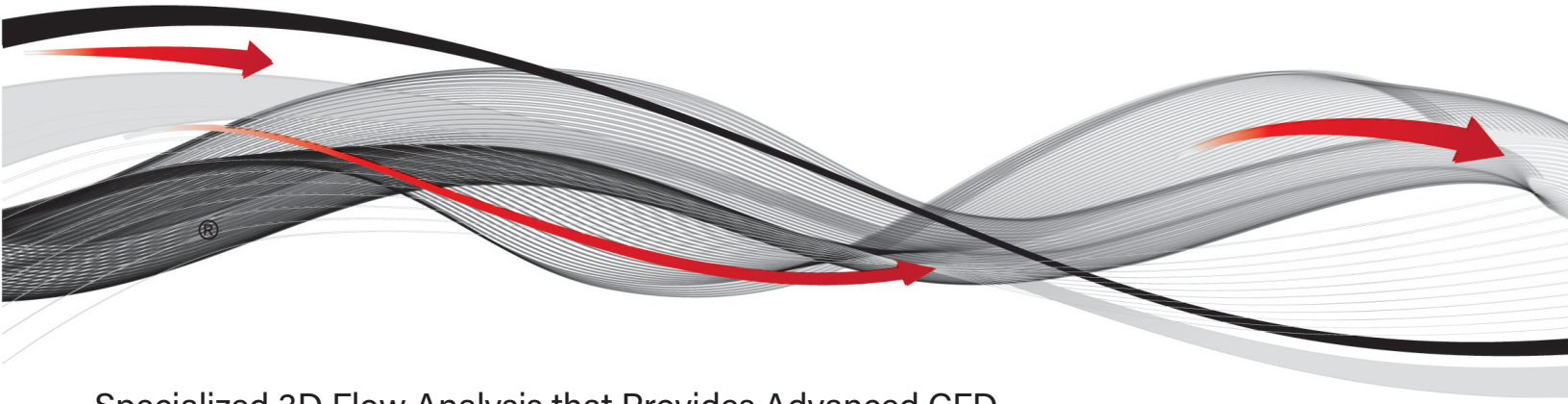
Concepts NREC

Experts in Turbomachinery

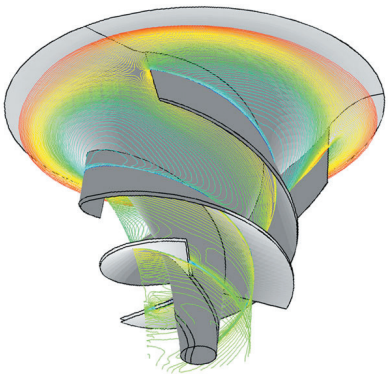


Specialized 3D Flow Analysis that Provides Advanced CFD

pbCFD™

Understanding the fluid dynamics of rotating machinery is fundamental to the development of competitive turbomachinery designs and products. pbCFD™ is the computational fluid dynamics (CFD) component of Concepts NREC's Agile Engineering Design System®. While intuitive enough for new CFD users who are interested in a cost-effective alternative to prototype manufacturing and testing, Pushbutton CFD also proves robust enough for advanced users who want to quickly and accurately optimize product efficiency and functionality.

Getting the Right Results Faster

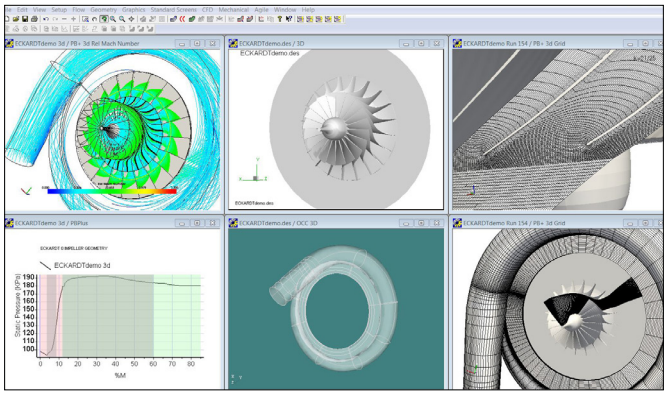


Concepts NREC provides commercial CFD products designed specifically for the turbomachinery industries. Utilizing extensive in-house design, experimental, and production expertise, Concepts NREC developed pbCFD based on a comprehensive understanding of the challenges faced by the rotating machine industry. The software offers state-of-the-art modeling capabilities such as a third-order AUSM finite volume scheme, real fluid behaviors and properties, and two phase flows. Also included are the industry-standard Spalart-Allmaras, k-epsilon, k-omega, and SST two-equation turbulence models. Validated with empirical data, pbCFD is the analysis solution for users who need the right answer faster.

