

Sustainable construction materials



INTRODUCTION the construction industry has many advantages as well as many disadvantage. For one side, this industry provides new ways to improve our lifestyle and welfare, it help us to survive climate, and give us plenty of facilities to all the social need that we have. But the bad part of this industry is that in order to satisfy all our needs, the environment results damaged, due the exploitation of the natural resources needed to produce construction materials, and the devastation of natural ecosystems.

In this essay we attempt to demonstrate that even when the construction industry has several issues, there are many options to improve it and the impact of them in the environmental, social and economic dimensions can be considerably reduce in order to get a higher social responsibility.

CONSTRUCTION ISSUES 1. Environmental Impact. Half of the materials used in the construction industry come from the earth's crust, producing annually in the field of European Union (EU) 450 million tonnes of construction waste and demolition waste (CDW), that is, more than a quarter of all waste generated.

The constantly increasing volume of CDW, with its increasingly complex nature as the range of materials used. This limits the possibilities for reuse and recycling of waste, which currently is only about 28% (in the case of Spain, 5%), which increases the need for landfill sites and to enhance the extraction of First [1]. In statistical terms, one can say that the construction sector is responsible for 50% of the natural resources used, 40% of the energy (including energy use) and 50% of total waste generated [2]. 2.

Social Impact he increasing demand of more buildings in cities and the need to improve the welfare and lifestyle of the citizens leads to the need of

create more jobs that work in the construction, however the work in this industry has been always one of the most dangerous, and even when the human right had made a positive impact in the sector, there is a need to give education to the workers in order to get more knowledge about the care they should have towards themselves and their job, having this knowledge can improve their possibilities to have a better lifestyle and improve their welfare.

Moreover, there is a trend in the industry of having the workers in outsourcing this is due to the increasing demand of new machinery that can performance as the regular worker used to do. The outsourcing of the labor, makes workers lose their job, plus they are out of the social security system.

3. Economic Impact the need to use elegant and more processed construction materials increase the overall cost of a builindg, plus we need to consider that the cost of extraction and transportation of them its even higher because lots of them are not easy to extract and process.

And there are also some materials that can be used in construction but are dangerous Silver bullet: New materials and technologies used in construction industry In our opinion the one factor that can make the difference in the construction is the type of materials used...bla bla Importance of the selection of materials in the construction industry Currently the construction industry is responsible for the consumption of between 40% and 50% of the raw materials of the earth (Mellado, 2005), this has serious consequences for our environment and our quality of life because we are depleting resources that in the future will be needed; this is why the knowledge about what

materials and technologies to use in construction is a determining factor in sustainable construction. Green Building Materials

Every day there are new products or materials that claim to be sustainable or ecological; some of the characteristics that must have the materials to be considered ecological are: 1. Not deplete natural resources. I. e. Hardwood obtained from sustainably managed farms. 2. That its extraction doesn't cause " ecological hurt". i. e. Extraction of Stone from quarries. 3. That in its collection and transportation to the place of construction doesn't consume too much energy. 4. That by their characteristics and thermal insulation allows considerable reduction of energy consumption in the future building, house, etc. 5. That doesn't release toxic substances such as volatile organic compounds. That once its life it's over, the material can be reused or recovered for other uses.

This is the case of many woods, sanitary materials and no compound materials. (Mellado, 2005) The Natural Step In practical terms: 1. All materials are no persistent and nontoxic and procure either from reused, recycled, renewable, or abundant (in nature) resources a. Reused means reused or remanufactured in the same form. b. Recycled means that the product is 100 percent recycled and can be recycled again in a closed loop in a sustainable way. c. Renewable means able to regenerate in the same form at a rate greater than the rate of consumption. d. Abundant means that the human flows are small compared to natural flows- i. e. aluminum, silica and iron. 2.

Design and use of materials in the building will meet the following criteria in order of priority: a. Material selection and design favor deconstruction, reuse and durability appropriate to the service life of the structure. b. Solid waste is eliminated by being as efficient as possible c. Where waste occur, resources are found for it on-site; or, d. For what's left, reuses are found off-site. e. Any solid waste that cannot be reused is recycled or composted.

