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Tijolito: a brazilian green brick
Tijolito: o bloco ecológico brasileiro

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ABSTRACT

Development and sustainability are issues that must be thought together. Because of this fact, the research of new green materials are fundamental to minimize environmental problems. Tijolito is an example of green brick that uses less cement in its composition, mixing it with soil, minimizing in its production sulfur oxides, carbon dioxide, and nitrogen oxides emission and because of its design that is properly to enter plumb and electrical utilities avoids waist of masonry. The unite who compose the brick are vertical pluggable and do not require mortar joint in the installation, reducing waste of material. Tijolito is fabricated presenting a high quality in the production process enabling the perfect construction of walls avoiding waste of masonry. Decreasing masonry and mortar joint waste, less construction garbage will be produced, the construction time will be reduced, and more money on the budget will be saved. Companies and individuals need to be aware of which type of materials are using in the building process if the material is sustainable. Those materials need to be efficient in the function of they are doing in a building, but they cannot cause damage to nature. Developing green materials individuals and companies contribute to environmental protection and for the maintenance of the resources.

KEY-WORDS: Sustainability. Tijolito. Masonry. Soil. Cement.

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RESUMO

Desenvolvimento e sustentabilidade são questões que devem ser pensadas juntas. Por isso, pesquisas sobre materiais sustentávei são fundamentais para minimizar problemas ambientais. Tijolito é um exemplo de bloco ecológico que usa menos teor de cimento na sua composição, e ao mistura-lo com o com solo, minimiza a emissão óxidos sulfuricos, dióxido de carbono e óxidos de nitrogênio, e por possuir orifícios para as passagens elétricas e hidráulicas evita a quebra e o desperdício de blocos. As unidades que compõe a alvenaria são dotadas de um sistema de encaixe vertical e não necessitam de argamassa de assentamento, reduzindo desperdícios de materiais. O Tijolito é fabricado com um alto controle em sua produção permitindo construir-se com qualidade e evitando a perda de materiais que são utilizados na construção das alvenarias. Diminuindo esses desperdícios, menos resíduos são produzidos, o tempo de construção é otimizado, gerando uma economia no orçamento da construção. Empresas e indivíduos devem atentar-se sobre os materiais que utilizam nas construções são sustentáveis. Esses materiais devem ser eficientes, mas não podem causam dano ao meio ambiente. Desenvolvendo materiais sustentáveis empresas e indivíduos contribuem para a proteção do meio ambiente e de matérias primas renováveis.

PALAVRAS-CHAVE: Sustentabilidade. Tijolito. Alvenaria. Solo. Cimento.

Introduction

Sustainability in the construction is an important issue nowadays, for any professionals who deal with construction need to be aware of the fundamental problem of scarcity of the resources. Companies and individuals who handle construction need to be attentive of which type of materials are using in the building process if the material cause damage or not to the environment and for the population. Those materials need to be efficient in the function of they are doing in a building, but they cannot cause damage to nature. As a result, new technologies to create sustainable materials have been developed for protecting the environment, reducing energy and material waste, pollution and contributing to air quality. With the sustainability concept, Doctor João Batista Santos de Assis drafted in 2008 in Brazil in partnership with the construction company Andrade Gutierrez S.A and with the Federal University of Minas Gerais State, a green brick called Tijolito.

The soil cement mansory tijolito and the sustentability

Doctor João Batista Santos de Assis (2008) explained in his research that Tijolito is made of a mixture with soil and cement and do not need to be burned like some bricks. The concept of sustainability can be observed because the green brick uses less cement in its composition. Cement is a material thought in the atmosphere a high percentage of sulfur oxides, carbon dioxide, and nitrogen oxides, which cause rain acidic and increase the greenhouse effect, contributing to the air pollution. The usage of Tijolito reduces the emission of toxic gases in the atmosphere because of mix soil and cement, reducing the percentage of the use of the cement in the brick composition. According to Tarun, R. N., Rakesh, K., Rudolph N. K. (2010, p. 01) "cement is a material that in its process of production through the atmosphere 5% of carbon dioxide". The fact that the masonry does not need to be burned also contribute to reducing the air pollution. The usage of this green brick contributes to decreasing the air pollution, decreasing the emission of toxic gases in the atmosphere, improving air quality, and consequently making a positive impact on the environment.

Tijolito does not need a mortar joint because has a shape that its units can fit together to compose a wall. The units which compose the brick are pluggable and do not require mortar joint in the installation. Doctor João Batista Santos de Assis (2008, p. xvi) pointed out that the "technique of using masonry without laying mortar brings gives Tijolito a unique characteristic when comparing it to similar masonry materials." The masonry units can fit together because of the perfect connection between each unit. The easy way that those units can be connected makes the masonry easy to be built decreasing construction time and saving money in the building budget. Almost all of mortar joints arising of cement, so without need this material for connecting masonry units also contribute to decreasing of sulfur oxides, carbon dioxide, and nitrogen oxides emissions.

The Tijolito is fabricated presenting a high quality in the production process enabling the perfect construction of walls avoiding waste of masonry. Doctor João Batista Santos de Assis (2008) reported that in a Brazilian construction project in the city of Contagem, in Minas Gerais State, the waste material was only 2%, while the waste of a similar material is the wage tax in masonry is 20%. Considering that Tijolito does not need to be burned, and mixing cement and soil, less toxic gases will be emitted on the air and less air pollution will be generated. Decreasing masonry and mortar joint

waste, less construction garbage will be produced, the construction time will be reduced, and more money on the budget will be saved.

Conclusions

The concept of sustainability is essential in building construction, individuals and companies must think about most of our resources are not renewable, so sustainable materials need to be developed. To protect the resources that are used for creating the construction materials before using it in construction, architects and engineers need to analyze pros and cons of the usage of each material and study if can or cannot be applied in the building process. Tijolito consists of a mix of soil and cement, reducing the amount of cement that is needed for produce a brick decreasing the emission of toxic gases in the atmosphere. This masonry has a unique design that allows a connection with its units, so do not need mortar joint connecting it. It is a high-quality production that makes the perfect connection between the masonry units reducing the brick waste. The cost of the Tijolito's units masonry is less than CMU blocks and as a sustainable material presents a reduction in carbon dioxide and another toxic gas emission, contributing to decreasing greenhouse effect and, saving time in construction schedule and saving money in the construction budget. Developing green materials, individuals and companies contribute to environmental protection and the maintenance of the resources.

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