06-NOV-09 GEORGIA DEPARTMENT OF TRANSPORTATION PROB. NO. 0001
12:50:16 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; 5 BEAMS; 110' SPAN; 50' TALL; BRIDGE 2A ; PIER 14

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	CAP REINFORCING STEEL MIN SIZE	MIN NO.	TOP CL.	* MIN S.SP	* DEPTH INCR.	* BOT CL.	CAP
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	MODE	R COEF	KL	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	21.28	0.120	10.000	2.50	5.00	1.250	0.300	3.000	0.000	0.000		

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	19.164	9.582	1.582					
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		50.000	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	S	18.000	18.000	2.250	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
1073.	2145.	1	50	0	44	6	41	12	33	16	17	19	7.375	7.375	6.475	24.599

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	110.0	220.0	15.583	15.583

MISCELLANEOUS FORCES

CENTRI. FT	TRACTION FORCE AND ARMS FL	APT	APL	EXPANSION COEFFICIENT	SHRINKAGE COEFFICIENT	STREAM FLOW PT	PL
11.848	7.940	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	249.533	294.742	0.000	442.114	0.000	294.742	249.533					
LL 1	1	85.407	31.502	0.000	0.000	0.000	0.000	0.000					
LL 2	2	87.957	111.809	0.000	34.053	0.000	0.000	0.000					
LL 3	3	87.957	111.809	0.000	114.360	0.000	36.603	0.000					
LL 4	1	0.000	0.000	0.000	0.000	0.000	31.502	85.407					
LL 5	2	0.000	0.000	0.000	34.053	0.000	111.809	87.957					
LL 6	3	0.000	36.603	0.000	114.359	0.000	111.809	87.957					
LL 7	1	0.000	18.301	0.000	80.307	0.000	18.301	0.000					
LL 8	2	20.851	98.608	0.000	96.058	0.000	18.301	0.000					
LL 9	3	20.851	98.608	0.000	111.809	0.000	98.608	20.851					
LL10	2	0.000	61.005	0.000	111.809	0.000	61.005	0.000					
LL11	3	66.105	111.809	0.000	111.809	0.000	61.005	0.000					
LL12	2	85.407	31.502	0.000	0.000	0.000	31.502	85.407					
LL13	3	87.957	111.809	0.000	34.053	0.000	31.502	85.407					

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	50.000	0.000	0.000	0.000	6.000	1.000	50.000	50.000
DEAD LOAD TOTAL	1	1814.614 2448.214	0.000	0.000	0.000	2448.214	9097.605	-9097.605	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	-171.369	-7.940	-520.729	-520.729
CENT. FORCE 1 LN	1	0.000	-255.715	11.848	777.027	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WIND ON SUBSTR.	1	0.000	-38.850	6.475	323.750	0.000	0.000	0.000	-147.594	-24.599	-1229.950	-1229.950
GROUP 2 WIND 1 1	1	0.000	-756.419	60.125	3401.919	0.000	0.000	0.000	-147.594	-24.599	-1229.950	-1229.950
GROUP 2 WIND 1 2	1	0.000	-756.419	60.125	3401.919	0.000	0.000	0.000	147.594	24.599	1229.950	1229.950

