ADDENDUM TO PDSTRIP DOCUMENTATION

FOREWORD

The PDSTRIP program has been modified so as to obtain as output the parameters necessary for running the SIMBAD program, namely for a certain number of frequencies and wave directions: added masses, radiation dampings, wave and drift forces. This addendum is not intended to replace the documentation of the PDSTRIP program but to supplement it with some additional information. Please refer to the PDSTRIP documentation for any further information.

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The input data are read from the file “pdstrip.inp”.
Another file contains the section offsets of the ship. The name is defined in the previous file, as for example “geomet.out”.

Results are written into the output file “pdstrip.out” and in another data files, but only the “pdstrip.out” file is further used by the SIMBAD pre-processing program.

The input is specified in a coordinate system where the x axis is pointing forward, y to port and z upward. In the PDSTRIP documentation, it is specified that the coordinate origin is, unless specified otherwise, located at the intersection of midship plane, midship section and base-line (keel). It is nevertheless recommended to locate the X and Y coordinates of the origin at the position of the Centre Of Gravity (X=Y=0), so as to position the X coordinates of the sections according to COG.

In the output file “pdstrip.out”, the parameters necessary for running the SIMBAD program (added masses, radiation dampings, wave and drift forces) are given in the same type of coordinate system as for the input but with the origin located at the COG(*).
(*)and not in the coordinate system 1, 2, 3 as specified in the PDSTRIP documentation

INFORMATION FOR THE FILE "PDSTRIP.INP":

AN EXAMPLE OF FILE IS GIVEN HEREAFTER. ONLY FEW PARAMETERS NEED TO BE CHANGED BETWEEN TWO CALCULATIONS FOR TWO TYPES OF VESSELS (APART FROM THE SECTION OFFSET FILE).

```
-20 t t t
PC TEU 3000
9.81 1.025 8.3 -8.3 999.
7 90. 60. 30. 0. -30. -60. -90.
geomet.out

f
39107.0     0.0 0.0 12.0     124.6 3186.6 3186.6     0.0 0.0 0.0

0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 flow separation

0.03 3.0        wave steepness; max wave height
0.8 0.6  0.8 0.6  0.8 0.6  0.8 0.6  0.8 0.6
0.8 0.6  0.8 0.6  0.8 0.6  0.8 0.6  0.8 0.6
0.8 0.6  0.8 0.6  0.8 0.6  0.8 0.6  0.8 0.6
0.8 0.6  0.8 0.6  0.8 0.6  0.8 0.6  0.8 0.6
0.8 0.6  0.8 0.6  0.8 0.6  0.8 0.6  0.8 0.6
0.8 0.6  0.8 0.6  Cy Cz

0       fin

0       sails

0  forces depending on motions

0.0 0.0 0.0 0.0 0.0 suspended weight

0  motion points
```

TITLE FOR THE TYPE OF SHIP

DRAUGHT AND DEPTH FROM THE BASE-LINE (KEEL)

WAVE ENCOUNTER ANGLES. ORDER TO BE KEPT LIKE THIS FOR THE PRE-PROCESSING PROGRAM (BETWEEN +90 AND -90).

MASS OF SHIP. COORDINATES OF THE CENTRE OF GRAVITY. INERTIAL RADII.

NUMBER OF COEFFICIENTS TO BE INCREASED OR DECREASED AS A FUNCTION OF NUMBER OF OFFSET SECTIONS

INFORMATION FOR THE FILE "PDSTRIP.INP" (FOLLOWING):

```
99
 1000.0    750.0248   514.0973   389.3734   312.2181   259.3743
      220.8418   191.5603   168.2591   149.1822   133.3587
      120.0826   108.4242   98.3848    89.4751    81.5469
      74.4736    68.1476    62.4175    57.2253    52.5182
      48.3288    44.5147    41.0719    38.0135    35.2345
      32.7270    30.4780    28.4349    26.5906    24.9201
      23.3887    22.0065    20.7434    19.5756    18.5132
      17.5263    16.6243    15.7827    15.0104    14.2934
      13.6206    12.9997    12.4152    11.8741    11.3630
      10.8886    10.4392    10.0208    9.6271     9.2528
      8.9031     8.5699     8.2578     7.9598     7.6802
      7.4126     7.1611     6.9222     6.6930     6.4769
      6.2692     6.0732     5.8845     5.7061     5.5357
      5.3714     5.2156     5.0652     4.9225     4.7845
      4.6534     4.5265     4.4058     4.2899     4.1774
      4.0703     3.9664     3.8672     3.7709     3.6790
      3.5895     3.5041     3.4217     3.3415     3.2647
      3.1899     3.1182     3.0483     2.9814     2.9160
      2.8534     2.7944     2.7340     2.6755     2.6189
      2.5690     2.5157     2.4640   wave length

1

0.0 t            1 speed

2
0 1
100 1

2
6
90
3
3.3

0/
```

