28-OCT-09 GEORGIA DEPARTMENT OF TRANSPORTATION PROB. NO. 0001
17:53:56 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; 120' SPAN; 30' TALL; BRIDGE 13 ; PIER 13

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	21.625	6.000	4.000	6.000	6.000	4.000	15.625	18.668	7.467	5.201					
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		30.000	0.000	12.000	6.000	12.000	6.000	6.000	0.000	12	6	11	12	6	11	34	16	11	34	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	14.000	14.000	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
1170.	2340.	1	50	0	44	6	41	12	33	16	17	19	7.375	7.375	4.071	15.364

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	120.0	240.0	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	8.580	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	228.206	266.132	0.000	532.263	0.000	266.132	228.206					
LL 1	1	63.176	60.965	0.000	0.000	0.000	0.000	0.000					
LL 2	2	63.176	96.435	0.000	88.670	0.000	0.000	0.000					
LL 3	3	63.176	96.435	0.000	177.350	0.000	35.462	0.000					
LL 4	1	0.000	0.000	0.000	0.000	0.000	60.982	63.159					
LL 5	2	0.000	0.000	0.000	88.679	0.000	96.444	63.159					
LL 6	3	0.000	35.470	0.000	177.350	0.000	96.444	63.159					
LL 7	1	0.000	24.938	0.000	99.203	0.000	0.000	0.000					
LL 8	2	45.994	99.203	0.000	103.085	0.000	0.000	0.000					
LL 9	3	45.994	99.203	0.000	181.232	0.000	45.994	0.000					
LL10	2	0.000	35.470	0.000	177.350	0.000	35.462	0.000					
LL11	3	63.176	96.435	0.000	177.350	0.000	35.462	0.000					
LL12	2	63.176	60.965	0.000	0.000	0.000	60.982	63.159					
LL13	3	63.176	96.435	0.000	88.670	0.000	60.982	63.159					

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	30.000	0.000	0.000	0.000	6.000	1.000	30.000	30.000
DEAD LOAD TOTAL	1	1776.089 2035.289	0.000	0.000	0.000	2035.289	8462.881	-8462.881	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	-185.182	-8.580	-391.102	-391.102
CENT. FORCE 1 LN	1	0.000	-133.469	6.184	281.885	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WIND ON SUBSTR.	1	0.000	-24.426	4.071	122.130	0.000	0.000	0.000	-92.184	-15.364	-460.920	-460.920
GROUP 2 WIND 1 1	1	0.000	-806.864	62.571	2308.567	0.000	0.000	0.000	-92.184	-15.364	-460.920	-460.920
GROUP 2 WIND 1 2	1	0.000	-806.864	62.571	2308.567	0.000	0.000	0.000	92.184	15.364	460.920	460.920

