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ARCHITECTURE AS A DEVICE TO RECYCLE THE SCRAP

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Abstract

For us, architects' material selection is one of the most crucial choices faced when designing. They fit out their creations, offering safety and shelter, ultimately setting the character and form of a building. Waste materials such as scrap metals, plastics, rubber and other products are generated in substantial quantities every day. Architects have the ability to change how materials are used offering the opportunity to reclaim, re-use and recycle waste materials efficiently and expressively through design.

The concept of recycling waste in architecture needs to allow for change in when designing buildings it is necessary to think beyond the current designated use of materials. Using recyclable materials is rapidly becoming an innovative and sustainable staple for architects. With growing concerns about transforming the built environment to be more sustainable, thinking about the entire life cycle of a material becomes vital. Future adaption is critical for all waste because if a material doesn't have the ability to change, it risks facing resource depletion. This project will explore the potential of re-use/recycle of existing waste materials that are predominately sourced from junkyards and automobile scrap.

Keywords – junk, scrap, sustainability, recycle, reuse

Introduction

The consumption of non-renewable resources and the creation of wastes have been identified as among the key issues that our society must address in order not to prejudice the opportunities for future generations. The construction industry, in common with many others, is being encouraged to improve the efficiency with which it uses materials. We are here to employ literature review and design simulation in addressing the challenges of architectural design from junk and raggery.

With climate change wreaking havoc on how we live our everyday lives and the emergence of an eco-friendly consciousness, sustainable architecture has gone from a model once overlooked to one which everyone wants to adopt. In urban spaces, there is a need to include waste and debris in construction. This method would serve millions and not burden the environment.

The presented discussion demonstrates that reclaimed materials should be considered as materials of their own; they should not be expected to simply comply with conventional construction methods and design practices. Since the salvaged components already exist, their architectural and structural design cannot be differentiated from each other. Therefore, tectonic expression endogenous to reclaimed materials needs to be developed in order to actuate their more widespread reuse.

Problem

One of the most alarming problems in the world today is waste management. With the ballooning world population, this issue can get much worse over time. If not dealt with accordingly the soonest time possible, too much waste can cause more pressing problems. Scarcity of resources and the need to reduce the environmental impacts of winning and processing construction materials and products is placing a greater emphasis on resource efficiency within the construction industry. Therefore there is significant scope for improving resource efficiency within the industry. The study aims at what is creative use of previously discarded materials, facilitates design discussion and community awareness about the possibilities to "reclaim, recycle and re-use". Eventually, to discuss the evolving aspects of salvaged materials in architectural practices. Seeing as the whole research paper and progress is concerned about improving the upbeat approach about sustainable building industry and using recycled materials for new projects, there is an important key of knowing the origin or the recycling itself as a way to understand more the importance of it nowadays.

Literature

Concept of zero waste

The concept of zero waste is already being approached by cities, events, companies, and others. According to zwia (zero waste international alliance), zero waste is “an ethical, economical, efficient, and visionary goal to guide people to change their practices and ways of life to encourage sustainable natural cycles where all materials are designed to enable recovery and post-consumer use.” Rethink, reuse, reduce, and ultimately recycle. It is these 4 r's that embody the concept, and which may be

applicable to the running of a house, a city, a building, a country, and so on. Of course, they are applicable to projects and constructions as well.

Why recycle/reuse

It's undeniable that the construction industry has a significant impact on the planet. Enormous amounts of resources, materials, water, and energy are exploited, processed, and consumed for the execution of a work and limited to the useful life of buildings.

It is true that humanity can no longer exploit environmental resources as if they were infinite and, above all, must stop generating so much waste. Becoming more resource efficient is a way toward sustainable economic growth. Recycle/reuse is the process of reusing discarded materials to reintroduce them into the production cycle. This process reduces the consumption of raw materials, decreases the total volume of waste, and can create jobs for thousands of people.

Disposal methods

Disposing of waste in a landfill involves burying waste to dispose of it, and this remains a common practice in most countries. Historically, landfills were often established in disused quarries, mining voids or borrow pits.

