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Data Article

Experimental datasets on properties of river sand as an aggregate in replacement of crushed rock for interlocking stones production

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A R T I C L E I N F O

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A B S T R A C T

The data explored the assessment of the quality of river sand as an aggregate in replacement of crushed stones which are widely used by majority of manufacturers in production of interlocking stones. Experimental tests carried out on river sand and crushed rock as aggregates include: Grain size distribution, Specific gravity, moisture content determination and Bulk density to determine the quality behavior parameters and (compressive strength) to determine the strength parameters. The data of the experiments are presented in Tables and Bar charts.

Specification Table

Subject area	Building Construction, Building Materials Science
More specific subject area	Building Materials Development
Type of data	Table, Figure

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How data was acquired	The data were obtained through experimental tests and procedures under conducive atmospheric condition in the laboratory and simple statistical tools were employed for the analyses.
Data format	Raw data obtained were processed and analysed.
Experimental factors	Various tests on Physical properties and strength parameters of aggregate samples such as moisture content, Bulk Density, Specific gravity, Sieve Analysis and compressive strength were carried out.
Experimental features	Engineering properties of River Sand and Crushed Rock with various laboratory tests.
Data source location	Ota, Atan, Ado-odo Local Government Area, Ogun State, Nigeria.
Data accessibility	The data is available with the article

Value of the data

- The data can be used as a clear indication for finding result comparison from other countries where the use of the said materials is prevalent.
- The data can be adopted for governmental policy on low-cost housing scheme production for the benefit of low-income earners.
- The data provided conducive room for further studies on the reliability of local building materials in the building industries.
- The data provided detailed experimental procedures on how river sand could be used instead of crushed stone thereby reducing its production cost.

1. Data

The data assessed the usefulness of available river sand in replacement of crushed stones in the production of interlocking stone. Related articles are [1–4]. The data presented in Tables 1–9 were obtained from the analyses of property parameters of river sand and crushed rock to determine its suitability for construction activities. The behaviour of 100% RS, 50%/50% RS/CR, 100% CR as indicated in Tables 1–9 illustrated that all the specimens met required standards but River sand had the highest value [5–10] The variance in the value of aggregates in moisture content determination, specific gravity and bulk density determination were equally illustrated in the tables. Data of grading sizes parameters are shown in Figs. 1–3 and they were all in conformity with the standard requirements [8–10].

Table 1
Moisture content determination of 100% river sand.

Tin no	1A (g)	1B (g)
Tin + Wet Soil	68	80
Tin + Dry Soil	67	79
Weight of Tin	34	40
Weight of Water	1.0	1.0
Weight of dry soil	33	39
M.C. %	**3.00**	**2.60**
	Average: - **2.80**	

Table 2
Moisture content determination of 50%:50% (river sand & crushed rock).

Tin no	2A (g)	2B (g)
Tin + Wet Soil	70	80
Tin + Dry Soil	68	79
Weight of Tin	34	40
Weight of Water	1.0	1.0
Weight of dry soil	34	39
M.C. %	**5.90**	**2.56**
	Average: - **4.23**	

Table 3
Moisture content determination of 100% crushed rock.

Tin no	3A (g)	3B (g)
Tin + Wet Soil	60	81
Tin + Dry Soil	68	79
Weight of Tin	34	40
Weight of Water	1.0	1.0
Weight of dry soil	33	39
M.C. %	**5.88**	**5.13**
	Average: - **5.51**	

Table 4
Specific gravity of 100% river sand.

Determination number-	1A	1B
Mass of Empty Pycnometer (g)	**170**	**180**
Mass of Empty Pycnometer + Sample (g)	270	280
Mass of Empty Pycnometer + Sample + Water (g)	526	536
Mass of Sample (g)	100	100
Mass of Pycnometer + Water	463	474
Mass of Sample in Water (g)	356	356
Volume of Pycnometer (cm^3)	290.9	290.9
Specific Gravity	**2.70**	**2.63**
	Average**: 2.67**	
	Specification: 2.60–2.72	

Table 5
Specific gravity of 50%:50% (river sand & crushed rock).

