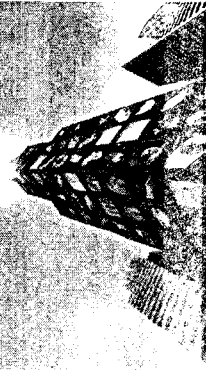



Release 10.0
November 2005




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Outline

- Turbo System
 - BladeModeler & TurboGrid
 - TurboPre & TurboPost


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CAE Integration

- Workbench CAE environment:
 - Unified geometry, tools, data, look
- CFD-related components in Workbench:
 - CFD meshing, CFX core technology, TurboSystem
- Fluid-structure interaction:
 - Basic FSI: 1-way CFX → ANSYS, ANSYS → CFX
 - Advanced FSI: 2-way force-displacement-thermal, mesh morphing, transient implicit, native IPC

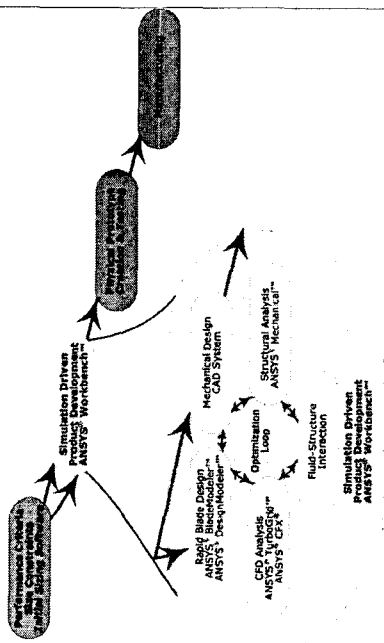
ANSYS Workbench



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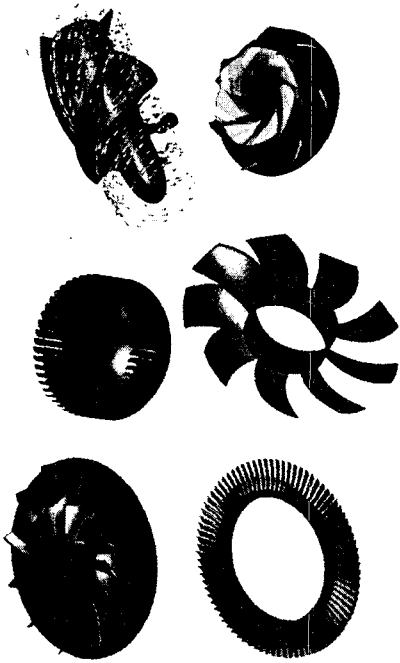


Rotating Machinery Design Process



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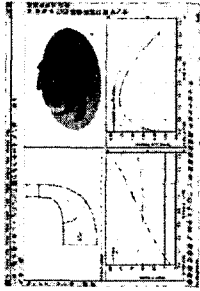
ANSYS CFX for Rotating Machinery



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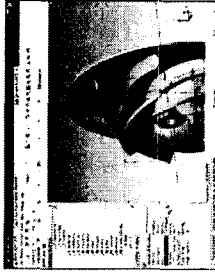
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Design Geometry BladeModeler



BladeGen

- Sketching
- Turbo coords
- Design language
- Rich tools
- Multiple modes



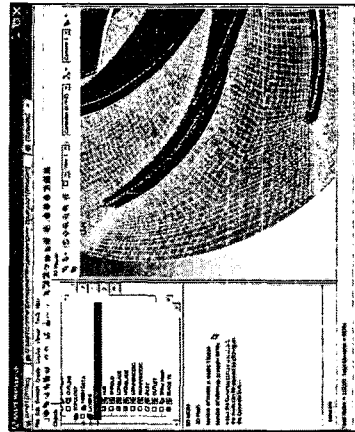
Blade Editing in DesignModeler

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Hex CFD Mesh: TurboGrid



- Efficient Blade Passage Meshing
- Blade curves from BladeModeler
- High quality hex
- High resolution boundary Layer
- Near automated
- Tip mesh: "thin"
- Template approach
- WYSIWYG

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Hybrid CFD Mesh: CFX-Mesh

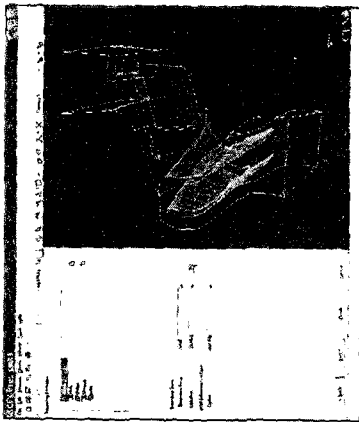


- General geometry
- Hybrid elements
- Less user time
- More nodes
- Design preview