*NUMBER OF WAVE LENGTHS (FREQUENCIES) FOR WHICH THE PARAMETERS SHOULD BE DETERMINED (ABOUT **100** AT LEAST) . THE FREQUENCY RANGE SHOULD BE IN BETWEEN **0.01** AND **5** RAD/S. ACCORDING TO THE **PDSTRIP** CALCULATION RESULTS (SEE HEREAFTER) , IT IS SOMETIMES NECESSARY TO INCREASE THE LOWER LIMIT OF FREQUENCY RANGE (UP TO **0.05** TO **0.1** RAD/S) AND/OR DECREASE THE UPPER LIMIT OF FREQUENCY RANGE (DOWN TO **4.8** TO **4.9** RAD/S)*

INFORMATION FOR THE OFFSET SECTION FILE:

```
      27 F   8.300000
-112.7035             5             0
-5.205000     -1.731000  0.0000000E+00     1.731000     5.205000
 8.300000      7.970000      7.812000      7.970000     8.300000
-107.7035            17             0
-10.65500     -8.729000     -7.995000     -5.707000    -5.331000
-2.988000     -1.400000    -0.2920000  0.0000000E+00    0.2920000
 1.400000      2.988000      5.331000      5.707000     7.995000
 8.729000      10.65500
 8.300000      8.018000      7.922000      7.667000     7.631000
 7.407000      7.262000      7.163000      7.137000     7.163000
 7.262000      7.407000      7.631000      7.667000     7.922000
 8.018000      8.300000
-97.70351             21             0
-14.37800     -13.26200     -11.73100     -10.57100    -9.747000
-8.570000     -7.247000     -5.583000     -4.059000    -2.425000
0.0000000E+00  2.425000      4.059000      5.583000     7.247000
 8.570000      9.747000      10.57100      11.73100     13.26200
 14.37800
 8.300000      7.921000      7.531000      7.281000     7.109000
 6.890000      6.659000      6.400000      6.185000     5.973000
 5.688000      5.973000      6.185000      6.400000     6.659000
 6.890000      7.109000      7.281000      7.531000     7.921000
 8.300000
-87.70351             29             0
-15.50400     -15.12800     -14.59500     -13.82000    -12.72600
-11.23300     -9.291000     -8.168000     -7.040000    -5.038000
-3.352000     -1.960000     -1.340000    -0.7310000
).0000000E+00
 0.7310000     1.340000      1.960000      3.352000     5.038000
 7.040000      8.168000      9.291000      11.23300     12.72600
 13.82000      14.59500      15.12800      15.50400
 8.300000      7.920000      7.530000      7.106000     6.654000
 6.179000      5.690000      5.440000      5.204000     4.811000
 4.500000      4.258000      4.172000      4.119000     4.078000
 4.119000      4.172000      4.258000      4.500000     4.811000
 5.204000      5.440000      5.690000      6.179000     6.654000
 7.106000      7.530000      7.920000      8.300000
-77.70351             37             0
-15.85200     -15.71700     -15.51400     -15.18200    -14.65900
-13.88200     -12.81900     -11.55300     -10.18800    -8.829000
-7.553000     -6.351000     -5.191000     -3.745000    -2.843000
-2.017000     -1.277000    -0.6560000  0.0000000E+00   0.6560000
 1.277000      2.017000      2.843000      3.745000     5.191000
 6.351000      7.553000      8.829000      10.18800     11.55300
 12.81900      13.88200      14.65900      15.18200     15.51400
 15.71700      15.85200
 8.300000      7.920000      7.530000      7.106000     6.654000
 6.179000      5.690000      5.204000      4.741000     4.323000
 3.964000      3.653000      3.375000      3.046000     2.853000
 2.683000      2.545000      2.443000      2.442000     2.443000
 2.545000      2.683000      2.853000      3.046000     3.375000
 3.653000      3.964000      4.323000      4.741000     5.204000
 5.690000      6.179000      6.654000      7.106000     7.530000
 7.920000      8.300000
-67.70351             45             0
-15.98400     -15.94000     -15.87200     -15.74700    -15.53000
-15.18500     -14.68900     -14.07000     -13.36800    -12.62000
```

USE ALWAYS "SYM = F (FALSE)", FOR WHICH THE SECTIONS ARE DESCRIBED BY OFFSET POINTS BEGINNING AT THE WATERLINE ON STARBOARD AND ENDING AT THE WATERLINE ON PORT SIDE. THE WAVE DRIFT FORCES CAN BE DETERMINED ONLY IF "SYM = FALSE".

