

PIER-46-7-140-40.OUT

06-NOV-09
13:22:09

GEORGIA DEPARTMENT OF TRANSPORTATION
PRECONSTRUCTION DIVISION - OFFICE OF BRIDGE & STRUCTURAL DESIGN
THE ANALYSIS AND DESIGN OF PIERS FOR BRIDGES - V 4.2.07 - AASHTO SPECS 1984 INTERIM
REVISED: JUNE 30, 2008
46' CURB-CURB; 7 BEAMS; 140' SPAN; 40' TALL; BRIDGE 2A ; PIER 9

PROB. NO. 0001

DESIGN NO.	NO. CAN	NO. COL	NO. LLC	SKEW	ANG	F'C	FC	N	FY	FS	DESIGN DATA		CONC.	Z	* * * CAP			REINFORCING			STEEL			* * * CAP		
OPTIONS				D	M	S	PSI	PSI	PSI	PSI	EC	ES	STRAIN	FACT	MAIN	STR	MAX	MAX	MIN	MIN	MIN	TOP	MIN	MIN	DEPTH	BOT
D	D	D	L	2	2	13	0-00-00	3500.	1400.	8.	60000.	24000.	3409.	29000.	0.0030	170.	11	5	13	13	11	2	2.00	4.00	3.00	2.00
COLUMN	REINFORCING	STEEL	R	KL	OC	OF	CM	BD1	BD2	IMPACT	SOIL	WT	ALL.S.P.	MIN	MAX	EDGE	PILE	REBAR	ALL.PILE	ALL.PILE						
MIN.P	MAX.P	CL.SP.	CLEAR	MODE	COEF					%	KCF	KSF	PL SP	PL SP	PL SP	DIST	DEPTH	CLEAR	CAPACITY	UPLIFT						
1.00	8.00	2.50	3.750	2	2.00	0.70	0.90	0.00	1.00	0.75	18.87	0.120	0.000	3.00	9.00	1.250	1.000	3.000	235.000	-9.999						

CAP DATA

CN	C	L	A	DE	BC	BE	DH	LH	XB1	XB2	XB3	XB4	XB5	XB6	XB7	XB8
11	L	11.000	2.500	4.000	5.000	5.000	2.000	8.500	7.375	5.375						
12	C	27.570	2.500	6.000	5.000		0.000	0.000	2.500	4.731	7.054	7.054	4.731			
13	3	SAME AS CANTILEVER 1														

COLUMN DATA

CN	P	I	T	S	HT	A	DT	BT	DB	BB	DL	FLEX	ND	NB	SZ	ND	NB	SZ	ND	NB	SZ	SLOPE	EP	AP			
21	1	C	T		40.000	0.000	5.000	5.000	5.000	5.000	4.000	0.000	5	5	11	5	5	11	14	14	11	13	14	11	0.000	0.000	0.000
22	1	2	SAME AS COLUMN 1																								

FOOTING DATA

CN	S/P	B	D	T	DEL.B	DEL.D	DEL.T	R.B/D	R.D/B	S.HT.	NP	SYM.	BP	DP	SET.
31	P	7.000	7.000	3.000	0.500	0.500	0.250	1.000	1.000	2.500	4	3	0.000	0.000	0.000
32	2	SAME AS FOOTING 1													

GROUP II WIND																			
SUPERSTRUCTURE AREA*STD.					WIND ON SUPERSTRUCTURE INTENSITIES					* WIND FORCE ARM					* WIND ON PIER				
TRANS.	LONG.	WIND	FT1	FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	APT	APL	PT	PL			
1365.	2730.	1	50	0	44	6	41	12	33	16	17	19	7.375	7.375	4.394	24.497			

