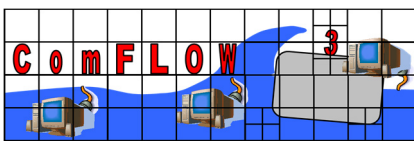


ComFLOW-3

The offshore industry, MARIN and the Universities of Groningen and Delft have worked together successfully in the development of the Volume of Fluid method ComFLOW to study complex free-surface flows around offshore structures.



Important aspects have been studied, implemented and validated like:

- Sloshing in LNG containment systems
- Air entrapment during wave impacts (“cushioning”)
- Wave run-up and deck impacts on semi-submersibles and TLPs
- Motions of offshore structures due to large waves

Large steps forward have been made in previous projects, but there are still some challenges ahead, such as the large computational times and the too high artificial (numerical) dissipation of the waves.

The ComFLOW-3 Joint Industry Project aims to continue the development of ComFLOW focusing on new functionality and its validation, and further improvement of present functionality. The objective of the JIP is:

To further improve, develop and validate the ComFLOW program for complex free-surface flows in the offshore industry and make it useable for advanced engineering applications by improved functionality and speed-up of the algorithms. The following issues are therefore addressed in the ComFLOW-3 JIP:

New functionality

- Possibility to model viscous effects in the flow near sharp corners, like bilge keels.
- The ability to study local flow problems by using a local, very dense grid (for example wave impacts on deck girders).
- Possibility to model the dynamics of mooring lines and their influence on motions of offshore structures.
- Validation of new functionality with model tests, which contents can be proposed by the participants.

Schedule

The project will have a 3-year duration and starts in the autumn of 2009.

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Improvement of present functionality

Computational efficiency by applying parallelisation using multi-core PCs

Computational efficiency by using better absorbing boundary conditions, which make it possible to use a small computational domain

Better algorithms for wave propagation

The project runs parallel to a research project financed by the Dutch government, which supports 3 PhD students, a post-doc and validation model tests. The results of this research project are made available to the ComFLOW-3 JIP.

Deliverables

The deliverables of the ComFLOW-3 JIP will be as follows:

- Each year a new version of ComFLOW and manual will be delivered to the participants including the extensions made during the project at that moment
- A report with a description and the results of the validation model tests
- A validation report showing the results of ComFLOW versus the results of the new validation model tests
- A benchmarking report showing the results of ComFLOW versus the results of the existing suite of validation model test data
- PhD theses of the PhD students with detailed descriptions of the background of the method and the extensions which will be made during the project
- At the end of the project, a workshop will be organised where the participants can learn to work with the new version of ComFLOW

Participation fees

The following participation fees apply:

Company type	Non ComFLOW-2 participant	ComFLOW-2 participant
Oil companies	145,000	70,000
Engineering companies, Contractors and Shipyards	95,000	45,000
Others (application necessary)	65,000	30,000