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DESIGN OF FLYOVER BRIDGE IN TRICHY

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ABSTRACT

In this paper deals what are the problems occurring in high traffic intensity area in Trichy. The analysis influences of traffic behavior of both the structural components of highway fly over bridge systems. Additionally, it is also demonstrated that beneficial effect on the superstructure response and sometimes produce detrimental effects on the system behavior and is dependent on the characteristics of the high traffic intensity. Here I consider the place of Trichy to Chennai Highway because there are a more traffic problems in peak hours. It is an overpass and underpass together form a grade separation. Stack interchanges are made up of many over passes. A Pedestrians safe crossing over busy road without impacting traffic. The present flyover bridge is designed to connect the two roads. However, in-situ bridge traffic monitoring is still one of the rugged works for researchers in their field applications. Carry out the preliminary survey for the various alignment and finalize the optimistic alignment based an Engineering and economic aspect. Prepare alignment plans, longitudinal sections and cross sections with reference to latest IRC specification and current international best practices for these IRC specifications and current international best practices for these types of works. Finally detailed design should be prepared and it will be ensure that which is stable for all type of environmental condition.

KEYWORDS: Highway fly over bridge, IRC specifications, Preliminary survey.

INTRODUCTION

A bridge is a construction built to span physical obstacles such as a body of water, valley, or road, for the purpose of providing passage over the obstacle. Designs of bridges vary depending on the function of the bridge, the nature of the terrain where the bridge is constructed, the material used for construction and the funds available to build it. A bridge has three main elements. First, the substructure (foundation) transfers the loaded weight of the bridge to the ground; it consists of components such as columns (also called piers) and abutments. An abutment is the connection between the end of the bridge and the road carried by the earth; it provides support for the end sections of the bridge. Second, the superstructure of the bridge is the horizontal platform that spans the space between columns. Finally, the deck of the bridge. The guidelines for Non-linear analysis for bridge structure presents a collection of general recommendations for the modeling and analysis of highway bridges and overpasses subjected to earthquake ground motions, required for the design or evaluation of the capacity and ductility of critical bridge components and systems.

LITERATURE REVIEW

Dzolev et al, This paper presents the analysis of reinforced concrete Girder Bridge designed according to EN 1998-2, with the determination of the achieved ductility in plastic hinges at the target displacement for the designed seismic action, for confined and unconfined concrete cross sections, with and without the effects of geometric nonlinearity. . In this paper, analyses were conducted for RC Girder Bridge with confined and unconfined concrete cross sections [1, 2] with and without the effects of geometric nonlinearity. Based on the pushover curves, it can be concluded that, for the same level of horizontal displacement, lower values of base-shear are obtained if P-Δ effects are applied. Obtained target displacement and achieved local ductility also differ

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whether concrete is modelled as confined or unconfined, giving higher values in favour of confined concrete. Results are presented only for the shorter column.

Rajeev Sharma (2015), This paper deals with theevaluation studies for the existing, RC bridge using non-linear static analysis. For the seismic assessment of the bridge a 3 span bridge is selected which is located on the hindon river at Ghaziabad (Uttar Pradesh).this area is highly vulnerable to the seismic activity because it is lie in the Zone – 4 .so , the high magnitude earthquake may be occurs in this region(may be greater than 7 magnitude). . For doing the seismic evaluation of the bridge at the time of earthquake open sees software is used. The open sees model is used to describe the various performances of the bridge.

T. Pramod Kumar et al, This paper deals with the analysis and design of super structure of road cum railway bridge across Krishna river proposed ondownstream side of existing bridge between Mahanadu road of Sithanagaram and P.N.Bus station, Vijayawada.The bridge is made of through type steel truss which carries two railway tracks at lower level and a roadway ofthree lane carriage way in the upper level. The span length matches with that of existing nearby railway bridge.Analyses of top floor members, truss members and bottom floor members are done usingSTAAD.Pro. Thedesign of structural members of the truss, top floor and bottom floor members is done as per Indian railwaystandard code and Indian roads congress code. In which they concluded that Road cum railway bridge reduce the construction cost by providing single bridge for both railway traffic road traffic instead of providing two separate bridges.It meets the increased railway and road traffic needs across the river Krishna.It reduces the land acquisition problem by providing single bridge.

