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DESIGN AND ANALYSIS OF PEDESTRIAN BRIDGE

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ABSTRACT

This project deals with the design and analysis of pedestrian bridge. In this project we are designing the pedestrian over head bridge where the traffic exceeds more than 2500 vehicles, for the elimination of conflicts between pedestrians and motor vehicles. As an average hourly traffic of more than 2500 vehicles in front of aurora's engineering college where students and other people cross the road. With this high average hourly traffic value, crossing by foot can not only be challenging, but can be dangerous. With this in mind, this project aims to design and build a pedestrian bridge at the intersection of roads in front of college building. This will eliminate traffic congestion and delay at the highway as well as eliminate conflicts between pedestrians and motor vehicles. We are designing the pedestrian bridge by using staad.pro

Keywords: Pedestrian Bridge Structures and Staad. Pro

I. INTRODUCTION

A span (also referred to as a footbridge, pedestrian flyover, or pedestrian overcrossing) may be a bridge designed for pedestrians and in some cases cyclists, animal traffic, and horse riders, rather than vehicle traffic. Footbridges complement the landscape and might be used decoratively to visually link two distinct areas or to signal dealing. In several developed countries, footbridges area unit each practical and might be lovely works of art and sculpture. For poor rural communities within the developing world, a span could also be a community's solely access to medical clinics, colleges and markets, which might somewhat be inaccessible once rivers area unit too high to cross. Easy span styles are developed to be property and simply constructible in such rural areas mistreatment solely native materials and labor.

An enclosed span between two buildings is usually called an airway. Bridges providing for each pedestrians and cyclists area unit usually brought up as green bridges and type a crucial a part of property transport movement towards additional sustainable cities. Footbridges area unit usually located to permit pedestrians to cross water or railways in areas wherever there are not any near roads to necessitate a road bridge.

They're additionally situated across roads to let pedestrians cross safely while not deceleration down the traffic. The latter may be a sort of pedestrian separation structure, samples of that area unit significantly found close to colleges, to assist forest all kids running ahead of moving cars.

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1.1 Type's Footbridges Include

- Simple span
- Clapper bridge
- Moon bridge
- Step-stone bridge
- Zig-zag bridge
- Plank
- Boardwalk
- Joisted
- Simple truss

1.2 Requirements, Specifications, And Given Parameters

The following may be a list of the specifications for the bridge project:

- a. The bridge should clear span stadium avenue owing to stripped breadth of median within the route.
- b. Got to co-here to the Americans with disabilities act (ADA) that sets a most slope of fifty for the walk (including walkway on approach)
- c. Right of approach (R/W) IS 80' from every direction of the center line of road.
- d. Bridge shall be designed for a minimum life of fifty years
- e. Clearance height of a minimum of 17.55' from the highest of the present pavement f) Minimum load of 85 foreign terrorist organizations.
- f. Design wind speed of 90 mph for a three's wind current of air.
- g. Design in line with American association of state highway transportation officers (AASHTO) and Highway State Department of Transportation (INDOT) needs
- h. Breadth of bridge to be 10' wide (controls the look vehicle to be used)
- Throughout these courses, the fundamental steps in coming up with a structure area unit instructed where as learning the interface of the SAP 2000 package. Any structural style which might be completed in SAP 2000 is also broken in to four steps:
- Modelling
- Analysis
- Display
- Design

II. LITERATURE REVIEW

2.1 Character of Pedestrian Roads

Various researchers, planners and designers have tried to characterize the weather of a perfect pedestrian atmosphere. For example, kroll classified the operate of streets as:

- · Utilitarian instrumentality,
- · Cultural manifestation, and
- Native focal points. (Kroll 2001)



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These three principal street functions offer varied stages for the personal expertise of walking. This personal expertise takes place during a physical, social and cultural environment. Any technique that tries to judge this multifaceted personal expertise ought to be equally made in analytical rigor and insight.

Another research worker offered a definition that Associate in Nursing "ideal" pedestrian environment would be one wherever several activities occur at the same time without conflicts among users like pedestrians, cyclists and drivers (Sarkar 1993).