GROUP 2 WIND 2 1	1	0.000	-670.310	53.687	3032.538	0.000	0.000	0.000	-319.730	-37.469	-1968.366	-1968.366
GROUP 2 WIND 2 2	1	0.000	-670.310	53.687	3032.538	0.000	0.000	0.000	319.730	37.469	1968.366	1968.366
GROUP 2 WIND 3 1	1	0.000	-627.256	50.468	2847.848	0.000	0.000	0.000	-491.867	-50.339	-2706.783	-2706.783
GROUP 2 WIND 3 2	1	0.000	-627.256	50.468	2847.848	0.000	0.000	0.000	491.867	50.339	2706.783	2706.783
GROUP 2 WIND 4 1	1	0.000	-512.445	41.884	2355.341	0.000	0.000	0.000	-606.624	-58.919	-3199.060	-3199.060
GROUP 2 WIND 4 2	1	0.000	-512.445	41.884	2355.341	0.000	0.000	0.000	606.624	58.919	3199.060	3199.060
GROUP 2 WIND 5 1	1	0.000	-282.823	24.716	1370.327	0.000	0.000	0.000	-692.692	-65.354	-3568.268	-3568.268
GROUP 2 WIND 5 2	1	0.000	-282.823	24.716	1370.327	0.000	0.000	0.000	692.692	65.354	3568.268	3568.268
GROUP 3 WIND 1 1	1	0.000	-464.339	29.037	1741.989	0.000	0.000	0.000	-44.278	-7.380	-368.985	-368.985
GROUP 3 WIND 1 2	1	0.000	-464.339	29.037	1741.989	0.000	0.000	0.000	44.278	7.380	368.985	368.985
GROUP 3 WIND 2 1	1	0.000	-410.017	25.786	1544.605	0.000	0.000	0.000	-152.898	-13.881	-763.649	-763.649
GROUP 3 WIND 2 2	1	0.000	-410.017	25.786	1544.605	0.000	0.000	0.000	152.898	13.881	763.649	763.649
GROUP 3 WIND 3 1	1	0.000	-382.856	24.160	1445.913	0.000	0.000	0.000	-261.518	-20.382	-1158.313	-1158.313
GROUP 3 WIND 3 2	1	0.000	-382.856	24.160	1445.913	0.000	0.000	0.000	261.518	20.382	1158.313	1158.313
GROUP 3 WIND 4 1	1	0.000	-310.426	19.825	1182.735	0.000	0.000	0.000	-333.932	-24.716	-1421.422	-1421.422
GROUP 3 WIND 4 2	1	0.000	-310.426	19.825	1182.735	0.000	0.000	0.000	333.932	24.716	1421.422	1421.422
GROUP 3 WIND 5 1	1	0.000	-165.567	11.155	656.379	0.000	0.000	0.000	-388.242	-27.966	-1618.754	-1618.754
GROUP 3 WIND 5 2	1	0.000	-165.567	11.155	656.379	0.000	0.000	0.000	388.242	27.966	1618.754	1618.754
LIVE LOAD LL 1	1	116.909	-1938.592	0.000	1938.592	116.909	1938.592	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	233.819	-2756.962	0.000	2756.962	233.819	2756.962	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 3	1	315.656	-2165.609	0.000	2165.609	315.656	2481.266	-315.657	0.000	0.000	0.000	0.000
LIVE LOAD LL 4	1	116.909	1938.592	0.000	-1938.592	116.909	0.000	-1938.592	0.000	0.000	0.000	0.000
LIVE LOAD LL 5	1	233.819	2756.962	0.000	-2756.962	233.819	0.000	-2756.962	0.000	0.000	0.000	0.000
LIVE LOAD LL 6	1	315.655	2165.609	0.000	-2165.609	315.655	315.657	-2481.266	0.000	0.000	0.000	0.000
LIVE LOAD LL 7	1	116.909	0.000	0.000	0.000	116.909	175.360	-175.360	0.000	0.000	0.000	0.000
LIVE LOAD LL 8	1	233.818	-1169.090	0.000	1169.090	233.818	1344.450	-175.360	0.000	0.000	0.000	0.000
LIVE LOAD LL 9	1	315.654	0.000	0.000	0.000	315.654	1210.005	-1210.005	0.000	0.000	0.000	0.000
LIVE LOAD LL10	1	233.819	0.000	0.000	0.000	233.819	584.550	-584.550	0.000	0.000	0.000	0.000
LIVE LOAD LL11	1	315.655	-1578.276	0.000	1578.276	315.655	2104.371	-526.095	0.000	0.000	0.000	0.000
LIVE LOAD LL12	1	233.818	0.000	0.000	0.000	233.818	1938.592	-1938.592	0.000	0.000	0.000	0.000
LIVE LOAD LL13	1	315.655	-736.533	0.000	736.533	315.655	2481.266	-1744.733	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	-50.999	-50.999	-50.999	-50.999	-50.999	-50.999	-50.999	-23.858	-348.251	-23.858	-348.251	-23.858	-539.205
P 2	-3708.041	-3708.041	-5537.768	-3708.041	-3708.041	-3708.041	-4803.686	-419.648	-802.812	-419.648	-802.812	-610.602	-1236.504
P 3	-4989.407	-4989.407	-7505.235	-4989.407	-4989.407	-4989.407	-6495.891	-817.245	-817.245	-817.245	-817.245	-1250.937	-1250.937
C 1L	-11826.887	-11826.887	-17812.250	-11826.887	-11826.887	-11826.887	-15410.938	-892.125		-892.125		-1325.817	
C 1R	-11826.887	-11826.887	-17812.250	-11826.887	-11826.887	-11826.887	-15410.938		892.125		1325.817		892.125
P 5	-4989.407	-4989.407	-7505.235	-4989.407	-4989.407	-4989.407	-6495.890	817.245	817.245	1250.937	1250.937	817.245	817.245
P 6	-3708.040	-3708.040	-5537.768	-3708.040	-3708.040	-3708.040	-4803.686	802.812	419.648	1236.504	610.602	802.812	419.648
P 7	-50.998	-50.998	-50.999	-50.998	-50.998	-50.998	-50.999	348.251	23.858	539.205	23.858	348.251	23.858

