### Project:
SUCTION CHAMBERS FOR COOLING WATER PUMPS (scale 1:9)

### Project team:
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### Client:
VA TECH COMBINED CYCLE GmbH & Co

### Objectives:
- Identification of air entraining surface vortices during pump operation
- Determination of swirl flow in the pumps suction pipes
- Recommendations of constructive measures to suppress these shortcomings

### Abstract
Vortex and swirl formation in pump sumps are mostly generated by eccentric approaching flow conditions caused by offset introduction, velocity gradients or obstructions. The occurrence of asymmetric inflow conditions were also assumed for the suction chamber of a cooling water system at a combined cycle gas turbine power station in Ireland. However, such inflow conditions can provoke harmless or harmful vortices. Surface and subsurface vortices are responsible for the generation of swirl flow into the suction pipe with their negative effects on the pump efficiency. Therefore, the Institute of Hydraulic Engineering was commissioned to investigate by means of a hydraulic model test (scale of 1:9) all potential deficiencies of the existing pump sumps in terms of possible air entrainment due to surface vortices in all potential combinations of pumps and screen operating regimes. A further goal was to determine the size of the inflow swirl in the suction pipes of the cooling water pumps resulting from submerged floor, wall and interlinked vortices.

### Hydraulic model tests of a multi pump sump

![Hydraulic model test](image)

**Reference:**