(Kibert, 2008) Bibliografía Kibert, C. J. (2008). Sustainable Construction. Green Building Design and Delivery. Hoboken, New Jersey: John Wiley ; Sons, Inc. Mellado, E. A. (2005). Guia para obtener una vivienda sostenible. Barcelona, Espana: Ediciones Ceac.] Symonds, Argus, Cowi and Prc Bouwcentrum: « Construction and demolition waste management practices and their economic impacts», February 1999, DGXI, European Commision [2] Anink, D. , Boonstra, C. , y Mak, J. : Handbook of Sustainable Building. An Environmental Preference Method for Selection of Materials for Use in Construction and Refurbishment, Londres, 1996 JORGE ARMANDO ORTEGA SANCHEZ 1150980 NEW CONSTRUCTION MATERIALS There is an increasing demand, in both the private and public sectors, to understand sustainable construction practices. This demand is driven by a realisation that sustainable practices make sense to both owners and operators. The practices not only help the environment but can also improve economic profitability and improve relationships with stakeholder groups.

If a sustainable construction project aims to minimise the environmental impact of the proposed development over its design life, then considerable care must be taken to select the most appropriate materials, in terms of the impacts of their manufacture, use and final disposal or recycling. It is not

sufficient to state that materials are “recyclable”. Practically all materials fit this description but only a tiny fraction of them actually are recycled. It is important that materials should, as far as is practical, be kept separate and be clearly labelled to facilitate recycling at the end of their useful life. Even this will, of course, not guarantee that they will be recycled but it is the responsibility of everyone involved at every stage of a sustainable construction project to ensure that they have acted to the best of their ability to minimise the current and future impact of the development.

The selection of appropriate materials depends on the financial, environmental and operational performance of competing products, as well as on the criteria set out for the development. For example, there is no point in reducing the materials intensity of the wall design at the expense of its insulating effect, as to do so would lead to a greater environmental impact over the design life of the building. Similarly, it would be unwise to invest the limited resources of a project in expensive gimmicks of limited practical value, such as photovoltaic cells, when the overall impact of the development could be more effectively reduced by investing the money elsewhere.

RECYCLING IN SUSTAINABLE CONSTRUCTION Recycling Facts
Recycling cuts energy consumption and pollution.

Paper recycling can reduce air pollutants by 75 percent and water pollution by 67 percent; using scrap steel and iron rather than virgin products results in an 86 percent reduction in air pollution and a 76 percent reduction in water pollution; recycling aluminum saves 95 percent of the energy used to produce it from virgin products. A ton of recycled paper saves 17 trees and three cubic yards of landfill space. Buying recycled products is an essential

part of making recycling work (closing the loop). The residential building industry can play a major role in helping to reduce waste and promote recycling by specifying and asking for recycled products. Plastics The symbol variation for plastic products has three thin arrows and a number in the middle. The number indicates the type of plastic used to make the product.

This identification is important because plastics may not be mixed during recycling. Even a small amount of a different type can make the entire batch unusable. Types 1 and 2 make up 90 percent of the plastic bottle market generally available to consumers. * Type 1 — PETE or PET (Polyethylene Terephthalate) Used for soda, liquor and juice bottles and peanut butter jars and some jars for oils. This plastic can be recycled into new construction products including fabrics and carpet fibers. * Type 2 — HDPE (High-Density Polyethylene) Used for milk, juice, detergent, bleach and motor oil containers. When recycled, this plastic is used for lumber substitutes, trash and compost containers among other products. Type 3 — V or PVC (Vinyl/Polyvinyl Chloride) Used for windows, doors, shower curtains, and similar products. This plastic can be recycled into fencing, sewer pipes and garden hoses. * Type 4 — LDPE (Low-Density Polyethylene) Used for cellophane wrap, stretch wrap and squeeze bottles. This plastic is recycled to make similar products. * Type 5 — PP (Polypropylene) Used for food containers and long underwear. This plastic is recycled into furniture, carpet and auto parts. * Type 6 — PS (Polystyrene) Also know as Styrofoam. This plastic is recycled into plastic wood, packing peanuts, office and desk accessories. * Type 7 — Other Plastics. This designation is for all other plastics that are difficult to recycle. Paper

