# 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".
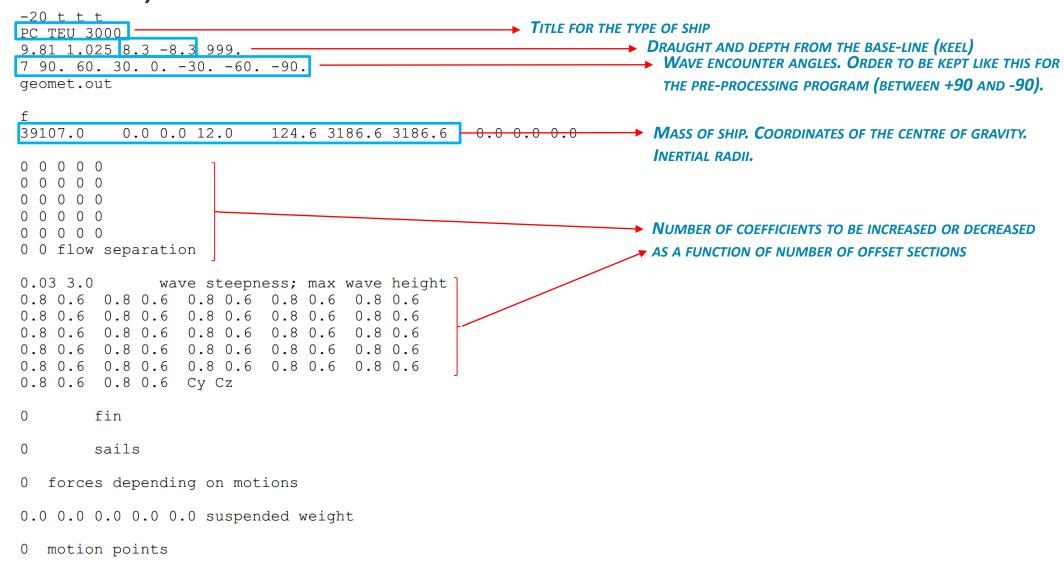
Results are written into the output file "PDSTRIP.OUT" and in another data files, but only the "PDSTRIP.OUT" file is further used by the SIMBAD pre-processing program.

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 $(X=Y=0)$.

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 coordinate system as for the input (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                   0
 -112.7035        5
 -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 $Z_G$ 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+02   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.*