Data Article

Data of the properties of rebar steel brands in Lagos, Nigerian market used in reinforced concrete applications

Opeyemi Joshua a,⁎, Kolapo O. Olusola b, Kehinde D. Oyeyemi c, Ayodeji O. Ogunde a, Lekan M. Amusan a, David O. Nduka a, Joyce Abuka-Joshua c

a Department of Building Technology, Covenant University, Ota, Nigeria
b Department of Building, Obafemi Awolowo University, Ile-Ife, Nigeria
c Department of Physics, Covenant University, Ota, Nigeria

ARTICLE INFO

Article history:
Received 18 January 2018
Accepted 29 January 2018
Available online 3 February 2018

ABSTRACT

The data presented herein are compilations of the research summary of “Assessment of the Quality of Steel Reinforcement Bars Available in Nigerian Market” (Joshua et al., 2013) [1]. This data article provides information on the properties and cost of steel rebars used in reinforced concrete in Lagos, Nigeria. The data is based on the properties of 12 mm rebar brands which are the most used steel diameter in construction and they include actual diameters, yield strengths, ultimate strengths, ultimate/yield strength ratio, ductility and the cost of each brand. This data also contains the limiting standard properties of the highlighted properties in this data.

© 2018 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

Specifications Table

Subject area Engineering, Material Science and Concrete
More specific subject area Reinforced Concrete, Construction and Civil Engineering

⁎ Corresponding author.
E-mail address: ope.joshua@covenantuniversity.edu.ng (O. Joshua).

https://doi.org/10.1016/j.dib.2018.01.083
2352-3409/© 2018 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).
1. Data

Over 90% of storey building in Nigeria are of structures made from reinforced concrete [1,2], where all tensile stresses in these concrete structures are resisted by the steel rebars embedded in the concrete. These steel rebars are designed on the assumptions that they possess right cross-sectional diameters and areas, they are of minimum tensile strengths of 460 MPa as specified in the design standards, and they are of specific elongation (ductility) to prevent sudden failures [3]. If the rebars available in the market used in construction possess properties less than these design assumptions, then the failures of such structures become inevitable before their expected lifespan. The data presented herein (Figs. 1–4) were obtained from the physical and mechanical tests of the various steel rebar brands obtained from market survey of nine (9) brands of steel. The data also highlight the limiting standard properties obtained from standards regulating the steel rebars and design assumptions [3,4].

2. Experimental design, materials, and methods

The method of sampling these rebars is by market survey to identify the steel brands used in this data, purchased three cuts of 12 mm diameter rebars for each identified steel brand from three different merchants. The cuts were labeled and sent to the laboratory for tests. 12 mm diameter bar size was chosen because it is the most used in structural design work in Nigeria [5]. Nine (9) steel brands were identified denoted as Brands A-J. The tests conducted include tensile yield and ultimate strengths, elongation (ductility), and prices per standard market length of the identified brands were also surveyed. The tests performed are in triplicates and the average used as represented in this data. Lesser rebar diameter than specified indicate less cross-sectional area of the rebars in reinforced
concrete and hence lesser tensile or compressive resistant strength characteristics. This is vice versa for larger diameters than the specified are used.

Reinforced concrete is designed according to a recommended standard procedure [3], which specifies a minimum of 460 MPa yield strength. The strength of steel rebars used to reinforce concrete is based on the assumption that if the actual yield strength is less than this minimum requirement,
then the reinforced concrete may lose the capacity to effectively resist the tensile service loads. This translates to a reduced strength of the structure. Ductility in steel is a desired property for occupants’ safety in reinforced concrete structures. In the event of reinforced concrete failures, especially under flexural loads, concrete reinforced with ductile steels give warnings like excessive beam deflection which is actually a precursor to the total failure of the structure. The occupants of such structures are therefore given sufficient time to evacuate before the total collapse [1]. Several works on the factors mitigating against construction projects in developing countries have been carried out [6,7].

Acknowledgments

The authors are grateful to the Centre for Research, Innovation and Discovery, Covenant University, Ota, Nigeria for sponsoring the publication of this article.

Transparency document. Supporting information

Supplementary data associated with this article can be found in the online version at http://doi.org/10.1016/j.dib.2018.01.083.

References