04-NOV-09 GEORGIA DEPARTMENT OF TRANSPORTATION PROB. NO. 0001
14:51:18 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
32' CURB-CURB; 5 BEAMS; 140' SPAN; 60' TALL; BRIDGE 7 ; PIER 4

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	8	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	17.625	4.000	4.000	6.000	6.000	4.000	13.625	14.000	7.000	3.000					
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	8.000	6.000	8.000	6.000	6.000	0.000	8	6	11	8	6	11	22	16	11	22	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	10.000	10.000	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 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	16.653

GROUP III WIND

STD. * WIND FT1	FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	* STD. * WIND 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
0.000	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	265.598	299.028	0.000	299.028	0.000	299.028	265.598					
LL 1	1	78.521	58.890	0.000	0.000	0.000	0.000	0.000					
LL 2	2	78.521	98.151	0.000	78.521	0.000	19.630	0.000					
LL 3	1	0.000	0.000	0.000	0.000	0.000	58.890	78.521					
LL 4	2	0.000	19.630	0.000	78.521	0.000	98.151	78.521					
LL 5	1	0.000	29.445	0.000	78.521	0.000	29.445	0.000					
LL 6	2	58.890	107.966	0.000	78.521	0.000	29.445	0.000					
LL 7	2	9.815	78.521	0.000	98.151	0.000	78.521	9.815					
LL 8	2	78.521	58.890	0.000	0.000	0.000	58.890	78.521					

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	1633.030 2021.830	0.000	0.000	0.000	2021.830	6609.005	-6609.005	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
WIND ON SUBSTR.	1	0.000	-46.056	7.676	460.560	0.000	0.000	0.000	-99.918	-16.653	-999.180	-999.180
GROUP 2 WIND 1 1	1	0.000	-958.900	75.926	5058.904	0.000	0.000	0.000	-99.918	-16.653	-999.180	-999.180
GROUP 2 WIND 1 2	1	0.000	-958.900	75.926	5058.904	0.000	0.000	0.000	99.918	16.653	999.180	999.180
GROUP 2 WIND 2 1	1	0.000	-849.359	67.736	4507.103	0.000	0.000	0.000	-319.001	-33.033	-2102.782	-2102.782
GROUP 2 WIND 2 2	1	0.000	-849.359	67.736	4507.103	0.000	0.000	0.000	319.001	33.033	2102.782	2102.782
GROUP 2 WIND 3 1	1	0.000	-794.588	63.641	4231.202	0.000	0.000	0.000	-538.083	-49.413	-3206.385	-3206.385
GROUP 2 WIND 3 2	1	0.000	-794.588	63.641	4231.202	0.000	0.000	0.000	538.083	49.413	3206.385	3206.385
GROUP 2 WIND 4 1	1	0.000	-648.533	52.721	3495.467	0.000	0.000	0.000	-684.138	-60.333	-3942.120	-3942.120
GROUP 2 WIND 4 2	1	0.000	-648.533	52.721	3495.467	0.000	0.000	0.000	684.138	60.333	3942.120	3942.120

GROUP 2 WIND 5 1	1	0.000	-356.423	30.881	2023.997	0.000	0.000	0.000	-793.679	-68.523	-4493.921	-4493.921
GROUP 2 WIND 5 2	1	0.000	-356.423	30.881	2023.997	0.000	0.000	0.000	793.679	68.523	4493.921	4493.921
GROUP 3 WIND 1 1	1	0.000	-589.832	36.778	2575.833	0.000	0.000	0.000	-29.975	-4.996	-299.754	-299.754
GROUP 3 WIND 1 2	1	0.000	-589.832	36.778	2575.833	0.000	0.000	0.000	29.975	4.996	299.754	299.754
GROUP 3 WIND 2 1	1	0.000	-520.710	32.641	2283.313	0.000	0.000	0.000	-168.219	-13.270	-884.794	-884.794
GROUP 3 WIND 2 2	1	0.000	-520.710	32.641	2283.313	0.000	0.000	0.000	168.219	13.270	884.794	884.794
GROUP 3 WIND 3 1	1	0.000	-486.149	30.572	2137.053	0.000	0.000	0.000	-306.463	-21.544	-1469.833	-1469.833
GROUP 3 WIND 3 2	1	0.000	-486.149	30.572	2137.053	0.000	0.000	0.000	306.463	21.544	1469.833	1469.833
GROUP 3 WIND 4 1	1	0.000	-393.987	25.056	1747.027	0.000	0.000	0.000	-398.625	-27.060	-1859.860	-1859.860
GROUP 3 WIND 4 2	1	0.000	-393.987	25.056	1747.027	0.000	0.000	0.000	398.625	27.060	1859.860	1859.860
GROUP 3 WIND 5 1	1	0.000	-209.662	14.024	966.974	0.000	0.000	0.000	-467.747	-31.197	-2152.379	-2152.379
GROUP 3 WIND 5 2	1	0.000	-209.662	14.024	966.974	0.000	0.000	0.000	467.747	31.197	2152.379	2152.379
LIVE LOAD LL 1	1	137.411	-1511.524	0.000	1511.524	137.411	1511.524	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 2	1	274.823	-1648.941	0.000	1648.941	274.823	1786.351	-137.410	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 3	1	137.411	1511.524	0.000	-1511.524	137.411	0.000	-1511.524	0.000	0.000	0.000	0.000
LIVE LOAD LL 4	1	274.823	1648.941	0.000	-1648.941	274.823	137.410	-1786.351	0.000	0.000	0.000	0.000
LIVE LOAD LL 5	1	137.411	0.000	0.000	0.000	137.411	206.115	-206.115	0.000	0.000	0.000	0.000
LIVE LOAD LL 6	1	274.822	-1374.107	0.000	1374.107	274.822	1580.222	-206.115	0.000	0.000	0.000	0.000
LIVE LOAD LL 7	1	274.823	0.000	0.000	0.000	274.823	687.057	-687.057	0.000	0.000	0.000	0.000
LIVE LOAD LL 8	1	274.822	0.000	0.000	0.000	274.822	1511.524	-1511.524	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	-33.476	-33.476	-33.476	-33.476	-33.476	-33.476	-33.476		-19.222	-364.499	-19.222	-364.499	-19.222	-534.968
P 2	-2749.772	-2749.772	-3943.056	-2749.772	-2749.772	-2749.772	-3464.313		-414.391	-803.127	-414.391	-803.127	-584.860	-1186.682
P 3	-5198.182	-5198.182	-7542.130	-5198.182	-5198.182	-5198.182	-6601.744		-829.661	-829.661	-829.661	-829.661	-1213.216	-1213.216
C 1L	-8591.707	-8591.707	-12469.875	-8591.707	-8591.707	-8591.707	-10913.963		-867.101		-867.101		-1250.656	
C 1R	-8591.707	-8591.707	-12469.875	-8591.707	-8591.707	-8591.707	-10913.963			867.101		1250.656		867.101
P 5	-5198.182	-5198.182	-7542.130	-5198.182	-5198.182	-5198.182	-6601.744		829.661	829.661	1213.216	1213.216	829.661	829.661
P 6	-2749.772	-2749.772	-3943.056	-2749.772	-2749.772	-2749.772	-3464.313		803.127	414.391	1186.682	584.860	803.127	414.391
P 7	-33.476	-33.476	-33.477	-33.476	-33.476	-33.476	-33.477		364.499	19.222	534.968	19.222	364.499	19.222

