

ENVIRONMENTAL IMPACT OF CONSTRUCTION MATERIALS & PRACTICES TO SAVE PLANET EARTH

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Abstract: to identify the environmental impacts associated with development proposals well in advance of their implementation, so that such impacts can be avoided or reduced to acceptable levels before they occur.

Optimum illuminance level can reduce energy consumption as it avoids the over-provision of lighting and produces a good indoor visual environment. This indicator is assigned to encourage use of daylight instead of electric lighting, and use of automatic lighting control system for integrated daylight and electric lighting operation. However, daylight may bring along radiation to the interior and so the use of optimum external solar shading devices and the collection of reflected daylight are encouraged.

Keywords— Labour Productivity, materials, EIA, Lean Technique

I INTRODUCTION

Constructing infrastructure is a costly and time consuming affair. Owners and builders go through great efforts testing, inspecting, and documenting many important activities to ensure these cost and time expenditures do not overrun.

Traditionally, these tests, inspections, and other documents have been recorded on paper and retained in paper form for years, until they could safely be discarded.

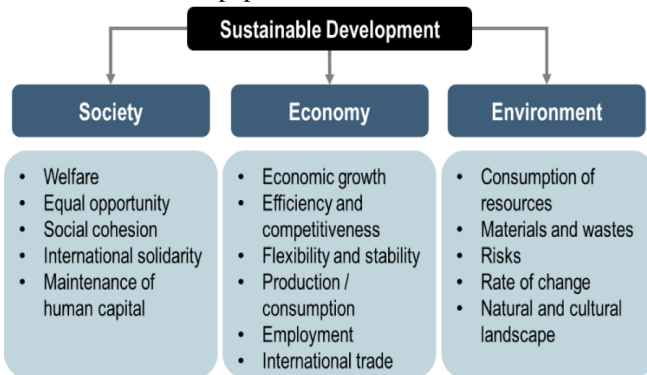
E-Construction is alternative to this where records are recorded and kept digitally, throughout the life of a project and for as long as necessary. This applies throughout the construction process from design to final completion and closeout to create a paperless environment.

and the field and between owners and contractors, including the use of digital plans & specifications, materials tracking tools, construction inspection reports, testing, and more. There are many benefits to transitioning to an e-Construction model but there are of course some difficulties that need to be navigated as well.

The ultimate goal of green building and design is to create sound structures that possess environmental sustainability without the sacrifice of the kinds of modern comforts people expect.

Both architects and builders of eco-friendly buildings follow a comprehensive reuse, recycle, and repurpose model in as many facets of construction as possible

1. Generating the Clean Energy
2. Increasing heating, ventilation, and air conditioning (HVAC) systems.
3. Choosing right Construction Location
4. Waste hierarchy can reduce the amount of waste generated and improve the waste management processes
5. Conserve Water and Electricity
6. Plant More Trees
7. Protect Local Water Sources
8. Join Environmental Groups to Combat Pollution



If you were to visit an e-Construction site, the most visually noticeable difference would likely be the increased use of mobile devices, but e-Construction goes beyond this. It affects many interactions between the office

The Environmental Impact Assessment (EIA) of Projects is a key instrument of European Union environmental policy. It is currently governed by the terms of European Union Directive 2011/92/EU, as amended by Directive 2014/52/EU on the

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assessment of the effects of certain public and private Projects on the environment (EIA Directive).

Since the adoption of the first EIA Directive in 1985 (Directive 85/337/EEC), both the law and EIA practices have evolved. The EIA Directive was amended by Directives 97/11/EC, 2003/35/EC, and 2009/31/EC. The Directive and its three amendments were codified in 2011 by Directive 2011/92/EU. The codified Directive was subsequently amended by Directive 2014/52/EU. This guidance document focuses on the modifications made to the EIA Directive since 2001, with a particular emphasis on the key changes brought about by the most recent 2014 amendment to the Directive, which Member States have to transpose into their national legal systems by 16 May 2017.

