06-NOV-09 GEORGIA DEPARTMENT OF TRANSPORTATION PROB. NO. 0001
11:18:30 PRECONSTUCTION 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
32' CURB-CURB; 4 BEAMS; 173' SPAN; 90' TALL; BRIDGE 2B ; PIER 11

DESIGN DATA

DESIGN OPTIONS	NO. CAN	NO. COL	NO. LLC	SKEW ANG D M S	F'C PSI	FC PSI	N	FY PSI	FS PSI	EC KSI	ES KSI	CONC. STRAIN	Z FACT	* MAIN SIZE	* STR SIZ	* MAX TOP	MAX BOT	MIN SIZE	MIN NO.	TOP CL.	MIN S.SP	CAP INCR.	DEPTH CL.	BOT
D D D L	2	1	6	0-00-00	3500.	1400.	8.	60000.	24000.	3409.	29000.	0.0030	170.	11	5	16	16	11	2	2.00	4.00	3.00	2.00	

COLUMN REINFORCING STEEL MIN.P	MAX.P	CL.SP.	CLEAR	R MODE	KL COEF	OC	OF	CM	BD1	BD2	IMPACT %	SOIL WT KCF	ALL.S.P. KSF	MIN PL SP	MAX PL SP	EDGE DIST	PILE DEPTH	REBAR CLEAR	ALL.PILE CAPACITY	ALL.PILE UPLIFT	I P
1.00	8.00	2.50	3.750	2	2.00	0.70	0.90	1.00	1.00	0.75	16.13	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	17.625	4.000	4.000	6.000	6.000	4.000	13.625	14.000	9.333	0.667					
12	2 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	ND	NB	SZ	SLOPE	EP	AP
21	0	V	T		90.000	6.000	8.000	6.000	11.500	6.000	6.000	0.000	8	6	11	11	6	11	22	16	11	32	16	11	0.000	0.000	0.000

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	13.500	13.500	3.000	0.500	0.500	0.250	1.000	1.000	2.500	4	3	0.000	0.000	0.000

GROUP II WIND

SUPERSTRUCTURE AREA*STD. TRANS.	LONG.	WIND	WIND ON SUPERSTRUCTURE INTENSITIES FT1	FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	* WIND FORCE ARM APT	APL	* WIND ON PIER PT	PL
1818.	1818.	1	50	0	44	6	41	12	33	16	17	19	7.771	7.771	11.277	23.299

GROUP III WIND

STD. * WIND	WIND ON SUPERSTRUCTURE INTENSITIES FT1	FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	* STD. * WIND	WIND ON LIVE LOAD INTENSITIES FT1	FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	* LENGTHS OF LL TRANS.	LONGI.	* WIND ON LL ARMS APT	APL
1	50	0	44	6	41	12	33	16	17	19	1	100	0	88	12	82	24	66	32	34	38	172.5	172.5	16.375	16.375

MISCELLANEOUS FORCES

CENTRI. FT	TRACTION FORCE AND ARMS FL	APT	APL	EXPANSION COEFFICIENT	SHRINKAGE COEFFICIENT	STREAM FLOW PT	PL
7.792	6.420	16.375	16.375	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	397.380	383.190	0.000	0.000	419.290	374.630						
LL01	1	31.550	61.820	0.000	0.000	86.160	118.490						
LL02	1	130.710	74.770	0.000	0.000	63.590	27.140						
LL03	2	44.320	101.870	0.000	0.000	139.350	145.630						
LL04	2	42.890	106.960	0.000	0.000	149.750	122.430						
LL05	2	139.910	136.580	0.000	0.000	105.470	37.640						
LL06	2	162.260	122.060	0.000	0.000	98.230	38.300						

