21-AUG-09 GEORGIA DEPARTMENT OF TRANSPORTATION PROB. NO. 0001
14:20:47 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 3 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 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	2.25	2.500	1	2.00	0.00	0.90	1.00	1.00	0.00	23.40	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		21.000	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	WIND ON SUPERSTRUCTURE INTENSITIES FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	* WIND FORCE ARM APT	APL	* WIND ON PIER PT	PL
593.	297.	1	50	0	44	6	41	12	33	16	17	19	6.167	2.833	2.264	7.497

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	89.0	89.0	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	3.748	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	175.998	175.998	0.000	0.000	175.998	175.998						
LL 1	1	69.967	49.976	0.000	0.000	0.000	0.000						
LL 2	2	69.967	88.958	0.000	0.000	71.966	8.995						
LL 3	1	0.000	0.000	0.000	0.000	1.999	117.944						
LL 4	2	0.000	21.989	0.000	0.000	73.965	143.932						
LL 5	1	23.988	71.966	0.000	0.000	23.988	0.000						
LL 6	2	23.988	75.964	0.000	0.000	95.955	43.979						
LL 7	2	33.424	85.400	0.000	0.000	86.519	34.543						
LL 8	2	69.967	49.976	0.000	0.000	1.999	117.944						

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	21.000	0.000	0.000	0.000	0.000	1.000	21.000	21.000
DEAD LOAD TOTAL	1	721.992 797.592	-31.504	0.000	31.504	797.592	2974.228	-2942.724	0.000	0.000	0.000	0.000
TRAC. FORCE 1 LN	1	0.000	0.000	1.347	28.285	0.000	0.000	0.000	-9.909	-3.498	-83.359	-83.359
WIND ON SUBSTR.	1	0.000	0.000	2.264	47.544	0.000	0.000	0.000	0.000	-7.497	-157.437	-157.437
GROUP 2 WIND 1 1	1	0.000	-170.636	29.933	799.235	0.000	0.000	0.000	30.186	3.158	96.510	96.510
GROUP 2 WIND 1 2	1	0.000	-170.636	29.933	799.235	0.000	0.000	0.000	30.186	18.152	411.384	411.384
GROUP 2 WIND 2 1	1	0.000	-154.109	27.253	726.429	0.000	0.000	0.000	21.853	0.217	26.403	26.403
GROUP 2 WIND 2 2	1	0.000	-146.211	25.973	691.634	0.000	0.000	0.000	31.275	18.537	420.543	420.543
GROUP 2 WIND 3 1	1	0.000	-147.820	26.234	698.726	0.000	0.000	0.000	15.331	-2.086	-28.467	-28.467
GROUP 2 WIND 3 2	1	0.000	-132.023	23.672	629.135	0.000	0.000	0.000	34.175	19.560	444.940	444.940
GROUP 2 WIND 4 1	1	0.000	-123.151	22.233	590.053	0.000	0.000	0.000	7.360	-4.899	-95.521	-95.521
GROUP 2 WIND 4 2	1	0.000	-102.088	18.818	497.266	0.000	0.000	0.000	32.486	18.964	430.730	430.730

