

Pushbutton FEA™

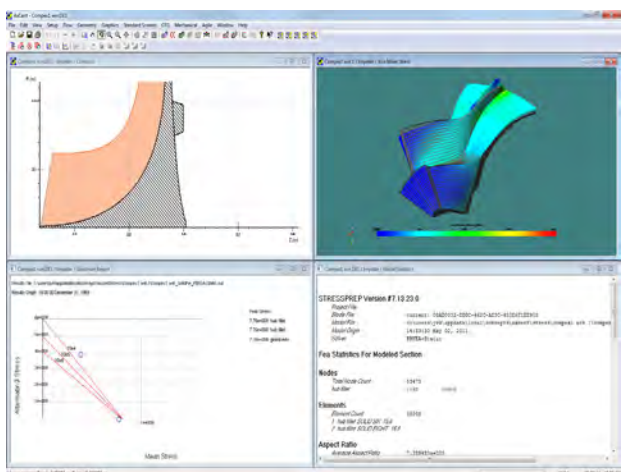
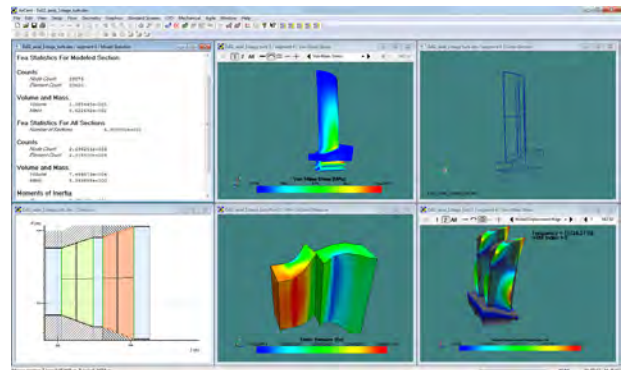
PRODUCING DESIGNS THAT MEET BOTH PERFORMANCE AND PRODUCT LIFE CRITERIA IS A FUNDAMENTAL component of today's advanced turbomachinery marketplace. Pushbutton FEA™ is designed to both extend and integrate into your design environment. This enables aerodynamic and structural design to be performed concurrently within AxCent® utilizing the integrated FEA tools. Since this can be done as soon as you have initial blade definition, it means structural analysis and life assessment can be performed earlier in the design process than ever before.

Modeling

Complex radial and axial geometries can be easily modeled with the parametric tools available within Pushbutton FEA, which has a powerful and accurate linear finite element solver. Above all, Pushbutton FEA is designed to be simple and intuitive for the non-FEA professional, while still providing the necessary power and flexibility for the structural design professional.

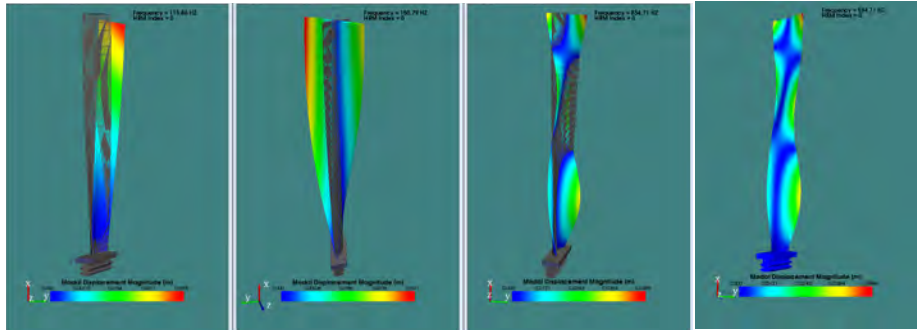
FEA Solver

Both quadratic and linear elements are available for all analysis types. Thermal, static, and modal solvers are available. Cut faces can be modeled using both cyclic and coupled DOF boundary conditions. All of the load information is created from the previously calculated aerodynamic conditions using rapid load, MST or CFD. These aerodynamic loads are applied to the FEA model elements as convective heat transfers and pressures applied to the external element faces. Thermal



Both axial and radial analyses are integrated within the AxCent® software.

stresses can be included in the static analysis, and the static stresses can also be incorporated as a pre-stress condition for the modal solver. Spin or centrifugal softening is available, as is the use of a lumped mass matrix instead of the default consistent mass matrix.



Modal analysis results can be animated.

Closely Coupled

There are no files involved in the transfer of information from the aero to the mechanical design, so modifications to the aero definitions are immediately updated into the mechanical design. This reduces the likelihood of the two processes becoming desynchronized due to outdated definition files.

Support of Other Solvers

In addition to the integrated Pushbutton FEA solver, the software maintains its links with other FEA solvers such as ANSYS®, COSMOS/M®, NASTRAN™ and ABAQUS® and therefore can also be utilized with your existing tools. Using a 3rd party solver means that Pushbutton FEA becomes a powerful and intuitive geometry design tool with grid generation. Some post-processing capability is also available, such as Goodman, Campbell, and interference diagrams.

Post-processing

For the Concepts NREC Pushbutton FEA solver, full 3D post-processing is available. Displaced geometry color surface contour plots of temperature, displacement, and stresses can be overlaid with undisplaced wireframes, making it easier to visualize the effects of the load conditions. There is also modal displacement-based animation which can be used to view the mode shapes. This is particularly useful for visualizing the typical modal displaced shapes.

Agile Engineering Design System® Applications

		Radial		Axial					
		Compressors	Pumps	Fans & blowers	Turbines	Compressors	Pumps	Fans & blowers	Turbines
Preliminary design	COMPAL®	✓							
	PUMPAL®		✓						✓
	RITAL™				✓				
	FANPAL™			✓					✓
Detailed design	AXIAL™						✓	✓	✓
	AxCent®	✓	✓	✓	✓	✓	✓	✓	✓
CFD	Pushbutton CFD®	✓	✓	✓	✓	✓	✓	✓	✓
FEA	Pushbutton FEA™	✓	✓	✓	✓	✓	✓	✓	✓
Optimization	TurboOPT II™	✓	✓	✓	✓	✓	✓	✓	✓
CAM	MAX-PAC™	✓	✓	✓	✓	✓	✓	✓	✓

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CONCEPTS NREC

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Concepts NREC design software is compatible with all commercial design packages.