06-NOV-09 GEORGIA DEPARTMENT OF TRANSPORTATION PROB. NO. 0001
13:29:48 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; 4 BEAMS; 170' SPAN; 90' TALL; BRIDGE 2B ; PIER 10

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	MIN SIZE	MIN NO.	TOP CL.	MIN S.SP	CAP DEPTH INCR.	BOT CL.
D D D L	2	1	6	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	COEF	R	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	16.39	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	9.333	0.667					
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	0	V	T		90.000	6.000	8.000	6.000	11.500	6.000	6.000	0.000	8	6	11	11	6	11	22	16	11	32	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	13.500	13.500	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
1792.	1792.	1	50	0	44	6	41	12	33	16	17	19	7.771	7.771	11.277	23.299

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	170.0	170.0	16.375	16.375

MISCELLANEOUS FORCES

CENTRI. FT	TRACTION FORCE AND ARMS FL	APT	APL	EXPANSION COEFFICIENT	SHRINKAGE COEFFICIENT	STREAM FLOW PT	PL
7.792	6.340	16.375	16.375	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	218.490	251.340	0.000	0.000	280.230	297.000						
LL01	1	20.120	62.760	0.000	0.000	80.560	127.420						
LL02	1	114.590	81.820	0.000	0.000	66.260	36.050						
LL03	2	36.210	100.340	0.000	0.000	124.410	163.450						
LL04	2	10.760	103.230	0.000	0.000	146.820	107.370						
LL05	2	85.840	144.580	0.000	0.000	101.520	13.940						
LL06	2	134.720	117.380	0.000	0.000	98.430	43.760						

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	90.000	0.000	0.000	0.000	6.000	1.000	90.000	90.000
DEAD LOAD TOTAL	1	1251.810 1988.910	1233.970	0.000	-1233.970	1988.910	5029.301	-6263.271	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	-141.857	-6.340	-674.418	-674.418
CENT. FORCE 1 LN	1	0.000	-174.346	7.792	828.874	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WIND ON SUBSTR.	1	0.000	-67.662	11.277	1014.930	0.000	0.000	0.000	-139.794	-23.299	-2096.910	-2096.910
GROUP 2 WIND 1 1	1	0.000	-1301.544	100.877	9775.211	0.000	0.000	0.000	-139.794	-23.299	-2096.910	-2096.910
GROUP 2 WIND 1 2	1	0.000	-1301.544	100.877	9775.211	0.000	0.000	0.000	139.794	23.299	2096.910	2096.910
GROUP 2 WIND 2 1	1	0.000	-1153.478	90.125	8723.978	0.000	0.000	0.000	-287.860	-34.051	-3148.144	-3148.144
GROUP 2 WIND 2 2	1	0.000	-1153.478	90.125	8723.978	0.000	0.000	0.000	287.860	34.051	3148.144	3148.144
GROUP 2 WIND 3 1	1	0.000	-1079.445	84.749	8198.361	0.000	0.000	0.000	-435.926	-44.803	-4199.377	-4199.377
GROUP 2 WIND 3 2	1	0.000	-1079.445	84.749	8198.361	0.000	0.000	0.000	435.926	44.803	4199.377	4199.377
GROUP 2 WIND 4 1	1	0.000	-882.024	70.413	6796.716	0.000	0.000	0.000	-534.636	-51.971	-4900.200	-4900.200
GROUP 2 WIND 4 2	1	0.000	-882.024	70.413	6796.716	0.000	0.000	0.000	534.636	51.971	4900.200	4900.200
GROUP 2 WIND 5 1	1	0.000	-487.182	41.741	3993.426	0.000	0.000	0.000	-608.669	-57.347	-5425.817	-5425.817

