Chapter 2

GETTING STARTED

In this Chapter instructions are provided for installing the WAMIT-PC software, and making simple test runs.

The two principal subprograms of WAMIT are POTEN and FORCE. POTEN solves for the velocity potential on the body surface, and optionally also for the source strength. FORCE evaluates physical parameters including the force and motion coefficients, and field data including the fluid pressure, velocity, and free-surface elevation. The basic sequence in a typical application of WAMIT is (1) prepare the input files; (2) run WAMIT. The principal results are then contained in output files which may be printed and post-processed. This architecture is illustrated in Figure 1.1.

The principal input files to the subprogram POTEN are the Potential Control File (POT) which specifies parameters including the fluid depth, wave periods, and wave heading angles, and the Geometric Data File (GDF), which describes the geometry of the structure to be analyzed. These files are discussed briefly below, and in more detail in subsequent Chapters. The principal input files to the subprogram FORCE are the Force Control File (FRC), which specifies inputs regarding the body dynamics, and the P2F file ('Poten to Force') which transfers data from POTEN to FORCE.

There are three additional input files which should also be considered: (1) Licensed users of WAMIT V6PC must utilize a unique input file **userid.wam**, which identifies the site license, (2) the optional input file **fnames.wam** is recommended to specify the input filenames, and (3) the optional configuration file (**config.wam** or ***.cfg**) may be used to specify certain options and other information used by the program. The file userid.wam is provided by WAMIT Inc. Samples of the fnames.wam and configuration files are included with the test runs; for example the files `test01.wam` and `test01.cfg` are intended for use with TEST01. (Before running TEST01 the user must rename or copy these files, as explained below.)

2.1 INSTALLATION AND SETUP

WAMIT V6.5S users are advised to skip this section and review a section in

Chapter 11 regarding installation and setup of V6.5S

The WAMIT-PC software is delivered in two forms, (1) on a CD-ROM disk, or (2) as a compressed zip file suitable for electronic transfer. This software includes the main executable program **wamit.exe**, the DLL files listed below, a complete set of input files for the standard test runs TESTn (n=01,02, ...), and the labeled output files TESTn.OUT for these test runs. Also included is the text file **readme.txt** with additional information.

In the standard PC-executable Version 6.5, there are five additional dynamic link library files (DLL) which must be installed in the same directory (i.e. 'folder') as the executable file wamit.exe. If these DLL files are missing the program will not run, regardless of the inputs and options specified. The eight DLL files are **geomxact.dll**, **newmodes.dll**, **rg2wamit.dll**, **libifcoremd.dll**, **libmmd.dll**, **libiomp5md.dll vcruntime140.dll** and **svml dispmd.dll** The extended Version including the capability to input MultiSurf models requires one additional DLL file, as explained in Section 6.7.

Version 6.5 is compiled using Intel Fortran IFX Version 2025 3. The 4 DLL files **libifcoremd.dll**, and **libmmd.dll libiomp5md.dll svml dispmd.dll** are required to run the executable code compiled with Intel Fortran Compiler. These DLL files are distributed by Intel and may be redistributed to all users. **vcruntime140.dll** is part of the Visual C++ 2015-2022 Redistributable and used by applications compiled with Visual Studio 2015 or later.

Before installing the software a new main directory (folder) should be made. The recommended name is C:\WAMITv6, but the user may prefer to use a different drive.Copy all of the software to this directory, preserving the same subdirectories (folders) within the new directory as are on the CD ROM or in the zip file. If the software is received in a zip file by electronic transfer, it must be unzipped using a local utility, and all unzipped files should be saved in the directory C:\WAMITv6 and in subdirectories corresponding to those in the zip file. The text file **readme.txt** includes an outline of the directory tree and files. If any difficulties are encountered during installation and testing the user should confirm that the subdirectories and files correspond to the description in **readme.txt**.

