12-NOV-09 GEORGIA DEPARTMENT OF TRANSPORTATION PROB. NO. 0001
17:06:08 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
39' CURB-CURB; 5 BEAMS; 140' SPAN; 70' TALL; BRIDGE 17 ; PIER 25

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	12	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 MIN.P	REINFORCING STEEL 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	20.960	5.250	4.000	6.000	6.000	4.000	15.710	17.334	8.667	3.417					
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		70.000	0.000	10.500	6.000	10.500	6.000	6.000	0.000	10	6	11	10	6	11	29	16	11	29	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	12.500	12.500	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
1365.	2730.	1	50	0	44	6	41	12	33	16	17	19	7.375	7.375	8.876	22.954

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	292.679	343.608	0.000	515.412	0.000	343.608	292.679					
LL 1	1	89.856	47.555	0.000	0.000	0.000	0.000	0.000					
LL 2	2	89.856	116.285	0.000	68.682	0.000	0.000	0.000					
LL 3	3	89.856	116.285	0.000	116.277	0.000	89.816	0.000					
LL 4	1	0.000	0.000	0.000	0.000	0.000	47.555	89.856					
LL 5	2	0.000	0.000	0.000	68.682	0.000	116.285	89.856					
LL 6	3	0.000	89.816	0.000	116.277	0.000	116.285	89.856					
LL 7	1	0.000	23.781	0.000	89.848	0.000	23.781	0.000					
LL 8	2	34.349	113.630	0.000	103.062	0.000	23.781	0.000					
LL 9	3	34.349	113.630	0.000	116.277	0.000	113.630	34.349					
LL10	2	0.000	79.273	0.000	116.277	0.000	79.273	0.000					
LL11	2	89.856	47.555	0.000	0.000	0.000	47.555	89.856					
LL12	3	89.856	116.285	0.000	68.682	0.000	47.555	89.856					

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	70.000	0.000	0.000	0.000	6.000	1.000	70.000	70.000
DEAD LOAD TOTAL	1	2033.254 2638.054	0.000	0.000	0.000	2638.054	9188.281	-9188.281	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	-843.848	-843.848
WIND ON SUBSTR.	1	0.000	-53.256	8.876	621.320	0.000	0.000	0.000	-137.724	-22.954	-1606.780	-1606.780
GROUP 2 WIND 1 1	1	0.000	-966.100	77.126	5902.164	0.000	0.000	0.000	-137.724	-22.954	-1606.780	-1606.780
GROUP 2 WIND 1 2	1	0.000	-966.100	77.126	5902.164	0.000	0.000	0.000	137.724	22.954	1606.780	1606.780
GROUP 2 WIND 2 1	1	0.000	-856.558	68.936	5268.462	0.000	0.000	0.000	-356.807	-39.334	-2874.183	-2874.183
GROUP 2 WIND 2 2	1	0.000	-856.558	68.936	5268.462	0.000	0.000	0.000	356.807	39.334	2874.183	2874.183