GROUP 2 WIND 5 1	1	0.000	-70.522	13.699	358.211	0.000	0.000	0.000	-4.655	-9.140	-196.600	-196.600
GROUP 2 WIND 5 2	1	0.000	-45.510	9.644	248.027	0.000	0.000	0.000	25.182	16.386	369.284	369.284
GROUP 3 WIND 1 1	1	0.000	-157.775	17.285	520.768	0.000	0.000	0.000	50.101	4.146	137.164	137.164
GROUP 3 WIND 1 2	1	0.000	-157.775	17.285	520.768	0.000	0.000	0.000	50.101	8.644	231.626	231.626
GROUP 3 WIND 2 1	1	0.000	-144.952	15.869	478.192	0.000	0.000	0.000	29.885	1.883	69.426	69.426
GROUP 3 WIND 2 2	1	0.000	-132.732	14.717	441.783	0.000	0.000	0.000	58.292	9.372	255.108	255.108
GROUP 3 WIND 3 1	1	0.000	-141.596	15.448	466.007	0.000	0.000	0.000	12.676	0.004	12.753	12.753
GROUP 3 WIND 3 2	1	0.000	-117.155	13.144	393.188	0.000	0.000	0.000	69.489	10.484	289.654	289.654
GROUP 3 WIND 4 1	1	0.000	-120.425	13.175	397.102	0.000	0.000	0.000	-4.809	-2.017	-47.157	-47.157
GROUP 3 WIND 4 2	1	0.000	-87.838	10.104	300.011	0.000	0.000	0.000	70.942	10.458	290.558	290.558
GROUP 3 WIND 5 1	1	0.000	-72.992	8.149	244.123	0.000	0.000	0.000	-27.943	-4.811	-128.968	-128.968
GROUP 3 WIND 5 2	1	0.000	-34.295	4.502	128.827	0.000	0.000	0.000	62.012	9.159	254.356	254.356
LIVE LOAD LL 1	1	119.943	-1055.141	0.000	1055.141	119.943	1055.141	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 2	1	239.886	-819.148	0.000	819.148	239.886	1216.058	-396.910	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	119.943	1432.182	0.000	-1432.182	119.943	0.000	-1432.182	0.000	0.000	0.000	0.000
LIVE LOAD LL 4	1	239.886	1943.512	0.000	-1943.512	239.886	90.771	-2034.283	0.000	0.000	0.000	0.000
LIVE LOAD LL 5	1	119.942	-492.002	0.000	492.002	119.942	588.098	-96.096	0.000	0.000	0.000	0.000
LIVE LOAD LL 6	1	239.886	310.840	0.000	-310.840	239.886	604.602	-915.442	0.000	0.000	0.000	0.000
LIVE LOAD LL 7	1	239.886	5.671	0.000	-5.671	239.886	758.031	-763.702	0.000	0.000	0.000	0.000
LIVE LOAD LL 8	1	239.886	377.041	0.000	-377.041	239.886	1055.141	-1432.182	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	-236.083	-7.285	-236.083	-7.285	-387.981
P 2	-1970.783	-1970.783	-3186.577	-1970.783	-1970.783	-1970.783	-2698.803		-220.373	-449.171	-220.373	-449.171	-372.272	-794.197
P 3	-2480.094	-2480.094	-4084.733	-2480.094	-2480.094	-2480.094	-3440.956		-454.665	-454.665	-454.665	-454.665	-799.691	-799.691
C 1L	-3866.496	-3866.496	-6506.558	-3866.496	-3866.496	-3866.496	-5447.372		-469.295		-469.295		-814.321	
C 1R	-3825.541	-3825.541	-8241.969	-3825.541	-3825.541	-3825.541	-6470.109			469.295		942.349		469.295
P 4	-2439.594	-2439.594	-5436.859	-2439.594	-2439.594	-2439.594	-4234.363		454.670	454.670	927.724	927.724	454.670	454.670
P 5	-1984.663	-1984.663	-4506.035	-1984.663	-1984.663	-1984.663	-3494.467		449.766	220.968	922.820	533.444	449.766	220.968
P 6	-7.226	-7.226	-7.226	-7.226	-7.226	-7.226	-7.226		236.305	7.507	548.781	7.508	236.305	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	0.052	#5@11.93	48.00		0.23	0.000	0.010
P 2	-1515.987	-2076.002	13.00	9 # 11	6.24	4 # 11	24.00	0.050	#5@12.40	24.00	0.156	D#5@ 7.92	60.00		0.48	0.600	1.051
P 3	-1907.765	-2646.889	16.75	11 # 11	6.24	4 # 11	24.00	0.158	D#5@ 7.83	24.00	0.158	D#5@ 7.83	60.00		0.59	0.666	1.032
C 1	-2942.724	-4977.007	35.65	23 # 11	6.24	4 # 11	24.00	0.166	D#5@ 7.46	24.00	0.211	D#5@ 5.88	60.00		1.24	0.807	0.838
P 4	-1876.611	-3257.203	22.58	15 # 11	6.24	4 # 11	24.00	0.203	D#5@ 6.10	24.00	0.203	D#5@ 6.10	60.00		0.81	0.802	0.868
P 5	-1526.664	-2688.051	18.54	12 # 11	6.24	4 # 11	24.00	0.201	D#5@ 6.17	24.00	0.066	#5@ 9.36	60.00		0.66	0.836	0.937
P 6	-5.558	-5.558	6.24	4 # 11	6.24	4 # 11	22.33	0.123	#5@ 5.06	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				1459.4	4178.4	0.0	1459.4	4379.9	652.8	2421.9	7238.4	1078.9	1.653	48.00	72.00
1	B	1	LL	4	0.0				1557.7	-4178.4	0.0	1557.7	4379.9	696.8	2589.5	7252.0	1153.7	1.656	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	1509.	32799.	1.048	1.118	1.000	1	0.70
1	B	7 # 11	7 # 11	5 # 11	5 # 11	37.44	1.083	1.00	0.000	1509.	32799.	1.048	1.118	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			991.989	-1543.466	0.000	0.000	0.000	50.079	50.079	187.276	187.276	40.442	-0.026	26.213	MAX.P1
1	1	LL	4	0.0			1458.906	-3378.303	0.000	0.000	0.000	22.948	22.948	323.241	323.241	70.526	-0.034	38.484	MAX.MT
1	3	LL	4	1.1R			1289.586	-2757.045	-25.973	38.420	3.704	30.237	25.751	278.325	282.811	60.924	-0.034	34.076	MAX.VT
1	1	LL	4	0.0			1458.906	-3378.303	0.000	0.000	0.000	22.948	22.948	323.241	323.241	70.526	-0.034	38.484	MAX.VP
1	3	LL	4	4.2R			1289.586	-2322.979	-9.633	-594.458	-22.689	79.344	19.948	229.218	288.614	91.631	14.387	34.076	MAX.ML
1	3	LL	4	4.2R			1289.586	-2322.979	-9.633	-594.458	-22.689	79.344	19.948	229.218	288.614	91.631	14.387	34.076	MAX.VL
1	3	LL	4	1.2R			991.989	-2007.664	-14.592	-398.343	-15.639	47.304	7.377	190.052	229.978	45.558	-0.026	26.213	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
10.000	10.000	3.250	0.975	0.71	23 # 5 @	5.125	TOP TRAN	71.271	27.532	55.064	22.812	0.000
				0.89	15 # 7 @	8.000	BOT.LONG	92.365	28.437	56.874	23.562	0.000

NUMBER OF PILES = 9 BP = 3.750 DP = 3.750