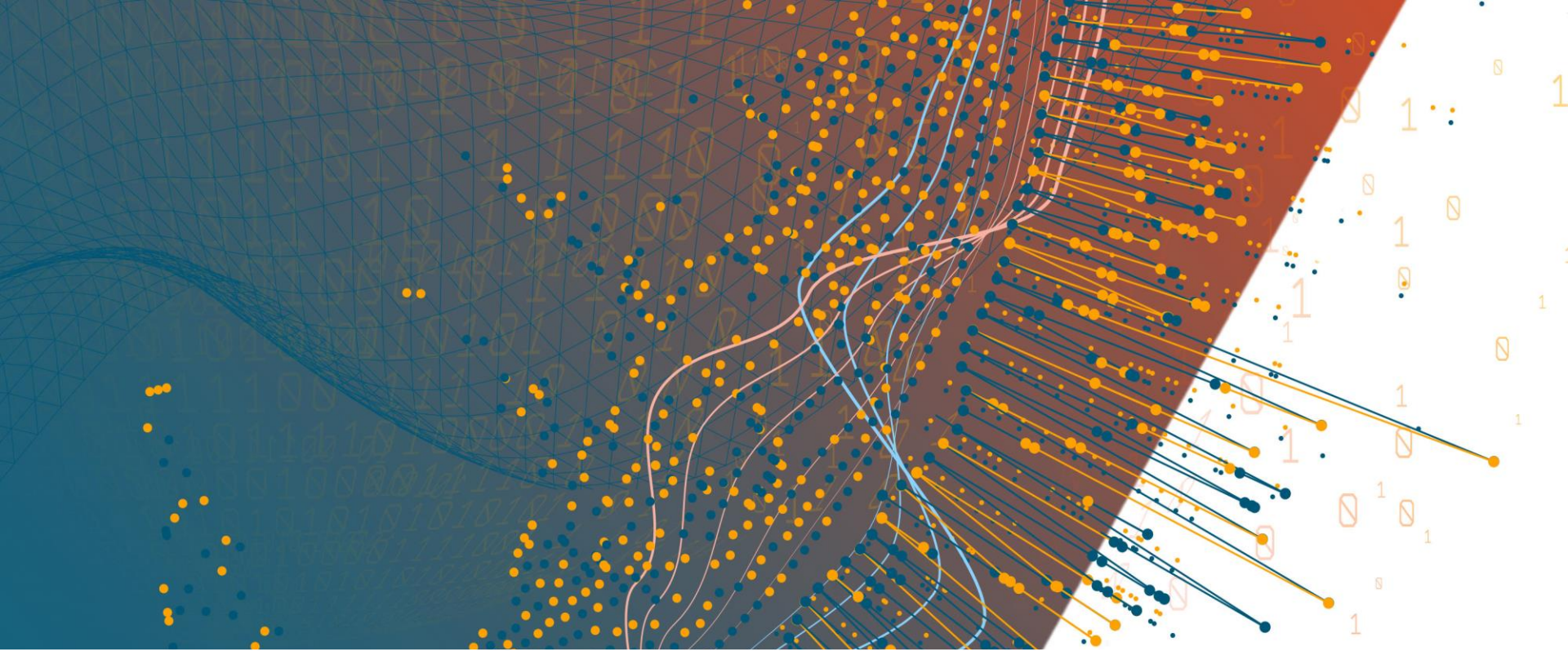


ALTAIR | AnalySwift™

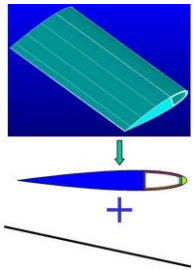
VABS TOP USE CASES

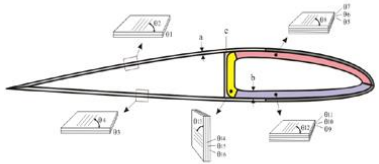
Altair Partner Alliance

VABS for Composite Rotor Blades (Helicopter, eVTOL/AAM/UAM/ORB/UAV/UAS/ODM, Propeller) and Wind Turbine Rotor Blades

Challenge

- Composite rotor blades are impossible to accurately model using conventional approaches due to their complexity. In fact, representing such blades in a 3D FEA computer model would require billions of degrees of freedom to accurately capture all the engineering properties (especially torsional behavior and transverse shear stress), overwhelming available computing resources. This forces engineers to use less than ideal workaround approaches such as a smeared properties approach in 3D FEA or relying on shell elements, both of which compromise accuracy. VABS overcomes these limitations by enabling extremely accurate and efficient simulation of composite wind turbine rotor blades.