2.2 DEMONSTRATION PROGRAMS

A special demonstration version of WAMIT can be downloaded in .zip format from the web site **www.wamit.com**. This program, **wamit_demo.exe**, can be used for demonstration or educational purposes, without obtaining an end-user license, subject to the conditions stated in the website. The installation and use of this software is the same as the licensed version, with the following exceptions:

- The program only accepts geometry inputs from the standard input files for the test runs described in the Appendix.
- The site license identification file **userid.wam** and DLL files are not required.
- The program runs are interrupted after display of the header, and the user is prompted to press the Enter key to continue the run.

The downloadable zip file includes all of the input files required to execute the standard test runs.

2.3 STANDARD TEST RUNS

Various standard test runs are included with the software, to illustrate different types of applications and features of the program. The results of these test runs can be used to confirm that the installation and setup of the program have been performed correctly by the user. The test runs also provide opportunities to use (and modify) existing input files, for tutorial purposes. The remainder of this Chapter is intended to guide new users through these procedures. Descriptions of each test run are included in the Appendix.

If the WAMIT software is installed in accordance with the instructions above, the required .EXE, .DLL, and USERID.WAM files will be installed in the directory C:\WAMITv6. All required input files for the standard test runs will be copied to the subdirectory C:\WAMITv6\TESTRUNS. Benchmark versions of the output files **test*.out** will be copied to the subdirectory C:\WAMITv6\TESTRUNS\OUT. These benchmark output files can be compared with results obtained by the user to ensure that the software is installed correctly.

Before running WAMIT with the standard test runs, the user should (1) open a DOS Command Prompt Window (in the Windows environment a Command Prompt Window is opened by clicking on 'Start', 'Programs', 'Command Prompt'), and (2) change the default subdirectory by entering the command `cd \WAMITv6\TESTRUNS`.

Since the executable file wamit.exe is resident in the directory C:\WAMITv6, the appropriate command to execute WAMIT is 'C:\WAMITv6\WAMIT'. There are three alternative shortcuts which may be used to simplify this command: (1) add C:\WAMITv6 to the system PATH, (2) copy the files wamit.exe, *.dll, and userid.wam from this directory to another directory which is included in the PATH, or (3) use the batch file **wamit.bat** which is supplied in the testruns subdirectory.

2.4 RUNNING TEST01

Test Run 01 evaluates the added-mass and damping coefficients, exciting forces, motions, wave elevations, field pressures, fluid velocities and drift forces for a freely-floating truncated vertical circular cylinder of radius 1.0m and draft 0.5m, in infinite water depth for three wave periods and one wave heading angle. Further details are contained in Appendix A.

The corresponding input files **test01.gdf**, **test01.pot**, and **test01.frc** are included in the subdirectory C:\WAMITv6\TESTRUNS. In order to specify the appropriate filenames during the run, first copy the file `test01.wam` to the file `fnames.wam`. (Copying is recommended, in preference to renaming the file, to preserve the original file.) The appropriate DOS command is

```
copy test01.wam fnames.wam
```

This file contains the filenames of all required input files for TEST01.

Next enter **wamit** to start the run. During execution of the subprogram POTEN the monitor displays the starting time, and after the solutions for the velocity potentials are obtained at each wave period the monitor will display a new line of information including the period (in seconds), time, and the maximum number of iterations required for the radiation and diffraction solutions. After the first solutions are displayed the results for subsequent periods run faster, since the panel integration of the Rankine components of the source potential are only evaluated initially and saved for reuse. After the third period the intermediate storage file **test01.p2f** is created on the disk, storing the velocity potentials and other inputs to the subprogram FORCE. Output from FORCE will appear relatively quickly on the screen, and the same output is stored in the file **test01.out**. The latter file includes useful identification information concerning the inputs, body parameters, run times and dates. This is followed for each period by tabulations of the hydrodynamic parameters requested in **test01.frc**. Assuming the standard version of **test01.out** has been saved in a subdirectory, as recommended in Section 2.1, the data in the new version of **test01.out** can be compared with the standard file with the same name. On a contemporary PC the total run time should be a few seconds.