- ✓The Developer, or the expert(s) on his behalf, carries out the assessment. The outputs of the assessment are presented in the EIA Report which contains: information regarding the project, the Baseline scenario, the likely significant effect of the project, the proposed Alternatives, the features and Measures to mitigate adverse significant effects as well as a Non-Technical Summary and any additional information specified in Annex IV of the EIA Directive.
- ✓The Competent Authority makes a decision about whether EIA is required. At the end of this stage, a Screening Decision must be issued and made public.
- ✓The Directive provides that Developers may request a Scoping Opinion from the Competent Authority which identifies the content and the extent of the assessment and specifies the information to be included in the EIA Report.
- ✓The Competent Authority makes the EIA Report available to authorities with environmental responsibilities, local and regional authorities and to other interested organizations and the public for review. They are given the opportunity to comment on the project and its environmental effects
- ✓The Competent Authority examines the EIA report including the comments received during consultation and issues a Reasoned Conclusion on whether the project entails significant effects on the environment. This must be incorporated into the final Development Consent decision.

- During construction and operation phase of the project the Developer must monitor the significant adverse effects on the environment identified as well as measures taken to mitigate them.

AIM

- Aim to improve the decisions taken on the need for an EIA and the terms of reference on which the assessment is made. To save our planet we need to promote self-sustainability and self-sufficiency.
- Global warming and the worse conditions the earth is facing by each passing day. Our purpose should be to promote a greener and healthier environment

Motivation

- ✓ The construction process is a set of activities, each of which is controlled and improved. Conventional managerial methods, like the sequential method of the project realization, deteriorate flows by violating the principles of flow design and improvement.
- ✓ They concentrate on conversion activities. The resultant problems in construction to compound and self-perpetuate.
- ✓ In project control, fire-fighting current or looming crises consumes management resources and attention so totally that there is a little room for planning, let alone improvement activities. As a consequence it leads to non-optimal flows and an expansion of Non-Value Adding activities.

Objectives

- We study the effects of Environmental Impact Assessment on construction industry..
- To identify the source of wastes on construction site and to reduce wastes & improve quality of Construction
- To make recommendations to improve labour productivity in construction; to find out the Disputes in construction industry. To find out the critical situations on site and how to overcome them immediately to increase the productivity in construction using Lean Technique

Problem Statement

This study attempted to determine how profit and efficiency of construction projects could be increased using Lean Construction Management principles. This study also explored and evaluated

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differences between construction in India, by analyzing the methods of minimum wastage and by Lean thinking implemented in the construction projects

II LITERATURE REVIEW

"Health is the capacity of the land for self-renewal. Conservation is our effort to understand and preserve this capacity, Sandi Valentine, Michael Plybon, IJCERT, 2017
Make the effort to use those recycle bins! Some communities are starting to charge fines to people who are throwing away items that should be recycled. And if your community doesn't pick up recyclables (or only certain ones) you can usually find someone who accepts them. Check with dry cleaners, supermarkets, manufacturers, your local public works department and civic organizations to find where recycled goods can be dropped off.

Protecting Our Planet Securing Our Future, Robert T. Watson John A. Dixon Steven P. Hamburg Anthony C. Janetos Richard H. Moss, U.S. National Aeronautics and Space Administration the World Bank

The Earth's physical and biological systems policymakers with an excellent opportunity to cost- (land, atmosphere, and oceans) provide humans effectively address global environmental issues at with the goods and services essential for survival the local, national, and regional levels. Multiple and good health; these include goods such as food, timber, and medicines; and services such as the purification of air and water, soil generation and achieved by adopting a combination of technology maintenance of soil fertility, pollination of crops and policies, and measures that explicitly recognize natural vegetation, dispersal of seeds, preservation the linkages among the environmental problems and of biodiversity, and control of the vast majority of satisfying human needs. The Earth's natural systems also All global environmental problems are caused stabilize the Earth's climate, offer protection from by the same underlying driving forces: population the sun's harmful ultraviolet rays, and provide asize, level of consumption, and choice of technolothetic beauty and support for the world's diverse. Demand for environmental goods and services cultures