Karthiga et al, This paper presents a linear analysis of the substructure of rail over bridge by consideringIRS 25t railway loading and road over bridge by considering IRC class-A loading.Road over bridges are bridges over which the roadway can be operated. On the otherhand, in rail over bridges, the rail track can be operated over the bridge. The aim ofthis paper is to determine the various types of loads acting on the structure andanalyze the substructure of road over bridge and rail over bridge using STAAD Pro.The moment is obtained from STAAD Pro for road over bridge and rail over bridgeand compared for the critical pier section. The loads and load combinations areconsidered with respect to IRS and IRC codes.

R.Monteiro et al, This paper intends to readdress that issue from the modeling type point of view. Currently, most of the structural seismic analyses are carried out considering either fiber-based or plastic hinge structural models. Depending on the choice, distinct ways of considering the non-linear behavior of the elements are regarded and different parameters and calibration procedures need to be set. With the purpose of investigating the accuracy of both modeling possibilities, a parametric study is conducted on different bridge configurations, comparing pushover curves as well as NSP results which make use of those pushover curves. Application issues, such as advantages and/or limitations.

Chao Li et al, This paper studies the seismic responses of corrosion-damaged RC bridges under spatially varying seismic ground motions. The chloride induced corrosion damage to the bridge is considered in the analysis. Based on the time-variant chloride corrosion current density, the extent of the reinforcement corrosion in the bridge piers is estimated. The probability distributions of bridge column reinforcement diameter and yield stress at different time steps after the bridge having been in service are calculated using Monte Carlo simulation method.

EXISTING BRIDGE DETAILS

Road level at Ends	:	R>L.(+)98.762m
Road Level at Middle	:	R.L.(+)97.200m
H.F.L	:	R.L.(+)98.411m
Sill Level	:	R.L. (+) 95.376m
Skew@River Crossing	:	12.815
Width of carriageway	:	7.00m
Overall Width	:	7.00m
Footpath	:	No
Median	:	No
Wearing Coat	:	No
Length of Causeway	:	235.000m
No. of vent pipe	:	140 Nos
Type of Structure	:	PCC- Causeway

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Time period / Items	Intersection converting to the flyover		
	Before	During	After
1. Flyover location	Highway route no 43 and highway route no 4135		
2. Traffic movement	✓	✓	✓
3. Delay	✓	-	✓
4. Queue length	✓	-	✓
5. Traffic Signal	Cycle time 244 s.	Cycle time 254 s.	Cycle time 224 s.
6. Speed	Avg: 28.5 km/hr.	-	Avg: 45.7 km/hr.
7. Distance	✓	-	✓
8. Conflict points	46 points	-	55 points
9. Road Safety Audit	✓	✓	✓
10. Accident statistics	17 crashes (28 months)	52 crashes (30 months)	9 crashes (15 months)
	7.3 crashes/year	20.8 crashes/year	7.2 crashes/year

SUB SOIL INVESTIGATION

For this purpose I am not investigating the soil particulars. Because we plan to use the same Foundation which they used for remaining bridges. The remaining three bridges having the pile foundation.

Design loading : one lane of 70R
Exposure : Moderate
Seismic Zone : Zone II
Width of Carriageway : 7.50m
Overall Width : 12.00m
Footpath : 1.50m
Median : No
Kerb : 0.45m
Crash Barrier : 0.55m
Wearing coat : 75mm
No. of span : 11 Nos

Layout of site

FLYOVER EVALUATION

The project evaluation compares the cases with and without the flyover project in order to assess the benefits arising from the project. The benefits include savings in the value of time (VOT), vehicle operating cost (VOC) and cost of accidents. Details are as follows;

Value of time (VOT)

Value of time means the cost (equivalent to money) that is lost due to delay during a trip, but when traffic flow through the intersection is improved after the flyover is operational, the increased intersection efficiency will save travel time and road users can use this time to do another activity. Value of time in the area (province) of case

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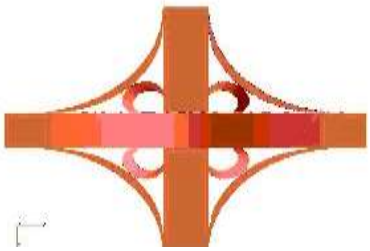
study can be calculated from the gross province product (GPP), number of people employed and average hours of work

Vehicle operating costs (VOC)

