) in concrete. So to understand the percentage, Quantity, change in the physical property of concrete. In such situation to identify the above contains we are study on the concrete block which prepare by using the laterite as the mix proportion is (1:5:10, 1:4:8, 1:3:6.) Replacement is adopted by 25%,50%,75%,100%.Also Maintain the water cement ratioW/C.

**KEYWORDS:** Analysis, Physical Property of laterite, W/C ratio, Compressive strength, Curshing strength, Density

## I. INTRODUCTION

The overall construction cost of construction is affected by construction material which of them sand ( fine aggregate plays the main role in construction up to half percentage vale of mix design is occupied by sand and other are cement , course aggregate. it is observed the cost is increased and quality of fine aggregate is deceased. the found near the sit is not possible. so overcome this all problem is to use of laterite stone quarry dust as a partial replacement of sand in concrete. by this process we find percentage, quantity, change in the physical property of concrete. the laterite stone quarry dust is found in open mils and other place in which it has used as form bricks .it contained aluminous laterite (bauixite), (ii) iron ore (iii) manganiferouse laterite (manganese ore), (iv) nickeliferous laterite (nickel ore) and (v) chromiferous laterite (chrome ore). laterite containe some binding property is react as a binding agent with such as  $fe_2o_3$ - $al_2o_3$  ratio more than one, and  $sio_2$ - $fe_2o_3$  ratio less than 1.33 is termed as ferruginous laterite, while that having  $fe_2o_3$ - $al_2o_3$  ratio less than one and  $sio_2$ - $al_2o_3$  ratio less than. and there properties like cheap in cost, it has more content of cement and it required same time for carrying strength

## II. LITERATURE REVIEW

1. Sir Olugbengaaetal(2007) :- He is Investigating ,comparing of compressive strength of sandcrete block vs laterite block by partial replacement of laterite with fine aggregate .

**Research :-** :- He is Investigating ,comparing of compressive strength

**Type of Material:** - laterite , fine aggregate ,other construction Material.

**Conclusion:** - Use of 50% % laterite ,with fine aggregate which compressive strength decreases with increasing in laterit .

2. **Sir James Aguwa et al (2009) :-** He has investigated the compressive strength and Cost affects to construction. And also to minimum quantity of cement required to build better strength.  
**Research :-** He is Investigating ,comparing of compressive strength and cost of construction .  
**Type of Material:-** laterite , fine aggregate ,other construction Material.  
**Conclusion :-** use 24% of laterite with replace of cement prepare cube 7,14,21,28 he observe that avg. compressive strength is calculated
3. **Sir Akeem Raheena et al ( 2012) :-** Production and testing is done on laterite block  
**Research :-** He is Investigating ,comparing of compressive strength and cost of construction .  
**Type of Material:-** laterite , fine aggregate ,other construction Material.  
**Conclusion:-** The compressive .strength of 250\*150\*220 are 1NM of minimum 28 days .
4. **Sir Masakzu et al (2012):-** Identify the steel as a costly material so to overcome it use of laterite is adopted to maintained the strength .  
**Research:-** He is Investigating cost of construction and strength of structure .  
**Type of Material:-** study on, laterite, fine aggregate ,other construction Material.  
**Conclusion:-** the cost of construction is affect by steel as major content.
5. **Sir Chandratil (2013):-** Investigation on the urbanization and increasing the cost of construction.  
**Research:-** He is Investigating cost of construction and strength of structure.  
**Type of Material:-** study on, laterite, fine aggregate, bamboo reinforcement, other construction material.  
**Conclusion:-** use of natural cheap product of construction material is beneficial to control the cost of construction.
6. **Sir Joshua et al (2013):-** Use of natural product in the small house making component such as ota, kitchen etc.  
**Research:-** He is Investigating cost of construction by replacement of natural material.  
**Type of Material:-** laterite, sandcret hollow concrete block , other local construction material .  
**Conclusion:-** Use of local construction material is beneficial to maintained the construction cost .
7. **Sir Shuaibu et al (2014) :-** Use of Lateraled concrete to enhance the strength of concrete.  
**Research:-** He is Investigating cost of construction by using Lateraled concrete.  
**Type of Material:** Lateraled concrete, sandcret hollow concrete block, other local construction material  
**Conclusion:-** Identify lateral soil can be give good strength to the concrete structure.
8. **Sir Asieduet al (2014) :-** He can makes the affordable housing and how to utilization of laterite fine as a replacement of fine aggregate to produce sandcret hollow block.  
**Research:-** He is Investigating cost of construction by using Lateraled concrete.  
**Type of Material:** laterite fine, sandcret hollow concrete block, other local construction material  
**Conclusion:-** Identify lateral fine is used up to 30% in the sand cret hollow block is gives good strength.
9. **Sir Aanbenzyet al (2016) :-** He work on the production of block (Solid )which is use laterite fine.  
**Research:-** He is Investigating cost of construction by using Lateraled concrete.  
**Type of Material:** laterite fine, sandcret solid block, other local construction material



**Conclusion:**-Identify laterite fine is used up to (5%, 10%, 15%) in the sandcrete hollow block gives good strength.

**10. Sir Aderibigbe et al (2017) :-** He has investigated the possibility of use of laterite dust quarry in cement stabilizing lateritic soil block.

**Research:** - He is investigating cost of construction by using Laterite concrete.

**Type of Material:**- laterite fine, soil block, other local construction material

### III. DISCUSSION

Method and analysis which is performed in our research work is as follows.

The Modern method is used to make block which is used for testing. The block is prepared by some method is given below.

#### Testing of Material

**Water cement Ratio W/C:** - In the above discretion to make the mould of mixture in 0.99 to 1.79 %.

It is very important ratio which affects the initial setting time, workability and indirectly affects the strength of concrete. The water absorption of block is in first mix 6.1-9.5, second mix 4.3-6.3, and third mix 4.1-6.8 in percentage.

**Types of Material:** - Cement, fine sand, coarse aggregate, laterite fine quarry dust.

**Density of Laterite concrete block:** - Is calculated as the unit weight of laterite fine dust prepared block is 1564 kg/m<sup>3</sup> and 1464 kg/m<sup>3</sup>. The proportion of mix-design is (1.5:10) has max result is found.

**Compressive strength of laterite block:** - In our study is found that different with mix proportion such as 1.5:10 is (1.93-1.40), second mix is 1.4:8 is (2.86-2.21) and third one is mix 1.3:6 is 3.0-2.28.

**Block size:**-200\*200\*50 mm wooden mould No. of block: - 267 nos

### IV. CONCLUSION

The compressive strength of laterite fine stone quarry with cement and aggregate is decreasing with increasing percentage of laterite fine stone quarry. The compressive strength is affected by W/C ratio. The most affected ratio is 0.92. The max compressive strength is when the percentage of 25 % is beneficial to use in construction work. It can be saved up to 25 % cost of cement which decreases.

So overall testing and investigating the use of laterite fine stone is usefully up to 25% with partial replacement of sand. It is most profitable when the use of laterite fine with 0.92 W/C ratio mix -1.4:8.

The research is beneficial to conclude the quantity, percentage, and cost of construction. Also it helps the natural quarry of sand by river.

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