DESIGN OF ABUTMENT FOOTING

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

REDISTRIBUTION OF PRESSURE

FOR WIND AT SERVICE CONDITION

Length of footing	l_f	17.00	m		
Width of Footing	l_b	8.05	m		
Width of Abutment just above footing		6.05	m		
Vertical Load	P	1004.04	kN		
Longitudinal Moment	M_e	3661.12	kN-m		
Transverse Moment	M_b	0.00	kN-m		
Area in Tension = y x l_b			0.00	**m^2**	0.00 %
Maximum Pressure before Redistribution			160.06	**kN/m^2**	
Maximum Pressure After Redistribution = pxK			160.06	**kN/m^2**	
Maximum Stress at Edge of Pier			160.06	**kN/m^2**	
Distance From Face of Pier to the Edge			1.00	m	
Stress at the Edge of Pier			140.18	**kN/m^2**	
Average Stress on Cantilevered Area			150.12	**kN/m^2**	
Area of the Cantilever Portion			1.00	**m^2**	
Distance of Centroid of the Stress in Cantilever Portion			0.51	m	
Moment about the Face of Pier			**76.72**	**kN-m**	
CONCRETE GRADE			**M-25**		
FOR THIS GRADE σcbc			**10**	N/mm2	
m			**9.33**		
σst			**200**		
factor k			0.318		
j			0.894		
R			1.422		
Effective Depth Required			232	mm	
Adopt Total Depth			1000	mm	
Cover			50	mm	
Assume Bar Dia			16	mm	
Keeping A Cover Of 50 mm Effective Depth			942	mm	
Adopt Effective Depth			942	mm	
Steel Required Ast			456	mm^2	
Area Of One Bar			201	mm^2	

Spacing S			441	mm	
Provide Bars Of Dia And Spacing		16 mm	**150**	mm	**Adopt spacing as 150 mm**
Area Of Distribution Steel			1884	mm^2	
Dia Of Bar For Distribution Steel			20	mm	
Area Of One Bar In Distribution Reinforcement			314	mm^2	
Using The Bars Spacing Required			167	mm	
Provide Bars Of Dia And Spacing		16 mm	160	mm	**Adopt spacing as 150 mm**
Provide Bars Of Dia And Spacing for Top Main Steel		12 mm	150	mm	
Provide Bars Of Dia And Spacing for Top Distribution Steel		12 mm	150	mm	
CHECK FOR SHEAR	(As per IRC 21-1987 Cl. 304.7)				
Critical Section is at a distance equal to effective depth from pier face			942	mm	
Section of Shear from end of pier			0.06	m	
Maximum Stress at Edge of Pier			160.06	**kN/m^2**	
Stress at the Section for Shear Check			157.48	**kN/m^2**	
Average Stress on Cantilevered Area			158.77	**kN/m^2**	
Shear Force			9.21	kN	
V=V' + M/d tanB	(B=0) Hence V =V'				
Actual Shear Stress			0.01	**N/mm^2**	
Percentage Steel	100As/bd		0.14		
Tc			0.23	**N/mm^2**	
k=1					
Permissble Shear Stress = k Tc			0.23	**N/mm^2**	
		< Actual Shear Stress hence Shear Reinforcement should be provided			
Dia Of two Legged Stirrups			16	mm	
Area Of One Bar In Distribution Reinforcement			201	mm^2	
Using The Bars Spacing Required s= Asw ts d/V			8223	mm	
Provide Bars Of Dia And Spacing		16 mm	150	mm	**Adopt spacing as 150 mm**