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**TO STUDY OF NATURE IN CIVIL ENGINEERING PERSPECTIVE [ Title ]**



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This is to certify that a report submitted as a internship entitled “**TO STUDY OF NATURE IN CIVIL ENGINEERING PERSPECTIVE**” was carried out by following students as College Name for the partial fulfillment of B.E. Degree to be awarded by Gujarat Technological University. This Internship work has been carried out under my supervision and is to my satisfaction.

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**DECLARATION OF ORIGINALITY**

I hereby certify that I am the sole author of this thesis and that neither part of this thesis nor the thesis as a whole has been submitted for a degree to any other University of Institute. I certify that, to the best of my knowledge, my thesis does not infringe upon anyone’s copyright nor violate any proprietary rights and that any ideas, techniques, quotations, or any other material from the work of other people included in my thesis, published or otherwise, are fully acknowledged in accordance with the standard referencing practices. I declare that this is a true copy of my report, including any final revisions, as approved by my report review committee.

Date: 10th June, 2014

Place: Gandhinagar

KISHOR G

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**ACKNOWLEDGEMENT**

This is the place to admit that while there appears only author on the cover, this work just as any other, is a product of the interaction with and support during our internship work, among them, first I express my gratitude to my guides **Dr. M. M. Patel & Mr. H. P. Patel** for their affection throughout guidance, advice and encouragement. Thanks to all my **family members and Mr. D. M. Patel** for their affection, care and encouragement. Special thanks to my college for giving me the invaluable knowledge. Above all I am thankful to almighty **God** for everything.

Student Name

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**ABSTRACT**

The main object is to study of nature in civil engineering perspective. To compare the different types of trees with the civil engineering structures and improve the loading of structure. To compare load transform mechanism of nature with civil engineering structures and check the behavior of structures.

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**1. INTRODUCTION**

* 1. **General:**

Civil engineering is that which deals with the design, construction andmaintenance of naturally and physically made environment, including works like roads, canals, buildings, dams, bridges etc.

There are many issues which occur in the buildings like cracking, leaks, collapse etc. due to different types of natural calamities, wind loads, impact loads, live loads etc. To solve this problem, detailed study of civil engineering required.

In nature, there is wide range of trees which cannot break or bent by the wind loads and natural calamities. In civil engineering, there are different types of structures. In nature, there are different types of trees available. Civil buildings consists foundation, column, beam, slab, chhajjas etc. where Trees consists roots, leaves, branches, trunk, flowers.

In a trees, roots act as anchor, holds the tree firmly in place where in buildings and civil structures the foundation act as anchor and holds whole structure firmly in place.

The trunk is main stem of the tree; it supports branches, leaves and flowers. Outer surface of tree known as bark protects the tree from heat, cold; moisture etc. in structures, the column is main part which supports beams, slabs etc. and transports the different types of loads to the soil through foundation. The paint of the structure protects it from moisture.

**1.2 There are different types of trees:**

1. Tallest trees
2. Shorter trees
3. Narrow trees
4. Big leaves trees
5. Small leaves trees
6. Dip root trees
7. Shallow root trees
8. Flexible trees
9. Rigid trees
10. Additional supporting trees
11. Depending supporting trees
    1. **Building structures and loads**

Structures refer to a system of connected parts that can support loads while performing its primary functions.

Normally all static / stationary structures used by the common public are designed by civil engineers.

Engineers must design the structure for:

* Safety
* Serviceability
* Aesthetics
* Economy
* Environmental conditions

**1.4 There are four basic types of structures:**

* Trusses
* Cables and arches
* Frames
* Surface Structures

**1.4.1 Trusses:**

* Trusses consist of slender members, arranged in a triangular pattern.
* Truss members are usually subjected to axial forces only.

**1.4.2 Cables and arches:**

* Cables and arch type structures are used to span long distances.
* Cables are usually flexible and carry their loads in tension.
* An arch has the reverse curvature of a cable and it achieves its strength in compression.
* The arch must be rigid in order to maintain its shape.

**1.4.3 Frames:**

* Frames are commonly used in building structures.
* Frames are composed of beams and columns that are connected together.
* Steel frames and concrete frames are most commonly used in buildings.