Green Buildings - A Step towards Environmental Protection,

kshey B, Swati B and Disha B, [Resources, Recvcling and Waste Management](#) May 29, 2018

The green building can be named economical building

which deals with ecological issues within or outside the building premises. These natural issues incorporate vitality effectiveness ventures to spare vitality, water protection and decrease in water utilization, indoor air quality, building air ventilation and light, diminishment of contaminations, better wellbeing, reduction in heat island and albedo impacts impacts. The urban communities confronting natural issues have begun receiving green building ideas as a stage towards environmental protection. The authors of the present paper have briefly dealt the significance of green buildings structures alongside the expected steps to be taken in creating green structures and the subsequent advantages there from

Can Green Building Law save the Planet?, Stuart D. Kaplow, Spring 2014 Article, 2013

Buildings have a large impact on the planet and are tremendous consumers of electricity, accounting for projected 74.0% of the total electricity consumption in the United States in 2012.1 In a broader measure, buildings in the United States account for 41.0% of the nation's overall energy use. 2 Building occupants in the United States use over fifteen trillion gallons of potable water each year, which is 13.6% of the total water consumed per day.3 To appreciate the relationship between electricity and water, 20% of the electricity used in California goes to move and treat water. 4 The U.S. Environmental Protection Agency estimates that building occupants generate over 250 million tons of solid waste per year, which is 4.43 pounds per person per day. 5 Of that, only 1.53 pounds per person per day is recycled or composted. 6 Building-related construction and demolition debris totals approximately 160 million tons

The Last Chance to Save the Planet? An Analysis of the Geo-engineering Advocacy Discourse in the Public Debate, Jonas Anshelm and Anders Hansson, Environmental Humanities, vol. 5, 2014, pp. 101-123

we aim to improve our understanding of the public discourse on geo-engineering in mass media. We focus on how various storylines and metaphors are interrelated in mass media, constituting a general discourse favoring more research into and testing or deployment of geo-engineering. Unlike previous research, which has concentrated on mapping, identifying, and quantifying various aspects of this discourse, we use textual analysis to explain the rationales of specific storylines and the roles they play in the discourse, discerning and interpreting the key aspects and overall pattern of the public debate on geo-engineering. In line with Nigel Clark, we claim that the geo-engineering debate has the potential to foster critical and progressive debate that goes beyond present discussions of the pros and

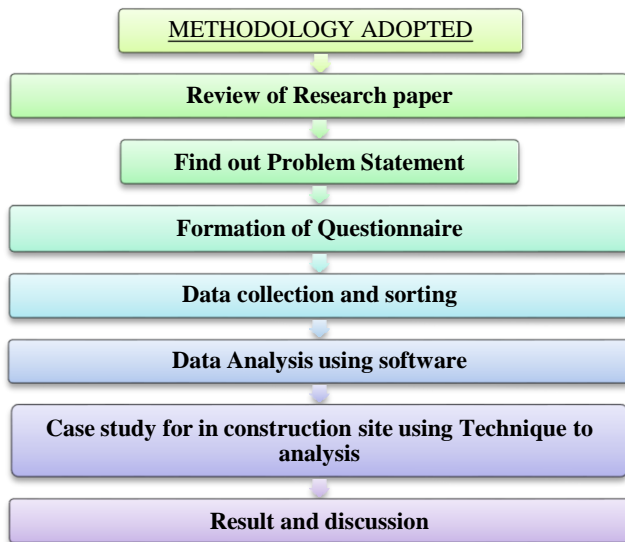
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cons of various geo-engineering options. A point of departure in the environmental humanities.

