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"A Review paper on Reduction of CO2 emissions from Construction sector for Green Construction"

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Abstract : In this paper, Firstly we have considered Green construction technology regarding the method of Green construction for the Reduction of CO2 emissions from construction. How to use of reduction of CO^2 emission from construction through green construction comparison between of Green construction and traditional conventional method. In this paper, we have found the most effective and economical method regarding construction, quality, and also time-saving factors. Discussion of the project about the comparison of green construction system with conventional construction method. After all, we have estimated CO^2 emission from conventional buildings referring with help of the existing plan Pune region area also detailed estimating each content of Green construction building and compare their respective emission as per area and conclude that which method is suitable and beneficial along with to evaluate the true potential to reduce CO^2 emissions from buildings."Reduce CO2 emissions to zero with technology." This article discusses the difficulties of lowering emissions from building construction, operation, and maintenance, as well as potential solutions. We've expanded on that work here for a wider audience's benefit.
The study discusses the general issue of direct and indirect building emissions. It explores the often-overlooked effects of the materials used in construction. It also looks at issues such as CO2 emissions and energy consumption from buildings, as well as new analysis methodologies for better system design. Finally, numerous innovative techniques are explored that have the potential to reduce CO2 emissions in buildings to almost zero. In conclusion, we encourage new viewpoints that boost the use of new methods and systems, thereby presenting instances of what can be done.

KEYWORDS: Green construction, CO^2 émissions, Reduction of CO^2 emissions, Sustainable construction, Low environmental impact Materials.

I. INTRODUCTION

The modern methods of construction are a broad range of processes and products that aims to improve business efficiency, quality, customer satisfaction, environmental performance, sustainability, and the predictability of delivery timescales. One of the most important industries on the world is construction. The contribution of this industry to the global GDP is enormous. The construction sector has seen enormous growth in recent years as a result of globalisation and technological advancements. Housing conditions are significantly worse in nations such as India and China. Due to the ever-increasing population in these countries, there is an overgrowing demand for housing. Now keeping in view, the gigantic task of providing affordable shelter to the masses, the adoption of modern and cost-effective technology assumes greater significance The issue of CO2 emissions is at the core of the necessary improvements in the construction industry. We agree that anthropogenic greenhouse gas emissions pose a threat to our species' long-term prosperity, and that a significant reduction in our sector's emissions might help us achieve that goal buildings must be addressed rapidly and extensively. The IPCC's comprehensive compilation of studies from thousands of scientists throughout the world has proven the need of reducing possible anthropogenic temperature rises, and following much negotiation, the international community agreed with the Copenhagen Accord that temperature rise should not exceed two degrees (Ramanathan & Xu, n.d.). We have one of the most significant potential to reduce CO2 emissions of any single sector. We are presenting ideas for transforming the construction industry in order to reduce CO2 emissions. We are not committing to a precise reduction target or timetable. We are saying that it is possible to have buildings with very near-zero CO2 emissions from both construction and operation, and we hope only to "feed that scientific advice into policy" (Schenkel, 2010) with real information about technologies that provide this potential. We have the ability to create and implement the designs and technology required to achieve this goal. Energy-related emissions can be decreased directly by altering the source and making buildings more efficient. As previously said, material grey emissions must be assessed and decreased.

Objective:
1. To minimize carbon emission in construction sector.
2. To find reduction in CO2 emission from alternative material.
3. To optimize building efficiency by integrating systems for their design, operation, and maintenance.

II. LITERATURE SURVEY

The manufacture of materials and products, the construction of the structure itself, the setting on site, the exploitation, the renovations, the later rehabilitations, and finally the final demolition all contribute to a large amount of CO2 being released into the environment. The current paper demonstrates how careful selection of low environmental impact materials can reduce CO2 emissions by up to 30% throughout the construction phase. The goal of this research is to find the total amount of CO2 emissions saved by using the method described in the material selection phase of a building's life cycle. This material choice, as well as the bioclimatic characteristics, must be determined from the beginning of the design process. The research presented here has been carried out on a case study of three terraced houses built in Spain, comparing them with a building with similar characteristics but constructed in a conventional way and with no selection of materials. The houses have been constructed following low environmental impact criteria, including alternative energies for future use and maintenance.

There are large amounts of emissions from cement production for concrete and there are already new technologies available to reduce this source (Huntzinger & Eatmon, 2009; Schlaich & Zareef, 2008). The largest portion of CO2 emissions from buildings remains in their operation and which

results in the fact that buildings demand 2/3 of electricity generated (Roodman & Lenssen, 1995).

But one added benefit of this fact is that CO2 emissions of buildings are reduced by improvements in electricity production. As described, this can be done in building projects through integrated systems, but the technology for renewable energy generation and supply is also growing. It has been shown how coal, the most CO2 intense electricity supply, could be phased out of the US in the next 2–3 decades (Kharecha, Kutscher, Hansen, & Mazria, 2010).

Globally, a path has been demonstrated for the implementation of technology that would lead to climate stability (Hoffert et al., 2002). In terms of buildings compared to other sectors like transportation, it was recently demonstrated that it would be more effective to use the biomass being used to create transportation fuel instead of as fuel for electricity production (Campbell, Lobell, & Field, 2009).