GROUP III WIND																									
STD. * WIND ON SUPERSTRUCTURE INTENSITIES					* STD. * WIND ON LIVE LOAD INTENSITIES					* LENGTHS OF LL * WIND ON LL ARMS															
WIND	FT1	FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	WIND	FT1	FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	TRANS.	LONGI.	APT	APL
1	50	0	44	6	41	12	33	16	17	19	1	100	0	88	12	82	24	66	32	34	38	140.0	280.0	15.583	15.583

MISCELLANEOUS FORCES							
CENTRI.	TRACTION	FORCE	AND	ARMS	EXPANSION	SHRINKAGE	STREAM
FT	FL	APT	APL	COEFFICIENT	COEFFICIENT	PT	FLOW
0.000	9.860	15.583	15.583	0.00018000	0.00044000	0.000	0.000

DEAD LOAD SUPERSTRUCTURE AND LIVE LOAD CASES

I.D.	NL	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
D.L.	0	260.426	0.000	294.318	0.000	294.318	294.318	294.318	0.000	294.318	0.000	260.426	
LL 1	1	78.973	0.000	58.438	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
LL 2	2	78.973	0.000	98.446	0.000	78.963	18.440	0.000	0.000	0.000	0.000	0.000	
LL 3	3	78.973	0.000	98.446	0.000	90.263	97.404	47.148	0.000	0.000	0.000	0.000	
LL 4	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	58.438	0.000	78.973	
LL 5	2	0.000	0.000	0.000	0.000	0.000	18.440	78.963	0.000	98.446	0.000	78.973	
LL 6	3	0.000	0.000	0.000	0.000	47.148	97.404	90.263	0.000	98.446	0.000	78.973	
LL 7	1	0.000	0.000	0.000	0.000	29.224	78.963	29.224	0.000	0.000	0.000	0.000	
LL 8	2	0.000	0.000	57.932	0.000	108.187	79.479	29.224	0.000	0.000	0.000	0.000	
LL 9	3	0.000	0.000	57.932	0.000	108.187	79.996	108.187	0.000	57.932	0.000	0.000	
LL10	2	0.000	0.000	9.225	0.000	78.963	98.446	78.963	0.000	9.225	0.000	0.000	
LL11	3	37.932	0.000	88.188	0.000	99.479	98.446	78.963	0.000	9.225	0.000	0.000	
LL12	2	78.973	0.000	58.438	0.000	0.000	0.000	0.000	0.000	58.438	0.000	78.973	
LL13	3	78.973	0.000	98.446	0.000	78.963	18.440	0.000	0.000	58.438	0.000	78.973	

□ COLUMN MOMENTS(KIP-FEET), SHEARS(KIPS), REACTIONS(KIPS)

TRANSVERSE													* LONGITUDINAL		
LOAD	COL	PC	MT	V	MB	RF	ML	MR	MT	V	MB	MF			
UNIT F.AT CL.CAP	1	0.680	9.377	0.500	10.623	0.680	0.000	-9.377	2.000	0.500	20.000	20.000			
	2	-0.680	9.377	0.500	10.623	-0.680	-9.377	0.000	2.000	0.500	20.000	20.000			
EXPANSION OF CAP	1	0.000	132.334	7.936	185.118	0.000	0.000	-132.334	0.000	0.000	0.000	0.000			
	2	0.000	-132.334	-7.936	-185.118	0.000	132.334	0.000	0.000	0.000	0.000	0.000			
SHRINKAGE OF CAP	1	0.000	-323.483	-19.400	-452.511	0.000	0.000	323.483	0.000	0.000	0.000	0.000			
	2	0.000	323.483	19.400	452.511	0.000	-323.483	0.000	0.000	0.000	0.000	0.000			