INFORMATION FOR THE OFFSET SECTION FILE:

```
   1.491000       1.860000       2.213000       2.543000       2.812000
   2.963000       2.984000       2.921000       2.837000       2.701000
   2.493000       2.193000       1.790000       1.331000      0.8780000
  0.5030000      0.2620000      0.1420000      0.1070000      0.1350000
   8.300000       7.530000       7.106000       6.654000       6.179000
   5.690000       5.208000       4.741000       4.323000       3.964000
   3.653000       3.375000       3.113000       2.594000       2.335000
   1.817000       1.333000      0.9450000      0.6640000      0.4560000
  0.2930000      0.1640000      0.0000000E+00  0.1640000      0.2930000
  0.4560000      0.6640000      0.9450000       1.333000       1.817000
   2.335000       2.594000       3.113000       3.375000       3.653000
   3.964000       4.323000       4.741000       5.208000       5.690000
   6.179000       6.654000       7.106000       7.530000       8.300000
   119.7965              41       2  3  38
-1    -0.5  0.00E+00    0     -0.698
-1.268      -1.543      -2.096      -2.495      -2.739
-2.891      -2.982      -3.051      -2.984      -2.898
-2.645      -2.308      -1.876      -1.279      -0.525
0.00E+00    0.525 1.279 1.876 2.308
2.645 2.898 2.984 3.051 2.982
2.891 2.739 2.495 2.096 1.543
1.268 0.698 0     0.00E+00    0.5
1
8.3   8.1   7.9   4.943 4.902
4.763 4.651 4.323 3.964 3.653
3.375 3.113 2.594 2.075 1.817
1.333 0.945 0.664 0.466 0.37
0.353 0.37  0.466 0.664 0.945
1.333 1.817 2.075 2.594 3.113
3.375 3.653 3.964 4.323 4.651
4.763 4.902 4.943 7.9   8.1
8.3
```

FOR A BULB, IT IS NECESSARY TO INTRODUCE AN UNCONNECTED PART (SEE PDSTRIP DOCUMENTATION P. 8)

RESULTS ARE WRITTEN INTO THE OUTPUT FILE “PDSTRIP.OUT”.

```
     8    32.060     8.300          0.800          0.600
     9    32.118     8.300          0.800          0.600
    10    32.128     8.300          0.800          0.600
    11    32.120     8.300          0.800          0.600
    12    32.112     8.300          0.800          0.600
    13    32.080     8.300          0.800          0.600
    14    32.034     8.300          0.800          0.600
    15    31.978     8.300          0.800          0.600
    16    31.822     8.300          0.800          0.600
    17    31.186     8.300          0.800          0.600
    18    29.430     8.300          0.800          0.600
    19    26.230     8.300          0.800          0.600
    20    21.700     8.300          0.800          0.600
    21    16.294     8.300          0.800          0.600
    22    10.614     8.300          0.800          0.600
    23     5.736     8.300          0.800          0.600
    24     5.504     8.300          0.800          0.600
    25     5.628     8.300          0.800          0.600
    26     5.968     8.300          0.800          0.600
    27     6.102     4.990          0.800          0.600
Transverse metacentric height:   4.536
No fins
-------------------------------------------------------------------------------------------------------------------

No sails
No forces depending on ship motions
-------------------------------------------------------------------------------------------------------------------

No suspended weight
-------------------------------------------------------------------------------------------------------------------

In the following 1,2,3 designate directions forward, to starboard, downward
Number of frequencies               99
```

*THE METACENTRIC HEIGHT DETERMINED BY **PDSTRIP** MAY DEVIATE FROM THE CHOSEN VALUE BECAUSE OF DISCRETIZATION ERRORS. THE TRANSVERSE METACENTRIC HEIGHT **GM** INDICATED IN THE OUTPUT LIST IS THEN TO BE CHECKED AND THE VERTICAL COORDINATE OF THE CENTRE OF GRAVITY **ZG** TO BE CHANGED, IF NECESSARY, SO THAT **GM** BECOMES CORRECT.*

