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DESIGN OF SUPERSTRUCTURE OF A T-BEAM BRIDGE WITH SOLAR PANELS ALONG THE RAILINGS

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ABSTRACT

The design project on T Beam Bridge explains the philosophy of the analysis and design of simply supported T beam bridge members employing working stress method. The concepts of permissible stresses of concrete and reinforcement and the factors of safety are adopted. The basic assumptions of the working stress method are accomplished to design the structure to its maximum utility. Balanced and under-reinforced sections are explained establishing the governing equations for the analysis and design of the components namely; ***Deck slab, Cantilever slab, longitudinal girders and Cross beams****. The Superstructure is designed for IRC Class AA Loading and also checked for IRC Class A Loading. The solution procedures for the two types of problems, viz., analysis and design have been worked out individually by abiding to the code requirements and provisions. Due to the restrictions for the functional requirements of the 16m span bridge, a check for resisting moment is to be carried out to arrive at an economical design by adopting* ***Working stress method*** *and also* ***Design of solar panels*** *along handling rails so that current can be obtained and supplied to near by****street lights****, houses and so, on thus we don't need to depend up on any other source of electricity in this particular area where we have our solar bridge.*

I.INTRODUCTION

The T-beam bridges is designed with respect to working stress method by designing its special components such as **Deck slab, Cantilever slab, longitudinal girders and Cross beams**using and then to supply it with solar panels on their railings so that to obtain required amount of electricity.

The availability of electricity is very much less and we undertake many methods to produce electricity like **hydroelectric power producing structures, wind mills, nuclear power plants** and so on. To obtain electricity apart from above mentioned passages I prefer my idea of providing the handling rails with solar panels and which will be handy in supplying current to the street lights along the bridges designed under working stress factors. The current can also be supplied below them when we have a junction path also it can even supply the portion of collected power to near by street lights away from the constructed bridges if possible.

II.SOLAR PANELS

A solar PV system design can be done in four steps:

• Load estimation.• Estimation of number of PV panels.

• Estimation of battery bank.• Cost estimation of the system.

Thus estimated panels are wired over the concrete handling rails in such a way thata factor called „ operating factor‟ is used to estimate the actual output from a PV module. [The operating factor between 0.60 and 0.90 (implying the output power is 60 to 80% lower than rated output power) in normal operating conditions, depending on temperature, dust on module, etc.]

III.FIGURES AND TABLE

Indian road congress codes for design of bridges, Pigeaud's curve method for determination of deck design, Courbon's method for longitudinal girders calculation.[$P_i = \frac{P}{n}\left[1 + \frac{ne\sum d_i^2}{d_i}\right]$]. Also implementing the Buoyancy effect, Centrifugal forces due to curvature, Impact effect, Temperature effect, Seismic effect, Horizontal forces due to water currents and Wind load.

IV.CONCLUSION

The Design of the superstructure of a T-Beam bridge is done and the reinforcement details are projected in AUTO CADD. The moment carrying capacity of the girders were calculated and the same was found to be safe. Then they are supplied with suitable voltage of solar panels along the handling rails which is being designed to be safe under all circumstances. This course of design has played a vital role in learning the various difficulties involved during the process of Designing, and components of solar panels with good quality product so that they withstand for a long period and the various aspects to be considered during the Design Process of a project.

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