Incineration is a disposal method that involves combustion of waste material. Incineration and other high temperature waste treatment systems are sometimes described as "thermal treatment". Incinerators convert waste materials into heat, gas, steam, and ash.

Effective waste disposal calls for concerted efforts from all, no matter how anxious or worried they may be about our environment.

Material differentiation

From a technical viewpoint, the landscape can be divided into three key concepts: materials that are being recovered and recycled, materials that are being reused, materials that are being reclaimed. There are two main categories of materials: not organic and organic.

- Non- organic: glass (window glass part, vine glass), metal (ships, planes, cars, steel beams, containers, metal furniture, parts of electronic devices, window frames) ,concrete (construction parts, old foundations, bridges) , stone, minerals,, synthetic fabric (clothing, domestic and

commercial fabrics used for furniture) x plastic (furniture, panels of devices), rubber (tires)

- Organic: wood (furniture, ships, bridges, constructions, paper), natural fabric (wool, silk, cotton, leather), food waste (composting), clay (brick, tile).

List of materials

Steel can be endlessly transformed into new objects without loss of quality. Although glass bottles and containers are highly recyclable, the recycling of window glass faces a series of additional complications. Using "reclaimed wood" has become quite popular. Hardwoods can last hundreds of years, if kept properly. They can be used in large structural parts or as slats for the manufacture of other artifacts such as crates, pallets, or supports for various purposes.

Recycling concrete allows construction waste to be reused and construction costs to be reduced. In recycling hardened concrete, a special crusher is used and produces what is known as "recycled aggregate". The additional materials may also have reuse and recycling options. Of course, there are also substances such as asbestos, latex paint, chemical solvents, adhesives, and lead-based paint that need to be treated carefully to reduce their impact on the environment. Expanded polystyrene, or eps, is a material that can be recycled as well. Eps becomes a raw material for the manufacture of new plastic products when it is crushed and compacted. It can be used for finishes or even paints.

Post consumer waste, scrap & vehicle recycling

Quite commonly, it is simply the waste that individuals routinely discard, either in a waste receptacle or a dump, or by littering, incinerating, pouring down the drain, or washing into the gutter. Post consumer wastes are of different types, but here will mainly focus on automobile junk. Scrap consists of recyclable materials left over from product manufacturing and consumption, such as parts of vehicles, building supplies, and surplus materials. Unlike waste, scrap has monetary value, especially recovered metals, and non-metallic materials are also recovered for recycling. Scrap metal originates both in business and residential environments. Vehicle recycling is the dismantling of vehicles for spare parts. At the end of their useful life, vehicles have value as a source of spare parts and this has created a vehicle dismantling industry.

Philosophy

Superuse originated in rotterdam, end of 1990 by the architects cesare peeren and jan jongert which aims to connect different closed loop ecosystems and applies to building supplies, energy, water, food etc. *"every material around us exists for a reason, and represents multiple opportunities. The job of the architect is to know how to transform existing objects to give them a second life,"* explains marco bakker from the bakker & blanc (babl) architectural bureau in lausanne, switzerland.

Trash tectonics originated in new york/virginia by the architects mcdowell and espinosa which aim converting waste to architecture. *"What if we eliminate the need for raw material and banish all waste? What if design was to occur simultaneously with building?"* ask mcdowell and espinosa. They are questions that architects across the globe are now asking as they consider ways to convert the world's most impractical discards into building blocks for tomorrow's homes.

Originated in basel, switzerland, 1995 by architect barbara **buser**, architectural firm in situ which aim to put waste construction materials into a wider social and humanitarian context, such as reconstruction projects in disaster-hit areas or poor countries.in 1995, she created the first exchange for recyclable material, which collects reusable materials from construction sites and demolished buildings. *"It's possible to build entire houses using recycled materials, their used aspect even adds charm to the structure,"* says buser.

