28-OCT-09 GEORGIA DEPARTMENT OF TRANSPORTATION PROB. NO. 0001
18:16:25 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
44' CURB-CURB; 6 BEAMS; 125' SPAN; 30' TALL; BRIDGE 19 ; PIER 2

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	23.625	8.000	4.000	6.000	6.000	4.000	15.625	20.378	8.151	4.227					
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	16.000	6.000	16.000	6.000	6.000	0.000	16	6	11	16	6	11	46	16	11	46	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	18.000	18.000	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
1219.	2438.	1	50	0	44	6	41	12	33	16	17	19	7.375	7.375	4.071	18.078

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
9.478	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	248.377	291.898	0.000	583.797	0.000	291.898	248.377					
LL 1	1	74.660	52.813	0.000	0.000	0.000	0.000	0.000					
LL 2	2	74.660	99.143	0.000	81.142	0.000	0.000	0.000					
LL 3	3	74.660	99.143	0.000	193.572	0.000	15.044	0.000					
LL 4	1	0.000	0.000	0.000	0.000	0.000	52.828	74.645					
LL 5	2	0.000	0.000	0.000	81.150	0.000	99.151	74.645					
LL 6	3	0.000	15.052	0.000	193.572	0.000	99.151	74.645					
LL 7	1	0.000	23.458	0.000	104.014	0.000	0.000	0.000					
LL 8	2	37.916	104.015	0.000	113.015	0.000	0.000	0.000					
LL 9	3	37.916	104.015	0.000	202.572	0.000	37.916	0.000					
LL10	2	0.000	30.691	0.000	193.572	0.000	30.683	0.000					
LL11	3	45.149	111.248	0.000	195.339	0.000	30.683	0.000					
LL12	2	74.660	52.813	0.000	0.000	0.000	52.828	74.645					
LL13	3	74.660	99.143	0.000	81.142	0.000	52.828	74.645					

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	30.000	0.000	0.000	0.000	6.000	1.000	30.000	30.000
DEAD LOAD TOTAL	1	1948.297 2293.897	0.000	0.000	0.000	2293.897	10121.802	-10121.802	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	-405.689	-405.689
CENT. FORCE 1 LN	1	0.000	-204.564	9.478	432.036	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	-108.468	-18.078	-542.340	-542.340
GROUP 2 WIND 1 1	1	0.000	-839.632	65.021	2400.136	0.000	0.000	0.000	-108.468	-18.078	-542.340	-542.340
GROUP 2 WIND 1 2	1	0.000	-839.632	65.021	2400.136	0.000	0.000	0.000	108.468	18.078	542.340	542.340