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	-39.230	-39.230	3.12	2 # 11	3.12	2 # 11	0.00	0.000	#5@ 0.00	24.00	0.060	#5@10.33	61.70		0.08	0.000	0.146
P 2	-2852.339	-3695.143	14.34	10 # 11	3.12	2 # 11	24.00	0.060	#5@10.33	24.00	0.134	#5@ 4.62	91.14		0.24	0.539	1.097
P 3	-3838.006	-4996.839	18.49	12 # 11	3.12	2 # 11	24.00	0.123	#5@ 5.05	24.00	0.123	#5@ 5.05	96.00		0.30	0.612	1.107
C 1	-9097.605	-11854.567	45.95	30 # 11	3.12	2 # 11	24.00	0.141	#5@ 4.41	24.00	0.141	#5@ 4.41	96.00		0.74	0.601	0.909
P 5	-3838.005	-4996.839	18.49	12 # 11	3.12	2 # 11	24.00	0.123	#5@ 5.05	24.00	0.123	#5@ 5.05	96.00		0.30	0.612	1.107
P 6	-2852.339	-3695.143	14.34	10 # 11	3.12	2 # 11	24.00	0.134	#5@ 4.62	24.00	0.060	#5@10.33	91.14		0.24	0.539	1.097

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P 7   -39.229   -39.230   3.12  2 # 11    3.12  2 # 11   24.00 0.060 #5@10.33   0.00 0.000 #5@ 0.00  61.70        0.08  0.000  0.146

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		2866.6	-6650.2	0.0	2866.6	6786.9	1974.4	20578.1	48817.6	14201.7	7.191	72.00	192.00
1	B	3	LL 3	4.1			C		3593.0	7080.2	-3675.6	3593.0	7221.3	4200.9	18220.2	36637.7	21313.5	5.073	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	3278.	162821.	1.021	1.148	1.000	2	0.70
1	B	16 # 11	16 # 11	29 # 11	29 # 11	140.40	1.016	1.00	0.000	3181.	162821.	1.020	1.143	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		2708.485	5329.514	56.150	-2564.281	-41.820	5.148	1.608	8.805	12.344	29.341	0.000	26.012	MAX.P1
1	3	LL 3	1.1		C		3521.030	7313.265	79.335	-2307.439	-37.463	5.718	2.534	12.421	15.605	38.908	0.000	33.816	MAX.MT
1	3	LL 3	3.1		C		3521.030	6928.368	72.995	-3333.565	-54.366	6.692	2.091	11.447	16.048	38.144	0.000	33.816	MAX.VT
1	3	LL 3	3.1		C		3521.030	6928.368	72.995	-3333.565	-54.366	6.692	2.091	11.447	16.048	38.144	0.000	33.816	MAX.VP
1	3	LL 3	5.1		C		3521.030	5901.973	56.088	-3932.139	-64.225	7.814	2.386	10.324	15.752	280.325	38.284	33.816	MAX.ML
1	3	LL 3	5.1		C		3521.030	5901.973	56.088	-3932.139	-64.225	7.814	2.386	10.324	15.752	280.325	38.284	33.816	MAX.VL
1	3	LL 3	3.1		C		2708.485	5329.514	56.150	-2564.281	-41.820	4.901	1.457	8.526	11.971	29.158	5.058	35.259	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
21.000	21.000	4.000	0.988	0.27	28 # 4	@ 9.000	TOP TRAN	51.907	52.475	104.202	43.480	0.000
				1.44	24 #10	@10.500	BOT.LONG	281.801	53.543	106.323	44.365	0.000