FLOW-3D® HYDRO

Turbulent Intensity
0.0   25.0   50.0   75.0   100.0

entrained air volume fraction
0.00   0.08   0.15   0.23   0.30
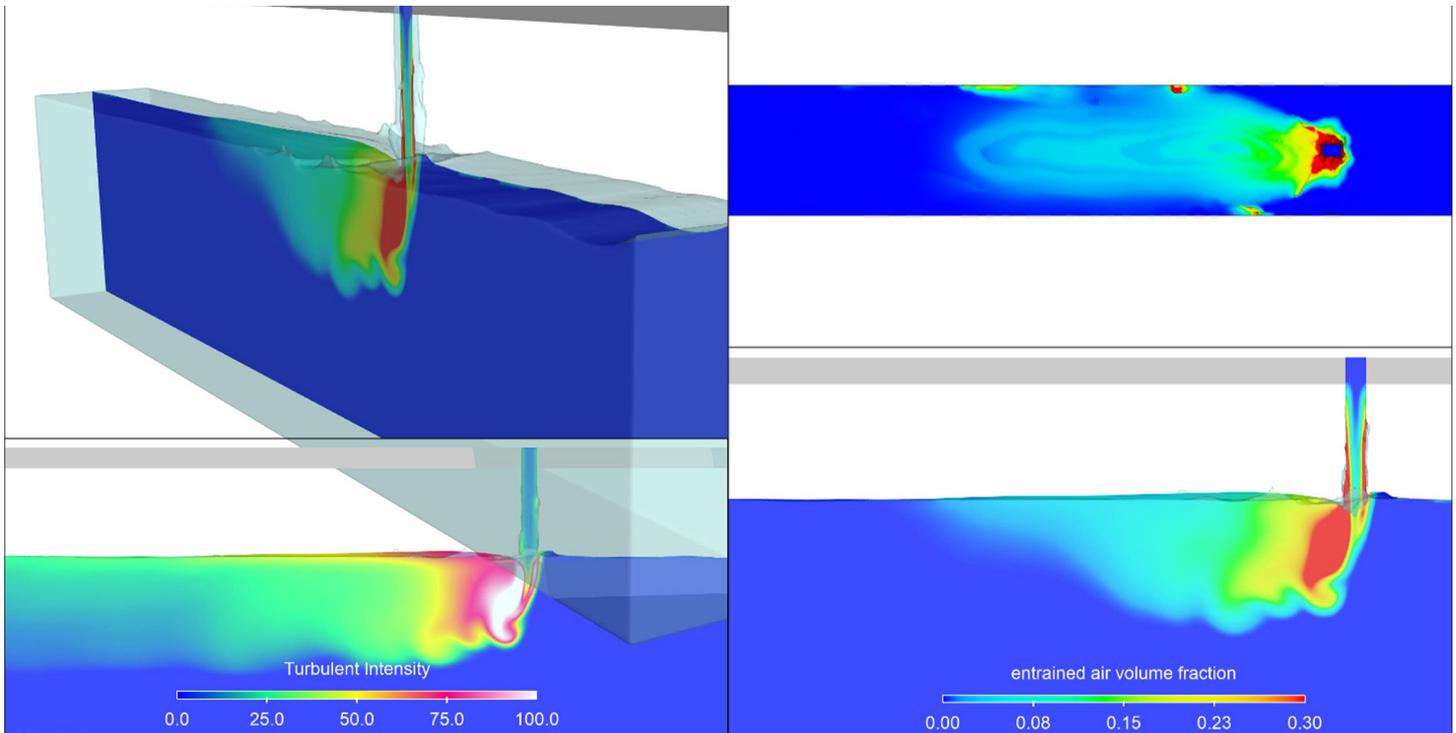
Understanding the effects of entrained air on flow bulking, overtopping, and cavitation is a critical component for the design and analysis of hydraulic structures. Entrained air also plays an important role in the reaction rates and mixing processes of wastewater treatment plants.

