Document details

International Journal of Recent Technology and Engineering
Volume 7, Issue 6, March 2019, Pages 153-157

Performance analysis of a small capacity horizontal axis wind turbine using QBlade (Article)

Said, A .[a], Islam, M.[b], Mohiuddin, A .K.M.[a], Idres, M.[a]

[a]Department of Mechanical Engineering, Kulliyah of Engineering, International Islamic University Malaysia, P.O. Box 10, Kuala Lumpur, 50728, Malaysia
[b]Department of Mechanical and Production Engineering, Ahsanullah University of Science and Technology, 141 & 142, Love Road, Tejgaon Industrial Area, Dhaka, 1208, Bangladesh

Abstract

View references (13)

In recent times, wind energy has become one of the leading renewable energy sources for generating electricity in prospective regions around the globe. Nowadays, researchers are conducting different research activities to develop and optimize the existing designs of wind turbines through experimental and diversified computational techniques. Among the computational techniques, one of the popular choices is Computational Fluid Dynamics (CFD). However, CFD techniques are hardware intensive and computationally expensive. On the other hand, freely available simple tools like QBlade is computationally inexpensive and it can be used for performance and design analyses of horizontal and vertical axis wind turbines. In the present research, an attempt has been made to use QBlade for performance analyses of a smaller capacity horizontal axis wind turbine using selected prospective airfoils. In this study, four airfoils (namely, NACA 4412, SG6043, SD7062 and S833) have been selected and investigated in QBlade . It has been found that the overall power coefficients (CP) of NACA 4412 at different tip speed ratios are superior to the other three airfoils. © BEIESP.

SciVal Topic Prominence

Topic: Wind turbines | Wind power | Horizontal axis

Prominence percentile: 62.901

Author keywords

Airfoil HAWT NACA 4412 QBlade S833 SD7062 SG6043 Wind Energy Wind Turbine

Funding details

Funding sponsor	Funding number	Acronym
International Islamic University Malaysia		
Rigshospitalet		

Funding text

The authors would like to acknowledge the financial support provided by RIGS Project of International Islamic University Malaysia (IIUM) to carry out this work.

ISSN: 22773878
Source Type: Journal
Original language: English
Document Type: Article
Publisher: Blue Eyes Intelligence Engineering and Sciences Publication

References (13)

View in search results format ›

All | Export | Print | E-mail | Save to PDF | Create bibliography

1 http://www.q-blade.org

2 Marten, D., Wendler, J.
(2013) Qblade Guidelines. Cited 40 times.
http://qblade.org/project_images/files/guidelines_v06.pdf

3 Anderson, M.B., Milborrow, D.J., Ross, J.N.
PERFORMANCE AND WAKE MEASUREMENTS ON A 3 M DIAMETER HORIZONTAL AXIS WIND TURBINE. COMPARISON OF THEORY, WIND TUNNEL AND FIELD TEST DATA.
(1982) Papers presented at the International Symposium on Wind Energy Systems, pp. 113-135. Cited 18 times.
ISBN: 0906085799

4 https://wind.nrel.gov/airfoils/AirfoilFamilies.html

5 https://wind.nrel.gov/airfoils/Shapes/S833_Shape.html

6 http://m-selig.ae.illinois.edu/ads/coord_database.html

7 Selig, M.S., Donovan, J.F., Fraser, D.B.
(1989) Airfoils at Low Speeds, Spartech. Cited 138 times.

8 Giguére, P., Selig, M.S.
New airfoils for small horizontal axis wind turbines
(1998) Journal of Solar Energy Engineering, Transactions of the ASME, 120 (2), pp. 108-114. Cited 64 times.
doi: 10.1115/1.2888052
View at Publisher

9 Wood, D.
(2011) Small Wind Turbines: Analysis, Design, and Application. Cited 119 times.
Springer-Verlag London Limited

10 XFoil
http://web.mit.edu/drela/Public/web/xfoil

11 Drela, M.
XFOIL: an analysis and design system for low Reynolds number airfoils.

(1989) LOW REYNOLDS NUMBER AERODYNAMICS. PROC. CONF., NOTRE DAME, U.S.A., JUNE 5-7, 1989 }EDITED BY T.J. MUELLER]. (LECTURE NOTES IN, (54), Berlin, Germany, Springer-Verlag, 1989), pp. 1-12. Cited 979 times.
ISBN: 0387518843; 978-038751884-8

View at Publisher

12 http://www.xflr5.com

13 Islam, M.
(2008) Analysis of Fixed-Pitch Straight-Bladed VAWT with Asymmetric Airfoils. Cited 8 times.
Order No. NR42382, University of Windsor (Canada)). ProQuest Dissertations and Theses

Mohiuddin, A .K.M.; Department of Mechanical Engineering, Kulliyah of Engineering, International Islamic University Malaysia, P.O. Box 10, Kuala Lumpur, Malaysia; email:mohiuddin@iium.edu.my