28-OCT-09 GEORGIA DEPARTMENT OF TRANSPORTATION PROB. NO. 0001
11:08:51 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
42' CURB-CURB; 6 BEAMS; 140' SPAN; 60' TALL; BRIDGE 13 ; PIER 8

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	CAP REINFORCING STEEL MAX BOT	MIN SIZE	* MIN NO.	* TOP CL.	* MIN S.SP	CAP DEPTH INCR.	BOT CL.
D D D L	2	1	13	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	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	22.420	6.795	4.000	6.000	6.000	4.000	15.625	18.793	7.517	4.481					
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	1	C	T		60.000	0.000	13.590	6.000	13.590	6.000	6.000	0.000	13	6	11	13	6	11	38	16	11	38	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	15.590	15.590	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	FT1	FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	* WIND FORCE ARM APT	APL	* WIND ON PIER PT	PL
1365.	2730.	1	50	0	44	6	41	12	33	16	17	19	7.375	7.375	7.676	24.746

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	140.0	280.0	15.583	15.583

MISCELLANEOUS FORCES

CENTRI. FT	TRACTION FORCE AND ARMS FL	APT	APL	EXPANSION COEFFICIENT	SHRINKAGE COEFFICIENT	STREAM FLOW PT	PL
6.184	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	271.033	309.872	0.000	774.679	0.000	309.872	271.033					
LL 1	1	82.598	54.813	0.000	0.000	0.000	0.000	0.000					
LL 2	2	82.598	100.851	0.000	91.372	0.000	0.000	0.000					
LL 3	3	82.598	100.851	0.000	197.288	0.000	31.496	0.000					
LL 4	1	0.000	0.000	0.000	0.000	0.000	54.822	82.589					
LL 5	2	0.000	0.000	0.000	91.382	0.000	100.851	82.589					
LL 6	3	0.000	31.505	0.000	197.288	0.000	100.851	82.589					
LL 7	1	0.000	27.420	0.000	109.991	0.000	0.000	0.000					
LL 8	2	50.115	109.991	0.000	114.716	0.000	0.000	0.000					
LL 9	3	50.115	109.991	0.000	202.013	0.000	50.115	0.000					
LL10	2	0.000	38.772	0.000	197.287	0.000	38.763	0.000					
LL11	3	68.093	108.090	0.000	197.287	0.000	38.763	0.000					
LL12	2	82.598	54.813	0.000	0.000	0.000	54.822	82.589					
LL13	3	82.598	100.851	0.000	91.372	0.000	54.822	82.589					

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

LOAD	COL	PC	TRANSVERSE MT	V	MB	RF	ML	MR	* LONGITUDINAL MT	V	MB	MF
UNIT F.AT CL.CAP	1	0.000	-6.000	1.000	60.000	0.000	0.000	0.000	6.000	1.000	60.000	60.000
DEAD LOAD TOTAL	1	2203.087 2863.561	0.000	0.000	0.000	2863.561	9913.125	-9913.125	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	-212.808	-9.860	-745.248	-745.248
CENT. FORCE 1 LN	1	0.000	-133.469	6.184	467.405	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WIND ON SUBSTR.	1	0.000	-46.056	7.676	460.560	0.000	0.000	0.000	-148.476	-24.746	-1484.760	-1484.760
GROUP 2 WIND 1 1	1	0.000	-958.900	75.926	5058.904	0.000	0.000	0.000	-148.476	-24.746	-1484.760	-1484.760
GROUP 2 WIND 1 2	1	0.000	-958.900	75.926	5058.904	0.000	0.000	0.000	148.476	24.746	1484.760	1484.760

