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Mankhurd Skywalk (Proposal)

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Abstract — *Due to the increase in the number of populations of metropolitan cities like Mumbai there are large number of accidents occurs on railway tracks. One such area in Mumbai known as Mankhurd, there are large number of accidents happen due to crossing and walking on railway tracks. People in this area walk freely considering railway tracks as road, school going children walk on the railway without the fear of death so we have come up with the idea of providing a skywalk that will reduce the number of accidents and prevent school going children and other people walking on railway tracks. By doing this we will reduce the time taken to reach respective destination, we can save money, we can also save the electricity consumption by the unique design of skywalk. We can also generate revenue by hoardings attached to skywalk and this will make to enhance the beauty of the Mankhurd area. The skywalk will start from Mankhurd station to Lallubhai compound. We have prepared and analyzed the model by using software called SAP. The skywalk design is made in such a manner that will make maximum use of sunlight during the day and can make use of the stored energy throughout the night.*

As per structure requirement we have designed the column, column cap, I sections of steel using IS 800:2007, and the slab and connected them. On the roof, solar panel have been placed so that sunrays directly fall on the plates and alternate placing of solar plates makes maximum use of solar energy at 16m span.

Keywords- *Mankhurd, Skywalk, Railway station, Highway, Lallubhai compound, Solar panel, Accidents.*

I. INTRODUCTION

Skywalk are the elevated structures constructed between two points that will connect and protect the people from weather. There are about 37 Skywalks in Mumbai. The average foot count of 23 skywalks in August 2010 was 565,000. Mankhurd is a suburb in eastern Mumbai with coordinate's 19.05°N 72.93°E, India. Population of Mankhurd is 674,850 the maximum people live here are from slum area which maximizes the use of railway tracks for school going children and other people residing nearby Mankhurd station. The skywalk connects from Mankhurd station to Lallubhai compound which consist of 65 buildings with 9,300 tenements. Maximum people living in Lallubhai compound and slum make us of railway tracks to reach homes, schools and station. Due to crossing and walking many peoples have lost their lives while crossing the railway tracks. After a month of study, it was found that providing a skywalk would be most reliable method for reducing the number of accidents and providing the commuter a safe way for the people residing in Mankhurd.

Other side of Mankhurd station i.e. Maharashtra Nagar does not require skywalk due to the provision of 1 meter pavement width made up of concrete which makes easy way for the people residing in Maharashtra Nagar without any problem faced by the commuters.

II. PEDESTRIAN INTENSITY ANALYSIS

Pedestrian Traffic Data:

Multiple studies were conducted on different times to obtain an accurate understanding of number of people crossing the railway tracks.

350 per hour (observed between 10 and 11 AM on 13/08/2016)
215 per hour (observed between 12 and 2 PM on 13/08/2016)
375 per hour (observed between 6 and 7 PM on 13/08/2016)

Figure 1: People walking on railway tracks

III. PROPOSED BRIDGE DESIGN

By studying the whole area, the most feasible and economical route found is to connect the skywalk from Mankhurd station to Lallubhai compound parallel to railway tracks that will reduce the time, money, and provide safety to the school going children as well as people residing nearby rail network.

Before this people residing nearby rail network and Lallubhai compound take the long route which is marked by red colour. By taking rickshaw it usually takes 15minutes to reach Lallubhai compound and the fare is Rs.35/- the other side of Mankhurd area does not need skywalk due to a 1m pavement which is laid parallel to railway tracks. The short route that we are proposing for skywalk is shown in green colour and by using skywalk it will hardly take 5minutes to reach the destination.

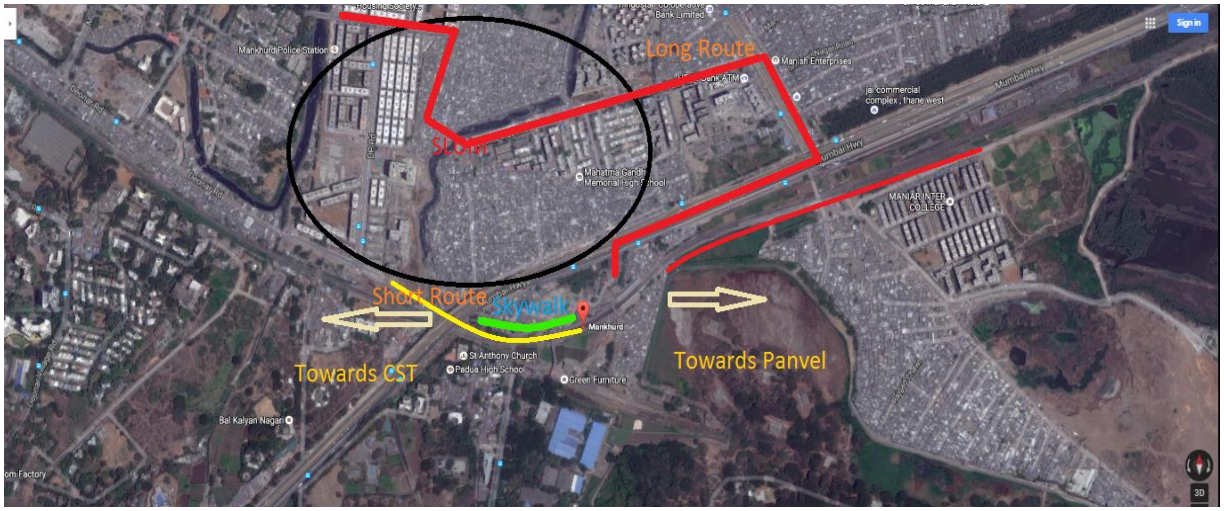

Figure 2: Shows the shortest path to reach destination.

