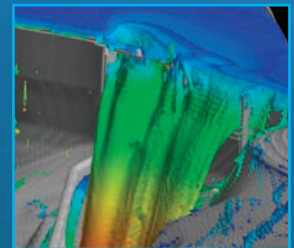
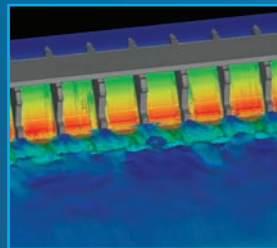
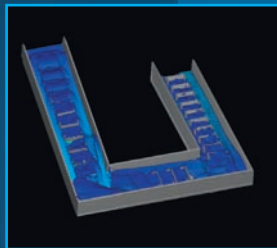
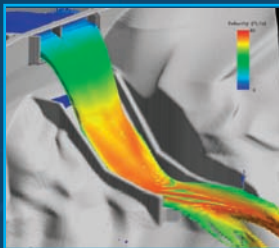


FLOW-3D

Powerful computational fluid dynamics software for accurate flow modeling



HYDRAULICS

Easy-to-use CFD software to optimize the design and operation of your hydraulics projects

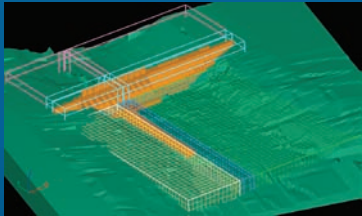
- Accurately predict dynamic surface profiles and flow patterns
- Determine erosion and deposition around structures
- Improve the design of fish-friendly passages
- Reduce design time
- Ensure dam and spillway safety and performance
- Eliminate reduced-scale physical modeling

FLOW Science
1980 - 2010

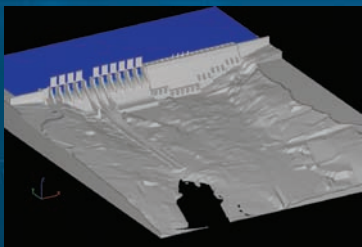
Improving the world through accurate flow modeling

Advanced Modeling Features

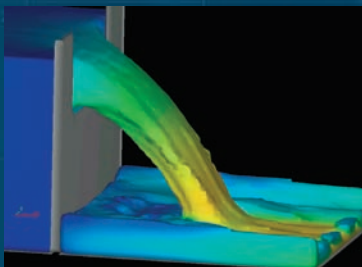
FLOW-3D predicts hydraulics performance, reducing cost in both the design process and the operation of the design.



Multi-Block meshing adds even more flexibility and efficiency to problem setup.



FLOW-3D's FAVOR™ method makes accurate representation of complex geometries simple.



FLOW-3D's TruVOF technique precisely simulates moving liquid fronts.

FLOW-3D
from
FLOW Science

www.flow3d.com

FLOW-3D: Exceptional Accuracy

Optimize your hydraulic designs and lower your costs with ***FLOW-3D***, the powerful computational fluid dynamics software for more accurate modeling.

When designing a hydraulic structure, traditionally a physical model would be constructed and analyzed. ***FLOW-3D*** eliminates scaling issues associated with physical models by simulating the actual design.

FLOW-3D addresses a wide range of design problems in hydraulics engineering. Users can increase the capacity of existing infrastructure in hydropower plants, develop novel approaches to fish passages, design intakes that minimize head loss, develop improved fore bay designs and tailrace flows, analyze scour and deposition and evaluate air entrainment.

FLOW-3D applies unique modeling principles that differentiate it from other applications and enhance the accuracy of your results. Traditional 1-D and 2-D codes don't provide a full detailed analysis of flow currents and flow surfaces. ***FLOW-3D*** simulates the entire flow process so that these important details are not neglected.

