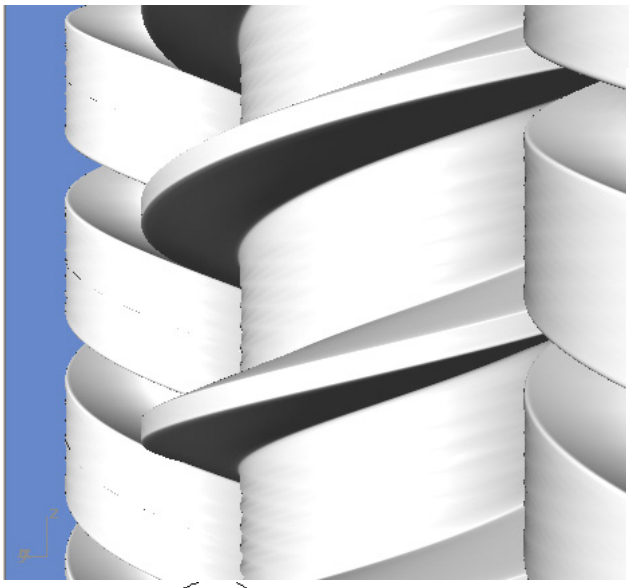
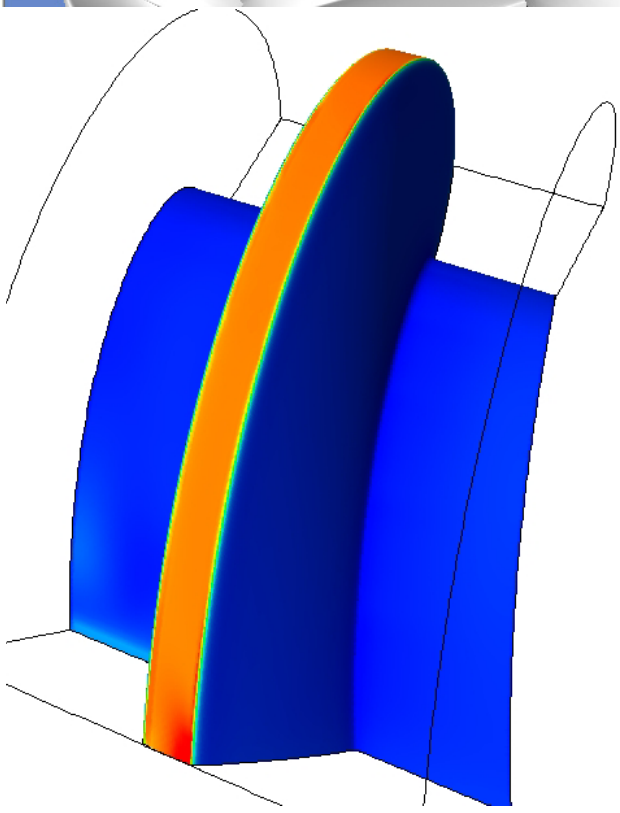
Intelligent Fluid Solutions
Experts in Fluids Engineering

A Hybrid Approach for Screw Pump Leakage Flow Analysis





A twin-screw pump consists of a central power screw intermeshing with two idler shafts with matching thread. The three shafts are supported within a housing so that the spaces between the threads and housing define discreet volumes. As the pump rotates fluid is moved from the low-pressure inlet side to the high -pressure outlet side via the discreet spaces between the threads.

The upstream pressure is communicated to the downstream chamber by means of a certain amount of slip flow between the component clearances. The degree of slip flow plays a vital role in the volumetric efficiency of the pump as well as mechanical losses due to friction.

Detailed CFD analysis of the slip flow was required to compliment and advance an existing design tool for the pump. The slip flow analysis required advanced structured meshing and domain creation to accurately capture the broad scale of fluid behaviour.

A unique combination of CFD simulation and spreadsheet analysis was developed for this problem to optimally model the pump behaviour. Critical sub-regions of the pump were analysed using CFD, then the results were pieced together in spreadsheet form to develop a full picture of the pump.

This approach facilitated a cost-effective solution to a difficult problem, reducing the analysis turn-around time from 3 weeks to 3 days.

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