Figure 4: Staircase Position

Figure 5: Column Position

IV. DESIGN CONSIDERATION

There are 7 simple design considerations that will have major impact on the long-term success of any project.

- Determine width
- Site conditions
- Geotech analysis
- Abutment plan
- Permitting
- Safety
- Durability

V. DETAILS OF SKYWALK

Length	450metres
Width	3meters
Height	6.2meters
Column	29
Staircase	5
Spacing between two Column c/c	16meters
Sections	ISMB 450
Duration	2years(approx.)
Cost of Project	4crore(approx.)

VI. SOFTWARE ANALYSIS

All the analysis was made by using a software called SAP (Structural Analysis Program), it is basically used for designing bridges and different types of loads were applied in software and the results were O.K.

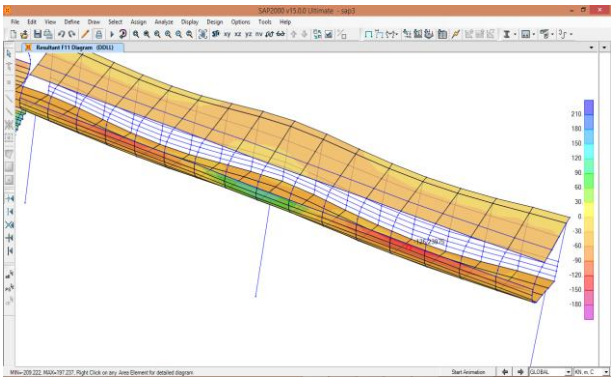

Figure 6: Stress Diagram

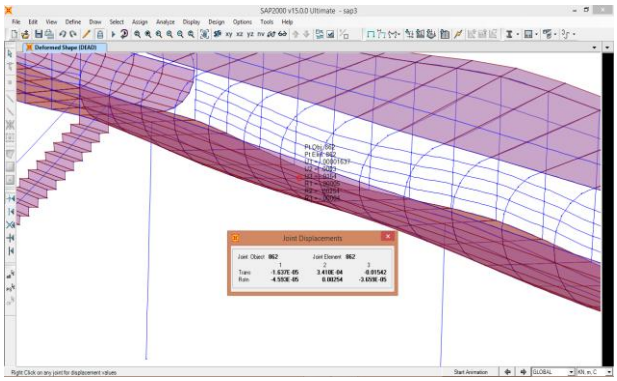

Figure 7: Joint Displacement

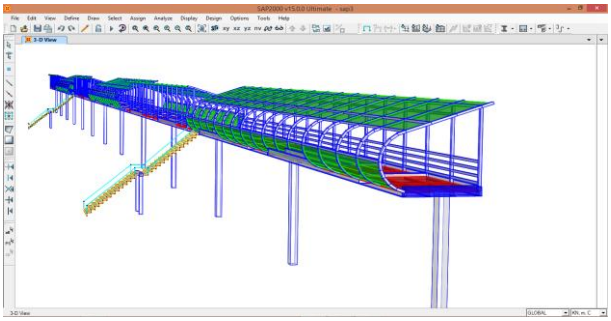

Figure 8: 3D Model in SAP

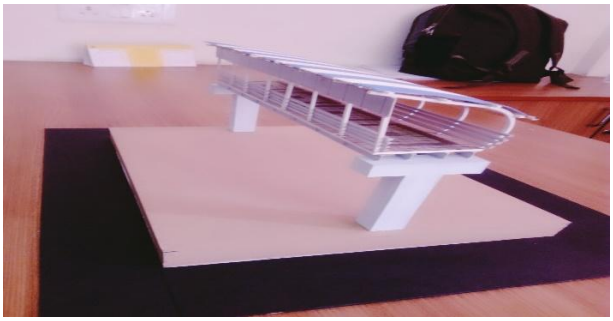

Figure 9: Model of Skywalk Section

VII. RESULT

Calculations	Manual	Software	Checks (O.K.)
	Slab		
Load	9.62 KN/m	8.25 KN/m	O.K.
Size	2mX3m	2mX3m	O.K.
	Beam		
Load	9.62 KN/m	7.2 KN/m	O.K.
Size	ISMB 450	ISMB 450	O.K.
	Column cap		
Load	633.72 KN	475 KN	O.K.
Size	400mmX400mm	400mmX400mm	O.K.
	Column		
Load	950 KN	647.28 KN	O.K.
Size	400mmX400mm	400mmX400mm	O.K.
	Footing		
Load	1470 KN	1068 KN	O.K.
Size	2.3mX2.3m	2.3mX2.3m	O.K.
All checks were O.K.			

All manual calculations were done using IS codes.

VIII. ADVANTAGES

- Provide safety to pedestrian walking on skywalk
- Boost to local business by access to nearby areas quickly
- Advances connections with neighborhood surroundings
- Provides easy access to key destinations
- Protects pedestrian from uneven weather
- Can be used as a source to generate revenue

IX. CONCLUSION

From the studies that we have done so far, we have come up with the idea of building a skywalk or skyway for the controlled movement of people residing in nearby areas. By building a skywalk we can reduce the number of accidents that happen on railway tracks and provide safety to the school going children and people. We can also save the money of the people which is approximately Rs.40/- per day which is spent on rickshaws or by bus. We can save 15 minutes by using a skywalk and people can reach the respective destinations in 5 minutes. We can also generate revenue by hoardings on the sides of the skywalk by doing this we can easily maintain the skywalk standards. We can also save electricity cost by providing solar panels at the roof of the skywalk.

The unique design of the skywalk helps us to make a skywalk which is Smart Skywalk and which in turn is a Green Skywalk.

X. REFERENCE

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