The American Forest ; Paper Association standardized guidelines for using the recycling symbol to specify the content of recycled paper within a product. The symbol of three white arrows within a black circle is used only to designate products made solely of recovered paper fiber. Less than 100 percent content is designated by three black arrows within a white circle and must state the percentage of content next to or below the symbol. Most paper can be recycled unless it has been tainted with food or coated with wax. Building and construction materials that utilize recycled paper products include cellulose for insulation, cellulose fiberboard and gypsum board sheeting material. Glass Generally glass products do not have a symbol.

Consumers just need to be aware that bottles cannot be mixed with other types of glass, like mirrors and light bulbs. Recycled glass used in new construction products includes new window glazing, wall and floor tiles and fiberglass insulation. Aluminum and Steel Products of aluminum or steel usually have a black symbol and the words " Where facilities exist. " Aluminum and steel must be separated or the aluminum recycling plants can be damaged. Some steel cans have aluminum lids and may still be recycled by the steel industry. The building and construction materials industry utilizes recycled aluminum in flashing material and window components.

Recycled steel is used for framing connectors, nails and structural framing.

NEW CONSTRUCTIONS MATERIALS AND TECHNIQUES. Garden Roofs.

Researchers from the Polytechnic University of Madrid (UPM) have built a roof covered with plants and a watering system that will optimise the consumption of a building's heating and cooling systems thanks to its insulation. It is a third-generation ecological roof, characterised by its

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sustainability and the use of indigenous plant species. The design of ecological roofs responds to the challenge of merging urban and rural lifestyles and is being developed in countries such as Germany, Switzerland, the USA and South Africa.

Ecological roofs reduce pollution in cities, absorb lead and other organic components. These roofs will help to reduce the temperature of cities, which today are a kind of urban heat island. Scientists have also estimated that acoustic contamination would be reduced to three decibels, thanks to plant absorption. Groundcover is therefore becoming a new type of building material but development prospects are not positive due to its high price. Decorative Solar Cells Researchers at the Fraunhofer Institute have just developed a dye solar cell, made when an electricity-generating film is sandwiched between two glass panels using screen printing techniques.

Made from organic dye and nanoparticles, the electricity generating film of the new module prototype is small enough for facade integration. This means the solar module can skip the roof and hang tough along the exteriors of corporate buildings and residential windows. Still in its early stages, the dye solar cells don't rival conventional silicon cells in efficiency. At only 4 percent efficient, they are recognized more for opening up a completely new element of decorative potential. The prototype is amber in color, but the glass facade can potentially be generated with an infinite array of colors and images down the line. Decorative twists, personalization, promotional designs, and company logos are included among the possibilities.

In this capacity, solar modules can provide protective shading and aesthetics for the indoor rooms while generating electricity. Ultratouch Recycled Cotton Insulation Made from cotton fibers recovered from blue jean and other textiles, UltraTouch insulation offers excellent thermal and acoustical performance. Because it doesn't contain fiberglass, it won't cause itching or skin irritation during installation. It's formaldehyde- and VOC-free, so offgassing isn't an issue. The re-used cotton fibers are treated with an EPA-registered fungal inhibitor that offers excellent protection from mold, mildew, fungus and pests, and provides outstanding fire-resistance.

Ultra Touch is made to be used between studs on interior or exterior walls and ceilings. It is rated for both heat loss and sound loss. SOURCES * Plataforma SINC (2008, November 30). Sustainable Garden Roofs Developed As New Construction Material. ScienceDaily. Retrieved * City of Austin Green Building Program ? * California Integrated Waste Management Board (CIWMB) <http://www.calrecycle.ca.gov/> ? * United States Environmental Protection Agency Office of Solid Waste <http://www.epa.gov/epawaste/conservation/cpg/index.htm> * http://www.greendepot.com/greendepot/product.asp?prod_name=Bonded+Logic+Quick+Ship+Program+%2D+Ultratouch+Insulation;pf_id=BLPQUICKSHIP;dept_id=5100;s_id=0;%22