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

LOAD	COL	TRANSVERSE PC	MT	V	MB	RF	ML	MR	* LONGITUDINAL MT	V	MB	MF
UNIT F.AT CL.CAP	1	0.000	-6.000	1.000	90.000	0.000	0.000	0.000	6.000	1.000	90.000	90.000
DEAD LOAD TOTAL	1	1779.240 2516.340	-150.021	0.000	150.021	2516.340	8149.105	-7999.084	0.000	0.000	0.000	0.000
TRAC. FORCE 1 LN	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-143.648	-6.420	-682.927	-682.927
CENT. FORCE 1 LN	1	0.000	-174.346	7.792	828.874	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WIND ON SUBSTR.	1	0.000	-67.662	11.277	1014.930	0.000	0.000	0.000	-139.794	-23.299	-2096.910	-2096.910
GROUP 2 WIND 1 1	1	0.000	-1319.446	102.177	9902.313	0.000	0.000	0.000	-139.794	-23.299	-2096.910	-2096.910
GROUP 2 WIND 1 2	1	0.000	-1319.446	102.177	9902.313	0.000	0.000	0.000	139.794	23.299	2096.910	2096.910
GROUP 2 WIND 2 1	1	0.000	-1169.232	91.269	8835.827	0.000	0.000	0.000	-290.008	-34.207	-3163.396	-3163.396
GROUP 2 WIND 2 2	1	0.000	-1169.232	91.269	8835.827	0.000	0.000	0.000	290.008	34.207	3163.396	3163.396
GROUP 2 WIND 3 1	1	0.000	-1094.125	85.815	8302.585	0.000	0.000	0.000	-440.222	-45.115	-4229.882	-4229.882
GROUP 2 WIND 3 2	1	0.000	-1094.125	85.815	8302.585	0.000	0.000	0.000	440.222	45.115	4229.882	4229.882
GROUP 2 WIND 4 1	1	0.000	-893.839	71.271	6880.604	0.000	0.000	0.000	-540.365	-52.387	-4940.873	-4940.873
GROUP 2 WIND 4 2	1	0.000	-893.839	71.271	6880.604	0.000	0.000	0.000	540.365	52.387	4940.873	4940.873
GROUP 2 WIND 5 1	1	0.000	-493.269	42.183	4036.641	0.000	0.000	0.000	-615.472	-57.841	-5474.116	-5474.116

GROUP 2 WIND 5 2	1	0.000	-493.269	42.183	4036.641	0.000	0.000	0.000	615.472	57.841	5474.116	5474.116
GROUP 3 WIND 1 1	1	0.000	-781.802	47.903	4805.663	0.000	0.000	0.000	-41.938	-6.990	-629.073	-629.073
GROUP 3 WIND 1 2	1	0.000	-781.802	47.903	4805.663	0.000	0.000	0.000	41.938	6.990	629.073	629.073
GROUP 3 WIND 2 1	1	0.000	-690.422	42.561	4265.521	0.000	0.000	0.000	-133.319	-12.332	-1169.215	-1169.215
GROUP 3 WIND 2 2	1	0.000	-690.422	42.561	4265.521	0.000	0.000	0.000	133.319	12.332	1169.215	1169.215
GROUP 3 WIND 3 1	1	0.000	-644.732	39.889	3995.450	0.000	0.000	0.000	-224.699	-17.674	-1709.357	-1709.357
GROUP 3 WIND 3 2	1	0.000	-644.732	39.889	3995.450	0.000	0.000	0.000	224.699	17.674	1709.357	1709.357
GROUP 3 WIND 4 1	1	0.000	-522.891	32.766	3275.260	0.000	0.000	0.000	-285.619	-21.236	-2069.452	-2069.452
GROUP 3 WIND 4 2	1	0.000	-522.891	32.766	3275.260	0.000	0.000	0.000	285.619	21.236	2069.452	2069.452
GROUP 3 WIND 5 1	1	0.000	-279.210	18.520	1834.882	0.000	0.000	0.000	-331.310	-23.907	-2339.523	-2339.523
GROUP 3 WIND 5 2	1	0.000	-279.210	18.520	1834.882	0.000	0.000	0.000	331.310	23.907	2339.523	2339.523
LIVE LOAD LL01	1	298.020	1330.755	0.000	-1330.755	298.020	730.214	-2060.969	0.000	0.000	0.000	0.000

