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1                     THE ANALYSIS AND DESIGN OF PIERS FOR BRIDGES - V 4.2.07 - AASHTO SPECS 1984 INTERIM
0PROBLEM NO. 0001 INPUT DATA          I75/I575 NW CORRIDOR - BRIDGE NO.5 RT WIDENING - BENT 3 HAMMER HEAD
0                                                          DESIGN DATA
  DESIGN NO. NO. NO. SKEW ANG  F'C    FC     N    FY      FS      EC     ES     CONC.   Z    *  *  * CAP REINFORCING STEEL  *  *  *  CAP
 OPTIONS CAN COL LLC  D  M  S  PSI    PSI         PSI     PSI     KSI    KSI    STRAIN FACT MAIN STR MAX  MAX  MIN  MIN  TOP   MIN DEPTH BOT
                                                                                          SIZE SIZ TOP  BOT SIZE  NO.  CL.  S.SP INCR. CL.
 D D D L  2   1   4   0-00-00 3500. 1400.  9. 60000. 24000. 3409. 29000. 0.0030 170.  11    5   9    9   11    2  2.00  4.00 3.00 2.00
0COLUMN REINFORCING STEEL   R   KL   OC   OF   CM  BD1  BD2 IMPACT SOIL WT ALL.S.P.  MIN   MAX  EDGE  PILE  REBAR ALL.PILE ALL.PILE I
 MIN.P MAX.P CL.SP. CLEAR MODE COEF                          %      KCF      KSF    PL SP PL SP DIST  DEPTH CLEAR CAPACITY  UPLIFT  P
  1.00  8.00  2.25  2.500   1  2.00 0.00 0.90 1.00 1.00 0.00 24.20  0.120    0.000  2.50  5.00  1.250 1.000 3.000 192.000    0.000
0                                                        CAP DATA
0CN  C     L       A      DE      BC      BE      DH      LH      XB1      XB2      XB3      XB4      XB5      XB6      XB7      XB8
011  C   4.250   0.000   3.000   3.000   0.000   0.000   0.000   2.343   0.844
012  2 SAME AS CANTILEVER  1
0                                                      COLUMN DATA
0CN 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
021 0 C T   25.000  0.000  3.000  3.000  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
0                                                    FOOTING DATA
0CN S/P    B       D       T      DEL.B   DEL.D   DEL.T  R.B/D  R.D/B   S.HT.  NP  SYM.   BP      DP      SET.
031  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
1                                                   GROUP II WIND
 SUPERSTRUCTURE AREA*STD.        WIND ON SUPERSTRUCTURE INTENSITIES       * WIND FORCE ARM  * WIND ON PIER
   TRANS.      LONG.  WIND FT1 FL1    FT2 FL2    FT3 FL3    FT4 FL4    FT5 FL5     APT      APL       PT       PL
0     46.         23.   1    50   0     44   6     41  12     33  16     17  19     5.167    1.833    1.596    2.256
0                                                       GROUP III WIND
 STD. *   WIND ON SUPERSTRUCTURE INTENSITIES     *  STD. *      WIND ON LIVE LOAD INTENSITIES      *  LENGTHS OF LL * WIND ON LL ARMS
 WIND FT1 FL1   FT2 FL2   FT3 FL3   FT4 FL4   FT5 FL5   WIND FT1 FL1   FT2 FL2   FT3 FL3   FT4 FL4   FT5 FL5    TRANS.  LONGI.   APT      APL
0  1   50   0    44   6    41  12    33  16    17  19    1   100   0    88  12    82  24    66  32    34  38     82.0    82.0  11.833  11.833
0                                  MISCELLANEOUS FORCES
 CENTRI.  TRACTION FORCE AND ARMS    EXPANSION    SHRINKAGE      STREAM FLOW
   FT         FL       APT     APL    COEFFICIENT COEFFICIENT     PT        PL
0 0.000     3.524    0.000   1.833    0.00018000  0.00044000    0.000    0.000