Advanced Fluid Surface Modeling

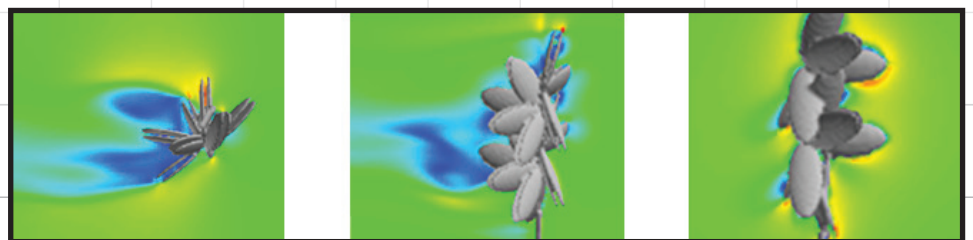
TruVOF, ***FLOW-3D***'s method for modeling fluids goes beyond the traditional Volume of Fluid (VOF) techniques to achieve the most accurate tracking of fluid surfaces to capture waves and hydraulic jumps.

FAVOR™ Makes Modeling Flow in Complex Structures Easy

A unique feature of ***FLOW-3D*** is the FAVOR™ (Fractional Area/Volume Representation) method, which permits true representation of complex geometry in a simple Cartesian mesh. As a result, ***FLOW-3D*** can be used to simulate flow in complex hydraulics structures accurately and efficiently.

Enhanced Modeling of Detailed Regions

With Multi-Block meshing capabilities in ***FLOW-3D***, you can easily and quickly capture complex geometries and apply varying degrees of resolution for sharper modeling.

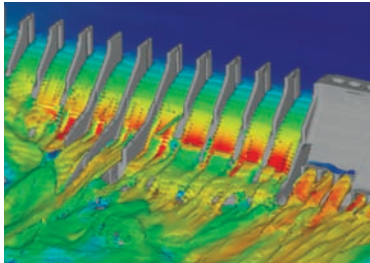


Simulation of flow around a mussel clump. Images courtesy of Blue Hill Hydraulics. Postprocessing by FieldView.

More Precise Simulation

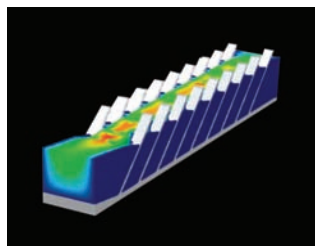
Access a wide variety of models with **FLOW-3D's** all-inclusive package:

Improve Dam and Spillway Performance by optimizing designs. **FLOW-3D** can quickly simulate a multitude of configurations to best determine flow of spillways, stilling basins and energy dissipaters.

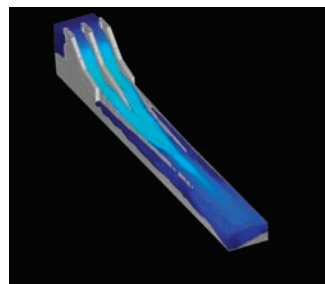


Dam and Spillway Safety is an essential component in the design process. **FLOW-3D** enables engineers to predict flow

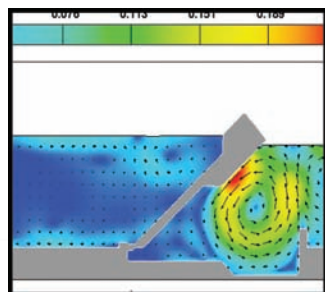
rates at Probable Maximum Flood conditions, determine cavitating regions and pressure loading on gates.



Fish Passages are a critical component in the design of hydraulic structures. **FLOW-3D** aids in the design of safe and effective passages by capturing their complex flow characteristics.



Air Entrainment may help sustain growth of microorganisms and cause detrimental downstream bulking and overtopping structures. **FLOW-3D's** Air Entrainment model determines quantities of air entrained and its volumetric bulking effects.



Fluid-Structure Interaction: Frequently, the flows that engineers need to model include moving components. In **FLOW-3D**, the movement of objects fully coupled with fluid flow can be simulated, making it possible to improve the function of these devices quickly and reliably.

"FLOW-3D is a powerful tool for solving complex hydraulic issues related to planning, design and operation of our hydraulic system, as well as associated environmental studies. I am also impressed with Flow Science's customer support and product development."

Kevin Sydor, M.Sc., P.Eng.
Senior Hydrotechnical Studies Engineer, Manitoba Hydro

New v9.4 Models

Multi Sediment Scour & Bedload Transport

Scour and deposition is an important consideration in the design of bridges, dams and reservoirs. The sediment scour model in **FLOW-3D** enables users to study the erosion and deposition of sediments caused by powerful currents and complex flow patterns.