**1.4.4 Surface structures:**

* Plate or shell type structures with much less thickness to its other dimensions
* The structure is subjected to tension or compression forces mainly.
  1. **Tree members and structure member:**

**1.5.1 Roots and foundation**

* Root of tree which transfer the load of entire tree in to the soil while the foundation or footing of building structure transfer the entire load of structure in to the soil.

****

**Fig: Root of tree**

****

**Fig: 2 Foundation of tree**

**1.5.2 Trunk and column:**

* Trunk is the vertical member of tree and in the building structure the column is also the vertical member.
* Trunk generally resists the loads from branch, leaf and wind loads etc. while columns in building resist compressive loads.

****

**Fig: 3 Trunk of tree**

****

**Fig: 4 Column of building**

**1.5.3 Branch and beam:**

* Branches are those which carries load from the other small branches and from leafs and transfer it to the trunk of tree while in the buildings beams are the horizontal members that are primarily used to carry vertical loads.

****

**Fig:5 Branches of tree**

****

**Fig: 6 Beam of building**

1. **LITERATURE REVIEW**

**2.1 Developing the Construction Industry in Ghana: The case for a central agency**

**Author:** George Ofori Singapore, national university of Singapore

**Published Date:** march 2012

**Abstract:** The aim of this paper is to propose the establishment of an agency to be charged with the sustainable management, development and regulation of the construction industry.

The specific objectives of the paper are to:

1. To review the literature to establish the following:

-- The importance of the construction industry in every country, and especially in a developing country such as Ghana

-- The need for, and merits of, continuously developing the industry

-- The construction industry in Ghana: its strengths and problems

2. Discuss the possible operations and funding of a construction industry development agency in Ghana

3. Explore the way forward towards the formation of a construction industry development agency in Ghana.

**Conclusion:** This final section of the paper is devoted to a brief discussion of a possible approach to the development of the construction industry in Ghana. The brevity of the report in this section is deliberate as the appropriate approach should be determined only through a comprehensive study of the construction industry in Ghana.

**2.2 The construction industry in developing country**

**Author :**(1)Fred Moavenzadeh Professor of Civil Engineering

(2)Janet Ann Koch Rossow Graduate Research Assistant

**Published date:** May 1976

**Abstract:** This report is one of a series of publications which describe various studies undertaken under the sponsorship of the Technology adaption Program at the Massachusetts Institute of technology.

This report presents the state of the art review of the construction industry in the developing countries. It discusses the role of construction in the process of development and its importance to economic growth, employment creation income generation and redistribution.

**Conclusion:**This report presents a state-of-the-art review of the construction industry in the developing countries, and identifies some of the potentials and barriers that exist for the transfer adaptation, and development of an indigenous industry.

**2.3 Sustainable Development in the Construction Industry**

**Author: Jeremy Glover**

**Published Date: 30 September, 2008**

**Abstract:** To do sustainable development in the construction industry.The purposeof this paper is not to enter into that debate but rather to consider whether it is possible to adopt those concepts within a contractual framework.

**Conclusion:** The key to enforcing any contractual obligation is clarity, understanding what is required and what the penalty for failing to comply with what has been specified might be.

**2.4 Construction industry development for disaster prevention and response**

**Author:** George Ofori, National University of Singapore

**Published Date:**NA

**Abstract:** Disasters, both natural and human-caused, have been occurring with increasing frequency and effect in recent decades in many countries around the world. They have had a disproportionately heavy toll on developing countries both in terms of loss of lives and damage to property. The need to take action to effectively manage disasters has been highlighted at many

Major international conferences and measures are underway in many countries and at the international level.

The developing countries are less able to deal with the causes and impacts of disasters. It is important to develop the construction industries of the poorer nations in order to equip them to manage disasters. This paper considers how this can be done. It starts by providing examples of recent disasters and their impact on human settlements. It then considers the role construction can play in disaster management. Following a review of current initiatives, some recommendations for further action are presented.

**Conclusion:** The need to provide the construction industries of developing countries with the capacity and capability to prevent disasters, both natural and man-made, is clearly evident. Actions at the national and international levels are required. In many cases, the necessary interventions are simple and relatively inexpensive measures and precautions. It is important to enhance knowledge on the linkage between good planning, design and construction and disaster prevention and management. A key missing element is awareness among practitioners. The best place to start is at the universities, through appropriate curriculum design and delivery, as well as continuing professional development for practitioners.