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	-25.751	-25.751	3.12	2 # 11	3.12	2 # 11	0.00	0.000	#5@ 0.00	24.00	0.060	#5@10.33	60.77		0.08	0.000	0.098
P 2	-2115.209	-2664.856	10.88	7 # 11	3.12	2 # 11	24.00	0.060	#5@10.33	24.00	0.141	#5@ 4.38	85.43		0.19	0.577	1.351
P 3	-3998.602	-5078.265	18.58	12 # 11	3.12	2 # 11	24.00	0.115	#5@ 5.40	24.00	0.115	#5@ 5.40	96.00		0.31	0.587	1.125
C 1	-6609.005	-8395.356	31.34	21 # 11	3.12	2 # 11	24.00	0.124	#5@ 5.02	24.00	0.124	#5@ 5.02	96.00		0.52	0.554	0.961
P 5	-3998.602	-5078.265	18.58	12 # 11	3.12	2 # 11	24.00	0.115	#5@ 5.40	24.00	0.115	#5@ 5.40	96.00		0.31	0.587	1.125
P 6	-2115.209	-2664.856	10.88	7 # 11	3.12	2 # 11	24.00	0.141	#5@ 4.38	24.00	0.060	#5@10.33	85.43		0.19	0.577	1.351
P 7	-25.751	-25.751	3.12	2 # 11	3.12	2 # 11	24.00	0.060	#5@10.33	0.00	0.000	#5@ 0.00	60.77		0.08	0.000	0.098

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					2719.6	-3579.9	0.0	2719.6	4429.8	2394.1	8579.9	13978.2	7554.3	3.155	72.00	96.00
1	B	2		4.1					2628.4	4544.1	-5124.8	2628.4	5367.2	6874.2	4336.0	8884.9	11379.6	1.655	72.00	96.00

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	15 # 11	15 # 11	8 # 11	8 # 11	71.76	1.038	1.00	0.000	2972.	15491.	1.237	1.467	1.000	2	0.70
1	B	15 # 11	15 # 11	8 # 11	8 # 11	71.76	1.038	1.00	0.000	2376.	15491.	1.181	1.341	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	2		3.1				2021.830	4231.202	63.641	-3206.385	-49.413	153.057	50.771	189.031	291.317	188.716	-0.763	39.609	MAX.P1
1	2		1.1				2628.379	6576.575	98.704	-1298.934	-21.649	135.783	94.071	308.932	350.643	260.247	-0.992	51.492	MAX.MT
1	2		3.1				2628.379	5500.562	82.733	-4168.300	-64.237	198.974	66.002	245.740	378.712	245.331	-0.992	51.492	MAX.VT
1	3	LL 2	3.1				2928.934	4581.504	39.744	-3848.429	-53.643	232.401	110.587	255.250	377.063	248.670	-0.992	57.108	MAX.VP
1	2		5.1				2628.379	2631.196	40.145	-5842.098	-89.080	272.422	86.216	172.292	358.499	308.720	60.157	51.492	MAX.ML
1	2		5.1				2628.379	2631.196	40.145	-5842.098	-89.080	272.422	86.216	172.292	358.499	308.720	60.157	51.492	MAX.VL
1	2		3.1				2021.830	4231.202	63.641	-3206.385	-49.413	153.057	50.771	189.031	291.317	188.716	-0.763	39.609	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
18.250	18.250	5.750	0.992	1.25	23 # 9	@ 9.500	TOP TRAN	290.645	63.130	126.259	52.308	0.000
				1.31	24 # 9	@ 9.125	BOT.LONG	309.684	64.491	128.982	53.436	0.000

NUMBER OF PILES = 14 BP = 2.625 DP = 2.625