

Quality control of red ceramics from Rio Grande do Norte, Brazil

Elcio Correia de Souza Tavares, Danilo Duarte da Costa e Silva and Cláudia Patrícia Torres Cruz

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elciotavares@unp.br

In Rio Grande do Norte, Brazil there is a park covering ceramic companies producing bricks, tiles and other red ceramic products. These companies are predominantly located in rural areas, concentrated around Natal, in the valley of the Rio Assu, and in the Serido region. Besides these points, they can also occur scattered in several locals. The sector is composed predominantly of micro-management group or family of low demand technology. These characteristics make this segment very important to the economy of the state, because they generate jobs in rural areas, contributing significantly to the man set at the country, preventing their migration to large cities. Overall, however, the product quality is very poor, leading to inappropriate use of raw materials, waste of energy, poor conformation of the product, environmental degradation, not obedience to the Brazilian and international standards, etc. These data raise the need for quality control in the ceramic industries of the state. This work aims to contribute to this quality control, raising the values of key physical properties of ceramic bodies produced by various industries in this state. These properties include porosity, water absorption, linear shrinkage, bulk density, loss of pressure to fire and collapse of the material produced. Yet determined the main parameters that influence these values by the Weibull statistics. The Weibull distribution is a type of statistical distribution. It's used mostly for designing with ceramics and it adequately fits a wide range of data. Ceramics tested under a three-point or four-point failure test exhibit a distribution of failures. For samples of constant size and shape, the resultant distribution is given by an expression where the survival probability at a given stress, shows which percentage of the samples survive, and provide a parameter called the Weibull modulus. The greater the value of Weibull modulus, the steeper the transition from survival to failure. The fracture strength variation in the tension of this composite has been modelled using Weibull distribution. The study questions the assumption that the fracture strength of composite materials can be taken as an average of the experimental results. In this respect, the Weibull distribution allows researchers to describe the fracture strength of a composite material in terms of a reliability function. It also provides material manufacturers with a tool that will enable them to present the necessary mechanical properties with certain confidence to end users. The Weibull distribution was employed here to model a strength property, but it can also be used in areas with similar uncertainties. The results show that, as expected, the pottery of the state does not meet the standards recommended by the ABNT and have wide variation in the quality of their products in the same batch leaving products with large variations in their properties, which complicates greater appreciation of them.