2.5 RUNNING TEST11

Test Run 11 is intended to complement TEST01, but using the higher-order method of solution (ILOWHI=1). The body dimensions and other inputs are the same, but the surface of the cylinder and also the solution for the velocity potential are represented in a more accurate, continuous manner by B-splines, as explained in Chapter 6.

To run TEST11 follow the same procedure outlined above for TEST01, but replace '01' by '11' in all references to filenames and extensions. A comparison of the results from these complementary tests is summarized in Section A.11 of the Appendix.

2.6 OTHER TEST RUNS

The procedure for running the other test runs is the same as explained above, except for copying the appropriate files to `fnames.wam` from the original versions `test*.wam` where '*' is the test number.

A special batch file **runtests.bat** is included in the licensed version and a similar file **rundemo.bat** in the demonstration version. Executing the corresponding batch file command will run all of the tests in succession.

2.7 MEMORY AND STORAGE RESTRICTIONS

WAMIT uses scratch files on the hard disk for temporary storage at runtime. Depending on the run parameters, the total number of scratch files and/or their size may become quite large. Normally these files are deleted by WAMIT after the files are no longer needed, and before the program stops. However some PC/Windows configurations save these deleted files in a 'recycled' directory, and this can cause the hard disk to become overloaded. Users who experience this problem should delete the accumulated files in the recycled directory, or alternatively change their system setup to avoid saving a backup of all deleted files.

Contemporary Pentium PC systems generally have sufficient capacity for all of the Test Runs. Further information regarding memory requirements is given in Chapter 10.

2.8 MODIFYING THE INPUT FILES

A text editor can be used to edit the input files. Users should refer to Chapter 3 for a complete explanation of the data in these files, but a few simple modifications will be outlined here for tutorial purposes, in the context of Test Run 01. Before proceeding further check that the files FNAMES.WAM and CONFIG.WAM correspond to this test run, and re-copy these files if necessary following the instructions in Section 2.4.

As the first modification we might request FORCE to perform additional computations, for the same periods and wave headings analyzed by POTEN, but with modified values of the vertical center of gravity (VCG) and radii of gyration (XPRDCT) in the force control file TEST01.FRC. In the standard file VCG=0.0 (center of gravity in the waterplane) and the radii of gyration are set equal to 1.0 (the three diagonal elements of the XPRDCT matrix). A positive VCG will move the center of gravity above the waterplane, reducing the pitch/roll hydrostatic stability and affecting these RAO's in longer wave periods. Modifying the radii of gyration should change the same RAO's primarily at shorter wave periods. It is not necessary to re-run POTEN in this case, provided the file TEST01.P2F has been retained for the POTEN output. To avoid the extra run time of POTEN, add the line IPOTEN=0 to the configuration file config.wam (See Section 3.7, and also the file CONFIG.17b which includes the same line). After modifications are made to the file TEST01.FRC it is advisable to save the modified file a with different filename, and to edit the FNAMES.WAM file to show the corresponding new filename for the force control file. If this procedure is followed, the output file will carry the same filename (with the **.out** extension) to distinguish it from the original file TEST01.OUT. The user may then compare the RAO's in the different output files to discern the effect of these changes.

As the second modification WAMIT may be re-run with a more extensive list of wave periods. Edit the potential control file TEST01.POT with the following changes:

- on line 5 change the number of wave periods (NPER) from 3 to 10
- on line 6 replace the three original wave periods by ten new periods in decimal format
- depending on your preference, (1) save the modified file with the original name

TEST01.POT, or (2) save the modified file with a new filename and correct the FNAMES.WAM file on line 2 with the new filename.

Since it is necessary to re-run POTEN in this case, either delete the line IPOTEN=0 if this was added to config.wam, or copy config.01 once again to config.wam. During the run, if the original filename TEST01.POT is retained, the user will be prompted whether or not to overwrite the old output file TEST01.P2F; overwriting is the simplest procedure to follow, in this circumstance, otherwise the new .P2F filename must be specified before the FORCE run is executed.

The input files for other test runs can be used to illustrate various options and modifications.