29-OCT-09 GEORGIA DEPARTMENT OF TRANSPORTATION PROB. NO. 0001
08:48:09 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
40' CURB-CURB; 6 BEAMS; 125' SPAN; 60' TALL; BRIDGE 25 ; PIER 26

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	12	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 MIN.P	REINFORCING STEEL 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	21.475	5.850	4.000	6.000	6.000	4.000	15.625	17.848	7.139	4.859					
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	11.700	6.000	11.700	6.000	6.000	0.000	11	6	11	11	6	11	33	16	11	33	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	13.700	13.700	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
1219.	2438.	1	50	0	44	6	41	12	33	16	17	19	7.375	7.375	7.676	22.328

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	125.0	250.0	15.583	15.583

MISCELLANEOUS FORCES

CENTRI. FT	TRACTION FORCE AND ARMS FL	APT	APL	EXPANSION COEFFICIENT	SHRINKAGE COEFFICIENT	STREAM FLOW PT	PL
4.054	8.900	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	237.508	269.589	0.000	404.383	0.000	269.589	237.508					
LL 1	1	73.932	53.541	0.000	0.000	0.000	0.000	0.000					
LL 2	2	73.932	91.762	0.000	89.252	0.000	0.000	0.000					
LL 3	3	73.932	91.762	0.000	175.836	0.000	40.890	0.000					
LL 4	1	0.000	0.000	0.000	0.000	0.000	53.550	73.923					
LL 5	2	0.000	0.000	0.000	89.261	0.000	91.761	73.923					
LL 6	3	0.000	40.899	0.000	175.836	0.000	91.761	73.923					
LL 7	1	0.000	26.784	0.000	100.689	0.000	0.000	0.000					
LL 8	2	52.327	100.689	0.000	101.930	0.000	0.000	0.000					
LL 9	3	52.327	100.689	0.000	177.077	0.000	52.327	0.000					
LL10	2	0.000	39.559	0.000	175.836	0.000	39.551	0.000					
LL11	2	73.932	53.541	0.000	0.000	0.000	53.550	73.923					
LL12	3	73.932	91.762	0.000	89.252	0.000	53.550	73.923					

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

LOAD	COL	TRANSVERSE PC	MT	V	MB	RF	ML	MR	* MT	LONGITUDINAL 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	1671.567 2240.187	0.000	0.000	0.000	2240.187	8328.803	-8328.803	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	-192.089	-8.900	-672.689	-672.689
CENT. FORCE 1 LN	1	0.000	-87.497	4.054	306.413	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	-133.968	-22.328	-1339.680	-1339.680
GROUP 2 WIND 1 1	1	0.000	-861.262	68.626	4567.066	0.000	0.000	0.000	-133.968	-22.328	-1339.680	-1339.680
GROUP 2 WIND 1 2	1	0.000	-861.262	68.626	4567.066	0.000	0.000	0.000	133.968	22.328	1339.680	1339.680
GROUP 2 WIND 2 1	1	0.000	-763.438	61.312	4074.286	0.000	0.000	0.000	-329.617	-36.956	-2325.241	-2325.241