GROUP 2 WIND 2 1	1	0.000	-849.359	67.736	4507.103	0.000	0.000	0.000	-367.559	-41.126	-2588.363	-2588.363
GROUP 2 WIND 2 2	1	0.000	-849.359	67.736	4507.103	0.000	0.000	0.000	367.559	41.126	2588.363	2588.363
GROUP 2 WIND 3 1	1	0.000	-794.588	63.641	4231.202	0.000	0.000	0.000	-586.641	-57.506	-3691.965	-3691.965
GROUP 2 WIND 3 2	1	0.000	-794.588	63.641	4231.202	0.000	0.000	0.000	586.641	57.506	3691.965	3691.965
GROUP 2 WIND 4 1	1	0.000	-648.533	52.721	3495.467	0.000	0.000	0.000	-732.696	-68.426	-4427.700	-4427.700
GROUP 2 WIND 4 2	1	0.000	-648.533	52.721	3495.467	0.000	0.000	0.000	732.696	68.426	4427.700	4427.700
GROUP 2 WIND 5 1	1	0.000	-356.423	30.881	2023.997	0.000	0.000	0.000	-842.237	-76.616	-4979.501	-4979.501
GROUP 2 WIND 5 2	1	0.000	-356.423	30.881	2023.997	0.000	0.000	0.000	842.237	76.616	4979.501	4979.501
GROUP 3 WIND 1 1	1	0.000	-589.832	36.778	2575.833	0.000	0.000	0.000	-44.543	-7.424	-445.428	-445.428
GROUP 3 WIND 1 2	1	0.000	-589.832	36.778	2575.833	0.000	0.000	0.000	44.543	7.424	445.428	445.428
GROUP 3 WIND 2 1	1	0.000	-520.710	32.641	2283.313	0.000	0.000	0.000	-182.786	-15.698	-1030.468	-1030.468
GROUP 3 WIND 2 2	1	0.000	-520.710	32.641	2283.313	0.000	0.000	0.000	182.786	15.698	1030.468	1030.468
GROUP 3 WIND 3 1	1	0.000	-486.149	30.572	2137.053	0.000	0.000	0.000	-321.030	-23.972	-1615.507	-1615.507
GROUP 3 WIND 3 2	1	0.000	-486.149	30.572	2137.053	0.000	0.000	0.000	321.030	23.972	1615.507	1615.507
GROUP 3 WIND 4 1	1	0.000	-393.987	25.056	1747.027	0.000	0.000	0.000	-413.193	-29.488	-2005.534	-2005.534
GROUP 3 WIND 4 2	1	0.000	-393.987	25.056	1747.027	0.000	0.000	0.000	413.193	29.488	2005.534	2005.534
GROUP 3 WIND 5 1	1	0.000	-209.662	14.024	966.974	0.000	0.000	0.000	-482.314	-33.625	-2298.053	-2298.053
GROUP 3 WIND 5 2	1	0.000	-209.662	14.024	966.974	0.000	0.000	0.000	482.314	33.625	2298.053	2298.053
LIVE LOAD LL 1	1	137.411	-2170.335	0.000	2170.335	137.411	2170.335	0.000	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 LL 2	1	274.821	-2689.460	0.000	2689.460	274.821	2689.460	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 3	1	371.010	-2100.880	0.000	2100.880	371.010	2420.514	-319.634	0.000	0.000	0.000	0.000
LIVE LOAD LL 4	1	137.411	2170.268	0.000	-2170.268	137.411	0.000	-2170.268	0.000	0.000	0.000	0.000
LIVE LOAD LL 5	1	274.822	2689.291	0.000	-2689.291	274.822	0.000	-2689.291	0.000	0.000	0.000	0.000
LIVE LOAD LL 6	1	371.010	2100.636	0.000	-2100.636	371.010	319.725	-2420.362	0.000	0.000	0.000	0.000
LIVE LOAD LL 7	1	137.411	-309.188	0.000	309.188	137.411	309.188	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 8	1	274.822	-2182.070	0.000	2182.070	274.822	2182.070	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 9	1	371.011	-1455.276	0.000	1455.276	371.011	1963.863	-508.587	0.000	0.000	0.000	0.000
LIVE LOAD LL10	1	274.822	-0.101	0.000	0.101	274.822	437.193	-437.092	0.000	0.000	0.000	0.000
LIVE LOAD LL11	1	371.010	-1855.262	0.000	1855.262	371.010	2248.645	-393.382	0.000	0.000	0.000	0.000
LIVE LOAD LL12	1	274.822	-0.068	0.000	0.068	274.822	2170.335	-2170.268	0.000	0.000	0.000	0.000
LIVE LOAD LL13	1	371.009	-467.273	0.000	467.273	371.009	2420.514	-1953.241	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	-33.165	-33.165	-33.165	-33.165	-33.165	-33.165	-33.165	-18.944	-371.287	-18.944	-371.287	-18.944	-550.608
P 2	-3008.250	-3008.250	-4356.201	-3008.250	-3008.250	-3008.250	-3815.406	-423.095	-825.929	-423.095	-825.929	-602.416	-1224.197
P 3	-6794.226	-6794.226	-9926.814	-6794.226	-6794.226	-6794.226	-8670.028	-864.864	-864.864	-864.864	-864.864	-1263.132	-1263.132
C 1L	-12887.062	-12887.062	-18725.879	-12887.062	-12887.062	-12887.062	-16383.359	-928.465		-928.465		-1326.733	
C 1R	-12887.062	-12887.062	-18725.512	-12887.062	-12887.062	-12887.062	-16383.141		928.465		1326.713		928.465
P 5	-6794.226	-6794.226	-9926.580	-6794.226	-6794.226	-6794.226	-8669.888	864.864	864.864	1263.112	1263.112	864.864	864.864
P 6	-3008.251	-3008.251	-4356.054	-3008.251	-3008.251	-3008.251	-3815.319	825.929	423.095	1224.177	602.396	825.929	423.095
P 7	-33.165	-33.165	-33.165	-33.165	-33.165	-33.165	-33.165	371.287	18.945	550.588	18.945	371.287	18.944