How Does Construction Impact the Environment?, Sonya Sikra, 21st June 2017

According to the EPA, construction activity can “significantly change the surface of a land” due in large part to “clearing of vegetation and excavating” which is common on many construction projects. According to the agency, the result means surrounding environments can be heavily polluted, particularly surrounding water pools, which have experienced an increase in pollution as a result of various construction projects in recent years. Additionally, research by Kleiwerks says that building material, such as concrete, aluminum, and steel, are directly responsible for “large quantities of CO2 emissions” due to high contents of “embodied energy content”, with 9.8 million tons of CO2 generated from the production of “76 million tons of finished concrete in the US.” The research also says that the construction sector’s current practices at reducing pollutants, or omissions, are massively ineffective and may even “generate high levels of greenhouse gas pollution.” Worryingly enough, construction activities consume “half of all the resources” extracted from nature, and account for one-sixth of global freshwater consumption, one-quarter of wood consumption, and one-quarter of global waste,” according to the research.

Methodology



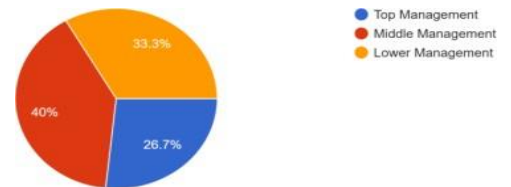
DATA COLLECTION

DATA COLLECTION TECHNIQUES

Among the many available methods in collecting data two

methods were adopted; these are literature review and questionnaires. The first step involves general information collection, including both first-hand and second-hand data, in order to identify major themes from the literature. In the second step, with the literature review and unstructured interviews, important factors of safety were identified. With these factors, a questionnaire was formed and Survey was conducted. The questionnaires were distributed through various electronic media platform to a variety of respondent working around the construction projects. About 100 people have responded to the questionnaire survey

The respondents were asked to indicate the positions they held in the respective companies and the duration for which the company is in operation. They were provided with options to choose from. About 26.7% of the respondents who participated in the study are from Top management background, 40% were from middle management, while 33.3% were serving as a lower management as shown in the Fig.



SPSS SOFTWARE

Analysis of the questionnaires survey was done using IBM SPSS Software. SPSS Statistics is a software package used for statistical analysis. The software name originally stood for Statistical Package for the Social Sciences (SPSS), reflecting the original market. It is a Windows based program that can be used to perform data entry and analysis and to create tables and graphs. It is capable of handling large amounts of data and can perform all of the analyses covered in the text and much more.

It is a widely used program for statistical analysis in social science. It is also used by market researchers, health researchers, survey companies, government, education researchers, marketing organizations, data miners, and others. All the responses obtained from the questionnaires are entered in to the software. First, the variables or the questions are entered in the data view, then, the responses are entered into the software from the various data entered into the software, frequency can be found which is used to determine the importance factor.

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SPSS data View:

The Questionary Survey responses were reported in excel file. After opening data, SPSS displays them in a spreadsheet-like fashion as shown in below figure. The excel file was export in data View and check the values and other information in spread sheet.

Si.No	NAME	WILLTHEAMKUN NOFENMUFOR	Waherresadit heperetypip	isGStpangun pacetporepety	labanmerah toppawerthe	Interresadit cedasasubane	Puchanggenit sumancargen	Abalotrasere onthGStandit	isGStalinget puchanggen
1	1 SWATI GORAD	1	2	2	1	1	1	1	1
2	2 ADITYA KALE	1	1	2	2	1	2	1	2
3	3 ADITI SONAWANE	1	1	2	1	1	1	1	1
4	4 NEHA PATIL	3	3	3	3	1	3	3	3
5	5 VISHAL KODHARDE	1	2	1	1	1	1	1	1
6	6 VALLABESH SANE	1	2	1	2	1	2	2	2
7	7 AJUNYA GARWAD	1	1	2	2	1	1	1	1
8	8 DINKAR POL	1	1	1	2	1	2	2	1
9	9 NIKHIL JOSHI	1	1	1	1	1	1	1	1
10	10 SHASHAK MESHAM	2	2	2	2	2	2	2	2
11	11 SUCHITA BARAMATE	3	3	3	3	3	3	3	3
12	12 SUSHMITA SANE	2	2	2	2	2	2	2	2
13	13 NIKHIL KULKARNI	2	2	2	2	2	2	2	2
14	14 NEHA PARATE	1	1	1	1	1	1	1	1
15	15 PRANALI THARDE	1	1	3	1	1	2	1	2
16	16 SARJET KULKARNI	1	2	2	1	1	1	2	1
17	17 NIKHIL KODHARDE	1	1	2	1	1	1	1	1
18	18 ANURAG PATIL	1	1	1	1	1	2	2	2
19	19 AAKANSHA NONGIA	1	1	1	1	1	1	1	1
20	20 DAMRU RANGARI	2	2	2	2	2	2	2	2
21	21 NIVEDI BHARDE	1	1	1	1	1	1	1	1

