

Title	Numerical modelling of pressure suppression pools with CFD and FEM codes
Author(s)	Timo Pättikangas, Jarto Niemi and Antti Timperi
Affiliation(s)	VTT Technical Research Centre of Finland
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Abstract	<p>Experiments on large-break loss-of-coolant accident for BWR is modeled with computational fluid (CFD) dynamics and finite element calculations. In the CFD calculations, the direct-contact condensation in the pressure suppression pool is studied. The heat transfer in the liquid phase is modeled with the Hughes-Duffey correlation based on the surface renewal model. The heat transfer is proportional to the square root of the turbulence kinetic energy. The condensation models are implemented with user-defined functions in the Euler-Euler two-phase model of the Fluent 12.1 CFD code.</p> <p>The rapid collapse of a large steam bubble and the resulting pressure source is studied analytically and numerically. Pressure source obtained from simplified calculations is used for studying the structural effects and FSI in a realistic BWR containment. The collapse results in volume acceleration, which induces pressure loads on the pool walls. In the case of a spherical bubble, the velocity term of the volume acceleration is responsible of the largest pressure load. As the amount of air in the bubble is decreased, the peak pressure increases. However, when the water compressibility is accounted for, the finite speed of sound becomes a limiting factor.</p>
Key words	Condensation pool, pressure suppression pool, BWR, CFD, fluid-structure interactions, FSI