GROUP 2 WIND 5 2	1	0.000	-487.182	41.741	3993.426	0.000	0.000	0.000	608.669	57.347	5425.817	5425.817
GROUP 3 WIND 1 1	1	0.000	-770.838	47.263	4740.938	0.000	0.000	0.000	-41.938	-6.990	-629.073	-629.073
GROUP 3 WIND 1 2	1	0.000	-770.838	47.263	4740.938	0.000	0.000	0.000	41.938	6.990	629.073	629.073
GROUP 3 WIND 2 1	1	0.000	-680.773	41.997	4208.563	0.000	0.000	0.000	-132.003	-12.255	-1161.448	-1161.448
GROUP 3 WIND 2 2	1	0.000	-680.773	41.997	4208.563	0.000	0.000	0.000	132.003	12.255	1161.448	1161.448
GROUP 3 WIND 3 1	1	0.000	-635.741	39.365	3942.376	0.000	0.000	0.000	-222.068	-17.521	-1693.823	-1693.823
GROUP 3 WIND 3 2	1	0.000	-635.741	39.365	3942.376	0.000	0.000	0.000	222.068	17.521	1693.823	1693.823
GROUP 3 WIND 4 1	1	0.000	-515.655	32.344	3232.542	0.000	0.000	0.000	-282.111	-21.031	-2048.740	-2048.740
GROUP 3 WIND 4 2	1	0.000	-515.655	32.344	3232.542	0.000	0.000	0.000	282.111	21.031	2048.740	2048.740
GROUP 3 WIND 5 1	1	0.000	-275.482	18.302	1812.875	0.000	0.000	0.000	-327.143	-23.664	-2314.927	-2314.927
GROUP 3 WIND 5 2	1	0.000	-275.482	18.302	1812.875	0.000	0.000	0.000	327.143	23.664	2314.927	2314.927
LIVE LOAD LL01	1	290.860	1585.273	0.000	-1585.273	290.860	574.581	-2159.854	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 LL02	1	298.720	-1172.178	0.000	1172.178	298.720	1986.114	-813.935	0.000	0.000	0.000	0.000
LIVE LOAD LL03	1	424.410	1893.695	0.000	-1893.695	424.410	975.227	-2868.921	0.000	0.000	0.000	0.000
LIVE LOAD LL04	1	368.180	1555.974	0.000	-1555.974	368.180	632.414	-2188.389	0.000	0.000	0.000	0.000
LIVE LOAD LL05	1	345.880	-1207.561	0.000	1207.561	345.880	1876.515	-668.954	0.000	0.000	0.000	0.000
LIVE LOAD LL06	1	394.290	-1361.880	0.000	1361.880	394.290	2433.893	-1072.013	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	-303.259	-19.222	-303.259	-19.222	-595.736
P 2	-3168.384	-3168.384	-5898.073	-3168.384	-3168.384	-3168.384	-4802.929	-373.518	-700.260	-373.518	-700.260	-665.995	-1247.569
P 3	-3637.506	-3637.506	-6732.250	-3637.506	-3637.506	-3637.506	-5490.646	-706.427	-706.427	-706.427	-706.427	-1253.736	-1253.736
C 1L	-6538.091	-6538.091	-11822.072	-6538.091	-6538.091	-6538.091	-9702.151	-743.867		-743.867		-1291.176	
C 1R	-8142.252	-8142.252	-14370.680	-8142.252	-8142.252	-8142.252	-11871.850		883.486		1508.430		883.486
P 4	-4683.187	-4683.187	-8411.838	-4683.187	-4683.187	-4683.187	-6915.912	846.046	846.046	1470.990	1470.990	846.046	846.046
P 5	-4120.938	-4120.938	-7432.753	-4120.938	-4120.938	-4120.938	-6104.061	839.880	475.581	1464.824	830.431	839.880	475.581
P 6	-33.477	-33.477	-33.477	-33.477	-33.477	-33.477	-33.477	405.322	19.222	760.172	19.222	405.322	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	0.061	#5@10.10	60.77		0.08	0.000	0.098
P 2	-2437.219	-3694.561	14.85	10 # 11	3.12	2 # 11	24.00	0.060	#5@10.33	24.00	0.129	#5@ 4.81	93.65		0.25	0.708	1.066
P 3	-2798.082	-4223.574	16.54	11 # 11	3.12	2 # 11	24.00	0.123	#5@ 5.03	24.00	0.123	#5@ 5.03	96.00		0.27	0.719	1.048
C 1	-5029.301	-9132.192	36.45	24 # 11	3.12	2 # 11	24.00	0.133	#5@ 4.68	24.00	0.179	D#5@ 6.93	96.00		0.60	0.914	0.902
P 4	-3602.451	-5319.933	20.78	14 # 11	3.12	2 # 11	24.00	0.169	D#5@ 7.33	24.00	0.169	D#5@ 7.33	96.00		0.34	0.692	0.964
P 5	-3169.953	-4695.432	18.80	13 # 11	3.12	2 # 11	24.00	0.176	D#5@ 7.04	24.00	0.060	#5@10.33	93.65		0.32	0.668	0.962
P 6	-25.751	-25.752	3.12	2 # 11	3.12	2 # 11	24.00	0.118	#5@ 5.28	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	LL03	0.0			C		2548.7	5262.1	0.0	2548.7	7625.4	3809.4	5068.4	15164.3	7575.5	1.989	72.00	96.00
1	B	2		4.1	R				2585.6	-10439.9	6370.3	2585.6	13285.0	10915.7	3401.1	17411.7	14306.4	1.311	72.00	138.00

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	0.378	3028.	9770.	1.449	2.491	1.000	2	0.70
1	B	16 # 11	16 # 11	16 # 11	16 # 11	99.84	1.005	1.00	0.368	2106.	9836.	1.273	1.714	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

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1 2       3.1R            1988.910-9432.331 -84.749 4199.377  44.803 122.901  46.249 216.912 293.564 219.473  30.825  25.048  MAX.P1
1 2       1.1R            2585.583*********-131.140 2725.983  30.289 116.218  66.346 325.539 375.411 304.372  42.683  32.563  MAX.MT
1 2       1.1R            2585.583*********-131.140 2725.983  30.289 116.218  66.346 325.539 375.411 304.372  42.683  32.563  MAX.VT
1 2       1.1R            2585.583*********-131.140 2725.983  30.289 116.218  66.346 325.539 375.411 304.372  42.683  32.563  MAX.VP
1 2       4.1R            2585.583********* -91.537 6370.260  67.562 184.659  68.420 257.099 373.337 344.147  28.664  32.563  MAX.ML
1 2       4.1R            2585.583********* -91.537 6370.260  67.562 184.659  68.420 257.099 373.337 344.147  28.664  32.563  MAX.VL
1 5       3.1R  E         1988.910-9432.331 -84.749 4199.377  44.803 122.901  46.249 216.912 293.564 219.473  30.825  25.048  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
28.600  28.600   5.500  0.999  1.42  32 #10 @10.625  TOP TRAN 305.403  59.083 118.166  48.955  0.000
                               1.56  29 #11 @11.750  BOT.LONG 348.547  60.700 121.400  50.295  0.000
NUMBER OF PILES = 17  BP = 4.350  DP = 4.350
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