3-D modeling and hexahedral mesh generation method based on failure characteristics of remanufactured centrifugal compressor impeller

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Abstrak

The precision of the 3-D model and the mesh quality of the remanufactured impeller are directly related to the accuracy of the results of numerical simulation analysis. In order to acquire high accuracy results, 3-D Modeling/hexahedral mesh technologies for remanufactured centrifugal compressor impellers are investigated. A method to reconstruct the structural characteristics of the remanufactured centrifugal compressor impellers, which was based on the measurement points of the structural characteristics and NURBS curve and surface theory, was proposed on the basis of the failure characteristics. Besides, the 3-D model construction process of the remanufactured centrifugal compressor impeller was introduced in detail. Furthermore, based on the 3-D model, a hexahedral meshing method was proposed. The quality of the remanufactured impeller mesh was analyzed with Jacobian matrix. The results showed that the 3-D model and the hexahedral mesh in this study met the accuracy requirement of the FEM analysis.