

## **COMPARISON OF AERODYNAMIC CHARACTERISTICS OF NACA4412, NACA 23012 AND SG6043 AIR FOILS AT VARIOUS REYNOLDS NUMBER USING X FOIL**

***Cheruku Srinivas Rao<sup>1\*</sup>, Subhas Kamal<sup>2</sup> & B. Nageswara Rao<sup>3</sup>***

*<sup>1</sup>Research Scholar, Department of Mechanical Engineering, KL University, Guntur, Andhra Pradesh, India*

*<sup>2</sup>Dean and Faculty of Engineering and Technology, KBN University, Kalaburagi, Karnataka, India*

*<sup>3</sup>Professor, Department of Mechanical Engineering, KL University, Guntur, Andhra Pradesh, India*

### ***ABSTRACT***

*The effectiveness of the wind turbine and the use of wind energy are significantly impacted by the choice of the blade of air foil. The most widely used airfoils include NACA4412, NACA 23012 and SG6043. Lift and drag forces on an airfoil blade or wing are known to depend mainly on the airfoil geometry in addition to the angle of attack. XFOIL program is used to compare the lift coefficient, drag coefficient and lift to drag ratio for NACA4412, NACA 23012 and SG6043 air foils at Reynolds numbers  $1.0 \times 10^5$  and  $5.0 \times 10^5$ . The results obtained were validated via comparison of the predicated data with published results in the literature. It's interesting to note that results like the drag and lift coefficients, lift to drag ratio vary with the Reynolds number and angle of attack which show that SG6043 air foils have better average performance criteria with higher lift to drag ratio.*

***KEYWORDS:*** Air foil, X Foil, Lift Coefficient, Drag Coefficient, Angle of Attack

---

### ***Article History***

***Received: 09 Aug 2025 | Revised: 11 Aug 2025 | Accepted: 16 Aug 2025***

---