RESULTS ARE WRITTEN INTO THE OUTPUT FILE "PDSTRIP.OUT".

```
Yaw drift moment per wave amplitude squared                        -0.426E+05
Long., transv. reduced water drift velocity per wave amplitude^2     3134.163 -1809.508
-------------------------------------------------------------------------------------------------------------------------------

Wave circ. frequency 0.080  encounter frequ. 0.080  wave length  1000.00  wave number 0.0063  wave angle   0.0
speed    0.00  wetted transom?         T  log(determinant)  164.85   3.15
             Real part(1)  Imagin.part(1)    Abs(1)  Real part(2)  Imagin.part(2)    Abs(2)  Real part(3)  Imagin.part(3)    Abs(3)
Translation       256.000    -8191.999     8195.998         1.072     -118.512      118.517         0.499         0.013         0.499
Rotation/k  ************************************         0.116        0.526        0.539         3.845       136.881       136.935
-------------------------------------------------------------------------------------------------------------------------------
MassAj.
-------------------------------------------------------------------------------------------------------------------------------
      9.0967639E+02  0.0000000E+00  0.0000000E+00  0.0000000E+00 -3.5146626E+03  0.0000000E+00
      0.0000000E+00  4.7095176E+04 -1.6360832E-02 -9.1865203E+04 -2.8039212E+00  6.3852856E+05
      0.0000000E+00 -1.0294529E-01  6.2713695E+04 -1.6079147E-01  9.6858362E+05  3.9857082E+00
      0.0000000E+00 -9.1945703E+04  3.7585041E-01  2.0544611E+06  1.3851483E+01  7.1175880E+06
     -3.5146626E+03 -3.9857082E+00  9.6858356E+05 -1.0261330E+01  1.5975517E+08  1.5957420E+02
      0.0000000E+00  6.3852869E+05  2.8039212E+00  7.1096645E+06  5.0483067E+01  1.3075589E+08
-------------------------------------------------------------------------------------------------------------------------------
Amorti.
-------------------------------------------------------------------------------------------------------------------------------
      0.0000000E+00  0.0000000E+00  0.0000000E+00  0.0000000E+00  0.0000000E+00  0.0000000E+00
      0.0000000E+00 -1.6141178E+14  4.4521610E-03 -1.9369414E+15 -3.5901245E-02 -8.2126518E+15
      0.0000000E+00  2.0483034E-03 -3.2975739E+14  3.1424377E-02  9.4421828E+15 -4.1898455E-02
      0.0000000E+00 -1.9369414E+15 -3.3942123E-03 -2.3243296E+16  1.3265945E+00 -9.8551821E+16
      0.0000000E+00  4.1898463E-02  9.4421828E+15  1.8211250E-01 -1.0120259E+18 -3.1730523E+00
      0.0000000E+00 -8.2126518E+15  3.5901252E-02 -9.8551821E+16 -1.4143766E+01 -8.0321551E+17
-------------------------------------------------------------------------------------------------------------------------------
Efforts
-------------------------------------------------------------------------------------------------------------------------------
      6.2951645E+01 -4.7946343E-01 -2.1569290E+12  1.8776697E+17  2.5802281E+14 -5.0804295E+01
     -2.1994762E+04  3.5794649E-01 -1.2607883E+13  1.8623575E+16  3.1786912E+14  3.1888447E+01
*** SURFRIDING. Linearization inappropriate
Longitudinal and transverse drift force per wave amplitude squared ********************
Yaw drift moment per wave amplitude squared                        -0.356E+26
Long., transv. reduced water drift velocity per wave amplitude^2     3619.019     0.000
-------------------------------------------------------------------------------------------------------------------------------
```

IT IS IMPORTANT TO VERIFY THAT FOR EACH WAVE FREQUENCY AND WAVE ANGLE, THE RESULTS ARE CORRECT. IN GENERAL, PROBLEMS HAPPEN WITH THE CALCULATION OF DRIFT FORCES AND THE MESSAGE "SURFRIDING. LINEARIZATION INAPPROPRIATE" APPEARS AND/OR IT WAS NOT POSSIBLE TO OBTAIN A CORRECT VALUE FOR THE DRIFT FORCES. AS PREVIOUSLY MENTIONED, IN THIS CASE, THE LOWER LIMIT OF FREQUENCY RANGE HAS TO BE INCREASED A LITTLE AND/OR THE UPPER LIMIT OF FREQUENCY RANGE TO BE DECREASED, DEPENDING ON WHICH FREQUENCY THE PROBLEM APPEARS.