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	-25.511	-25.511	3.12	2 # 11	3.12	2 # 11	0.00	0.000	#5@ 0.00	24.00	0.060	#5@10.33	59.15		0.08	0.000	0.099
P 2	-2314.039	-2934.928	12.55	9 # 11	3.12	2 # 11	24.00	0.060	#5@10.33	24.00	0.162	D#5@ 7.64	82.24		0.24	0.492	1.116
P 3	-5226.328	-6669.252	24.64	16 # 11	3.12	2 # 11	24.00	0.125	#5@ 4.95	24.00	0.125	#5@ 4.95	96.00		0.41	0.589	1.016
C 1	-9913.125	-12602.585	48.53	32 # 11	3.12	2 # 11	24.00	0.141	#5@ 4.40	24.00	0.141	#5@ 4.40	96.00		0.78	0.561	0.896
P 5	-5226.328	-6669.145	24.64	16 # 11	3.12	2 # 11	24.00	0.125	#5@ 4.95	24.00	0.125	#5@ 4.95	96.00		0.41	0.589	1.016
P 6	-2314.039	-2934.861	12.55	9 # 11	3.12	2 # 11	24.00	0.162	D#5@ 7.64	24.00	0.060	#5@10.33	82.24		0.24	0.492	1.116

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P 7   -25.511   -25.512   3.12  2 # 11    3.12  2 # 11   24.00 0.060 #5@10.33   0.00 0.000 #5@ 0.00  59.15        0.08  0.000  0.099

NOTE: *** FS/FZ RATIO EXCEEDS 1.0! ***
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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	LL 2	0.0			C		3460.6	-6185.8	0.0	3460.6	6544.6	2793.5	17131.2	32447.7	13849.8	4.956	72.00	163.08
1	B	2		5.1					3722.6	2631.2	-6473.4	3722.6	5305.2	8270.8	10847.0	15413.8	24029.8	2.906	72.00	163.08

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	16 # 11	16 # 11	22 # 11	22 # 11	118.56	1.010	1.00	0.000	3890.	70968.	1.058	1.345	1.000	2	0.70
1	B	16 # 11	16 # 11	22 # 11	22 # 11	118.56	1.010	1.00	0.000	3293.	70968.	1.049	1.278	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	3	LL 3	3.1		C		3175.675	5166.424	47.269	-3627.678	-50.594	176.593	100.341	215.328	291.579	117.873	0.000	37.327	MAX.P1
1	3	LL 3	1.1		C		4128.377	7286.764	69.517	-3194.878	-44.260	207.031	139.913	302.466	369.584	156.524	0.000	48.525	MAX.MT
1	3	LL 3	3.1		C		4128.377	6716.351	61.450	-4715.981	-65.772	229.571	130.444	279.926	379.053	153.236	0.000	48.525	MAX.VT
1	3	LL 3	3.1		C		4128.377	6716.351	61.450	-4715.981	-65.772	229.571	130.444	279.926	379.053	153.236	0.000	48.525	MAX.VP
1	3	LL 3	5.1		C		4128.377	5195.248	39.937	-5603.291	-78.321	256.333	138.535	253.164	370.962	434.314	68.467	48.525	MAX.ML
1	3	LL 3	5.1		C		4128.377	5195.248	39.937	-5603.291	-78.321	256.333	138.535	253.164	370.962	434.314	68.467	48.525	MAX.VL
1	3	LL 2	3.1		C		3094.756	5334.386	42.940	-3106.004	-43.692	165.391	100.059	218.012	283.344	116.477	0.000	36.398	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
21.500	21.500	6.250	0.993	0.80	40 # 6	@ 6.375	TOP TRAN	211.914	70.259	140.517	58.215	0.000
				1.67	23 #11	@11.125	BOT.LONG	434.760	71.562	143.124	59.295	0.000

NUMBER OF PILES = 19 BP = 3.167 DP = 4.750