

ANALYSIS AND DESIGN OF PEDESTRIAN BRIDGE

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ABSTRACT : In Civil design, engineers deal with the design, build, and support of the physical and naturally made environment, including works like bridges, roads, canals, dams, and structures. The construction of bridges has always been one of the most fascinating challenges to civil engineers. Timber, iron, steel, and concrete have been used to construct the bridge. In India mostly reinforced concrete bridges exist. A foot-traveler bridge is a structure built to span physical obstacles such as highways and railway tracks. This bridge will reduce transportation jams and delay at the highway as well as eliminate the conflicts between pedestrians and motor vehicles. In this present project work, the analysis and design of this RCC pedestrian bridge are done by using STAAD pro with standard design details as mentioned in Indian codes. The planned foot-traveler bridge is designed in STAAD Pro where the various loads & loads combinations are included in this design also include lateral Load.

Keywords: Canals, concrete, lateral load, pedestrian and highway.

INTRODUCTION

The pedestrian bridges are used to cross the roads to let pedestrians cross safely. Samples of that area unit are located close to institutions, colleges, and working areas. The demand and supply of the growing population whilst retaining market town character. This pedestrian bridge is design for the safety of the people who are using this bridge for their purposes where this bridge is design for serving the service to traffic who cross the bridge and the fast mover from the bridge. Decisive and easy access to the bus terminus and in conjunction with the six ways state highway would enable the traffic to flow at high speed so that the movement should not be disturbed in turn saving the destination, fuel, and time. Durable and sustainable bridges play an important role in the development of the nation. Objects of bridges vary depending on the purpose of the bridge, the nature of the terrain where the bridge is constructed and tied, the element used to make it, and the stocks available to build it. For short spans, the simplest form of the bridge deck is a concrete slab.

1. OBJECTIVES

The objective of this work is to investigate

- To analyze and design a Pedestrian Bridge over highways road in an urban city.
- To design and construct this structure for maximum strength, safety, and durability.
- To make use a simple design methods
- To analyze this structure we use STAAD. Pro analysis software for the different loads and load combinations working on this design.

2. MATERIALS USED FOR PEDESTRIAN BRIDGE

The purpose of the using materials in this foot over bridges to improve the strength, safety, and durability of the Bridge, during at least 30+ years. Types of the material are introduced in the market as new applications with different purpose. These materials can be made of natural glass, metals, or organic materials are added to Foot over bridges for increasing their durability and physical properties such as cracking generate by plastic shrinkage, drying shrinkage and thermal expansion of the bridge.

DESIGN AND ANALYSIS OF PEDESTRIAN BRIDGE OR FOOT BRIDGE

Here we deal with designing and analysis of this pedestrian bridge. The analysis is done by STAAD Pro software. here we all design the pedestrian bridge where traffic is more than 2000 vehicles, for the elimination of conflicts between pedestrians and motor vehicles. As average traffic in this bridge is more than 2000. The engineering college where students and other people cross the road, this designing project aims to design and build a bridge at the cross of roads in front of institutional building. This will minimize pedestrian traffic and delay highway traffic. We design this Foot Bridge by using STAAD pro analysis software

3. METHODOLGY

Determination Criteria

1. SPAN

In structural design 'span' is the term defined as the length of a structural component - e.g. roof, Beam, deck, or floor truss - that extends (or 'spans') within two supports. The place of the abutments and the right place of the extent of the footbridge are found by site surveying. For example, Truss bridges are used on this medium span (<20m) are applied due to their average self-weight, Suspended or suspension bridges might also be counted The selection of the span will depend on different measurements.

ABUTMENTS

The abutments are used to provide to resist the lateral and vertical load of span.

For long-term stability of this bridge is majorly dependent on the strength and stability of its abutments. The proper design and construction of abutments have created the life of the bridge.