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Physics: TurboPre

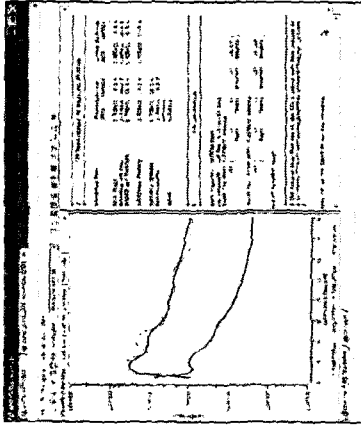


- Turbo-specific Prep
- Single component
- Multiple component
- Multiple passage
- Automated setup
- Connections
- Physics
- Boundaries

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CFX Solver: Single or Multiple Rotating Frames

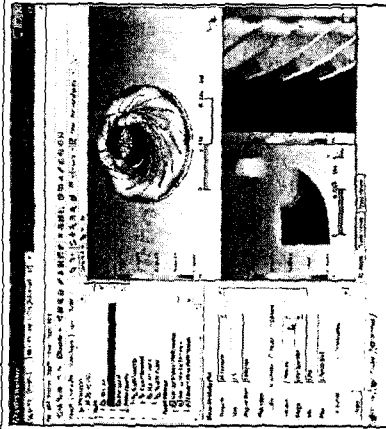


- Turbo-specific BC's
- Multi-frame extensions
- Stage const. Ptotal
- Transient efficiency
- Non-reflective outlets
- Non-equilibrium steam

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Post Processing: TurboPost

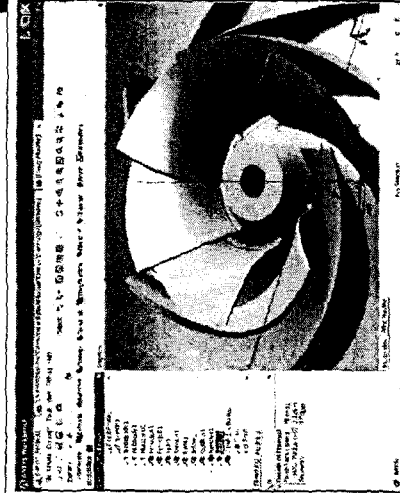


- Turbo Specific Post
- M-prime - θ
- Unrolled views
- Meridional views
- Meridional average
- Performance
- Blade load charts

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3D CAD: BladeModeler



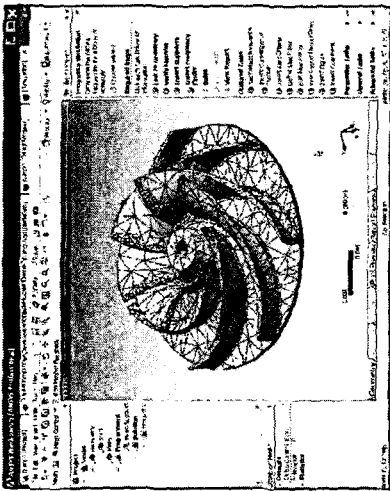
- 3D solid
- Fluid volume
- Solid volume
- Merid. Sketch
- trim, edit

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ANSYS Simulation: FEA Mesh

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ANSYS Simulation: FE Analysis

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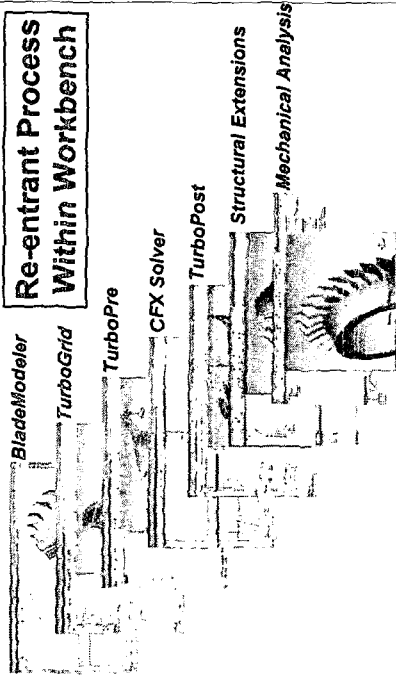


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Workbench TurboSystem

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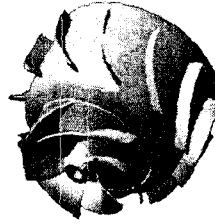


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Demo-Mixed Flow Pump

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- Pump stage analysis
- BladeGen files:
 - Mixed_Flow_Pump_Impeller.bgd
 - Mixed_Flow_Pump_Diffuser.bgd
- Conditions
 - Fluid: Water
 - Speed: 800 [rpm]
 - Inlet flow direction: normal to inlet
 - Inlet Pt: 1 [atrn]
 - Total exit flow rate: 132 [kg/s]

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