GROUP 2 WIND 3 1	1	0.000	-801.788	64.841	4951.612	0.000	0.000	0.000	-575.889	-55.714	-4141.585	-4141.585
GROUP 2 WIND 3 2	1	0.000	-801.788	64.841	4951.612	0.000	0.000	0.000	575.889	55.714	4141.585	4141.585
GROUP 2 WIND 4 1	1	0.000	-655.733	53.921	4106.677	0.000	0.000	0.000	-721.944	-66.634	-4986.520	-4986.520
GROUP 2 WIND 4 2	1	0.000	-655.733	53.921	4106.677	0.000	0.000	0.000	721.944	66.634	4986.520	4986.520
GROUP 2 WIND 5 1	1	0.000	-363.623	32.081	2416.807	0.000	0.000	0.000	-831.485	-74.824	-5620.221	-5620.221
GROUP 2 WIND 5 2	1	0.000	-363.623	32.081	2416.807	0.000	0.000	0.000	831.485	74.824	5620.221	5620.221
GROUP 3 WIND 1 1	1	0.000	-591.992	37.138	2968.811	0.000	0.000	0.000	-41.317	-6.886	-482.034	-482.034
GROUP 3 WIND 1 2	1	0.000	-591.992	37.138	2968.811	0.000	0.000	0.000	41.317	6.886	482.034	482.034
GROUP 3 WIND 2 1	1	0.000	-522.870	33.001	2634.921	0.000	0.000	0.000	-179.561	-15.160	-1149.814	-1149.814
GROUP 3 WIND 2 2	1	0.000	-522.870	33.001	2634.921	0.000	0.000	0.000	179.561	15.160	1149.814	1149.814
GROUP 3 WIND 3 1	1	0.000	-488.309	30.932	2467.976	0.000	0.000	0.000	-317.804	-23.434	-1817.593	-1817.593
GROUP 3 WIND 3 2	1	0.000	-488.309	30.932	2467.976	0.000	0.000	0.000	317.804	23.434	1817.593	1817.593
GROUP 3 WIND 4 1	1	0.000	-396.147	25.416	2022.790	0.000	0.000	0.000	-409.967	-28.950	-2262.780	-2262.780
GROUP 3 WIND 4 2	1	0.000	-396.147	25.416	2022.790	0.000	0.000	0.000	409.967	28.950	2262.780	2262.780
GROUP 3 WIND 5 1	1	0.000	-211.822	14.384	1132.417	0.000	0.000	0.000	-479.089	-33.087	-2596.669	-2596.669
GROUP 3 WIND 5 2	1	0.000	-211.822	14.384	1132.417	0.000	0.000	0.000	479.089	33.087	2596.669	2596.669
LIVE LOAD LL 1	1	137.411	-1969.723	0.000	1969.723	137.411	1969.723	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 2	1	274.823	-2565.406	0.000	2565.406	274.823	2565.406	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 3	1	371.011	-1608.274	0.000	1608.274	371.011	2308.865	-700.592	0.000	0.000	0.000	0.000
LIVE LOAD LL 4	1	137.411	1969.723	0.000	-1969.723	137.411	0.000	-1969.723	0.000	0.000	0.000	0.000
LIVE LOAD LL 5	1	274.823	2565.406	0.000	-2565.406	274.823	0.000	-2565.406	0.000	0.000	0.000	0.000
LIVE LOAD LL 6	1	371.011	1608.274	0.000	-1608.274	371.011	700.592	-2308.865	0.000	0.000	0.000	0.000
LIVE LOAD LL 7	1	137.410	0.000	0.000	0.000	137.410	206.110	-206.110	0.000	0.000	0.000	0.000
LIVE LOAD LL 8	1	274.822	-1374.127	0.000	1374.127	274.822	1580.237	-206.110	0.000	0.000	0.000	0.000
LIVE LOAD LL 9	1	371.011	0.000	0.000	0.000	371.011	1422.213	-1422.213	0.000	0.000	0.000	0.000
LIVE LOAD LL10	1	274.823	0.000	0.000	0.000	274.823	687.059	-687.059	0.000	0.000	0.000	0.000
LIVE LOAD LL11	1	274.822	0.000	0.000	0.000	274.822	1969.723	-1969.723	0.000	0.000	0.000	0.000
LIVE LOAD LL12	1	371.011	-536.115	0.000	536.115	371.011	2308.865	-1772.751	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	-33.133	-33.133	-33.133	-33.133	-33.133	-33.133	-33.133		-18.928	-399.411	-18.928	-399.411	-18.928	-594.488
P 2	-3743.493	-3743.493	-5434.229	-3743.493	-3743.493	-3743.493	-4755.910		-460.523	-907.213	-460.523	-907.213	-655.600	-1354.745
P 3	-6894.123	-6894.123	-10114.075	-6894.123	-6894.123	-6894.123	-8822.237		-937.457	-937.457	-937.457	-937.457	-1384.989	-1384.989
C 1L	-11944.766	-11944.766	-17514.262	-11944.766	-11944.766	-11944.766	-15279.793		-986.597		-986.597		-1434.129	
C 1R	-11944.766	-11944.766	-17514.262	-11944.766	-11944.766	-11944.766	-15279.793			986.597		1434.129		986.597
P 5	-6894.123	-6894.123	-10114.075	-6894.123	-6894.123	-6894.123	-8822.237		937.457	937.457	1384.989	1384.989	937.457	937.457
P 6	-3743.493	-3743.493	-5434.229	-3743.493	-3743.493	-3743.493	-4755.910		907.213	460.523	1354.745	655.600	907.213	460.523
P 7	-33.133	-33.133	-33.133	-33.133	-33.133	-33.133	-33.133		399.411	18.928	594.488	18.928	399.411	18.928