FLOW-3D HYDRO's air entrainment model is a powerful tool that simulates the entrainment of undissolved gas bubbles at free surfaces. Capabilities include localized and turbulent free surface entrainment observed at impinging jets and spillways. The entrained air/water mixture is simulated as a two-phase fluid using the drift-flux model, accounting for the variable density and buoyant effects of the entrained air bubbles.
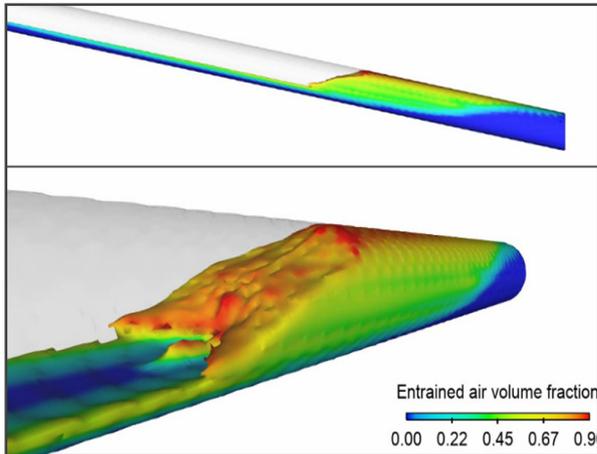
# FLOW-3D® HYDRO

AIR ENTRAINMENT

MODELING CAPABILITIES

· Turbulent free surface air entrainment
· Localized air entrainment
· Variable density two-phase flow
· Constant or dynamic bubble sizes

Entrained air volume fraction
0.00 0.22 0.45 0.67 0.9

Localized air entrainment in a hydraulic jump

APPLICATIONS

· Fluid bulking
· Stilling basin overtopping and capacity
· Hydraulic jumps
· Ventilation shafts
· Drop shafts
· Two-phase flow hydrodynamics
· Wastewater treatment plants
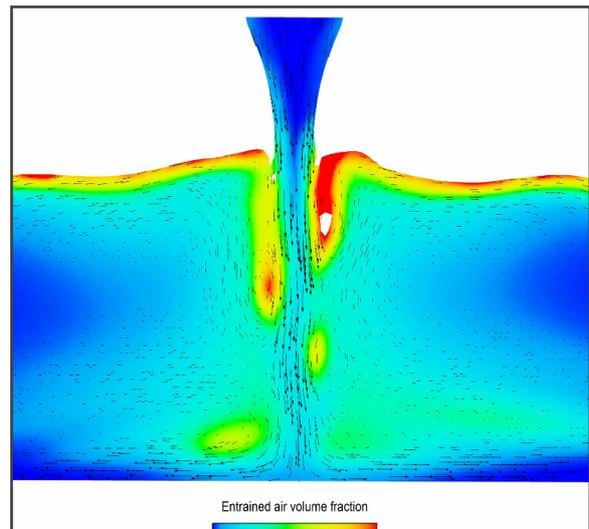
Localized air entrainment of an impinging jet

Entrained air volume fraction
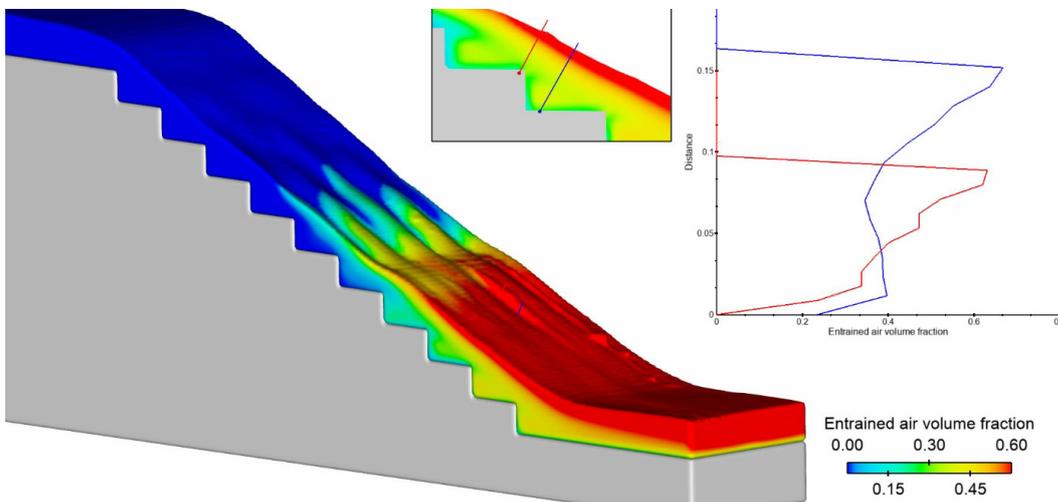
Turbulent free surface entrainment on a stepped spillway

Entrained air volume fraction
0.00   0.30   0.60
0.15   0.45