GROUP 2 WIND 2 1	1	0.000	-712.971	55.551	2046.195	0.000	0.000	0.000	-279.969	-29.404	-985.665	-985.665
GROUP 2 WIND 2 2	1	0.000	-712.971	55.551	2046.195	0.000	0.000	0.000	279.969	29.404	985.665	985.665
GROUP 2 WIND 3 1	1	0.000	-666.025	52.041	1915.009	0.000	0.000	0.000	-467.754	-43.444	-1510.410	-1510.410
GROUP 2 WIND 3 2	1	0.000	-666.025	52.041	1915.009	0.000	0.000	0.000	467.754	43.444	1510.410	1510.410
GROUP 2 WIND 4 1	1	0.000	-540.835	42.681	1565.179	0.000	0.000	0.000	-592.944	-52.804	-1860.240	-1860.240
GROUP 2 WIND 4 2	1	0.000	-540.835	42.681	1565.179	0.000	0.000	0.000	592.944	52.804	1860.240	1860.240
GROUP 2 WIND 5 1	1	0.000	-290.455	23.961	865.519	0.000	0.000	0.000	-686.836	-59.824	-2122.613	-2122.613
GROUP 2 WIND 5 2	1	0.000	-290.455	23.961	865.519	0.000	0.000	0.000	686.836	59.824	2122.613	2122.613
GROUP 3 WIND 1 1	1	0.000	-501.055	30.771	1239.566	0.000	0.000	0.000	-27.655	-4.609	-138.276	-138.276
GROUP 3 WIND 1 2	1	0.000	-501.055	30.771	1239.566	0.000	0.000	0.000	27.655	4.609	138.276	138.276
GROUP 3 WIND 2 1	1	0.000	-441.808	27.225	1095.215	0.000	0.000	0.000	-146.150	-11.701	-426.979	-426.979
GROUP 3 WIND 2 2	1	0.000	-441.808	27.225	1095.215	0.000	0.000	0.000	146.150	11.701	426.979	426.979
GROUP 3 WIND 3 1	1	0.000	-412.184	25.452	1023.039	0.000	0.000	0.000	-264.644	-18.793	-715.681	-715.681
GROUP 3 WIND 3 2	1	0.000	-412.184	25.452	1023.039	0.000	0.000	0.000	264.644	18.793	715.681	715.681
GROUP 3 WIND 4 1	1	0.000	-333.188	20.724	830.571	0.000	0.000	0.000	-343.641	-23.521	-908.149	-908.149
GROUP 3 WIND 4 2	1	0.000	-333.188	20.724	830.571	0.000	0.000	0.000	343.641	23.521	908.149	908.149
GROUP 3 WIND 5 1	1	0.000	-175.195	11.268	445.634	0.000	0.000	0.000	-402.888	-27.067	-1052.501	-1052.501
GROUP 3 WIND 5 2	1	0.000	-175.195	11.268	445.634	0.000	0.000	0.000	402.888	27.067	1052.501	1052.501
LIVE LOAD LL 1	1	124.141	-1862.238	0.000	1862.238	124.141	1862.238	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	248.281	-2259.538	0.000	2259.538	248.281	2259.538	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 3	1	335.181	-1676.095	0.000	1676.095	335.181	2033.584	-357.489	0.000	0.000	0.000	0.000
LIVE LOAD LL 4	1	124.141	1862.111	0.000	-1862.111	124.141	0.000	-1862.111	0.000	0.000	0.000	0.000
LIVE LOAD LL 5	1	248.282	2259.321	0.000	-2259.321	248.282	0.000	-2259.321	0.000	0.000	0.000	0.000
LIVE LOAD LL 6	1	335.181	1675.820	0.000	-1675.820	335.181	357.569	-2033.389	0.000	0.000	0.000	0.000
LIVE LOAD LL 7	1	124.141	-279.331	0.000	279.331	124.141	279.331	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 8	1	248.282	-1969.789	0.000	1969.789	248.282	1969.789	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 9	1	335.181	-1309.149	0.000	1309.149	335.181	1772.810	-463.661	0.000	0.000	0.000	0.000
LIVE LOAD LL10	1	248.282	-0.090	0.000	0.090	248.282	397.299	-397.210	0.000	0.000	0.000	0.000
LIVE LOAD LL11	1	335.181	-1676.095	0.000	1676.095	335.181	2033.584	-357.489	0.000	0.000	0.000	0.000
LIVE LOAD LL12	1	248.282	-0.127	0.000	0.127	248.282	1862.238	-1862.111	0.000	0.000	0.000	0.000
LIVE LOAD LL13	1	335.180	-357.684	0.000	357.684	335.180	2033.584	-1675.900	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	-21.751	-21.751	-21.751	-21.751	-21.751	-21.751	-21.751		-15.148	-311.816	-15.148	-311.816	-15.148	-448.971
P 2	-2526.025	-2526.025	-3550.162	-2526.025	-2526.025	-2526.025	-3139.281		-361.725	-707.697	-361.725	-707.697	-498.880	-1054.212
P 3	-6319.304	-6319.304	-9145.668	-6319.304	-6319.304	-6319.304	-8011.738		-752.327	-752.327	-752.327	-752.327	-1098.842	-1098.842
C 1L	-11001.745	-11001.745	-15907.200	-11001.745	-11001.745	-11001.745	-13939.145		-808.487		-808.487		-1155.002	
C 1R	-11001.745	-11001.745	-15906.730	-11001.745	-11001.745	-11001.745	-13938.862			808.487		1154.985		808.487
P 5	-6319.304	-6319.304	-9145.303	-6319.304	-6319.304	-6319.304	-8011.519		752.327	752.327	1098.825	1098.825	752.327	752.327
P 6	-2526.025	-2526.025	-3549.886	-2526.025	-2526.025	-2526.025	-3139.115		707.697	361.725	1054.195	498.843	707.697	361.725
P 7	-21.751	-21.751	-21.751	-21.751	-21.751	-21.751	-21.751		311.816	15.148	448.934	15.148	311.816	15.148