Determination number-	2A	2B
Mass of Empty Pycnometer (g)	**170**	**180**
Mass of Empty Pycnometer + Sample (g)	250	260
Mass of Empty Pycnometer + Sample + Water (g)	507	516
Mass of Sample (g)	80	80
Mass of Pycnometer + Water	458	466
Mass of Sample in Water (g)	337	336
Volume of Pycnometer (cm^3)	290.9	290.9
Specific Gravity	**2.58**	**2.66**
	Average**: 2.62**	
	Specification: 2.60–2.72	

Table 6
Specific gravity of 100% crushed rock.

Determination number-	3A	3B
Mass of Empty Pycnometer (g)	**170**	**180**
Mass of Empty Pycnometer + Sample (g)	250	260
Mass of Empty Pycnometer + Sample + Water (g)	508	518
Mass of Sample (g)	80	80
Mass of Pycnometer + Water	460	468
Mass of Sample in Water (g)	336	336
Volume of Pycnometer (cm^3)	290.9	290.9
Specific Gravity	**2.50**	**2.67**
	Average**: 2.59**	
	Specification: 2.60–2.72	

Table 7
Bulk density 100% river sand.

Determination number-	1A	1B
Weight of Density Container (g)	**1840**	**1840**
Percentage of water added (%)	4.000	4.000
Weight of Sample (g)	1736	1680
Weight of Container + Sample + Water (g)	3576	3520
Volume of Density Container (cm^3)	944	944
Bulk Density	**1.84**	**1.78**
	Average: **- 1.81**	
	Specification: - > 1.3	

Table 8
Bulk density of 50%:50% (river sand & crushed rock).

Determination number-	3A	3B
Weight of Density Container (g)	**1840**	**1840**
Percentage of water added (%)	4.000	4.000
Weight of Sample (g)	1686	1590
Weight of Container + Sample + Water (g)	3526	3430
Volume of Density Container (cm^3)	944	944
Bulk Density	**1.79**	**1.68**
	Average: **- 1.74**	
	Specification: - > 1.3	

Table 9
Bulk density of 100% crushed rock.

Determination number-	2A	2B
Weight of Density Container (g)	**1840**	**1840**
Percentage of water added (%)	4.000	4.000
Weight of Sample (g)	1646	1580
Weight of Container + Sample + Water (g)	3486	3420
Volume of Density Container (cm^3)	944	944
Bulk Density	**1.74**	**1.67**
	Average: **- 1.71**	
	Specification: - > 1.3	

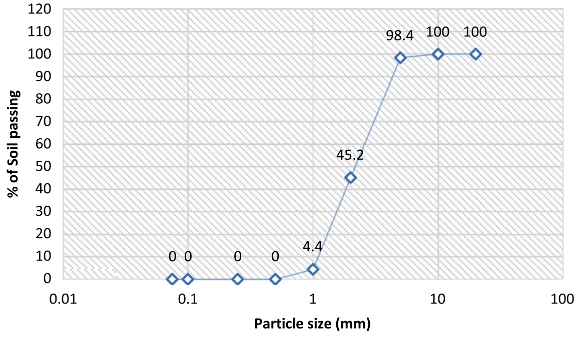

Fig. 1. Sieve analysis of 100% river sand.

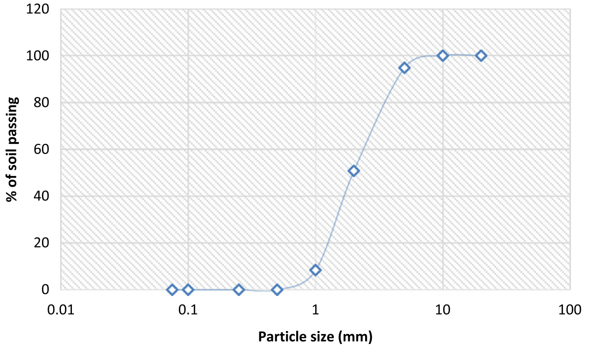

Fig. 2. Sieve analysis of 50%:50% rivers sand and crushed stone.