0                                      DEAD LOAD SUPERSTRUCTURE AND LIVE LOAD CASES
0I.D.  NL     P1        P2        P3       P4       P5       P6       P7       P8       P9      P10      P11      P12
0D.L.   0   89.203    0.000    0.000   89.659
0LL 1   1   37.014    0.000    0.000   35.017
0LL 2   1    0.000    0.000    0.000   29.815
0LL 3   1   31.209    0.000    0.000   35.017
0LL 4   2   48.718    0.000    0.000   40.218
1                                           COLUMN MOMENTS(KIP-FEET), SHEARS(KIPS), REACTIONS(KIPS)
0                                                   TRANSVERSE                           *                     LONGITUDINAL
0       LOAD          COL      PC         MT         V         MB         RF         ML         MR         MT         V         MB         MF
0UNIT F.AT CL.CAP      1     0.000      0.000     1.000     25.000      0.000      0.000      0.000      0.000     1.000     25.000     25.000
0DEAD LOAD TOTAL       1   190.337      1.068     0.000     -1.068    224.087    221.195   -222.263      0.000     0.000      0.000      0.000
                           224.087
0TRAC. FORCE 1 LN      1     0.000      0.000     0.000      0.000      0.000      0.000      0.000     -6.459    -3.524    -94.559    -94.559
0WIND ON SUBSTR.       1     0.000      0.000     1.596     39.900      0.000      0.000      0.000      0.000    -2.256    -56.400    -56.400
0GROUP 2 WIND 1 1      1     0.000    -11.884     3.896    109.284      0.000      0.000      0.000      0.000    -2.256    -56.400    -56.400
0GROUP 2 WIND 1 2      1     0.000    -11.884     3.896    109.284      0.000      0.000      0.000      0.000     2.256     56.400     56.400
0GROUP 2 WIND 2 1      1     0.000    -10.458     3.620    100.958      0.000      0.000      0.000     -0.253    -2.394    -60.103    -60.103
0GROUP 2 WIND 2 2      1     0.000    -10.458     3.620    100.958      0.000      0.000      0.000      0.253     2.394     60.103     60.103
0GROUP 2 WIND 3 1      1     0.000     -9.745     3.482     96.795      0.000      0.000      0.000     -0.506    -2.532    -63.806    -63.806
0GROUP 2 WIND 3 2      1     0.000     -9.745     3.482     96.795      0.000      0.000      0.000      0.506     2.532     63.806     63.806
0GROUP 2 WIND 4 1      1     0.000     -7.844     3.114     85.694      0.000      0.000      0.000     -0.675    -2.624    -66.275    -66.275
0GROUP 2 WIND 4 2      1     0.000     -7.844     3.114     85.694      0.000      0.000      0.000      0.675     2.624     66.275     66.275
0GROUP 2 WIND 5 1      1     0.000     -4.041     2.378     63.491      0.000      0.000      0.000     -0.801    -2.693    -68.126    -68.126
0GROUP 2 WIND 5 2      1     0.000     -4.041     2.378     63.491      0.000      0.000      0.000      0.801     2.693     68.126     68.126
0GROUP 3 WIND 1 1      1     0.000   -100.596     9.369    334.816      0.000      0.000      0.000      0.000    -0.677    -16.920    -16.920
0GROUP 3 WIND 1 2      1     0.000   -100.596     9.369    334.816      0.000      0.000      0.000      0.000     0.677     16.920     16.920
0GROUP 3 WIND 2 1      1     0.000    -88.524     8.302    296.074      0.000      0.000      0.000    -11.720    -1.702    -54.275    -54.275