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

		TRANSVERSE							* LONGITUDINAL			
LOAD	COL	PC	MT	V	MB	RF	ML	MR	MT	V	MB	MF
LIVE LOAD LL02	1	296.210	-1502.157	0.000	1502.157	296.210	2178.892	-676.734	0.000	0.000	0.000	0.000
LIVE LOAD LL03	1	431.170	1593.259	0.000	-1593.259	431.170	1095.907	-2689.167	0.000	0.000	0.000	0.000
LIVE LOAD LL04	1	422.030	1313.261	0.000	-1313.261	422.030	1099.642	-2412.903	0.000	0.000	0.000	0.000
LIVE LOAD LL05	1	419.600	-1576.970	0.000	1576.970	419.600	2596.159	-1019.188	0.000	0.000	0.000	0.000
LIVE LOAD LL06	1	420.850	-1846.655	0.000	1846.655	420.850	2841.294	-994.639	0.000	0.000	0.000	0.000

CAP ANALYSIS AND DESIGN DATA

CAP MOMENTS AND SHEARS

	MOMENTS(KIP-FEET)							** SHEARS(KIPS)					
POINT	D.L.TOT.	G1 MAX.+	G1 MAX.-	G2 MAX.+	G2 MAX.-	G3 MAX.+	G3 MAX.-	DL T.LT	DL T.RT	G1 + LT	G1 + RT	G1 - LT	G1 - RT
P 1	-33.476	-33.476	-33.476	-33.476	-33.476	-33.476	-33.476	-19.222	-535.816	-19.222	-535.816	-19.222	-888.082
P 2	-5338.839	-5338.839	-8626.542	-5338.839	-5338.839	-5338.839	-7307.523	-606.075	-1104.222	-606.075	-1104.222	-958.341	-1721.480
P 3	-6077.403	-6077.403	-9776.817	-6077.403	-6077.403	-6077.403	-8292.621	-1110.388	-1110.388	-1110.388	-1110.388	-1727.647	-1727.647
C 1L	-10593.837	-10593.837	-16762.285	-10593.837	-10593.837	-10593.837	-14287.519	-1147.828		-1147.828		-1765.087	
C 1R	-10398.809	-10398.809	-16236.989	-10398.809	-10398.809	-10398.809	-13894.725		1165.183		1783.875		1165.183
P 4	-5812.955	-5812.955	-9176.368	-5812.955	-5812.955	-5812.955	-7826.976	1127.744	1127.744	1746.435	1746.435	1127.744	1127.744
P 5	-5062.815	-5062.815	-8013.562	-5062.815	-5062.815	-5062.815	-6829.729	1121.577	576.500	1740.268	892.663	1121.577	576.500
P 6	-33.476	-33.475	-33.476	-33.476	-33.476	-33.476	-33.476	506.241	19.222	822.404	19.222	506.241	19.222

CAP DESIGN DATA

PT.	M+ UNF. K-FT.	M- UNF. K-FT.	TOP REINFORCE. AS	NO.SIZE	BOT.REINFORCE. AS	NO.SIZE	LEFT STIRRUPS M.SP.	AV/IN	BAR&SPAC	RIGHT STIRRUPS M.SP.	AV/IN	BAR&SPAC	D IN.	FC PSI	PS %	FS/FF RATIO	FS/FZ RATIO
P 1	-25.751	-25.751	3.12	2 # 11	3.12	2 # 11	0.00	0.000	#5@ 0.00	24.00	0.161	D#5@ 7.69	60.77		0.08	0.000	0.098
P 2	-4106.799	-5621.172	21.91	15 # 11	3.12	2 # 11	24.00	0.066	#5@ 9.38	24.00	0.232	D#5@ 5.35	93.65		0.37	0.614	0.956
P 3	-4674.925	-6378.939	24.25	16 # 11	3.12	2 # 11	24.00	0.224	D#5@ 5.55	24.00	0.224	D#5@ 5.55	96.00		0.40	0.647	0.971
C 1	-7999.084	-10990.399	43.02	28 # 11	3.12	2 # 11	24.00	0.234	D#5@ 5.30	24.00	0.238	D#5@ 5.21	96.00		0.70	0.669	0.912
P 4	-4471.504	-6020.750	22.72	15 # 11	3.12	2 # 11	24.00	0.228	D#5@ 5.45	24.00	0.228	D#5@ 5.45	96.00		0.37	0.633	0.997
P 5	-3894.473	-5253.638	20.31	14 # 11	3.12	2 # 11	24.00	0.236	D#5@ 5.26	24.00	0.060	#5@10.33	93.65		0.34	0.594	0.977
P 6	-25.750	-25.751	3.12	2 # 11	3.12	2 # 11	24.00	0.139	#5@ 4.47	0.00	0.000	#5@ 0.00	60.77		0.08	0.000	0.098