City as a resource originated in berlin , 1999 by folke köbberling and martin kaltwasser, karo architekten which aim to design their sculptural works and structures from discarded, found and donated material, using the "city as a resource". Folke köbberling and martin kaltwasser show how urban spaces can be reclaimed using recycling architecture, design new typologies on old foundations and socles. "*With self-built structures and architectural designs made from local scrap material we are able to demonstrate an open, more communicative form of urban planning."*

Case studies

In interiors

Discotheque -it is for the first time in the vadodara city that a discotheque has been designed from reclaimed and recycled material by the architects Manoj and Siddharth patel. The project's highlights are the entrance area - designed with recycled tin lids, use of recycled beer bottles along with recycled paper plantations in the foyer, use of neon color to highlight various elements of design throughout

the disco. The ordinary m.s. pipes & metal tree guards have been exclusively used featuring verticality and gradient of light and shadow and the integrated sitting arrangement using refurbished car seats. The recycled barrels are used for trendy mock tail bar counter and the car wheel rim has been used as high chairs.

Mud hands by architect Gouthama no object is looked down upon as waste. What seems like junk at first sight, when explored through the creative mind, can be transformed into useful objects of beauty.they have designed a variety of products from waste such as table tops from waste wood pieces, lights from used bottles and cardboard rolls, outdoor chairs made of used tyres and rope, and sculptures from automobile scrap. They have created panels from waste bamboo pieces which can be used as partition walls or supports for table. So all they like to say is: “think before you throw!”

Energy cafe was the idea of IAS Pratyay amrit collaborated with artist manjit, neha singh. In this cafe, a few unused parts of an old bicycle that was used by the employees of the electricity department are being utilized for a signboard. An old ambassador car that was in use until 2001 by the bihar state electricity board secretary is now renovated and remodeled to be used as an elevated sofa. The control panel of the power sub-station is made intact with nuts and bolts, and a glass top is installed on it to make a perfect table. The oil drums from old transformers were made into green chairs and tables. The insulators are used as seats with cushions and the benches, redesigned from wood and scrap metal. The menu board was modeled from wood, made from cable rolls. An unused portion of wood has been turned into a wall clock. The dustbins, which are going to be set up soon, are also made from scrap.

In architecture

Lausanne wing house by architect David hertz, a home with majestic roof appears to be gliding over a waterfall of glass suburban houses, perched on a hill. And in fact, the sensual shapes of its roof are actually the wings of a decommissioned boeing 747. That was actually cheaper than having a roof made to order. Some of the materials from the previous building were used as walkways. The foundation used many of the existing concrete retaining walls but they were rebuilt and reinforced as required to meet new code regulations. Completed in 2011, this bold project is also environmentally friendly, which has revived the discussion on the use of recycled materials in architecture.

Ras abu aboud stadium designed by Fenwick iribarren architects it will be the first ever demountable, transportable and reusable stadium

in the world & the third stadium fifa has developed for the qatar 2022 world cup. The stadium has a capacity of 40.000 and its structure is based on shipping containers which can be easily assembled or disassembled as required. Following the world cup, the stadium can be dismantled by section or in parts and be transported to other host cities for the next world cup, helping make it more sustainable and financially viable for other countries.

Windshield chapel in the town of alabama recycled materials were selected to be used in order to fit within the tight budget, but also to provide a unique building type and to create successful architectural spaces. A large number of old windscreens from eighty scrapped chevy caprice cars were layered over each other for the front facade, creating an architectural, breathable, skin. The soil excavated for the site was reused as rammed earth to complete the main base of the building along with old sheet metal to clad the remainder of the facade, with laminated timber trusses made from locally grown timber creating the internal structure.

Architecture & interiors

Earth ship by Architect Michael reynolds transformed common u-shaped earth-filled tire homes seen today.The primary building material is recycled automobile tires filled with compacted earth, or compressed soil.“every material around us exists for a reason”

Reynold’s constructions look nothing like piles of trash, instead they evoke enchanted castles with their shimmering colors – not unlike gaudi’s fantastic creations.

Scrap house by public architecture public architecture and other local design firms for world environment day 2005, this green demonstration home is built entirely of salvaged materials. Erected on the civic center plaza adjacent to san francisco city hall, scrap house showcases the creative use of previously discarded materials. Some materials were re-invented for their intended purpose, such as a chandelier using several discarded lamps. Other solutions present scrap in innovative ways.

