

# Re-Design and Numerical Analysis on Vertical Axis Wind Turbine Blade Profile

Prof. D.H. Burande<sup>1</sup>, Mr. Vedang Ijantkar<sup>2</sup>, Mr. Omkar Jagtap<sup>3</sup>, Mr. Shrutam Gadadare<sup>4</sup>,  
Mr. Digvijay Marathe<sup>5</sup>

Assistant Professor, Mechanical Engineering, NBNSSOE, Pune, India<sup>1</sup>

UG Student, Mechanical Engineering, NBNSSOE, Pune, India<sup>2,3,4,5</sup>

**Abstract:** Wind energy is a promising renewable and clean energy source and wind turbines are the common devices to harvest this energy. Vertical-axis wind turbines (VAWTs), one kind of wind turbine, are concerned because of their congenital advantages of easy maintenance. However, one main issue of VAWTs is that the aerodynamic phenomenon of dynamic stall typically occurs under low tip-speed-ratio conditions, which negatively affects their power extraction performance. This study focuses on exploring a better blade design to improve the power coefficient of VAWTs. The study of cambered NACA2412 and symmetric NACA0018 aerofoil is designed in Q blade software and analyzed. For computational analysis Ansys space claim, ANSYS workbench software is used to carry out 2D analysis to study the understanding of performance of blade and then 3D analysis is carried out to learn modelling of blades rotation and distance from shaft or center of VAWT plays very important role in increasing the efficiency and power outcome of the system.

**Keywords:** NACA, QBlade, VAWTs, HAWT, etc.

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