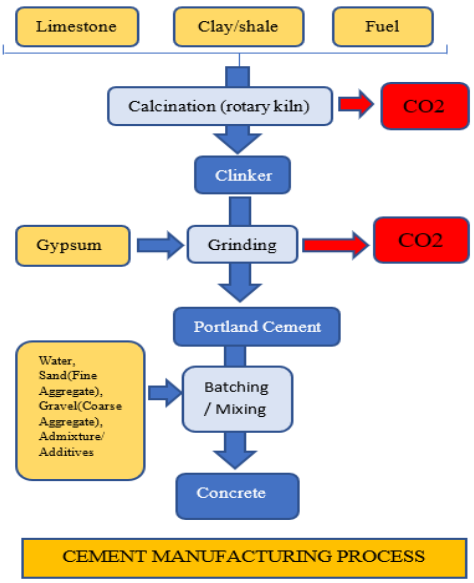

Diagram 1

Alarming issue and Concerns for Engineers and environment
CO2 Release
Estimated 5 to7% of the total output of carbon dioxide is released in cement production.
2. Considered as one of the prominent reasons to accelerate global warming.
3. The World Earth Summits expressed their concern about the emission of greenhouse gases.
4. Cement industry has been warned to switch over from Portland cement to greener alternative binders.

Industrial and Agri- Waste generation
1. Growing Industrialization – Release of waste by- products such as fly ash, rice husk ash, GGBFS.
2. Most of these materials are Pozzolanic i.e. can be activated.
Needs dumping- Dumping in grounds is one of the environmentally threating methods.
Pozzolanic Name- open scope for its use in the cement industry

Industrial and Agriculture Waste Product
Diagram 2

Geopolymer Based Construction Materials
Primary Requirement:
1. Any pozzolanic material which is a rich source of silica and alumina, and can get easily dissolved in the alkaline solution, may be taken as a geopolymer precursor.
2. Alkaline solution(NaOH+Na2SiO3) used as alkaline activator.
3. Geopolymersation reaction in comparison to C-S-H get formation(Exothemic Reaction).
4. Wet Curing is not required as in Cement Concrete.
5. Heat Curing can be used to accelerate the rate of geopolymerisation.
6. No Cement is required
7. 100% waste material pozzolanic in nature (Aluminosilicates) can be used

III. CONCLUSION

The building sector is one of the largest contributors to greenhouse gas emissions in urban areas. A quantitative assessment of the carbon footprint of urban buildings is needed to advance research and policy debates on building carbon emission reduction and sustainable architectural planning.

1. This study develops a calculation methodology for carbon footprint accounting of urban buildings by us as a case study. Also, a scenario analysis is also carried out to assess the possibility for emission reduction.. It is shown that the carbon footprint of urban buildings increased from 8.95 million tons in 2005 to 13.57 million tons in 2009 in India, with an average annual growth rate of 12.87%.

2. The carbon footprint of a building was 45 percent due to building material manufacture and 40 percent due to building energy use, respectively.

3. With the implementation of low-carbon strategies in the building sector, such as increased energy efficiency design for new buildings and energy-saving retrofit for existing buildings, there would be a significant influence on carbon emission reduction.

4. Geopolymer concretes develop moderate to high mechanical strength with a high modulus of elasticity and a shrinkage much lower than with OPC.

5. The growth rate of energy consumption from urban buildings would decrease 2.98% by 2020, with an energy saving of 1.66 million tce and a carbon emission reduction of 3.15 million t CO2e, in a low-carbon development scenario irregularity.

REFERENCES

[1] Wei Huanga, b, Fei Lia, b, Sheng-hui Cuia et.al., Carbon Footprint and Carbon Emission Reduction of Urban Buildings: A Case in Xiamen City, China, Urban Transitions Conference, Shanghai, September 2016

[2] Forrest Meggers,*, Hansjürg Leibundgutb, Sheila Kennedy et.al. Reduce CO2 from buildings with technology to zero emissions, Sustainable Cities and Society-2 (2012)

[3] Chen W Q, Wan H Y. (2009). Life cycle assessment of aluminum and the environmental impacts of the aluminium industry. *Light Metals*, 5, 3-10 in Chinese.

[4] Cole A. (2009). More treatment in surgeries and at home will help cut NHS carbon footprint. *British Medical Journal*, 1: 338-345

[5] Christopher L, Weber H S. (2008). Quantifying the global and distributional aspects of American household carbon footprint. *Ecological Economics*, 66, 379-391

[6] Eggleston HS, Buendia L, Miwa K. (2007). *2006 IPCC Guidelines for national greenhouse gas inventories*. Institute for Global Environmental Strategies (IGES). Tokyo, Japan.

[7] Carbon Trust. (2007). Carbon Footprint Measurement Methodology. version 1.1.

[8] Giurcoa D, Petrie J G. (2007). Strategies for reducing the carbon footprint of copper: new technologies, more recycling or demand management. *Minerals Engineering*, 20: 842-853. [9] GFN. Ecological Footprint Glossary. *Global Footprint Network*, Oakland, CA, USA, 2007.

[10] Burnham A., Wang M, Wu Y. (2006). "Development and applications of GREET 2.7 - the transportation vehicle-cycle model". *Argonne GREET Model Reports*.

[11] Gong Z Q, Zhang Z H. (2004). Quantitative assessment of the embodied environmental profile of building materials. Journal of Tsinghua University (Science and Technology). 44(9), 1209-1213 in Chinese