Puneet - residence of the Architect Jitendra nayak who believes in “be light on earth” has been living in an eco-friendly house which could be the perfect example for budget green homes. *“we have totally avoided these two things while constructing our house. We did not cement the brick walls, thus directly reducing the heat generation within the house. On any given day, the interior temperature is a minimum 2 degrees lesser than outside temperature. We have created mechanical ventilation, something like a wind*

funnel, by giving ways for the air to enter and circulate. Large windows sometimes block the wind, but smaller ones take more volume of air inside," jitendra explains.

Products Beyond the environmental benefits, it's important to encourage more individuals, families, and businesses to recycle any unwanted items they have, because recycling makes good economic sense. It makes a major contribution to the "circular economy," with scrap being one of the materials that can be refashioned into new uses. A sofa made from the discarded portion of an ambassador car, a table made from a tractor, rugs made of old gunny bags, and so many other handmade products are a trend. Many designers work with scrap and outcomes are marvelous.

Urban design

street art by Artist bordalo ii Worn motorcycle helmet, plastic pipes, old tire or broken chair, street art takes out the trash. The portuguese artist, known as bordalo ii, recycles the garbage that clogs the city for assemble into large colorful sculptures hanging on the walls. His beautiful frankenstein animals are as spectacular.

ona by Artist – cumul have installed a recycled tire art installation, as part of the "cultura en la calle" festival in rivas-vaciamadrid, spain. This is a variant of the "pneumàtic" project, where through the usage of refused tires, create pieces of art. 'ona' installation resembles a wave that is reminiscent of its origins.

Live case

deval's art defines *"To invent, you need a good imagination and a pile of junk"*. Started with a small set up, presently he owns a workshop which also helps aspiring inventors to work through. Whole of the workshop and his office is recycled and repurposed. From the entrance gate, to partition walls, roof, sittings, working spaces, almost everything you see there is waste or scrap as they say. But here, you see only beautiful interiors, fine art work and a composed work place. Every single piece is junk with a purpose to reduce waste and reuse the material.

Pitchers café bar designed by architecture basics blends waste with glamour creating a unique yet modern space. Located in the vibrant city of indore, pitchers café bar incorporates junk, scrap and waste into design. The principal materials used in the bar were junk metal, automobile parts and waste wood. The concept of the café was driven by the use of waste as a tool to utilise the availability of such alternate resources.

The art of lighting, most of the fixtures were constructed with metal scrap. Square hollow pipes were reused and arranged to resemble the machinery. Cycle crank sets were used to create ceiling lights over another space. The light bulbs

were fitted within the crank sets suspended from the ceiling using the bicycle chain. The bar door resembles a submarine door wherein all the spare engine parts and scraps are arranged together.

The need to conserve resources has given impetus to the concepts of up cycling, recycling and repurposing in today's creative climate. In case of pitchers, the scrap, junk and waste have been used as distinct design elements and as a result, the overall cost of the project has been controlled effectively.

fork it by Ar.ruchir tiwari where whole structure is made of the scrap shipping containers. Also worthy of mention is the presence of modulated metal caps at the back of the hall, adding an edge to the interior. The cafe is crafted from metal and wood, with limited quantity of veneer and fabric consumption. The charging points are of discarded old plugs.

Sustainability and scrap

Global sustainability with scrap metal starts simply. It starts with your car.The car you drive today will inevitably end up in either one of two places, a landfill or recycling facility. And you want it to end up in the latter, not the former. You want it to be recycled.

It's easy to see from those numbers that the scrap metal of a car is essential in the reduction of greenhouse gasses and the preservation of our natural resources. It's important to recycle scrap metal, it's that simple.

That goal connects with the promotion of our natural resources and energy efficiency, which help create a sustainable infrastructure for the future. And that's one simple way we can all help protect and sustain the earth's environment.