0GROUP 3 WIND 2 2      1     0.000    -88.524     8.302    296.074      0.000      0.000      0.000     11.720     1.702     54.275     54.275
0GROUP 3 WIND 3 1      1     0.000    -82.489     7.769    276.704      0.000      0.000      0.000    -23.439    -2.728    -91.629    -91.629
0GROUP 3 WIND 3 2      1     0.000    -82.489     7.769    276.704      0.000      0.000      0.000     23.439     2.728     91.629     91.629
0GROUP 3 WIND 4 1      1     0.000    -66.393     6.346    225.048      0.000      0.000      0.000    -31.252    -3.411   -116.532   -116.532
0GROUP 3 WIND 4 2      1     0.000    -66.393     6.346    225.048      0.000      0.000      0.000     31.252     3.411    116.532    116.532
0GROUP 3 WIND 5 1      1     0.000    -34.203     3.501    121.738      0.000      0.000      0.000    -37.112    -3.924   -135.209   -135.209
0GROUP 3 WIND 5 2      1     0.000    -34.203     3.501    121.738      0.000      0.000      0.000     37.112     3.924    135.209    135.209
0LIVE LOAD LL 1        1    72.031     -4.679     0.000      4.679     72.031     86.724    -82.045      0.000     0.000      0.000      0.000
0LIVE LOAD LL 2        1    29.815     69.857     0.000    -69.857     29.815      0.000    -69.857      0.000     0.000      0.000      0.000
1                                           COLUMN MOMENTS(KIP-FEET), SHEARS(KIPS), REACTIONS(KIPS)
0                                                   TRANSVERSE                           *                     LONGITUDINAL
0       LOAD          COL      PC         MT         V         MB         RF         ML         MR         MT         V         MB         MF
0LIVE LOAD LL 3        1    66.226      8.922     0.000     -8.922     66.226     73.123    -82.045      0.000     0.000      0.000      0.000
0LIVE LOAD LL 4        1    88.936    -19.916     0.000     19.916     88.936    114.146    -94.231      0.000     0.000      0.000      0.000
1                                                    CAP ANALYSIS AND DESIGN DATA
0                                                       CAP MOMENTS AND SHEARS
0                                 MOMENTS(KIP-FEET)                              **                        SHEARS(KIPS)
0POINT     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
0P 1         -3.191    -3.191    -3.191    -3.191    -3.191    -3.191    -3.191      -3.347 -119.311   -3.347 -119.311   -3.347 -225.077
0P 2       -104.514  -104.514  -193.782  -104.514  -104.514  -104.514  -157.968    -120.792 -120.792 -120.792 -120.792 -226.559 -226.559
0C 1L      -287.553  -287.553  -535.365  -287.553  -287.553  -287.553  -435.943    -123.423          -123.423          -229.189
0C 1R      -288.942  -288.942  -493.517  -288.942  -288.942  -288.942  -411.442              124.015           211.329           124.015
0P 3       -105.015  -105.015  -178.707  -105.015  -105.015  -105.015  -149.142     121.385  121.385  208.698  208.698  121.385  121.385
0P 4         -3.191    -3.191    -3.191    -3.191    -3.191    -3.191    -3.191     119.903    3.347  207.217    3.347  119.903    3.347
0                                                        CAP DESIGN DATA
 PT.    M+ UNF.    M- UNF.   TOP REINFORCE.  BOT.REINFORCE.     LEFT STIRRUPS         RIGHT STIRRUPS        D       FC      PS    FS/FF   FS/FZ
