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**Presentation Title:** Analisi CFD delle valvole sottomarine

**Abstract:**

ATV is a worldwide-affirmed manufacturer of valves and actuators for the most demanding applications in the offshore industry, such as deep and ultra-deep water, High-Pressure/High-Temperature, highly corrosive services and HIPPS applications. Due to the harsh environment and the high demanding working conditions, product design, mechanical strength and fluid dynamic performance are carefully evaluated to avoid any issue in service. Even if final acceptance tests are physically performed on the valve in a controlled environment, numerical analyses are cost-effective solutions that predict valve's behavior in conditions more adherent to field environment. Being a true Multiphysics problem, in which mechanical behavior is coupled with hydrodynamics and thermal phenomena, valve numerical assessment involves both classical FEM and CFD analyses. Coupling the CFD data with FEA lead to the determination of the structural strength of the valves exposed to high temperature and pressure, using fluid-solid interaction simulation technique. Fluid dynamic analyses of subsea valves cover different aspects, evaluating the hydrodynamics performance (i.e. valve flow coefficient or water hammer effects), the possibility of internal erosion due to particles transport, and the force induced by seabed currents alongside the thermal condition due to natural and forced convection. Furthermore, experimental testbeds are numerically simulated too before their physical manufacture: the interaction of the valve with the surrounding instruments and pipeline can be comprehensively evaluated, in a easy and rapid way, leading to the design of a more effective (and less expensive) test bed. Thus, CFD analyses are usually aimed to - help designers to improve valves performances, identifying critical areas subject to erosion and evaluating environmental boundary conditions like the hydrodynamic forces or the temperature field; - validate the product in respect of project specifications, evaluating the pressure drop due to internal friction and verifying the flow coefficient; - design test bed to perform accurate tests. CFD analyses are a very powerful tool, which help designers to compare solutions and create better products in a cost-effective way. Indeed, CFD simulation is a recognized method to evaluate valve's performance and behavior, verifying the final design against Customer's specifications.