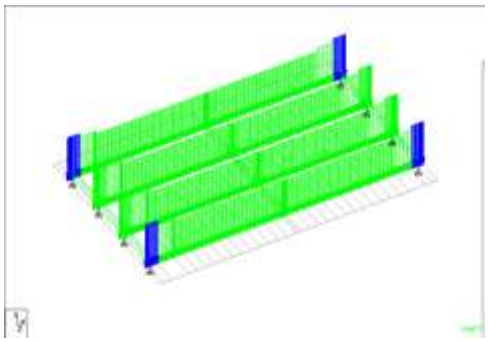
Vehicle operating costs comprise the cost of fuel, lubricant cost, idling of the engine and operation cost, these correlated with number, type, vehicle speed and traffic volume (Watcharin, V., (1994)). When vehicles are waiting for green signal at the intersection stop line with the engine running; wasteful fuel consumption results which also vary with types of vehicles (Goyal, S. K., Goel, S., &Tamhane, S. M. (2009)). The different traffic volume between case without and with project can be converted to equivalent monetary term.

Proposed Flyover Bridge

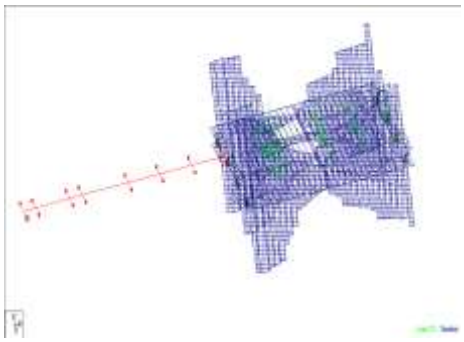


Clover leaf junction (Top view)

Clover leaf junction (Isometric view)



Dead Load Longitudinal Girder



Live Load on Deck slab

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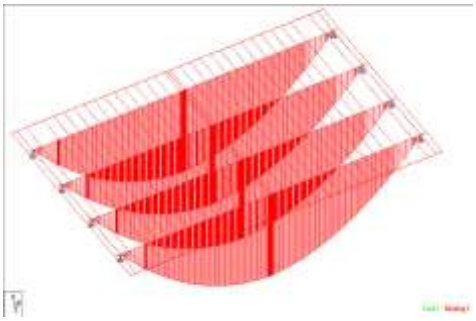
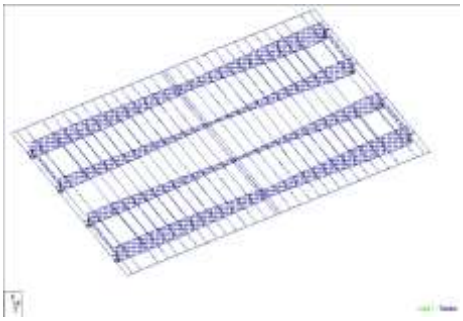
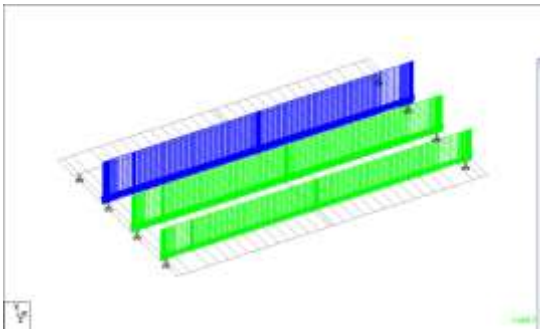


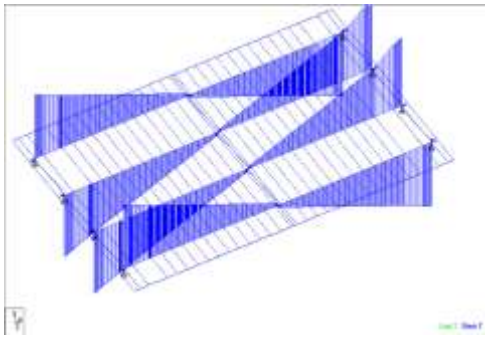
Dead Load on deck slab



Dead Load reaction



Self-weight of Deck slab



Shear force of deck slab

CONCLUSION

- To reduce the travelling time of vehicles in toll plaza
- Economical savings of fuel consumption
- Without interrupt traffic vehicle move in easy way
- Through flyovers plenty of time is saved avoiding congestion.
- Pollution effect is reduced.
- Flyovers reduce the risk of accidents.
- Flyovers also contribute a lot to the aesthetics of the city. The persons traveling on the flyover can enjoy the panoramic view of the city.

Flyovers have many advantages, but shortcomings arise only because of some mistakes committed during their construction or due to improper planning, etc.

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