2. TRAFFIC

The major traffic covers for this bridge are foot-traveler, and the occasional moderate vehicle like a pick-up with a high weighted load up to about 3.0 tonne. Most of these footbridge types contain the following conditions: Bamboo bridges - walkers, bicycles, smaller lives such as cows, sheep, and possibly horses, and pushed motorcycles of the local level are cross the footbridge. It is unlikely to depend on the imports and exports of the material.

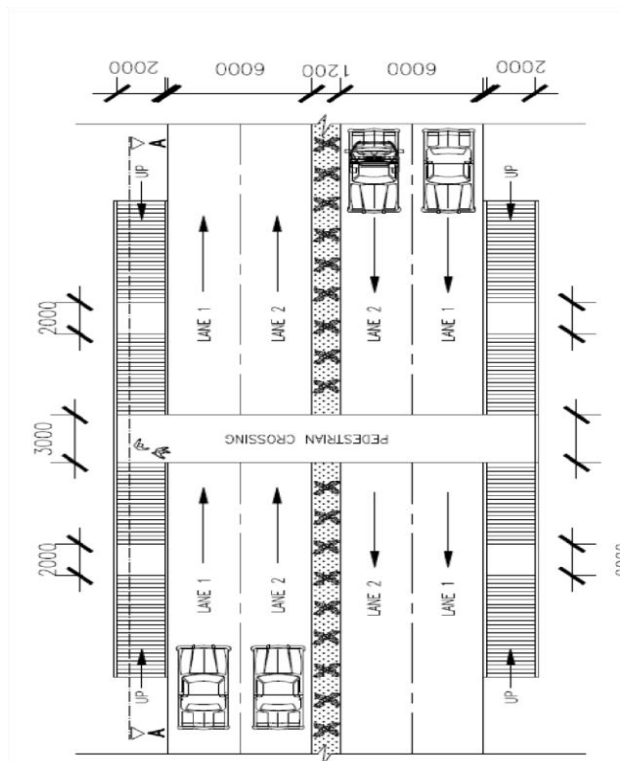
3. SUSTENANCE

Majorly the bridges are made with steel or galvanized steel, the material had rusting with time. The pedestrian bridge has minimum maintenance, such as galvanized steel or fiber-reinforced systems. Bridge inspections must be happening regularly, the maintenance requirements will vary in the project site and quality of the material use in this design. Some companies are made for maintenance purposes. We should regularly check or inspect the bridge for maintenance.

4. ESTIMATION OR COSTING

The estimation of the cost is a most important thing for the construction of the bridge. Estimation or Costing for initially working purposes must be considered when selecting this pedestrian bridge design. The cost of the foot bridge is Minimized and Maximized as per the material using in this project. The estimation is used defined as the process of calculating the quantities and costs of the various items used in the construction.

PLAN VIEW OF THIS PEDESTRIAN BRIDGE



LOAD COMBINATIONS:

- DL(Dead load) + LL(Live load)
- DL(Dead load) + WL(+X) (wind load) at x dir.
- DL(Dead load) + WL(-X) (wind load) at x dir.
- DL(Dead load) + WL(+Z) (wind load) at z dir.
- DL(Dead load) + WL(-Z) (wind load) at z dir.

LOADS:

- **Dead load** Indicate the weight of the material. The dead load is the self weight of the bridge. **IS 875-1 (1987)**

- **Live load** Indicate the weight of the traffic at the bridge. The dead load is the self weight of the bridge. **IS 875-2** (1987)
- **Wind load** it Indicate the load which generate in structure through wind. **IS 875-3** (1987)

CONCLUSIONS

- Our project deals with Analysis and design of a pedestrian bridge using STAAD Pro software.
- This foot bridge is designed in STAAD Pro. Various loads & combinations are included in the analysis we also included lateral loads.
- The Analysis of frame and truss used in this foot bridge is done by stiffness matrix method using STAAD Pro Software.
- Design of columns, beam, and foundation are done manually by limit state method. As per IS456 – 2000, IS 875, and SP16.

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