COLUMN ANALYSIS AND DESIGN OUTPUT

CRITICAL COLUMN LOADS

CN	T B	GR	LLC	WC	R	E S	C F	S F	PF	MTF	MLF	PM	MTM	MLM	PU	MTU	MLU	PU/PM	B	D
1	T	1	LL06	0.0			C		3226.7	-4657.4	0.0	3226.7	6516.7	7239.3	4905.8	9945.0	11047.7	1.526	72.00	96.00
1	B	2		5.1					3271.2	5442.7	-7116.4	3271.2	7117.9	15883.1	3523.0	7684.1	17146.6	1.079	72.00	138.00

COLUMN DESIGN DATA

CN	T B	B FACE 1 NO.SIZE	B FACE 2 NO.SIZE	D FACE 3 NO.SIZE	D FACE 4 NO.SIZE	AS	PS	BD12	BD	SUMPU	SUMPC	DEL.T	DEL.L	CM	R	PHIC
1	T	15 # 11	15 # 11	8 # 11	8 # 11	71.76	1.038	1.00	0.036	3706.	12988.	1.399	3.739	1.000	2	0.70
1	B	16 # 11	16 # 11	16 # 11	16 # 11	99.84	1.005	1.00	0.135	2792.	11864.	1.308	2.232	1.000	2	0.70

FOOTING 1 DESIGN LOADS

F	G	LLID	WC	ES	C	S	P	MT	VT	ML	VL	P4	P3	P2	P1	MTF	VBF	VPF	LOAD
1	2		3.1				2516.340	8452.606	85.815	-4229.882	-45.115	137.443	65.922	221.132	292.653	204.144	37.168	37.768	MAX.P1

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1 3 LL06  1.1      C      3742.35610664.670  82.533-2593.406 -25.779 184.406 140.720 334.087 377.773 285.204  51.765  56.161  MAX.MT
1 3 LL06  1.1      C      3742.35610664.670  82.533-2593.406 -25.779 184.406 140.720 334.087 377.773 285.204  51.765  56.161  MAX.VT
1 3 LL06  1.1      C      3742.35610664.670  82.533-2593.406 -25.779 184.406 140.720 334.087 377.773 285.204  51.765  56.161  MAX.VP
1 2       4.1             3271.242 9139.812  92.652-6423.135 -68.103 203.451  94.881 262.696 371.266 442.249  48.255  49.098  MAX.ML
1 2       4.1             3271.242 9139.812  92.652-6423.135 -68.103 203.451  94.881 262.696 371.266 442.249  48.255  49.098  MAX.VL
1 5       1.1   E         2516.34010052.335 102.177-2096.910 -23.299 104.758  69.220 253.817 289.354 217.397  39.473  37.768  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
25.500  25.500   5.500  0.996  1.32  34 # 9 @ 9.000  TOP TRAN 287.433  59.169 118.337  49.026  0.000
                              2.02  34 #11 @ 9.000  BOT.LONG 454.401  60.700 121.400  50.295  0.000
NUMBER OF PILES = 18  BP = 3.833  DP = 5.750
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