The TERI INDIA is now working to reduce greenhouse gas emissions, and commits all un organizations to measure, reduce and then offset any greenhouse gas emissions that can't be avoided, while heightening awareness about the importance of sustainability.

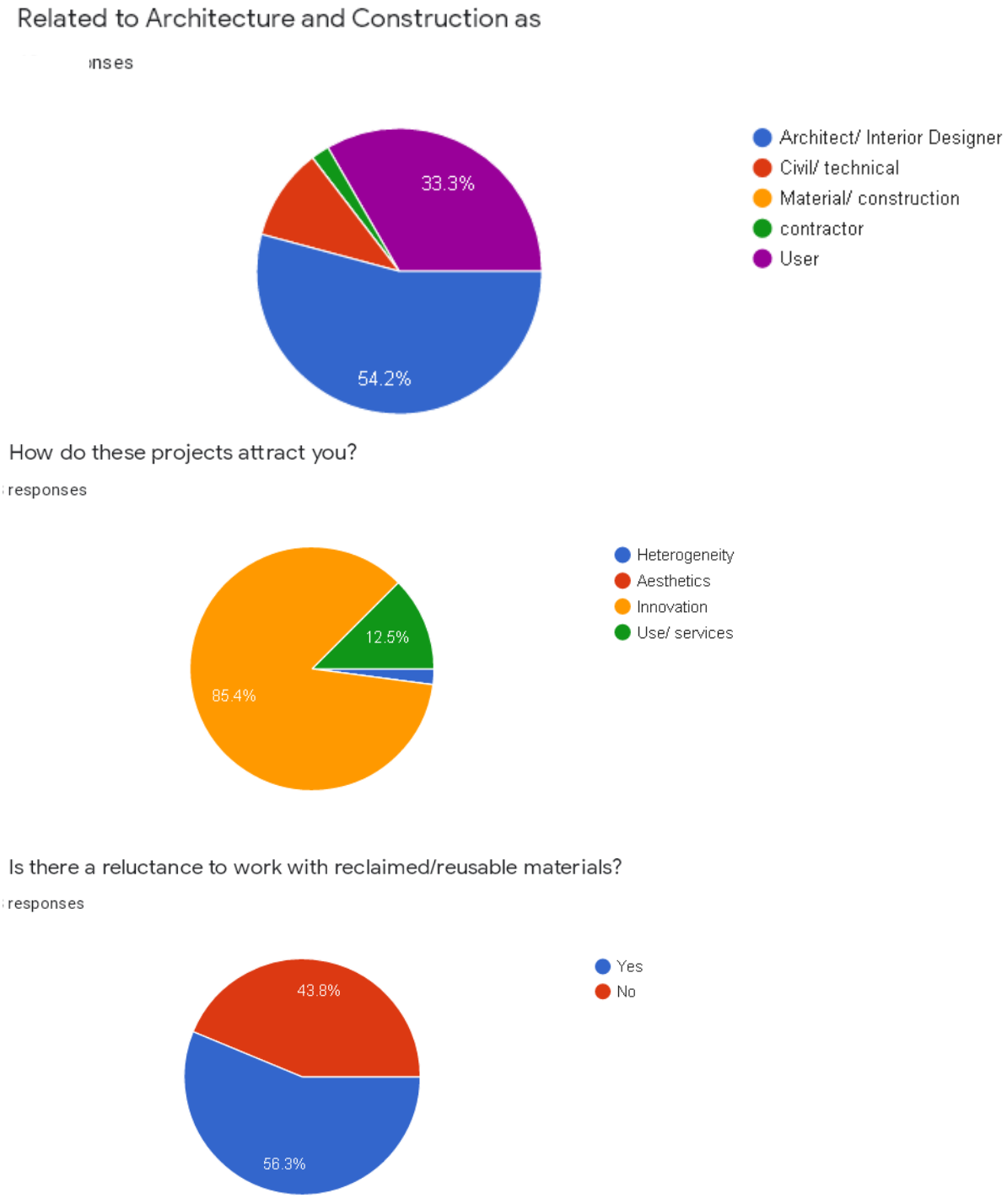
In addition, the GRIHA continues promoting voluntary sustainability standards by encouraging countries to develop their own national platforms for enhancing sustainability.