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	-25.487	-25.487	3.12	2 # 11	3.12	2 # 11	0.00	0.000	#5@ 0.00	24.00	0.067	#5@ 9.24	59.08		0.08	0.000	0.099
P 2	-2879.610	-3658.392	15.06	10 # 11	3.12	2 # 11	24.00	0.060	#5@10.33	24.00	0.181	D#5@ 6.85	85.56		0.28	0.560	1.162
P 3	-5303.171	-6786.337	25.14	17 # 11	3.12	2 # 11	24.00	0.151	#5@ 4.10	24.00	0.151	#5@ 4.10	96.00		0.41	0.555	0.972
C 1	-9188.281	-11753.688	45.11	29 # 11	3.12	2 # 11	24.00	0.164	D#5@ 7.58	24.00	0.164	D#5@ 7.58	96.00		0.73	0.595	0.937
P 5	-5303.171	-6786.337	25.14	17 # 11	3.12	2 # 11	24.00	0.151	#5@ 4.10	24.00	0.151	#5@ 4.10	96.00		0.41	0.555	0.972
P 6	-2879.610	-3658.392	15.06	10 # 11	3.12	2 # 11	24.00	0.181	D#5@ 6.85	24.00	0.060	#5@10.33	85.56		0.28	0.560	1.162
P 7	-25.487	-25.487	3.12	2 # 11	3.12	2 # 11	24.00	0.067	#5@ 9.24	0.00	0.000	#5@ 0.00	59.08		0.08	0.000	0.099

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					3239.9	-5569.5	0.0	3239.9	6518.0	3309.9	11005.0	22143.2	11244.4	3.397	72.00	126.00
1	B	2		5.1					3429.5	3141.8	-7306.3	3429.5	4099.5	11153.1	5576.2	6670.1	18146.5	1.627	72.00	126.00

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	14 # 11	14 # 11	93.60	1.032	1.00	0.000	3633.	24965.	1.170	1.703	1.000	2	0.70
1	B	16 # 11	16 # 11	14 # 11	14 # 11	93.60	1.032	1.00	0.000	3036.	24965.	1.138	1.527	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				2638.054	4951.612	64.841	-4141.585	-55.714	149.768	42.287	181.945	289.425	118.503	0.000	37.336	MAX.P1
1	2		1.1				3429.470	7672.812	100.264	-2088.814	-29.840	134.650	80.201	296.577	351.026	163.373	0.000	48.537	MAX.MT
1	2		4.1				3429.470	5338.680	70.097	-6482.476	-86.624	224.387	56.237	206.840	374.990	145.771	0.000	48.537	MAX.VT
1	3	LL 2	3.1				3730.025	6013.979	40.212	-4556.877	-56.100	209.175	91.638	255.446	372.984	158.242	0.000	52.660	MAX.VP
1	2		5.1				3429.470	3141.849	41.705	-7306.287	-97.271	265.998	76.529	165.228	354.697	378.245	55.245	48.537	MAX.ML
1	2		5.1				3429.470	3141.849	41.705	-7306.287	-97.271	265.998	76.529	165.228	354.697	378.245	55.245	48.537	MAX.VL
1	2		3.1				2638.054	4951.612	64.841	-4141.585	-55.714	149.768	42.287	181.945	289.425	118.503	0.000	37.336	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
17.750	17.750	5.750	0.985	0.94	28 # 7	@ 7.500	TOP TRAN	218.738	62.942	125.884	52.153	0.000
				1.62	19 #11	@11.125	BOT.LONG	389.934	64.321	128.641	53.295	0.000

NUMBER OF PILES = 18 BP = 2.542 DP = 3.812