We design our tools to integrate into and complement our clients' design processes. While our solver decreases development cycle times, it simultaneously increases the number of design iterations possible when compared to equivalent time spent invested in alternatives that require independent modeling, design, and analysis tools.

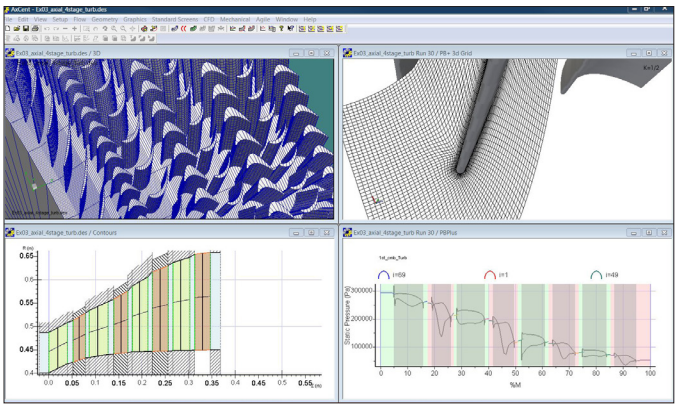
True Pushbutton Functionality

pbCFD has evolved to function in a truly "push-button" fashion. Combined with AxCent®, pbCFD's design and geometry modeling counterpart in the Agile Engineering Design System, it is easy to model design alternatives. Often in a matter of minutes users get results and insights into the flow behaviors of the rotating machinery under analysis. For those looking for high-performance computing solutions, both shared and distributed memory versions of the solver are available.



Radial compressor stage with volute in pbCFD.

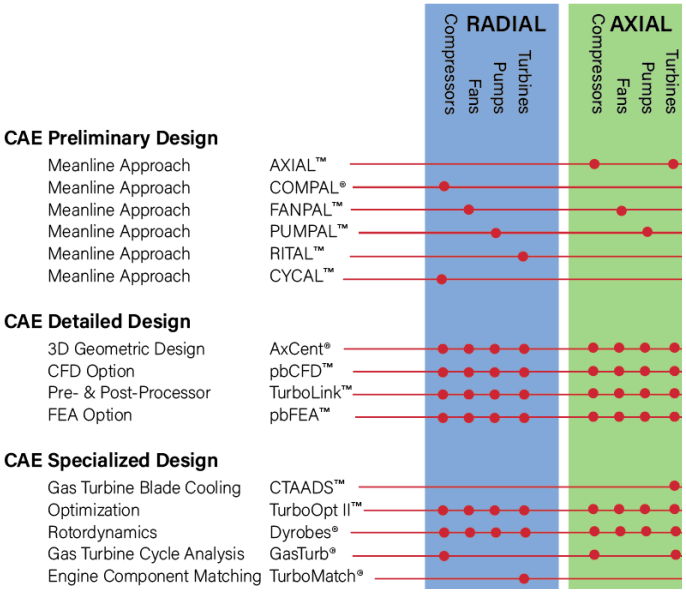
Meshing, often considered one of the most time consuming efforts in the CFD process, is integrated into pbCFD. By default, the automated meshing, smoothing, and refinement processes capture small and complex features such as blade tip-to-shroud clearances features that, when neglected or improperly represented, have a great effect on the accuracy of analysis results. Other flexible, more advanced meshing options for additional control are also offered. With automated meshing and rapid solution times that provide quick, accurate results, users can focus on fine-tuning instead of spending time setting up analyses.



Four-stage axial turbine analyzed with pbCFD.

Integrated Solution Increases Efficiency

pbCFD, together with the Agile Engineering Design System, provides an integrated solution with computer-aided design (CAD), meshing, and analysis tools for turbomachinery in one simple and compact interface. Engineers can oversee the entire turbomachinery design process, avoiding the time and hassle involved with shuffling data and models between multiple software tools and team members. Concepts NREC's data analysis tools automatically extract, interpret, and compare pbCFD's results for turbomachinery-specific factors such as pressure ratio, loading curves, incidence angle, and efficiency. pbCFD mesh and analysis data can also be exported for additional external analyses.



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