DEAD LOAD TOTAL	1	1085.128	286.009	10.848	147.906	1220.128	PIER-46-7-140-40.OUT		0.000	0.000	0.000	0.000
	2	1220.128	-292.544	-10.848	-141.371	1252.628	2140.829	-2426.838	0.000	0.000	0.000	0.000
		1117.628					2433.374	-2140.829				
		1252.628										
TRAC. FORCE 1 LN	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-96.544	-4.930	-274.024	-274.024
	2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-96.544	-4.930	-274.024	-274.024
WIND ON SUBSTR.	1	2.989	41.201	2.197	46.679	2.989	0.000	-41.201	-48.994	-12.248	-489.940	-489.940
	2	-2.989	41.201	2.197	46.679	-2.989	-41.201	0.000	-48.994	-12.248	-489.940	-489.940
GROUP 2 WIND 1 1	1	67.670	681.158	36.322	771.722	67.670	0.000	-681.158	-48.994	-12.248	-489.940	-489.940
	2	-67.670	681.158	36.322	771.722	-67.670	-681.158	0.000	-48.994	-12.248	-489.940	-489.940
GROUP 2 WIND 1 2	1	67.670	681.158	36.322	771.722	67.670	0.000	-681.158	48.994	12.248	489.940	489.940
	2	-67.670	681.158	36.322	771.722	-67.670	-681.158	0.000	48.994	12.248	489.940	489.940
GROUP 2 WIND 2 1	1	59.908	604.363	32.227	684.717	59.908	0.000	-604.363	-142.155	-20.438	-877.941	-877.941
	2	-59.908	604.363	32.227	684.717	-59.908	-604.363	0.000	-142.155	-20.438	-877.941	-877.941
GROUP 2 WIND 2 2	1	59.908	604.363	32.227	684.717	59.908	0.000	-604.363	142.155	20.438	877.941	877.941
	2	-59.908	604.363	32.227	684.717	-59.908	-604.363	0.000	142.155	20.438	877.941	877.941
GROUP 2 WIND 3 1	1	56.027	565.965	30.180	641.215	56.027	0.000	-565.965	-235.317	-28.629	-1265.943	-1265.943
	2	-56.027	565.965	30.180	641.215	-56.027	-565.965	0.000	-235.317	-28.629	-1265.943	-1265.943
GROUP 2 WIND 3 2	1	56.027	565.965	30.180	641.215	56.027	0.000	-565.965	235.317	28.629	1265.943	1265.943
	2	-56.027	565.965	30.180	641.215	-56.027	-565.965	0.000	235.317	28.629	1265.943	1265.943
GROUP 2 WIND 4 1	1	45.678	463.572	24.719	525.208	45.678	0.000	-463.572	-297.424	-34.089	-1524.610	-1524.610
	2	-45.678	463.572	24.719	525.208	-45.678	-463.572	0.000	-297.424	-34.089	-1524.610	-1524.610
GROUP 2 WIND 4 2	1	45.678	463.572	24.719	525.208	45.678	0.000	-463.572	297.424	34.089	1524.610	1524.610
	2	-45.678	463.572	24.719	525.208	-45.678	-463.572	0.000	297.424	34.089	1524.610	1524.610
GROUP 2 WIND 5 1	1	24.980	258.786	13.800	293.194	24.980	0.000	-258.786	-344.005	-38.183	-1718.611	-1718.611
	2	-24.980	258.786	13.800	293.194	-24.980	-258.786	0.000	-344.005	-38.183	-1718.611	-1718.611
GROUP 2 WIND 5 2	1	24.980	258.786	13.800	293.194	24.980	0.000	-258.786	344.005	38.183	1718.611	1718.611
	2	-24.980	258.786	13.800	293.194	-24.980	-258.786	0.000	344.005	38.183	1718.611	1718.611
GROUP 3 WIND 1 1	1	37.737	335.620	17.897	380.244	37.737	0.000	-335.620	-14.698	-3.675	-146.982	-146.982
	2	-37.737	335.620	17.897	380.244	-37.737	-335.620	0.000	-14.698	-3.675	-146.982	-146.982

□ COLUMN MOMENTS(KIP- FEET), SHEARS(KIPS), REACTIONS(KIPS)