**2.5 Construction for Sustainable Development – A Research and**

**Educational Agenda**

**Author:** Arpad Horvath1

Assistant Professor

Construction Engineering and Management Program

Department of Civil and Environmental Engineering

University of California at Berkeley

**Publishing Date:** 26-28 august, 1999

**Abstract:** Construction has to support a world of continuing population growth and economic development. At the same time, construction must pay heed to the widespread social interest in environmental preservation. It cannot further increase its environmental impact because it is not socially and environmentally acceptable. Yet the construction industry has not done enough to reduce its environmental footprint. Concerted national and international research and educational efforts are needed to change this situation. Construction engineering and management research should benefit from a systems perspective, and from application of standard methods and tools developed for environmentally-conscious design, construction and management by other industries such as the electronics, electromechanical products, and the automobile sectors. Traditional construction engineering and management education needs to incorporate the latest methods and tools for environmentally-conscious design, engineering and management, and discuss relevant case studies. Educational objectives could be achieved by including environmental modules in existing courses, developing new courses that focus on Environmentally-conscious construction, and encouraging and advising undergraduate and graduate research projects. This paper outlines an agenda for action in research and education.

**Conclusion:** This is a relatively easy way of raising the environmental consciousness of future construction engineers. Students who focus on construction engineering and management (as well as other interested civil engineering students) will want in-depth knowledge of the magnitude, type, details and possible solutions to environmental problems in construction.

**3. METHODOLOGY**

**4. Tree and structure**

**4.1 The tallest tree and according to that high rise structure**

**4.1.1 coast redwood tree with 115m height**

|  |  |
| --- | --- |
| **Coast redwood** | **Concorde tower** |
| * Height 115m (379.3 feet) * In Hyperion redwood national park, California, united states * In conical shape * Shallow root system about 5 or 6 feet deep * Shallow root system which extends over one hundred feet from the base this increases its stability during strong winds and floods     Fig:7 | * Height 115m (377 feet) * It is in Bangalore and has 20 floors * It has deep foundation (pile foundation) * Can we design this structure with shallow foundation? * Can we get stability in this structure like redwood tree   **2.concorde tower.jpg**  Fig:8 |

**4.1.2 coast Douglas fir with 99.4m height**

|  |  |
| --- | --- |
| **Coast Douglas** | **Alpha tower** |
| * It is in U.S * Second highest tree in the world * Height 99.4m (326 feet) * Roots are speeded * Foundation of roots is shallow   **1.Coast Douglas.jpg**  Fig:9 | * It is in Birmingham, England * Height 100m (328 feet) * In this building also deep foundation (pile foundation) * Can we construct this building with shallow foundation?   **450px-The_Alpha_Tower%2C_Birmingham_-_DSC08757.JPG**  Fig:10 |

**4.3 Big leaf tree**

|  |  |
| --- | --- |
| **Big leaf tree** | **Chhajja** |
| * The leaf of tree are flexible * The wind cannot do any effect on leaf * Palm tree is the example of that     Fig:11 | * Can our buildings chhajja made flexible?   **5 chhajja.jpg**  Fig:12 |

**4.4 Depending supporting tree**

|  |  |
| --- | --- |
| **Depending supporting tree** | **Constructed building** |
| * Depending supporting trees are those in which they have their own support to distribute the load   **4.depending supporting.JPG**  Fig:13 | * Can we provide additional depended supports in constructed building when load is increases?   **200px-Concorde_Tower_Under_Construction_on_15_May_2008.jpg**  Fig:14 |

REFERENCES

1. George Ofori Singapore*, “****Developing the Construction Industry in Ghana: The case for a central agency”*,** march 2012
2. Fred Moavenzadeh, Janet Ann Koch Rossow, “***The construction industry in developing country*”,**May 1976
3. Jeremy Glover, “***Sustainable Development in the Construction Industry”***, September 2008
4. George Ofori, “***Construction industry development for disaster prevention and response”***
5. Arpad Horvath, “***Construction for Sustainable Development – A Research and Educational Agenda”*,** august, 1999.