SPSS Variable View:

An SPSS data file always has a second sheet called variable view. It shows the metadata associated with the data. Metadata is information about the meaning of variables and data values. In Variable View, different columns are displayed. Each line corresponds to a variable. A variable is simply a quantity of something, which varies and can be measured, such as height, weight, number of children, educational level, gender and so forth. Name of the variable it is your own choice, but make it understandable and do not use numbers or symbols as the first letter since SPSS will not accept it. Moreover, you cannot use spaces in the name. The name of variable was used such as EMI, Construction material etc. The variable view spread sheet is shown in the below figure.

SPSS Data analysis

SPSS can open all sorts of data and display them -and their metadata- in two sheets in its Data Editor window. In our data contain variable holding respondent related questions we can compute the frequency by navigating to Descriptive Statistics as shown in below fig. For better understanding and detailed study pie charts and Bar chart option is also selected.

SPSS Output Window:

After clicking Ok, a new window opens up, SPSS output

viewer window. It holds a nice table with all statistics on all variables we chose. The screenshot below shows what it looks like. As we see, the Output Viewer window has a different layout and structure than the Data Editor window we saw earlier. Creating output in SPSS does not change our data in any way; unlike Excel, SPSS uses different windows for data and research outcomes based on those data.

Relative Index Manual Method

The sample for this study is relatively small. As a result, the analysis had combined all groups of respondents (clients, consultants, contractors and regulatory boards) in order to obtain significant results. Data was analyzed by calculating frequencies and Relative Importance Index (RII). The data analysis was carried out using SPSS. SPSS was used to generate the frequency (fi) of the response category index for the cause and effect factors. The relative importance index (RII) for each factor was calculated using the frequency data for each response categories generated from SPSS. Assessment of questionnaire was carried out using 3 point likert scale from 1 to 3 representing can be not at all, no, most of the times, yes respectively. Data analysis was done calculating Relative Important Index (RII) by following formula.

$$RII = \Sigma W / A * N$$

Where, W = weight given to each factor by respondents (1-3)

$$\Sigma W = 3 \times W_3 + 2 \times W_2 + 1 \times W_1$$

A = highest weight (i.e. 3)

N = total number of respondents (Ex. 100)

Site Photos



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Site Photos



CONT...



CONCLUSION

1. It is conclude that for any medium to large scale construction site applying lean technology or the principles of the lean techniques we will increase the productivity of the construction.
2. Using eco-friendly products will not temper with your use or productivity but make it more efficient and effective
3. The Environment Management Plan would consist of all mitigation measures for each item wise activity to be

undertaken during the construction, operation and the entire life cycle to minimize adverse environmental impacts as a result of the activities of the project.

4. The aim is to integrate an architecturally sustainable design with the natural environment with least damage to the nature and at best improving it by restoring its balance.