LOAD	COL	TRANSVERSE							LONGITUDINAL				
		PC	MT	V	MB	RF	ML	MR	MT	V	MB	MF	
GROUP 3 WIND 1 2	1	37.737	335.620	17.897	380.244	37.737	0.000	-335.620	14.698	3.675	146.982	146.982	
	2	-37.737	335.620	17.897	380.244	-37.737	-335.620	0.000	14.698	3.675	146.982	146.982	
GROUP 3 WIND 2 1	1	33.316	296.829	15.828	336.295	33.316	0.000	-296.829	-75.546	-7.812	-356.762	-356.762	
	2	-33.316	296.829	15.828	336.295	-33.316	-296.829	0.000	-75.546	-7.812	-356.762	-356.762	
GROUP 3 WIND 2 2	1	33.316	296.829	15.828	336.295	33.316	0.000	-296.829	75.546	7.812	356.762	356.762	
	2	-33.316	296.829	15.828	336.295	-33.316	-296.829	0.000	75.546	7.812	356.762	356.762	
GROUP 3 WIND 3 1	1	31.106	277.434	14.794	314.320	31.106	0.000	-277.434	-136.394	-11.949	-566.542	-566.542	
	2	-31.106	277.434	14.794	314.320	-31.106	-277.434	0.000	-136.394	-11.949	-566.542	-566.542	
GROUP 3 WIND 3 2	1	31.106	277.434	14.794	314.320	31.106	0.000	-277.434	136.394	11.949	566.542	566.542	
	2	-31.106	277.434	14.794	314.320	-31.106	-277.434	0.000	136.394	11.949	566.542	566.542	
GROUP 3 WIND 4 1	1	25.211	225.712	12.036	255.722	25.211	0.000	-225.712	-176.959	-14.707	-706.395	-706.395	
	2	-25.211	225.712	12.036	255.722	-25.211	-225.712	0.000	-176.959	-14.707	-706.395	-706.395	
GROUP 3 WIND 4 2	1	25.211	225.712	12.036	255.722	25.211	0.000	-225.712	176.959	14.707	706.395	706.395	
	2	-25.211	225.712	12.036	255.722	-25.211	-225.712	0.000	176.959	14.707	706.395	706.395	
GROUP 3 WIND 5 1	1	13.422	122.269	6.520	138.525	13.422	0.000	-122.269	-207.383	-16.775	-811.285	-811.285	
	2	-13.422	122.269	6.520	138.525	-13.422	-122.269	0.000	-207.383	-16.775	-811.285	-811.285	
GROUP 3 WIND 5 2	1	13.422	122.269	6.520	138.525	13.422	0.000	-122.269	207.383	16.775	811.285	811.285	
	2	-13.422	122.269	6.520	138.525	-13.422	-122.269	0.000	207.383	16.775	811.285	811.285	
LIVE LOAD LL 1	1	157.219	-147.378	-4.846	-46.460	157.219	582.426	-435.048	0.000	0.000	0.000	0.000	
	2	-19.809	111.072	4.846	82.765	-19.809	-111.072	0.000	0.000	0.000	0.000	0.000	
LIVE LOAD LL 2	1	264.808	-19.658	-0.285	8.253	264.808	582.426	-562.768	0.000	0.000	0.000	0.000	
	2	10.014	-4.451	0.285	15.856	10.014	4.451	0.000	0.000	0.000	0.000	0.000	
LIVE LOAD LL 3	1	289.430	145.044	5.968	93.662	289.430	524.183	-669.227	0.000	0.000	0.000	0.000	
	2	81.581	-173.230	-5.968	-65.475	81.581	173.230	0.000	0.000	0.000	0.000	0.000	
LIVE LOAD LL 4	1	-19.809	-111.072	-4.846	-82.765	-19.809	0.000	111.072	0.000	0.000	0.000	0.000	
	2	157.219	147.378	4.846	46.460	157.219	435.048	-582.426	0.000	0.000	0.000	0.000	
LIVE LOAD LL 5	1	6.441	-5.064	-0.621	-19.789	6.441	0.000	5.064	0.000	0.000	0.000	0.000	
	2	268.381	28.074	0.621	-3.221	268.381	554.352	-582.426	0.000	0.000	0.000	0.000	
LIVE LOAD LL 6	1	73.787	167.050	5.802	65.048	73.787	0.000	-167.050	0.000	0.000	0.000	0.000	
	2	297.224	-142.413	-5.802	-89.684	297.224	666.597	-524.183	0.000	0.000	0.000	0.000	
LIVE LOAD LL 7	1	66.162	185.745	6.992	93.940	66.162	0.000	-185.745	0.000	0.000	0.000	0.000	
	2	71.249	-187.168	-6.992	-92.517	71.249	187.168	0.000	0.000	0.000	0.000	0.000	
LIVE LOAD LL 8	1	183.048	286.229	10.526	134.825	183.048	0.000	-286.229	0.000	0.000	0.000	0.000	
	2	91.774	-275.177	-10.526	-145.878	91.774	275.177	0.000	0.000	0.000	0.000	0.000	
LIVE LOAD LL 9	1	180.604	328.504	12.352	165.577	180.604	0.000	-328.504	0.000	0.000	0.000	0.000	
	2	190.407	-330.271	-12.352	-163.810	190.407	330.271	0.000	0.000	0.000	0.000	0.000	