In the analysis of pedestrian and bicycle facilities in American state, the important attributes of the pedestrian network were known to be surface type of the pedestrian paseo, surface maintenance of the pedestrian sidewalk, dimension of the pedestrian paseo, separation from the conveyance carriageway, places for looking, places for consumption, potable fountains, lighting facilities, presence of steep gradients, signage, quantity of litter on the pedestrian paseo and presence of police patrols (Shafer etal 1999)

III. METHODOLOGY

In the present study, Staad Pro programming has been utilized as a part of request to dissect and plan Pre Engineered Structures and Ordinary Steel Structure. It gives the Bending minute, Shear Forces, Axial Forces, Torsion, Beam Structures of a steel structure so that the outline should be possible utilizing Tapered Areas and check for security in Pre Engineered Buildings.

3.1 Dead Load

Dead load on a structure is the after effect of the heaviness of the perpetual parts, for example, shafts, floor pieces, sections and dividers. These parts will create the same consistent "dead" load amid the lifespan of the building. Dead loads are applied in the vertical plane.

Dead load = volume of part x unit weight of materials

By computing the volume of every part and increasing by the unit weight of the materials from which it is made, a precise dead load can be resolved for every segment. The distinctive parts can then be included to decide the dead load for the whole structure.

3.2 Live Load

Every single unfixed thing in a building, for example, individuals and furniture result in a "live" load on the structure. Live loads are applied in the vertical plane. Live loads are variable as they rely on upon utilization and limit, consequently the AS 1170 table gives remittances which depend on preservationist gauges. For instance, the live load for a story in a house is given as 1.5 kPa contrasted with a move corridor floor live heap of 5.0 kPa. It is sensible to expect that a move lobby would have a bigger number of individuals in it than a house.

3.3 Moving Pressure

At the point when wind streams around a building, it can deliver some high suction weights. These happen principally at the main edges. In these regions, the cladding must be solidly settled to the structure and the rooftop must be immovably held down. The compliment the rooftop, the higher the suction powers is on the rooftop and the more imperative it is to ensure that the holding-down straps are altered safely into the structure.

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Move your mouse over the distinctive locales of the house to discover more data about the impacts of wind weight on a building.

Moving air influences a structure by applying weight on it. This weight changes with the speed of the air (rate and bearing) furthermore with the shape and introduction of the structure. For instance for one-story or two-story structures in Sydney, the configuration wind speed could shift between 30 m/s for a genuinely all around secured site and 50 m/s for an uncovered site. Melbourne encounters less tempests than Sydney, so the configuration speed could be as low as 25 m/s.

3.4 Seismic Load

Seismic stacking is one of the essential ideas of tremor building which implies utilization of a quake produced unsettling to a structure. It happens at contact surfaces of a structure either with the ground, or with neighboring structures, or with gravity waves from torrent.

Seismic stacking depends, fundamentally, on:

- Anticipated tremor's parameters at the site known as seismic peril
- Geotechnical parameters of the site
- Structure's parameters
- Characteristics of the foreseen gravity waves from tidal wave (if relevant).

Now and then, seismic burden surpasses capacity of a structure to oppose it without being broken, in part or totally Due to their shared communication seismic stacking and seismic execution of a structure are personally related.

IV. DESIGN



Figure: 1 Plan View of The Bridge

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Figure: 2 Elevation of the Bridge



Figure: 3 Isometric View of the Bridge





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Figure: 5 Bridge with Plate Thickness



Figure: 6 Bridge with Rectangular Properties





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Figure: 8 Uniform Force



Figure: 9 wind load factor "x"





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Figure: 11 wind load factor "z"



Figure: 12 wind load factor "-z"





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V. CONCLUSION

With pedestrian travel over aurora engineering college being as dangerous because it is, the group feels that the simplest attainable manner in making certain safe travel over this route is by constructing a brand new bridge. Additionally to serving to pedestrians safely cross the street road, the structure ought to be of associate innovative style of a similar calibre because the different pedestrian bridges placed on the IPFW field.

Based upon the intensive analysis place forth by this senior design cluster, the most suitable form of bridge to fulfil the wants of this structure is of associate arch vogue style.

With a overall span of 210' and a height off of the footer of 40.5', the structure isn't only safely ready to carry all of the forces that might be exposed to, however it'll conjointly be of a similar level of style as is to be excepted. Utilizing steel and concrete for the most important style members, erection of the structure would proceed quickly because of the flexibility of most of the most parts being prefab off of the work site.

Utilizing this style technique would greatly minimize the results that the development of the bridge for pedestrian usage.

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