21-AUG-09 GEORGIA DEPARTMENT OF TRANSPORTATION PROB. NO. 0001
14:21:00 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
I75/I575 NW CORRIDOR - BRIDGE NO.30 WIDENING - BENT 2 HAMMER HEAD

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	21-03-41	3500.	1400.	9.	60000.	24000.	3409.	29000.	0.0030	170.	11	5	14	14	11	4	2.00	4.00	3.00	2.00

COLUMN REINFORCING STEEL MIN.P	MAX.P	CL.SP.	R CLEAR	KL MODE	OC COEF	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	2.25	2.500	1	2.00	0.00	0.90	1.00	1.00	0.00 27.50	0.120	0.000	2.50	5.00	1.250	1.000	3.000	192.000	0.000	

CAP DATA

CN	C	L	A	DE	BC	BE	DH	LH	XB1	XB2	XB3	XB4	XB5	XB6	XB7	XB8
11	C	14.000	0.000	4.000	5.000	0.000	1.000	11.000	12.132	8.004	1.127					
12	C	14.000	0.000	4.000	5.000	0.000	1.000	11.000	3.000	1.006	8.069					

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	C	T		13.000	0.000	6.000	4.000	0.000	0.000	0.000	0.000	2	4	11	0	0	0	99	99	11	0	0	0	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	5.000	5.000	3.250	0.250	0.250	0.250	1.000	1.000	3.000	0	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
380.	190.	1	50	0	44	6	41	12	33	16	17	19	6.167	2.833	1.640	6.560

GROUP III WIND

STD. * WIND FT1	WIND ON SUPERSTRUCTURE INTENSITIES FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	* STD. * WIND FT1	WIND ON LIVE LOAD INTENSITIES 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	57.0	57.0	12.833	12.833

MISCELLANEOUS FORCES

CENTRI. FT	TRACTION FORCE AND ARMS FL	APT	APL	EXPANSION COEFFICIENT	SHRINKAGE COEFFICIENT	STREAM FLOW PT	PL
0.000	2.724	0.000	2.833	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	68.838	68.838	0.000	0.000	68.838	68.838						
LL 1	1	46.590	33.279	0.000	0.000	0.000	0.000						
LL 2	2	46.590	59.236	0.000	0.000	47.922	5.990						
LL 3	1	0.000	0.000	0.000	0.000	1.331	78.538						
LL 4	2	0.000	14.642	0.000	0.000	49.253	95.844						
LL 5	1	15.974	47.922	0.000	0.000	15.974	0.000						
LL 6	2	15.974	50.584	0.000	0.000	63.896	29.285						
LL 7	2	22.257	56.867	0.000	0.000	57.612	23.002						
LL 8	2	46.590	33.279	0.000	0.000	1.331	78.538						

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	0.000	1.000	13.000	0.000	0.000	0.000	0.000	1.000	13.000	13.000
DEAD LOAD TOTAL	1	293.352 340.152	-12.322	0.000	12.322	340.152	1231.806	-1219.484	0.000	0.000	0.000	0.000
TRAC. FORCE 1 LN	1	0.000	0.000	0.979	12.726	0.000	0.000	0.000	-7.202	-2.542	-40.248	-40.248
WIND ON SUBSTR.	1	0.000	0.000	1.640	21.320	0.000	0.000	0.000	0.000	-6.560	-85.280	-85.280
GROUP 2 WIND 1 1	1	0.000	-109.345	19.371	361.165	0.000	0.000	0.000	19.344	0.268	22.828	22.828
GROUP 2 WIND 1 2	1	0.000	-109.345	19.371	361.165	0.000	0.000	0.000	19.344	13.388	193.388	193.388
GROUP 2 WIND 2 1	1	0.000	-98.750	17.653	328.236	0.000	0.000	0.000	14.009	-1.615	-6.989	-6.989
GROUP 2 WIND 2 2	1	0.000	-93.697	16.833	312.531	0.000	0.000	0.000	20.036	13.632	197.259	197.259
GROUP 2 WIND 3 1	1	0.000	-94.716	16.999	315.697	0.000	0.000	0.000	9.834	-3.089	-30.319	-30.319
GROUP 2 WIND 3 2	1	0.000	-84.610	15.360	284.288	0.000	0.000	0.000	21.890	14.287	207.616	207.616
GROUP 2 WIND 4 1	1	0.000	-78.905	14.435	266.557	0.000	0.000	0.000	4.730	-4.890	-58.846	-58.846
GROUP 2 WIND 4 2	1	0.000	-65.431	12.250	224.678	0.000	0.000	0.000	20.804	13.903	201.548	201.548