GROUP 2 WIND 2 1	1	0.000	-741.808	57.707	2126.775	0.000	0.000	0.000	-304.117	-32.706	-1089.062	-1089.062
GROUP 2 WIND 2 2	1	0.000	-741.808	57.707	2126.775	0.000	0.000	0.000	304.117	32.706	1089.062	1089.062
GROUP 2 WIND 3 1	1	0.000	-692.895	54.050	1990.095	0.000	0.000	0.000	-499.767	-47.334	-1635.783	-1635.783
GROUP 2 WIND 3 2	1	0.000	-692.895	54.050	1990.095	0.000	0.000	0.000	499.767	47.334	1635.783	1635.783
GROUP 2 WIND 4 1	1	0.000	-562.462	44.298	1625.614	0.000	0.000	0.000	-630.200	-57.086	-2000.264	-2000.264
GROUP 2 WIND 4 2	1	0.000	-562.462	44.298	1625.614	0.000	0.000	0.000	630.200	57.086	2000.264	2000.264
GROUP 2 WIND 5 1	1	0.000	-301.596	24.794	896.652	0.000	0.000	0.000	-728.025	-64.400	-2273.625	-2273.625
GROUP 2 WIND 5 2	1	0.000	-301.596	24.794	896.652	0.000	0.000	0.000	728.025	64.400	2273.625	2273.625
GROUP 3 WIND 1 1	1	0.000	-521.677	32.006	1289.828	0.000	0.000	0.000	-32.540	-5.423	-162.702	-162.702
GROUP 3 WIND 1 2	1	0.000	-521.677	32.006	1289.828	0.000	0.000	0.000	32.540	5.423	162.702	162.702
GROUP 3 WIND 2 1	1	0.000	-459.955	28.312	1139.446	0.000	0.000	0.000	-155.984	-12.812	-463.467	-463.467
GROUP 3 WIND 2 2	1	0.000	-459.955	28.312	1139.446	0.000	0.000	0.000	155.984	12.812	463.467	463.467
GROUP 3 WIND 3 1	1	0.000	-429.094	26.465	1064.254	0.000	0.000	0.000	-279.428	-20.200	-764.233	-764.233
GROUP 3 WIND 3 2	1	0.000	-429.094	26.465	1064.254	0.000	0.000	0.000	279.428	20.200	764.233	764.233
GROUP 3 WIND 4 1	1	0.000	-346.798	21.539	863.744	0.000	0.000	0.000	-361.724	-25.126	-964.743	-964.743
GROUP 3 WIND 4 2	1	0.000	-346.798	21.539	863.744	0.000	0.000	0.000	361.724	25.126	964.743	964.743
GROUP 3 WIND 5 1	1	0.000	-182.207	11.688	462.723	0.000	0.000	0.000	-423.446	-28.820	-1115.126	-1115.126
GROUP 3 WIND 5 2	1	0.000	-182.207	11.688	462.723	0.000	0.000	0.000	423.446	28.820	1115.126	1115.126
LIVE LOAD LL 1	1	127.473	-2167.166	0.000	2167.166	127.473	2167.166	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	254.945	-2733.643	0.000	2733.643	254.945	2733.643	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 3	1	344.177	-2294.730	0.000	2294.730	344.177	2460.279	-165.549	0.000	0.000	0.000	0.000
LIVE LOAD LL 4	1	127.473	2167.044	0.000	-2167.044	127.473	0.000	-2167.044	0.000	0.000	0.000	0.000
LIVE LOAD LL 5	1	254.946	2733.435	0.000	-2733.435	254.946	0.000	-2733.435	0.000	0.000	0.000	0.000
LIVE LOAD LL 6	1	344.178	2294.455	0.000	-2294.455	344.178	165.637	-2460.092	0.000	0.000	0.000	0.000
LIVE LOAD LL 7	1	127.472	-286.821	0.000	286.821	127.472	286.821	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 8	1	254.946	-2044.444	0.000	2044.444	254.946	2044.444	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 9	1	344.177	-1422.760	0.000	1422.760	344.177	1839.999	-417.239	0.000	0.000	0.000	0.000
LIVE LOAD LL10	1	254.946	-0.098	0.000	0.098	254.946	375.259	-375.161	0.000	0.000	0.000	0.000
LIVE LOAD LL11	1	344.177	-1714.603	0.000	1714.603	344.177	2052.248	-337.645	0.000	0.000	0.000	0.000
LIVE LOAD LL12	1	254.946	-0.123	0.000	0.123	254.946	2167.166	-2167.044	0.000	0.000	0.000	0.000
LIVE LOAD LL13	1	344.176	-509.939	0.000	509.939	344.176	2460.279	-1950.339	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	-26.380	-26.380	-26.380	-26.380	-26.380	-26.380	-26.380		-16.775	-339.665	-16.775	-339.665	-16.775	-501.752
P 2	-3009.796	-3009.796	-4330.966	-3009.796	-3009.796	-3009.796	-3800.916		-395.689	-775.156	-395.689	-775.156	-557.776	-1152.483
P 3	-6362.461	-6362.461	-9278.590	-6362.461	-6362.461	-6362.461	-8108.646		-812.045	-812.045	-812.045	-812.045	-1189.371	-1189.371
C 1L	-13158.342	-13158.342	-19093.080	-13158.342	-13158.342	-13158.342	-16712.078		-886.925		-886.925		-1264.251	
C 1R	-13158.342	-13158.342	-19092.629	-13158.342	-13158.342	-13158.342	-16711.807			886.925		1264.236		886.925
P 5	-6362.461	-6362.461	-9278.260	-6362.461	-6362.461	-6362.461	-8108.449		812.045	812.045	1189.356	1189.356	812.045	812.045
P 6	-3009.797	-3009.797	-4330.701	-3009.797	-3009.797	-3009.797	-3800.757		775.156	395.689	1152.467	557.743	775.156	395.689
P 7	-26.379	-26.379	-26.380	-26.379	-26.379	-26.379	-26.380		339.665	16.775	501.719	16.775	339.665	16.775