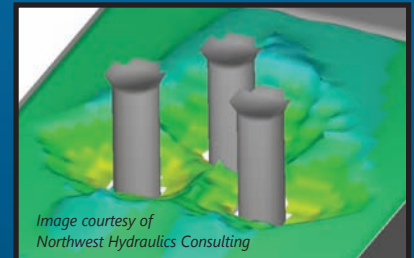


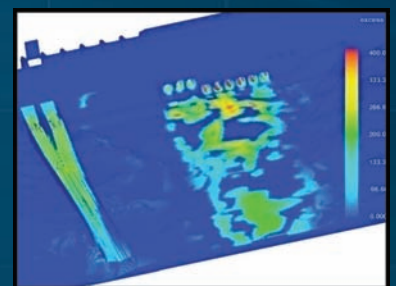
Image courtesy of Northwest Hydraulics Consulting

FLOW-3D simulation of the erosion that occurs around a group of three 2.4 m diameter piers as river water flows past at 1.5 m/s.

This model handles multiple components such as sands, silts, and fine gravel in one simulation. The bedload transport model describes the transport of heavier debris by the currents along the bottom of the reservoir.

Scour Potential

The Scour Potential model computes excess shear stress at which scouring can occur.



Simulating scour potential downstream of a dam.

FLOW-3D

from

FLOW Science

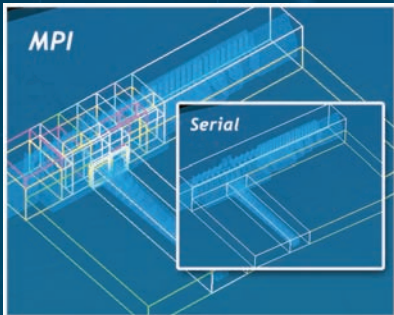
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FLOW-3D/MP v4.0 Cluster Version

FLOW-3D/MP v4.0 is the latest cluster version of FLOW-3D and allows for larger simulations to be run and results obtained more quickly than with the serial version. Simulation runtimes can be reduced by 3-4x on 8 processors. FLOW-3D/MP is available on both Linux and Windows Compute Cluster.

Automatic Decomposition Tool

FLOW-3D/MP v4.0 now includes an Automatic Decomposition Tool (ADT) which makes meshing easier than ever. ADT automatically finds the most efficient way of dividing the domain into multiple mesh blocks. This feature not only saves users time setting up their simulations, but it obtains more computational efficiency than before.



ADT aids in decomposing the domain into multiple mesh blocks when the geometry is complicated, like in the geometry of this dam that could not be easily decomposed manually.

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An All-Inclusive Application

From Model Setup to Simulation to Detailed Results Analysis

FLOW-3D includes all the functionality you need in one simple-to-use application, driven by an intuitive graphical user interface. Users can easily set up a model and quickly mesh it through its graphical model builder, screen out model incompatibilities and configuration errors, and perform detailed analysis through extensive post-processing capabilities.

Hydraulics Data Output

FLOW-3D has a complete postprocessor capable of outputting data graphically in 1-D, 2-D and 3-D views or numerical data for import to other analysis packages. The postprocessing includes specific data, such as: fluid residence time, fluid elevation, depth-averaged velocity, and velocity at an offset from the bottom.

Dedicated Support

The professionals at Flow Science work closely with customers to understand their needs and ensure the software continuously meets their real-world challenges. Flow Science offers valuable training to help customers maximize their use of **FLOW-3D**. Most importantly, Flow Science provides accessible, responsive technical support.

Call **505-982-0088** or email sales@flow3d.com for more information about how **FLOW-3D** can enhance the reliability and quality of your hydraulics designs and help you reduce overall costs.

"FLOW-3D's greatest strength is its adaptability. At Blue Hill Hydraulics, we use the program to provide real-time support to manufacturers working in a wide variety of industries and to help manage our company's aquaculture operations along the Maine coast. No other CFD program is as reliable or as easy to use as FLOW-3D."

*John E. Richardson, Ph.D., P.E.
President, Blue Hill Hydraulics*



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505-982-0088

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