        K-FT.      K-FT.      AS  NO.SIZE      AS  NO.SIZE   M.SP. AV/IN BAR&SPAC  M.SP. AV/IN BAR&SPAC    IN.     PSI      %    RATIO   RATIO
0P 1     -2.455     -2.455   3.12  2 # 11    3.12  2 # 11     0.00 0.000 #5@ 0.00   16.33 0.064 #5@ 9.67  36.00            0.27   0.000   0.013
0P 2    -80.396   -121.514   3.12  2 # 11    3.12  2 # 11    16.33 0.065 #5@ 9.54   16.33 0.065 #5@ 9.54  36.00            0.39   0.258   0.662
0C 1   -221.195   -335.341   3.76  3 # 11    3.12  2 # 11    16.33 0.067 #5@ 9.31   16.33 0.056 #5@11.10  36.00            0.32   0.565   1.077
0P 3    -80.781   -114.725   3.12  2 # 11    3.12  2 # 11    16.33 0.054 #5@11.43   16.33 0.054 #5@11.43  36.00            0.38   0.214   0.625
0P 4     -2.455     -2.455   3.12  2 # 11    3.12  2 # 11    16.33 0.053 #5@11.62    0.00 0.000 #5@ 0.00  36.00            0.27   0.000   0.013
0NOTE: *** FS/FZ RATIO EXCEEDS 1.0! ***
1                                         COLUMN ANALYSIS AND DESIGN OUTPUT
0                                              CRITICAL COLUMN LOADS
     T                     E  C  S
 CN  B   GR  LLC  WC  R  S  F  F     PF      MTF     MLF      PM      MTM      MLM      PU      MTU      MLU   PU/PM    B      D
0 1  T    1 LL 4 0.0                440.5   -41.8     0.0   440.5   154.5    154.5  2498.0   878.2    878.2  5.673  36.00  36.00
0 1  B    3 LL 4 3.1                406.9   384.2 -365.0   406.9   436.8    414.9  1132.4  1215.0   1154.1  2.782  36.00  36.00


0                                            COLUMN DESIGN DATA
     T  B FACE 1  B FACE 2  D FACE 3  D FACE 4
 CN  B    NO.SIZE   NO.SIZE   NO.SIZE   NO.SIZE    AS      PS     BD12    BD      SUMPU      SUMPC   DEL.T     DEL.L       CM    R  PHIC
0 1  T     6 # 11    6 # 11    4 # 11    4 # 11  31.20  2.407  1.00  0.000       462.      3197.  1.169     1.169      1.000  1  0.70
0 1  B     6 # 11    6 # 11    4 # 11    4 # 11  31.20  2.407  1.00  0.000       385.      3197.  1.137     1.137      1.000  1  0.70
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0 FOOTING 1 DESIGN LOADS

OF	G	LLID	WC	ES	C	S	P	MT	VT	ML	VL	P4	P3	P2	P1	MTF	VBF	VPF	LOAD
01	3	LL	4	3.1			295.694	291.670	7.769	-280.748	-9.776	82.249	8.715	83.285	156.819	20.742	0.000	1.452	MAX.P1
01	3	LL	4	1.1			384.402	454.717	12.179	-267.851	-10.042	84.796	14.093	130.398	201.101	28.758	0.000	1.888	MAX.MT
01	3	LL	4	1.1			384.402	454.717	12.179	-267.851	-10.042	84.796	14.093	130.398	201.101	28.758	0.000	1.888	MAX.VT
01	3	LL	4	1.1			384.402	454.717	12.179	-267.851	-10.042	84.796	14.093	130.398	201.101	28.758	0.000	1.888	MAX.VP
01	3	LL	4	5.1			384.402	177.715	4.552	-421.627	-14.263	140.006	29.892	75.189	185.302	28.184	0.000	1.888	MAX.ML
01	3	LL	4	1.1			384.402	454.717	12.179	-267.851	-10.042	84.796	14.093	130.398	201.101	24.535	0.000	1.888	MAX.VL
01	3	LL	2	3.1R			248.093	-334.017	-7.769	186.189	6.252	52.895	4.305	88.838	137.428	19.461	0.000	1.116	MAX.P3

0 FOOTING 1 ANALYSIS/DESIGN RESULTS

O	FOOTING SIZE			*	BAR REINFORCEMENT STEEL			*	SECTION CAPACITIES				*
O	B	D	T	P1/PA	AS	NO.SIZE	SPAC.	PLACEMENT	MT.	VB	VP	DS	FC
O	6.750	6.750	3.250	0.653	0.36	13 # 4 @	6.125	TOP LONG	39.739	28.060	56.120	23.250	0.000
O					0.36	13 # 4 @	6.125	BOT.TRAN	40.606	28.663	57.327	23.750	0.000

ONUMBER OF PILES = 4 BP = 2.125 DP = 2.125