BETA
SIMULATION SOLUTIONS

physics on screen

+ Smoothed Particle Hydrodynamics (SPH) solver

Make effortless hydrodynamic simulations

+ SPH solver

Simplify flow analyses

Simulate fluid flows with minimal pre- processing effort

The Smoothed Particle Hydrodynamics (SPH) solver enables effortless hydrodynamic simulations. Based on a mesh-free Lagrangian method, the SPH solver is well suited to efficiently address problems with free surface flows. Its current implementation focuses on fluid flow modeling.

Fully integrated in the ANSA ecosystem

Avoiding complicated input/output files, the SPH solver is accessible within ANSA, taking advantage of the numerous tools to create, adjust or improve a model. When a design revision is required, the user can access his favorite ANSA tools to modify the mesh and rerun the simulation.

Direct and simple interface

The SPH solver is accessible through a single window, which requires minimal input from the user, using the existing FEM model. Setting a fluid inlet or a fluid volume is as simple as selecting a set of nodes. Element quality defining the shape /domain of the simulation is inconse-quential and may be the same mesh used for other type of analyses. The ground and rigid bodies the fluid interacts with, are easily selected without the need to set up any complicated contact definition.

Coupled with kinematics

Easy definition of complex boundary conditions can be achieved using the advanced kinematic tools of the ANSA pre-processor.

GPU implementation

All computationally intensive calculations are handled by the GPU, enabling almost real time simulation for medium sized problems, and greatly accelerating bigger ones.

User interaction during solution

The user has the possibility to switch between the different sophisticated visualization modes that convey all the necessary information during the solution. Velocity field, density field or transparent liquid rendering are available. The model manipulation (rotation, translation etc.) is feasible at any time of the solution process allowing the inspection of the flow from any point of view.

The easy access to stop/pause the simulation process for what if scenarios, along with the ANSA tools makes it the ideal frame-work for design space exploration.

Results file fully compatible with META post-processor

SPH tailored data post-processing capabilities in META, allows stream-line calculation/visualization and realistic fluid rendering among other. The user may request to generate a results file with all the flow informa-tion for further results inspection. This output file is fully compatible with META, where stunning visualiza-tions, cross sections of flow, and other complex operations may be performed.

Easy video export

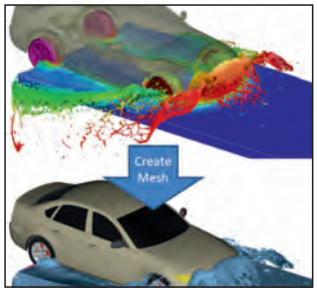
The video export of the simulation can be achieved by simply defining the export path for further results inspection.

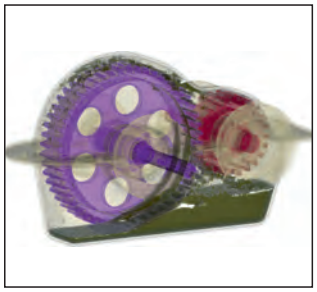
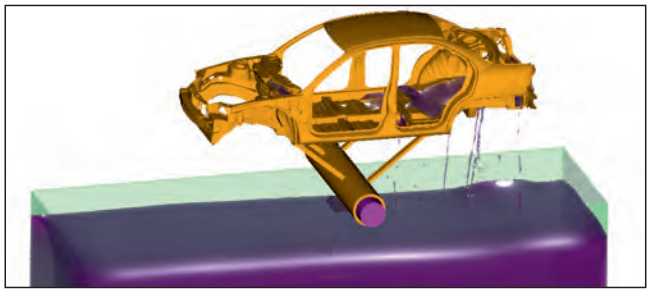
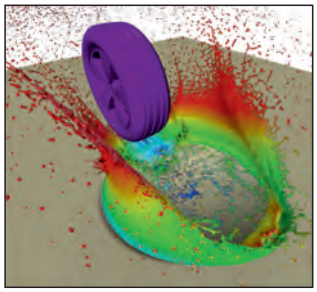
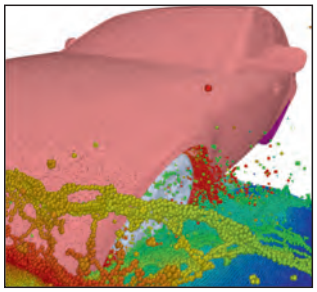
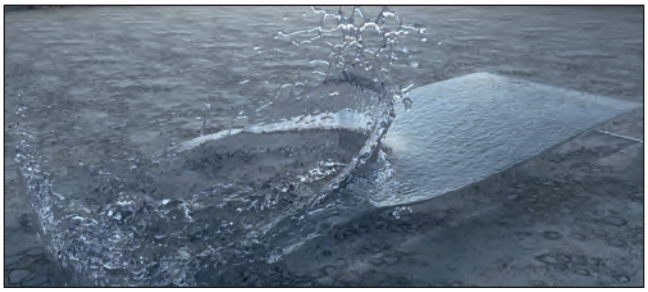
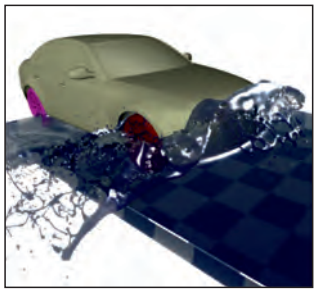
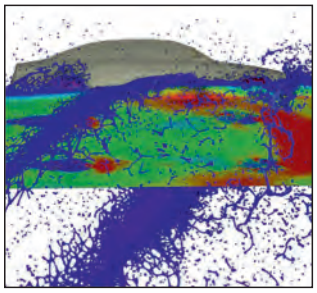
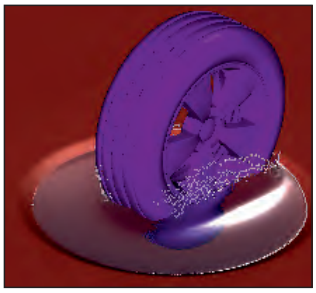
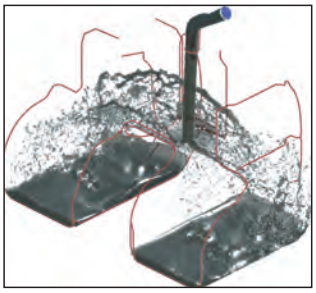
Features

- Accessible within ANSA
- Process progress interaction and stepwise monitoring
- Mesh use from other simulation types
- Definition of boundary conditions through the kinematic tools of ANSA
- Easy setting of a fluid inlet or volume
- Highly tuned GPU implementation
- Ability for mesh modification when design revisions are required
- Ability to pause simulation, modify flows, or extend simulation time, and continue from the last state
- Fully compatible output files with META post- processor
- Complete flow information results and stunning visualizations and videos creation employing META
- Particles' boundary (Regularly-placed-particles/Poisson-Disk-Particles) handling including adhesion and viscosity parameters
- Pressure results calculation and visualisation
- Animation Bar of SPH results available within ANSA, allows to travel among the states of the current solution
- Video creation either while running the simulation or by loading existing results
- Possibility to create mesh out of the free surface of the fluid from any result-state either over the whole-fluid, or on a restricted space.

Benefits

- Complete process integration and monitoring within a single environment
- Short learning curve
- Fast and high-quality modeling for complex flows
- Reduced user-dependent error-prone operations
- Fast design modifications for reanalysis
- Ideal framework for design exploration
- Low memory footprint



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