

**A CASE STUDY ON FLYOVER BRIDGE RESTING ON HARD STRATA MATERIALS AT RAIPUR NAKA, DURG (INDIA)**

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**ABSTRACT:-** The site of Y-shaped Flyover Bridge is at the junction of steel city, Bhilai and the city of Durg. It is being constructed at Raipur Naka over the rail lines leading to three different directions i.e. towards Mumbai, Howrah and Dalli Rajhara. The flyover is being built under a joint venture of BSP, SECR and CG Govt. and the estimated cost of the project is around 12 crores. The prime importance of the construction of flyover is to reduce the traffic congestion and to ease its flow at peak hours when the crossings remain closed for a quite long time due to movement of rails and due to it the structure is resting on end bearing piles i.e. on hard strata materials. Therefore a detailed soil material investigation is carried out in this research paper, which is useful for public welfare.

**Keywords:** Flyover bridge, traffic, ends bearing pile and hard strata etc.

**Introduction**

The use of piles as a foundation can be traced since olden times. The art of driving piles was well established in Roman times. Pile foundations are the part of a structure used to carry and transfer the load of the structure to the bearing ground located at more depth below ground surface. Pile foundations are one of the types of deep foundations. They are used in case soft/silty/clayey type of soils. As in such case of soils going for normal foundations may not be possible either from economical point of

view or may not be possible at all in case you want to construct near seashore etc., these are the foundations which transfer load to greater depths, where there is strong strata / load reaching that point is minimal. The base of an end bearing pile rests on a relatively firm soil such as rock, very dense sand or gravel. The load of the structure is transmitted through the pile into this firm soil. Because the base of the pile bears the load of the structure, this type of pile is known as an end bearing pile.

**Experimental Data of Flyover Bridge:**

A	Details about pile					
(i)	Dia of Pile = 1.0 m					
(ii)	Dia of Pile = 15 m to 17.7 m					
(iii)	Liner Plate is provided between 3 to 6 m in length.					

(iv)	Main Longitudinal bar 25 mm.					
(v)	Intermediate Ring dia = 16 mm at an Spacing of 760 mm					
(vi)	Helical Reinforcement dia = 10 mm at an spacing of 200 mm					
(vii)	No. of Piles in project = 112 nos.					
(viii)	No. of Piles in groups = 16					
	12 group is identical and making matrix 3 x 2					
	2 group is identical and making matrix 4 x 2					
	2 group is identical and making matrix 4 x 3					
(ix)	We obtain the stiff clay in the case of Railway fly over bridge ,					
	Stiff clay is received at a minimum depth of 6 m form the bore log test.					
(x)	Clear cover to main reinforcement = 50 mm					
<b>B</b>	<b>Specifications of Materials</b>					
(i)	Grade of concrete = M - 35					
	Quantity of material for a single batch					
	<u>Material</u>	<u>Mas</u>	<u>Cumulative mass</u>			
1	20 mm C.A.	318 kg	318 kg			
2	10 mm F.A	135 kg	453 kg			
3	Sand	185 kg	638 kg			

4	Cement	150 kg (3 bags)	788 kg			
5	Water	58.5 litre	W/C ratio = 0.4			
6	Super Plasticizer (900-1000 ml)	CAM BOND Brand				
	Grade of steel	Fe 415				
	Type of cement	Ultra Tech 53 grade cement				
	Sand	Medium sand 75 u - 2.0 mm				
	concrete mix strength for 28 days		45 to 50 N/mm <sup>2</sup>			
<b>C.</b>	<b>ABOUT ORGANISATION</b>	:- Unique construction Ltd. Satna (M.P)				
1	Estimated cost of Project	= 12 crores				
2	Date of commencement	= April 2007				
3	Date of Completion	=October 2008				
<b>D.</b>	<b>Equipment used for piling</b>	:-				
	Concreting is done through trimming pipe with Hopper					
2	Chisel for cutting of Hard Strata - and wt. of chisel is 2.5 tones.					
3	Bucket of Ht. 1.5 m used for removing mud					
4	Trimming pipe 20 cm dia and length 1 - 1.5 m					

5	Tuff Rider used for shifting of the concrete material				
6	Cub log:- used for staging case, shuttering plate.				
7	Rolling machine for making lines as circular.				
<b>(E)</b>	<b>Details about super structure</b>				
(i)	Total No. of pier = 50 Nos.				
(ii)	Dimension of pier = 1.5 x 4.5 x 6.5 on Ht				
(iii)	Dia of bar used in piers = 20 mm				
<b>(F)</b>	<b>Testing of Pile :-</b>				
	Mild steel 8 " dia pipe is used for testing purpose. <b>Type of Testing:</b>				
1.	<b>Pile integrity test</b> through sonography, in the sonography operation, transmission and				
	and receiver wires are lowered in pile through 8 " dia pipe and check the condition				
	of piling , and kind of collapse condition.				
2.	<b>Dynamic testing:</b> - is important if sonography test is not successful.				

**Conclusions:**

The following are the some of the outcomes from the provisions of Flyover Bridge:

- 1.Reduction in accidents
- 2.Savings in travel time
- 3.Saving in fuel
- 4.Fast crossing

- 5.Economic development through speedy traffic
- 6.Reduction in pollution.

**References:**

- 1.Geotechnical Engineering by Dr. S. N. Murthy (1991), pp43-45
- 2.Manual of flyover at Raipur Naka (2007), pp23-54