GROUP 2 WIND 2 2	1	0.000	-763.438	61.312	4074.286	0.000	0.000	0.000	329.617	36.956	2325.241	2325.241
GROUP 2 WIND 3 1	1	0.000	-714.525	57.655	3827.895	0.000	0.000	0.000	-525.267	-51.584	-3310.803	-3310.803
GROUP 2 WIND 3 2	1	0.000	-714.525	57.655	3827.895	0.000	0.000	0.000	525.267	51.584	3310.803	3310.803
GROUP 2 WIND 4 1	1	0.000	-584.092	47.903	3170.854	0.000	0.000	0.000	-655.700	-61.336	-3967.844	-3967.844
GROUP 2 WIND 4 2	1	0.000	-584.092	47.903	3170.854	0.000	0.000	0.000	655.700	61.336	3967.844	3967.844
GROUP 2 WIND 5 1	1	0.000	-323.226	28.399	1856.772	0.000	0.000	0.000	-753.525	-68.650	-4460.625	-4460.625
GROUP 2 WIND 5 2	1	0.000	-323.226	28.399	1856.772	0.000	0.000	0.000	753.525	68.650	4460.625	4460.625
GROUP 3 WIND 1 1	1	0.000	-528.166	33.088	2314.907	0.000	0.000	0.000	-40.190	-6.698	-401.904	-401.904
GROUP 3 WIND 1 2	1	0.000	-528.166	33.088	2314.907	0.000	0.000	0.000	40.190	6.698	401.904	401.904
GROUP 3 WIND 2 1	1	0.000	-466.444	29.394	2053.698	0.000	0.000	0.000	-163.634	-14.087	-924.321	-924.321
GROUP 3 WIND 2 2	1	0.000	-466.444	29.394	2053.698	0.000	0.000	0.000	163.634	14.087	924.321	924.321
GROUP 3 WIND 3 1	1	0.000	-435.583	27.546	1923.094	0.000	0.000	0.000	-287.078	-21.475	-1446.739	-1446.739
GROUP 3 WIND 3 2	1	0.000	-435.583	27.546	1923.094	0.000	0.000	0.000	287.078	21.475	1446.739	1446.739
GROUP 3 WIND 4 1	1	0.000	-353.287	22.621	1574.816	0.000	0.000	0.000	-369.374	-26.401	-1795.017	-1795.017
GROUP 3 WIND 4 2	1	0.000	-353.287	22.621	1574.816	0.000	0.000	0.000	369.374	26.401	1795.017	1795.017
GROUP 3 WIND 5 1	1	0.000	-188.696	12.770	878.259	0.000	0.000	0.000	-431.096	-30.095	-2056.226	-2056.226
GROUP 3 WIND 5 2	1	0.000	-188.696	12.770	878.259	0.000	0.000	0.000	431.096	30.095	2056.226	2056.226
LIVE LOAD LL 1	1	127.473	-1892.909	0.000	1892.909	127.473	1892.909	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	254.946	-2302.218	0.000	2302.218	254.946	2302.218	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 3	1	344.178	-1677.894	0.000	1677.894	344.178	2071.996	-394.102	0.000	0.000	0.000	0.000
LIVE LOAD LL 4	1	127.473	1892.844	0.000	-1892.844	127.473	0.000	-1892.844	0.000	0.000	0.000	0.000
LIVE LOAD LL 5	1	254.945	2302.046	0.000	-2302.046	254.945	0.000	-2302.046	0.000	0.000	0.000	0.000
LIVE LOAD LL 6	1	344.177	1677.653	0.000	-1677.653	344.177	394.189	-2071.842	0.000	0.000	0.000	0.000
LIVE LOAD LL 7	1	127.473	-286.830	0.000	286.830	127.473	286.830	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 8	1	254.946	-2012.211	0.000	2012.211	254.946	2012.211	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 9	1	344.178	-1306.657	0.000	1306.657	344.178	1810.990	-504.333	0.000	0.000	0.000	0.000
LIVE LOAD LL10	1	254.946	-0.086	0.000	0.086	254.946	423.637	-423.552	0.000	0.000	0.000	0.000
LIVE LOAD LL11	1	254.946	-0.064	0.000	0.064	254.946	1892.909	-1892.844	0.000	0.000	0.000	0.000
LIVE LOAD LL12	1	344.177	-368.436	0.000	368.436	344.177	2071.996	-1703.560	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	-327.705	-18.944	-327.705	-18.944	-488.211
P 2	-2537.755	-2537.755	-3683.610	-2537.755	-2537.755	-2537.755	-3223.896	-376.503	-726.969	-376.503	-726.969	-537.010	-1086.691
P 3	-6169.138	-6169.138	-9062.881	-6169.138	-6169.138	-6169.138	-7901.918	-768.914	-768.914	-768.914	-768.914	-1128.635	-1128.635
C 1L	-10827.443	-10827.443	-15825.557	-10827.443	-10827.443	-10827.443	-13820.326	-823.670		-823.670		-1183.391	
C 1R	-10827.443	-10827.443	-15825.186	-10827.443	-10827.443	-10827.443	-13820.103		823.670		1183.370		823.670
P 5	-6169.138	-6169.138	-9062.636	-6169.138	-6169.138	-6169.138	-7901.771	768.914	768.914	1128.614	1128.614	768.914	768.914
P 6	-2537.755	-2537.755	-3683.470	-2537.755	-2537.755	-2537.755	-3223.812	726.969	376.503	1086.669	536.990	726.969	376.503
P 7	-33.165	-33.165	-33.165	-33.165	-33.165	-33.165	-33.165	327.705	18.944	488.192	18.944	327.705	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	-1952.119	-2479.920	10.74	7 # 11	3.12	2 # 11	24.00	0.060	#5@10.33	24.00	0.132	#5@ 4.69	81.07		0.20	0.575	1.330
P 3	-4745.491	-6078.399	22.43	15 # 11	3.12	2 # 11	24.00	0.097	#5@ 6.40	24.00	0.097	#5@ 6.40	96.00		0.37	0.566	1.007
C 1	-8328.803	-10631.021	40.42	26 # 11	3.12	2 # 11	24.00	0.110	#5@ 5.64	24.00	0.110	#5@ 5.64	96.00		0.66	0.594	0.960
P 5	-4745.491	-6078.286	22.43	15 # 11	3.12	2 # 11	24.00	0.097	#5@ 6.40	24.00	0.097	#5@ 6.40	96.00		0.37	0.565	1.007
P 6	-1952.119	-2479.855	10.74	7 # 11	3.12	2 # 11	24.00	0.132	#5@ 4.69	24.00	0.060	#5@10.33	81.07		0.20	0.575	1.330
P 7	-25.511	-25.511	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! ***