GROUP 2 WIND 5 1	1	0.000	-45.178	8.966	161.733	0.000	0.000	0.000	-2.967	-7.607	-101.862	-101.862
GROUP 2 WIND 5 2	1	0.000	-29.177	6.371	112.002	0.000	0.000	0.000	16.121	12.250	175.375	175.375
GROUP 3 WIND 1 1	1	0.000	-101.065	11.130	245.761	0.000	0.000	0.000	32.090	2.129	59.765	59.765
GROUP 3 WIND 1 2	1	0.000	-101.065	11.130	245.761	0.000	0.000	0.000	32.090	6.065	110.933	110.933
GROUP 3 WIND 2 1	1	0.000	-92.850	10.223	225.743	0.000	0.000	0.000	19.144	0.680	27.980	27.980
GROUP 3 WIND 2 2	1	0.000	-85.025	9.485	208.331	0.000	0.000	0.000	37.335	6.531	122.233	122.233
GROUP 3 WIND 3 1	1	0.000	-90.698	9.953	220.086	0.000	0.000	0.000	8.123	-0.524	1.317	1.317
GROUP 3 WIND 3 2	1	0.000	-75.049	8.478	185.264	0.000	0.000	0.000	44.505	7.242	138.655	138.655
GROUP 3 WIND 4 1	1	0.000	-77.136	8.497	187.592	0.000	0.000	0.000	-3.075	-1.817	-26.701	-26.701
GROUP 3 WIND 4 2	1	0.000	-56.270	6.530	141.162	0.000	0.000	0.000	45.434	7.225	139.361	139.361
GROUP 3 WIND 5 1	1	0.000	-46.751	5.277	115.348	0.000	0.000	0.000	-17.892	-3.607	-64.783	-64.783
GROUP 3 WIND 5 2	1	0.000	-21.973	2.941	60.212	0.000	0.000	0.000	39.713	6.393	122.820	122.820
LIVE LOAD LL 1	1	79.869	-702.606	0.000	702.606	79.869	702.606	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 2	1	159.738	-545.451	0.000	545.451	159.738	809.756	-264.305	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	79.869	953.678	0.000	-953.678	79.869	0.000	-953.678	0.000	0.000	0.000	0.000
LIVE LOAD LL 4	1	159.739	1294.182	0.000	-1294.182	159.739	60.442	-1354.624	0.000	0.000	0.000	0.000
LIVE LOAD LL 5	1	79.870	-327.627	0.000	327.627	79.870	391.619	-63.992	0.000	0.000	0.000	0.000
LIVE LOAD LL 6	1	159.739	206.976	0.000	-206.976	159.739	402.607	-609.584	0.000	0.000	0.000	0.000
LIVE LOAD LL 7	1	159.738	3.774	0.000	-3.774	159.738	504.769	-508.543	0.000	0.000	0.000	0.000
LIVE LOAD LL 8	1	159.738	251.073	0.000	-251.073	159.738	702.606	-953.678	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	-6.804	-6.804	-6.804	-6.804	-6.804	-6.804	-6.804	-7.285	-96.775	-7.285	-96.775	-7.285	-197.921
P 2	-855.761	-855.761	-1665.341	-855.761	-855.761	-855.761	-1340.540	-81.065	-170.555	-81.065	-170.555	-182.212	-400.303
P 3	-1051.073	-1051.073	-2119.579	-1051.073	-1051.073	-1051.073	-1690.896	-176.049	-176.049	-176.049	-176.049	-405.797	-405.797
C 1L	-1601.348	-1601.348	-3359.328	-1601.348	-1601.348	-1601.348	-2654.031	-190.679		-190.679		-420.427	
C 1R	-1585.329	-1585.329	-4526.217	-1585.329	-1585.329	-1585.329	-3346.340		190.679		505.684		190.679
P 4	-1035.230	-1035.230	-3031.102	-1035.230	-1035.230	-1035.230	-2230.363	176.054	176.054	491.059	491.059	176.054	176.054
P 5	-860.587	-860.587	-2539.563	-860.587	-860.587	-860.587	-1865.962	171.150	81.660	486.155	289.737	171.150	81.660
P 6	-7.226	-7.226	-7.226	-7.226	-7.226	-7.226	-7.226	96.997	7.507	305.074	7.508	96.997	7.507