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	-16.732	-16.732	3.12	2 # 11	3.12	2 # 11	0.00	0.000	#5@ 0.00	24.00	0.060	#5@10.33	57.08		0.08	0.000	0.068
P 2	-1943.096	-2414.832	10.49	7 # 11	3.12	2 # 11	24.00	0.060	#5@10.33	24.00	0.128	#5@ 4.86	80.03		0.19	0.525	1.313
P 3	-4861.003	-6162.875	22.64	15 # 11	3.12	2 # 11	24.00	0.091	#5@ 6.85	24.00	0.091	#5@ 6.85	96.00		0.37	0.562	1.021
C 1	-8462.881	-10722.419	40.66	27 # 11	3.12	2 # 11	24.00	0.104	#5@ 5.97	24.00	0.104	#5@ 5.97	96.00		0.66	0.555	0.928
P 5	-4861.003	-6162.707	22.64	15 # 11	3.12	2 # 11	24.00	0.091	#5@ 6.85	24.00	0.091	#5@ 6.85	96.00		0.37	0.561	1.021
P 6	-1943.096	-2414.704	10.49	7 # 11	3.12	2 # 11	24.00	0.128	#5@ 4.86	24.00	0.060	#5@10.33	80.03		0.19	0.525	1.313

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P 7   -16.731   -16.732   3.12  2 # 11    3.12  2 # 11   24.00 0.060 #5@10.33   0.00 0.000 #5@ 0.00  57.08        0.08  0.000  0.068

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		2847.9	-5252.5	0.0	2847.9	5252.5	1815.9	15539.2	28720.4	9929.5	5.466	72.00	144.00
1	B	1	LL 2	0.0			C		3184.9	5638.4	0.0	3184.9	5638.4	2030.8	15759.0	27967.2	10073.0	4.957	72.00	144.00

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	16 # 11	16 # 11	18 # 11	18 # 11	106.08	1.023	1.00	0.000	3016.	186646.	1.000	1.063	1.000	2	0.70
1	B	16 # 11	16 # 11	18 # 11	18 # 11	106.08	1.023	1.00	0.000	3016.	186646.	1.000	1.063	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		2317.261	3194.153	42.149	-1771.657	-41.959	190.740	131.149	233.775	293.366	116.291	16.535	36.075	MAX.P1
1	3	LL 3	1.1		C		3012.440	4433.884	61.709	-1552.527	-36.108	230.538	178.413	321.331	373.456	153.477	21.816	46.897	MAX.MT
1	3	LL 3	1.1		C		3012.440	4433.884	61.709	-1552.527	-36.108	230.538	178.413	321.331	373.456	153.477	21.816	46.897	MAX.VT
1	3	LL 3	3.1		C		3012.440	4152.399	54.794	-2303.154	-54.547	247.962	170.494	303.908	381.376	151.179	21.496	46.897	MAX.VP
1	3	LL 3	4.1		C		3012.440	3902.190	48.647	-2553.363	-60.693	256.409	170.494	295.460	381.376	297.272	39.135	46.897	MAX.ML
1	3	LL 3	4.1		C		3012.440	3902.190	48.647	-2553.363	-60.693	256.409	170.494	295.460	381.376	297.272	39.135	46.897	MAX.VL
1	3	LL 2	3.1		C		2244.157	3487.658	37.820	-1497.885	-35.953	176.420	125.969	236.848	287.299	115.567	16.434	34.952	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
21.400	21.400	4.750	0.999	1.02	28 # 8	@ 9.125	TOP TRAN	182.434	48.384	96.768	40.090	0.000
				1.66	23 #11	@11.125	BOT.LONG	300.935	49.838	99.676	41.295	0.000

NUMBER OF PILES = 13 BP = 4.725 DP = 4.725