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REFERENCES

- [1]. Wijkman, A. Skånberg, K. (2015). The Circular Economy and Benefits for Society, Interim Report, Club of Rome with support from MAVA Foundation and Swedish Association of Recycling Industries, 2015.
- [2]. RPA (2015). Assessing the Potential Cost Savings and Resource Savings of Investments in 4 SME sectors.
- [3]. RPA (2014). Study on Economic and Social Benefits of Environmental Protection and Resource Efficiency Related to the European Semester.
- [4]. OECD (2015). Long-term productivity growth and the environment. ENV/EPOC/WPIEEP (2015).
- [5]. Hinterberger, F., Giljum, S., Oman, I., Polsterer, N., Stocker, A., Burrell, L., Campregher, C., Fuchs, D. und Hartwig, F. (2013). Green growth. From the interaction of resource and labour productivity SERI – Sustainable Europe Research Institute 63 Labour to Resource Productivity. Best Practice Examples, Initiatives and Policy Options.
- [6]. Sadler B. (2014) Environmental Assessment and Development Policymaking, in: Goodland R. and Edmundson V. (eds), Environmental Assessment and Development, pp 3- 19, The World Bank, Washington DC.
- [7]. Glasson, J., Thérivel, R., Chadwich, A., (2017). Introduction to Environmental Impact Assessment: Principles and Procedures, Process, Practice and Prospects. UCL Press, London
- [8]. S. Momtaz, Environmental impact assessment in Bangladesh: a critical review, Environ. Impact. Asses. Rev. 22 (2012) (2), pp. 163–179.
- [9]. United Nations Environment Program, Environmental impact assessment: basic procedures for developing countries, UNEP Regional Office for Asia and the Pacific, Bangkok (2016).
- [10]. Sadler B. (2016). Environmental Assessment in a Changing World: Evaluating Practice to Improve Performance. International Study of the Effectiveness of Environmental

Assessment, Final Report. Canadian Environmental Assessment Agency, Canada.

- [11]. Ebisemiju, F. 2015. Environmental impact assessment: making it work in developing countries. *Journal of Environmental Management*, 38: 247-273.
- [12]. Asian Development Bank, 2013. Environmental Assessment Requirements and Environmental Review Procedures of the Asian Development Bank. Office of Environment, Asian Development Bank, Manila, Philippines. 44 pp.
- [13]. Lovell, Heather, Harriet Bulkeley and Susan Owens. "Converging Agendas: Energy and Climate Change in the UK." *Environment and Planning C: Government and Policy* 27, (2018): 90–109
- [14]. Loukkanen, Matti, SuviHuttunen and Mikael Hildén. "Geo-engineering, Newsmedia and Metaphors: Framing the Controversial." *Public Understanding of Science* 36, (2014): 3-29
- [15]. Grutzen, P.J. (1971): Ozone production rates in an oxygen, hydrogen and nitrogen oxides atmosphere. *Journal Geophysical Research*, vol. 76, p. 7311.
- [16]. Fleming, James Rodger. *Fixing the Sky: The Checkered History of Weather and Climate Control*. New York: Columbia University Press, 2010
- [17]. Buck, Holly Jean, "Climate Engineering: Spectacle, Tragedy or Solution? A Content Analysis of News Media Framing." In *(De-) Constructing the Greenhouse: Interpretative Approaches to Global Climate Governance*, edited by Chris Methmann, DelfRothe and Benjamin Stephan, 166-181. Abingdon: Routledge, 2013.
- [18]. Boucher, Olivier, Piers M. Forster, Nicolas Gruber, Minh Ha-Duong, Mark G. Lawrence, Timothy M. Lenton, Achim Maas and Naomi E. Vaughan. "Rethinking Climate Engineering Categorization in the Context of Climate Change Mitigation and Adaptation." *WIREs Climate Change* 5, 2014: 23-35.
- [19]. Bellamy, Rob, Jason Chilvers, Naomi E. Vaughan and Timothy M. Lenton. "A Review of Climate Geo-engineering Appraisals." *Advanced Review* 3, (2012): 597-615