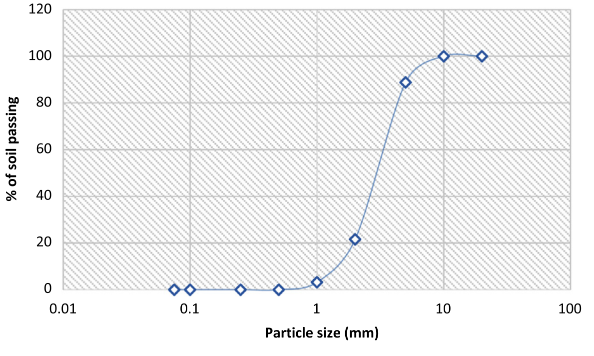

Fig. 3. Sieve analysis of 100% crushed rock.

2. Experimental design, materials and methods

The specimens of fine aggregate used for this data were obtained from Ota and Atan Tipper garage, Ado-odo Local Government Area, Ogun State, Nigeria. The River sand (RS) and crushed Rock (CR) used were; (100%RS), (100%CR) and (50%RS: 50%CR). Ordinary Portland cement (OPC) grade 42.5N was used and it was supplied in good condition. Portable water used for the study conformed to required standard [11]. The experimental procedures were carried out in the following order: 72 interlocking concrete cubes were produced under controlled temperature with ratio 1:3 and 1:4 respectively and

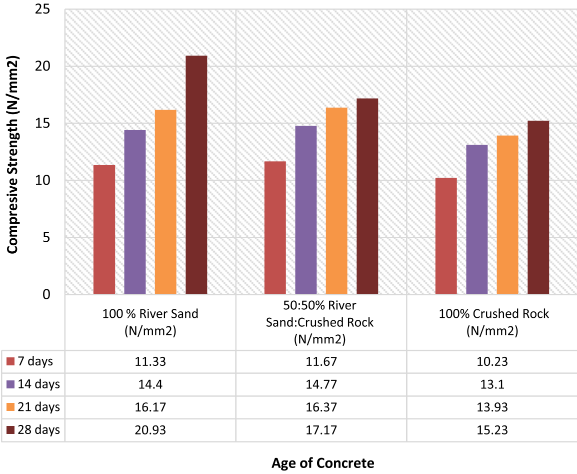

Fig. 4. Compressive strength of the soil for 1:3.

it was cured through immersion method. Compressive strength of concrete cubes was determined after curing for 7 days, 14 days, 21 days and 28 days respectively. To provide a good justification for the test results, several tests such as grain size distribution, specific gravity, moisture content determination and bulk density were conducted on the samples to determine its physical properties and suitability. However, various experimental procedures conducted on engineering properties of river sand and crushed rock were in conformity with the recommended standards [5].

The results of compressive strength for the three samples are shown in Figs. 4 and 5 and methods for mixing, curing, and strength test parameter were strictly followed and they were all in accordance to the standards [12–19]. Figs. 4 and 5 showed differences in strength parameters of the samples used. Thereby, the River sand had the highest compressive strength value with ratio (1:3) over Crushed rock which is most widely used by the interlocking stones manufacturers with assumption of colour resemblance to ordinary Portland cement. The data presented on river sand is a proof to be cost effective when compared with previous studies on crushed rock [1–4]. The outcome of the strength test revealed the performance and standard of local building materials in low cost housing production [19,20]. The presentation of data is also similar to that of [21], the experimental procedure of data presented took into consideration the recommendations of [22–24].

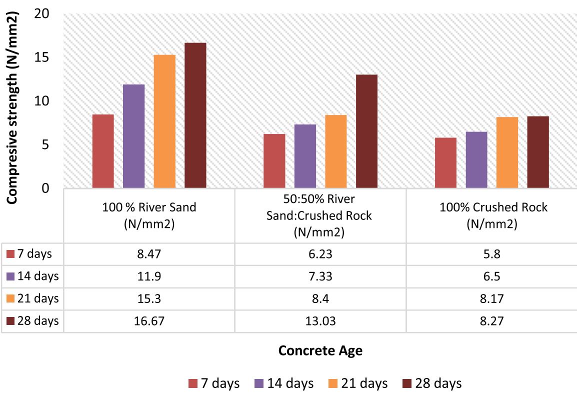

Fig. 5. Compressive strength of the soil for 1:4.

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Transparency document. Supplementary material

Transparency data associated with this article can be found in the online version at http://dx.doi.org/10.1016/j.dib.2018.08.056.

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