And we all have a role to play here.

Second life is using recycled materials for architecture using salvaged stuff not only has a positive environmental impact by reducing waste; it also offers architects materials typically unavailable. Combination of both reasons, mentioned in paragraphs above, helped to gain the understanding the necessity of consolidating the ideas of re-used materials in new architecture with the background of how does that affect the basic construction solutions as well as design appearance giving an overall sustainable approach based project.

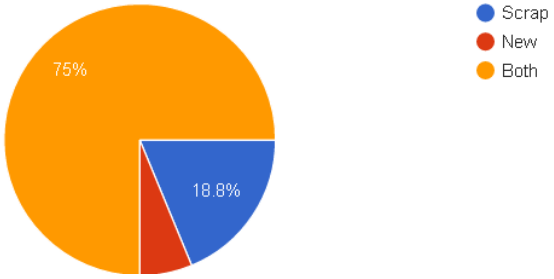
Fortunately, sustainable thinking is becoming more educated and adaptable topic while designing buildings.

A review



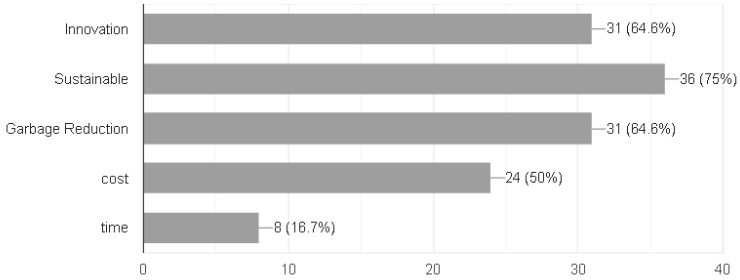
Building from

responses



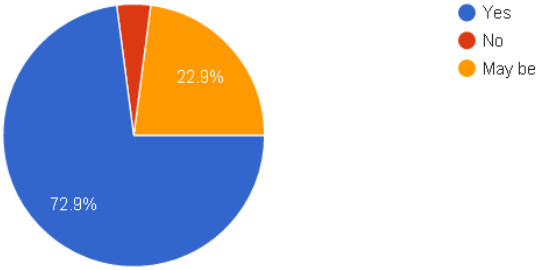
What's the point of recycling

esponses



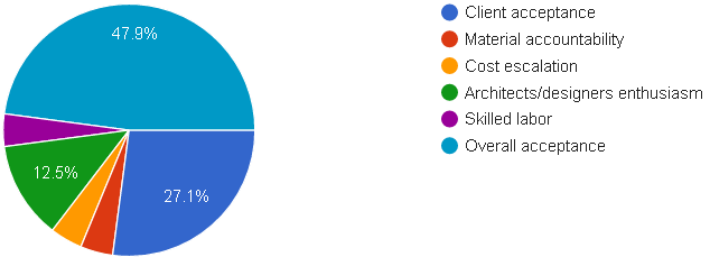
Can waste have a second life as a sustainable building material?

esponses



How do scrap influence architecture and design in the Indian context? Most important is :

48 responses



Conclusion

Green design and building have become one of the most essential ideas of the architectural industry. Sustainable design is something that every architect aspires to, and so many innovations and initiatives have come about in recent years. This initiative defies the perception that little beauty can be found in recycled materials. Using recycled building materials can bring a lot of artistic vision and expression to a project. It's not just about existing building materials from old sites and pavements; materials never considered before, like old tires and soda cans are also coming into vogue.

There are recyclable alternatives for most building materials today. Whether it's concrete, glass, plastics, brick, or metal, they can all be made by incorporating some of the already used material. In fact, making any of these with a bit of the previous version is a lot cheaper regarding energy requirements and also lowers the emissions by up to 90%.

The future of recyclable building materials looks bright. With innovative architects thinking "green" and looking for opportunities to recycle and reuse materials this initiative is something we can all support.

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