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	-5.234	-5.234	6.24	4 # 11	6.24	4 # 11	0.00	0.000	#5@ 0.00	22.33	0.050	#5@12.40	48.00		0.23	0.000	0.010
P 2	-658.278	-1031.184	6.66	5 # 11	6.24	4 # 11	24.00	0.050	#5@12.40	24.00	0.050	#5@12.40	60.00		0.20	0.629	1.123
P 3	-808.517	-1300.690	8.53	6 # 11	6.24	4 # 11	24.00	0.050	#5@12.40	24.00	0.050	#5@12.40	60.00		0.25	0.702	1.117
C 1	-1219.484	-2574.108	18.63	12 # 11	6.24	4 # 11	24.00	0.050	#5@12.40	24.00	0.057	#5@10.95	60.00		0.66	0.908	0.897
P 4	-796.331	-1715.664	12.34	8 # 11	6.24	4 # 11	24.00	0.052	#5@12.02	24.00	0.052	#5@12.02	60.00		0.45	0.903	1.012
P 5	-661.990	-1435.355	10.27	7 # 11	6.24	4 # 11	24.00	0.050	#5@12.40	24.00	0.050	#5@12.40	60.00		0.35	0.853	1.008
P 6	-5.558	-5.558	6.24	4 # 11	6.24	4 # 11	22.33	0.050	#5@12.40	0.00	0.000	#5@ 0.00	48.00		0.23	0.000	0.010

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	4	0.0				728.2	2793.6	0.0	728.2	2793.6	298.0	1842.5	7071.8	754.4	2.531	48.00	72.00
1	B	1	LL	4	0.0				789.0	-2793.6	0.0	789.0	2793.6	322.9	2020.0	7183.7	830.3	2.571	48.00	72.00

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	7 # 11	7 # 11	5 # 11	5 # 11	37.44	1.083	1.00	0.000	759.	77115.	1.000	1.023	1.000	1	0.70
1	B	7 # 11	7 # 11	5 # 11	5 # 11	37.44	1.083	1.00	0.000	759.	77115.	1.000	1.023	1.000	1	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 4	0.0				465.438	-1002.722	0.000	0.000	0.000	35.034	35.034	178.280	178.280	17.469	0.000	14.007	MAX.P1
1	1	LL 4	0.0				714.192	-2187.643	0.000	0.000	0.000	4.218	4.218	316.739	316.739	31.654	0.000	21.341	MAX.MT
1	1	LL 4	0.0				714.192	-2187.643	0.000	0.000	0.000	4.218	4.218	316.739	316.739	31.654	0.000	21.341	MAX.VT
1	1	LL 4	0.0				714.192	-2187.643	0.000	0.000	0.000	4.218	4.218	316.739	316.739	31.654	0.000	21.341	MAX.VP
1	3	LL 4	4.2R				605.069	-1453.962	-5.944	-285.813	-16.002	57.550	9.290	219.758	268.018	47.239	0.210	18.209	MAX.ML
1	3	LL 4	4.2R				605.069	-1453.962	-5.944	-285.813	-16.002	57.550	9.290	219.758	268.018	47.239	0.210	18.209	MAX.VL
1	3	LL 4	1.2R				465.437	-1223.031	-9.173	-191.428	-11.149	33.430	0.906	179.884	212.407	19.349	0.000	14.007	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
9.500	9.500	3.250	0.929	0.41	20 # 4 @	5.625	TOP TRAN	43.145	27.909	55.818	23.125	0.000
				0.60	19 # 5 @	6.000	BOT.LONG	64.635	28.588	57.176	23.688	0.000

NUMBER OF PILES = 5 BP = 3.500 DP = 3.500