

SCALE-DOWNED PITCH CONTROLLER FOR MODEL TEST OF A 5MW FLOATING OFFSHORE WIND TURBINE

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Conclusion & Future work

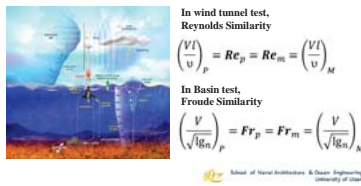
- 3D modeling and manufacturing of a scale-downed blade pitch controller for model tests of a 5MW floating offshore wind turbine by CATIA and by 3D printer, respectively.
- Active pitch controller which can adjust the thrust force under fluctuating wind through PID control.

Introduction

Motivation



Froude Similarity & Reynolds Similarity

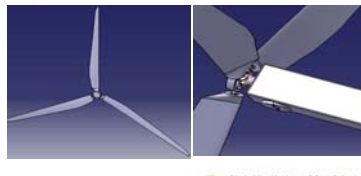


Nacelle and Hub Properties

Elevation of Yaw Bearing above Ground	87.6m
Vertical Distance along Yaw Axis from Yaw Bearing to Shaft	1.96256m
Distance along Shaft from Hub Center to Yaw Axis	5.01910m
Distance along Shaft from Hub Center to Main Bearing	1.912m
Hub Mass	56,740kg
Hub Inertia about Low-Speed Shaft	115,926kgm ²
Nacelle Mass	240,000kg
Nacelle Inertia about Yaw Axis	2,670,890kgm ²
Nacelle CM Location Downwind of Yaw Axis	1.5m
Nacelle CM Location above Yaw Bearing	1.75m
Equivalent Nacelle-Yaw-Actuator Linear-Spring Constant	9,028,320,000N/m/rad
Equivalent Nacelle-Yaw-Actuator Linear-Damping Constant	19,160,000N/(rad/s)

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CATIA Video



Reference model

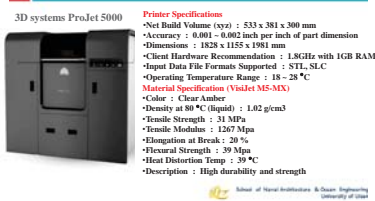


Procedure of manufacturing

Used program



3D Printer (ProJet 5000)



Printing procedure

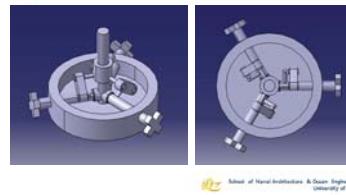


Printing procedure



Result

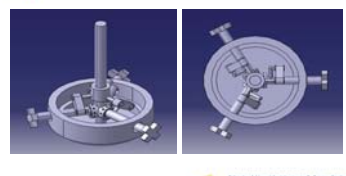
Model 1



Model 1



Model 2



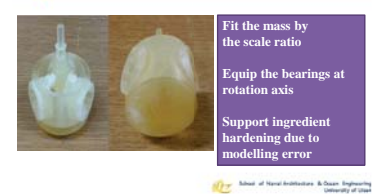
Model 2



Model 3



Model 3



Model 4



Model 4



Future Work

