ANCHORAGE OF DECK SLAB TO SUBSTRUCTURE

Name Of Work :- Construction of Submersible Bridge on ON KHERWARA - JAWAS - SUVERI ROAD IN KM 9/000, ACROSS RIVER SOM

In the case of a submersible bridge, the deck slab is near the plane of maximum velocity. To counteract the sliding action due to velocity of flow, loss of weight of slab due to buoyancy, the tilting forces due to eddies and currents and the disturbing forces due to debris or trees floating down the stream , it is necessary to anchor the deck slab to the substructure.

One possible solution to this anchorage is as shown in detailed drawing. The aim in this anchorage is to secure the deck slab to piers or abutments against uplift or lateral thrust and at the same time allow lateral movement due to expansion and contraction due to temperature effects the arrangement will be evident from the sketch given in the detailed drawing.

Check Against Uplift

The uplift force shall be maximum when the flow level is Just at near deck level. THIS WILL BE IN CASE OF AFFLUX FLOOD LEVEL 100.83 M

Total Height	=	0.23	M					
Maximum Uplift Pressure	=	0.23	x	10	=	2.3	kN/Sqm	
Area of Slab under effect of buoyancy	=	8.80	x	12	=	105.6	Sqm	
Uplift Force on Slab	=	105.6	x	2.3	=	242.88	kN	
Self Weight of Slab	=	8.80	x	12	x	0.75 x	24.00 =	1900.80 kN
Self Weight of Wearing Coat	=	8.80	x	12	x	0.075 x	24.00 =	190.08 kN
Footpath	=	2X10.8	x	1.50	x	0.50 x	0.00 =	0.00 kN
TOTAL								**2090.88 kN**
Net Uplift Pressure	=	242.88	-	2090.88	=	**-1848.00**	kN	

< 0 Hence Ok.

Check Against Sliding

Refer Stability Check of Pier

WATER CURRENT IN TRANSVERSE DIRECTION (ACROSS THE BRIDGE)

As per IRC- II (6-1966) clause 213.5 For V= 2.67 m/sec Maximum velocity being 1.414 x mean velocity (1.414= Root of 2)

Obstructed Velocity = V Cos 20 0	=	2.67	x	Cos 20 0						
	=	2.51								
2v2	=	12.59								
The soffit of the deck is at HFL	=	100.60	M	The afflux Flood Level is		100.83	M			

DRAG FORCE ON DECK SLAB DUE TO AFFLUX

Area Obstructed	=	8.80	x	0.230	=	2.02	Sqm					
Drag Force on Slab	=	52.00	x	k	x	v^2	x	Area Obstructed				
	=	52.00	x	1.50	x	12.59	x	2.02 / 100	=	**19.88**	kN	

Dia of Anchor Bars		32	mm							
Permissible Shear Stress		190	N/mm^2							
Shear Force Resisted by one Anchor Bar	=	(	0.785 x	32 ^{2}	/4)x	190 / 1000	=	38.19	kN	
Number Of Bars Provided Per slab		18	Nos.							
Total Shear Resisted	=	18	x	38.19	=	687.42	kN			
FACTOR OF SAFETY	=	687.42	/	19.87857	=	34.59				

> 2.00 Hence OK