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		2726.5	-5225.6	0.0	2726.5	5603.2	2142.2	13725.8	28227.4	10791.6	5.037	72.00	140.40
1	B	2		5.1					2912.2	2413.8	-5798.8	2912.2	3606.9	7195.3	8430.0	10394.9	20736.1	2.883	72.00	140.40

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	17 # 11	17 # 11	102.96	1.019	1.00	0.000	3096.	45943.	1.072	1.309	1.000	2	0.70
1	B	16 # 11	16 # 11	17 # 11	17 # 11	102.96	1.019	1.00	0.000	2543.	45943.	1.059	1.241	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	4.1		C		2529.729	3813.669	33.567	-3611.277	-50.431	181.583	75.185	184.458	290.856	112.336	0.000	32.446	MAX.P1
1	3	LL 3	1.1		C		3288.647	5919.888	57.244	-2883.612	-39.947	195.167	110.259	280.687	365.595	153.204	0.000	42.180	MAX.MT
1	3	LL 3	3.1		C		3288.647	5410.532	50.040	-4241.897	-59.157	222.706	97.741	253.148	378.113	149.410	0.000	42.180	MAX.VT
1	3	LL 3	3.1		C		3288.647	5410.532	50.040	-4241.897	-59.157	222.706	97.741	253.148	378.113	149.410	0.000	42.180	MAX.VP
1	3	LL 3	5.1		C		3288.647	4052.246	30.830	-5034.230	-70.362	254.417	106.086	221.437	369.768	313.019	62.634	42.180	MAX.ML
1	3	LL 3	5.1		C		3288.647	4052.246	30.830	-5034.230	-70.362	254.417	106.086	221.437	369.768	313.019	62.634	42.180	MAX.VL
1	3	LL 2	4.1		C		2454.662	4124.395	30.729	-3140.395	-44.201	165.967	73.389	190.691	283.270	111.994	0.000	31.507	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
19.000	19.000	5.750	0.990	0.88	38 # 6	@ 6.000	TOP TRAN	204.397	63.186	126.372	52.355	0.000
				1.33	20 #10	@11.375	BOT.LONG	314.274	64.405	128.810	53.365	0.000

NUMBER OF PILES = 16 BP = 2.750 DP = 2.750