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	-20.292	-20.292	3.12	2 # 11	3.12	2 # 11	0.00	0.000	#5@ 0.00	24.00	0.060	#5@10.33	57.97		0.08	0.000	0.081
P 2	-2315.228	-2923.782	12.35	8 # 11	3.12	2 # 11	24.00	0.060	#5@10.33	24.00	0.142	#5@ 4.38	83.02		0.23	0.574	1.284
P 3	-4894.201	-6237.420	22.98	15 # 11	3.12	2 # 11	24.00	0.110	#5@ 5.65	24.00	0.110	#5@ 5.65	96.00		0.38	0.582	1.033
C 1	-10121.802	-12855.445	49.56	32 # 11	3.12	2 # 11	24.00	0.128	#5@ 4.86	24.00	0.128	#5@ 4.86	96.00		0.80	0.579	0.914
P 5	-4894.201	-6237.269	22.98	15 # 11	3.12	2 # 11	24.00	0.110	#5@ 5.65	24.00	0.110	#5@ 5.65	96.00		0.38	0.582	1.033
P 6	-2315.228	-2923.660	12.35	8 # 11	3.12	2 # 11	24.00	0.142	#5@ 4.38	24.00	0.060	#5@10.33	83.02		0.23	0.574	1.284

P 7 -20.292 -20.292 3.12 2 # 11 3.12 2 # 11 24.00 0.060 #5@10.33 0.00 0.000 #5@ 0.00 57.97 0.08 0.000 0.081

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 3	0.0			C		3280.0	-5699.9	0.0	3280.0	5699.9	2076.3	22929.4	39856.0	14518.5	6.992	72.00	192.00
1	B	1	LL 3	0.0			C		3729.3	6498.3	0.0	3729.3	6498.3	2360.7	22914.8	39939.0	14509.1	6.146	72.00	192.00

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	29 # 11	29 # 11	140.40	1.016	1.00	0.000	3505.	429950.	1.000	1.055	1.000	2	0.70
1	B	16 # 11	16 # 11	29 # 11	29 # 11	140.40	1.016	1.00	0.000	3505.	429950.	1.000	1.055	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	1	LL 3	0.0		C		2583.438	3096.950	25.591	0.000	0.000	150.650	150.650	233.708	233.708	-0.506	0.000	0.000	MAX.P1
1	3	LL 3	1.1		C		3358.469	5702.812	74.876	-1635.480	-38.289	202.925	140.393	296.740	359.273	-0.658	0.000	0.000	MAX.MT
1	3	LL 3	1.1		C		3358.469	5702.812	74.876	-1635.480	-38.289	202.925	140.393	296.740	359.273	-0.658	0.000	0.000	MAX.VT
1	3	LL 3	1.1		C		3358.469	5702.812	74.876	-1635.480	-38.289	202.925	140.393	296.740	359.273	-0.658	0.000	0.000	MAX.VP
1	3	LL 3	5.1		C		3358.469	4627.575	48.462	-2873.631	-68.705	242.205	132.099	257.460	367.567	258.124	47.483	0.000	MAX.ML
1	3	LL 3	5.1		C		3358.469	4627.575	48.462	-2873.631	-68.705	242.205	132.099	257.460	367.567	258.124	47.483	0.000	MAX.VL
1	3	LL 3	4.1		C		2583.438	3960.694	47.130	-2060.103	-49.156	177.645	98.725	206.714	285.633	-0.506	0.000	0.000	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
18.000	18.000	4.750	0.995	0.00	0 # 0	@ 0.000	TOP TRAN	0.000	0.000	0.000	41.365	0.000
				1.43	21 #10	@10.250	BOT.LONG	267.499	49.923	99.845	41.365	0.000

NUMBER OF PILES = 15 BP = 3.875 DP = 7.750