□ COLUMN MOMENTS(KIP- FEET), SHEARS(KIPS), REACTIONS(KIPS)

TRANSVERSE * LONGITUDINAL

PIER-46-7-140-40.OUT
FOOTING 1 DESIGN LOADS

F	G	LLID	WC	ES	C	S	P	MT	VT	ML	VL	P4	P3	P2	P1	MTF	VBF	VPF	LOAD
2	3	LL 6	4.1R				1527.881	-472.540	-27.765	1446.260	28.018	243.204	106.554	156.578	293.229	81.878	-0.418	42.469	MAX.P1
2	3	LL 6	4.1R				1986.245	-614.302	-36.095	1880.138	36.423	316.166	138.520	203.552	381.198	106.441	-0.544	55.210	MAX.MT
2	3	LL 6	5.1R				1970.919	-461.946	-28.924	2016.495	39.112	328.506	137.963	187.380	377.923	102.795	-0.544	54.789	MAX.VT
2	3	LL 6	4.1R				1986.245	-614.302	-36.095	1880.138	36.423	316.166	138.520	203.552	381.198	106.441	-0.544	55.210	MAX.VP
2	3	LL 6	5.1R				1970.919	-461.946	-28.924	2016.495	39.112	328.506	137.963	187.380	377.923	129.256	-0.544	54.789	MAX.ML
2	3	LL 6	5.1R				1970.919	-461.946	-28.924	2016.495	39.112	328.506	137.963	187.380	377.923	129.256	-0.544	54.789	MAX.VL
1	2		5.1				1245.109	441.100	24.647	-1718.611	-38.183	223.278	59.482	105.811	269.607	67.930	-0.418	34.702	MAX.P3

FOOTING 1 ANALYSIS/DESIGN RESULTS

FOOTING SIZE			* BAR REINFORCEMENT STEEL *						SECTION CAPACITIES			
B	D	T	P1/PA	AS	NO.SIZE	SPAC.	PLACEMENT	MT.	VB	VP	DS	FC
10.000	10.000	3.250	0.998	1.10	14 # 8	@ 8.500	TOP TRAN	106.720	27.000	54.001	22.372	0.000
				1.28	13 # 9	@ 9.125	BOT.LONG	130.710	28.284	56.569	23.436	0.000

NUMBER OF PILES = 8 BP = 3.750 DP = 3.750

FOOTING 2 DESIGN SAME AS FOOTING 1