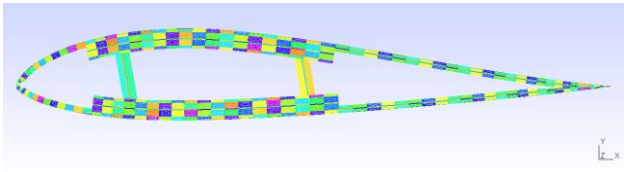
Solution

- VABS can calculate ply-level details or real composite blades with the accuracy of 3D FEA in seconds on a typical laptop computer. The primary advantages to users are accuracy, efficiency, and versatility.

  - ACCURACY: (1) Best complete set of beam properties: needed for static/dynamic design and analysis of rotor blades; (2) Complete set of accurate stresses/strains for assessing the structural safety of the blades; (3) Extensively validated in helicopter and wind industry.

  - EFFICIENCY: (1) Highly optimized for efficiency: ply-level details modeled in seconds

  - VERSATILITY: (1) No requirement for user to be an FEA expert; (2) Directly integrated into other design environments; (3) A unique technology continuously funded by US Army since 1988.



Result

- Users can quickly and accurately predict structural properties and recovering 3D stresses/strains of blades (helicopter/wind/eVTOL) and other slender composite structures (propellers, wing sections, landing gear, golf clubs, tubes, rods, columns, poles, shafts, etc.).

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VABS for Consumer/Sporting Goods

(Golf Club Shafts, Fishing Rods, etc.) and Other Slender Structures (Medical Devices, Satellites, etc.)

Challenge

- Composite rotor blades are impossible to accurately model using conventional approaches due to their complexity. In fact, representing such blades in a 3D FEA computer model would require billions of degrees of freedom to accurately capture all the engineering properties (especially torsional behavior and transverse shear stress), overwhelming available computing resources. This forces engineers to use less than ideal workaround approaches such as a smeared properties approach in 3D FEA or relying on shell elements, both of which compromise accuracy. VABS overcomes these limitations by enabling extremely accurate and efficient simulation of composite wind turbine rotor blades.

Solution

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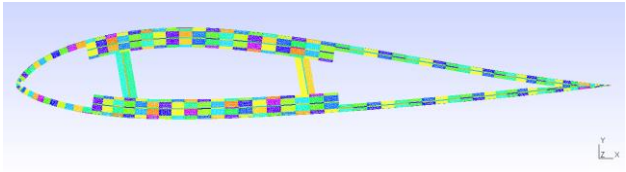
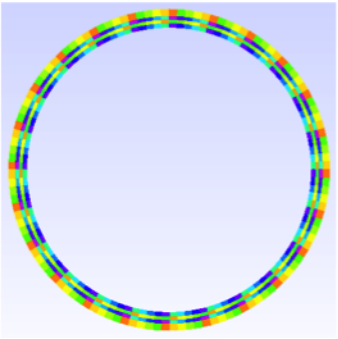
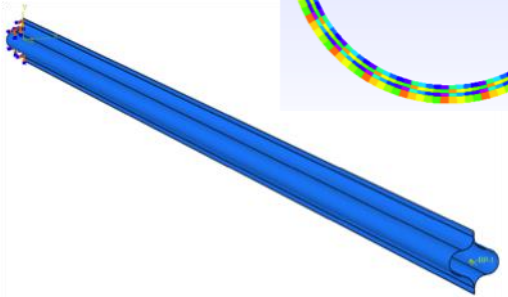
Result

- Users can quickly and accurately predict structural properties and recovering 3D stresses/strains of blades and other slender composite structures modeled as beams (propellers, wing sections, tubes, rods, columns, shafts, etc.).







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