

VERTICAL AXIS WIND TURBINE

PROJECT DESCRIPTION

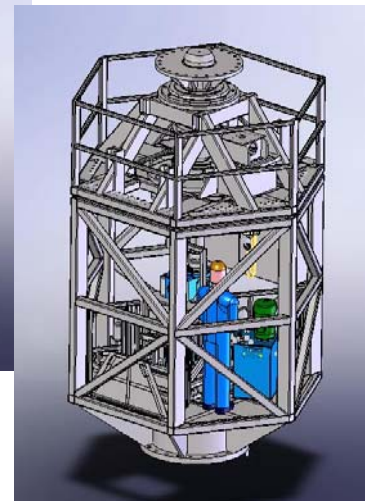
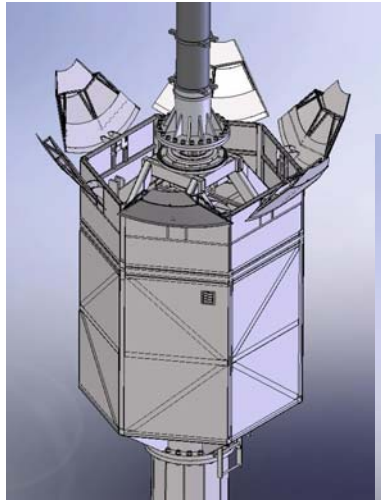


A CLIENT ASKED THAT I HELP THEM DESIGN A NEW WIND TURBINE TARGETED FOR COMMERCIAL INSTALLATIONS. ALL PARTS OF THIS NEW VERTICAL AXIS WIND TURBINE WERE DESIGNED FROM SCRATCH. I PROVIDED ASSISTANCE WITH:

- INTEGRATION OF THE BLADE ASSEMBLY, MACHINERY HOUSE, AND TOWER.
- DESIGN OF THE COMPLETE MACHINERY HOUSE, POWER TRANSMISSION COMPONENTS, HYDRAULIC BRAKING MECHANISMS, AND MAINTENANCE EQUIPMENT.
- OVERSIGHT AND COORDINATION BETWEEN THE BLADE DESIGNER, TOWER DESIGNER, AND ALL MANUFACTURER'S INVOLVED IN THE PROJECT.

DESIGN NOTES

- THE WIND TURBINE WAS DESIGNED TO WITHSTAND AN IEC CLASS III 50 YEAR EXTREME WIND OF 52.5 M/S (117 MPH).
- THE MAIN SUPPORT SHAFT AND BEARING ASSEMBLY WERE REQUIRED TO RESIST A MAXIMUM OVERTURNING MOMENT AT THE BOTTOM OF THE BLADE ASSEMBLY OF APPROXIMATELY 6,430,000 IN-LBF AND A RADIAL LOAD OF APPROXIMATELY 28,000 LBF.
- FOR INSTALLATION PURPOSES, THE MACHINERY HOUSE ROOF HAD TO BE RETRACTABLE.
- TO GENERATE POWER, A 15 kW MOTOR WAS CONNECTED TO A 50.8:1 SPEED INCREASER.
- A CUSTOM HYDRAULIC STORM BRAKE WAS DESIGNED TO WITHSTAND THE EXTREME TORQUE PLACED ON THE MAIN SUPPORT SHAFT, APPROXIMATELY 1,050,000 IN-LBF.



PROJECT SUMMARY



THE PROJECT DESIGN WAS COMPLETED AND INSTALLED IN JUNE 2009. THE PROTOTYPE UNIT WAS BUILT IN FORT WORTH AND SHIPPED TO WEST TEXAS A&M UNIVERSITY, IN CANYON, TX., FOR TESTING.



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