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# Hydrodynamic Characteristics of Fin Shaped Geometry for Sacrificial Anode Body to Reduce the Hull Appendages Effect

Zakki, Ahmad Fauzan[a]; Rindo, Good[a]; Ridwan, Mohd[b]; Windyandari, Aulia[b]

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[a] Naval Architecture Department, Engineering Faculty, Diponegoro University, Semarang, 50275, Indonesia

[b] Industrial Technology Department, Vocational School, Diponegoro University, Semarang, 50275, Indonesia





## Abstract

On the previous research, the foil shaped has been proposed to improve the drag force characteristics of the conventional zinc anode as sacrificial cathodic protection. As a part of the previous research efforts, the aim of this research is to evaluate the hydrodynamics characteristics of fin shaped geometry for sacrificial anode body to reduce the hull appendages effects. The configuration of fin shaped geometry has been proposed in order to improve the total drag force that has been generated by the conventional geometry design of the existing sacrificial anodes. The unstructured grid of computational fluid dynamic model has been developed for estimating the total drag force, the drag force coefficient and the flow pattern of the fin shaped geometry. The flow velocity has been defined on the vessel service speed of 5 knots, 8 knots and 10 knots. Comparison with the conventional geometry has been made to measure the influence of the configurations of fin shaped geometry on the total drag force and the drag force coefficient. The results show that the proposed fin shaped geometry has effectively reduced the total drag force of the conventional design. 

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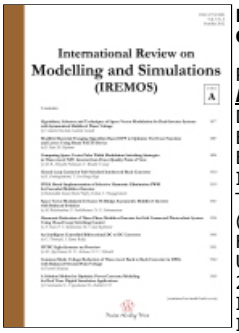


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# Hydrodynamic Characteristics of Fin Shaped Geometry for Sacrificial Anode Body to Reduce the Hull Appendages Effect

Ahmad Fauzan Zakki[1*], Good Rindo[2], Mohd Ridwan[3], Aulia Windyandari[4]

[*] *Corresponding author*

*Authors' affiliations*

[1] Naval Architecture Department, Engineering Faculty, Diponegoro University, Indonesia
[2] Naval Architecture Department, Engineering Faculty, Diponegoro University, Indonesia
[3] Industrial Technology Department, Vocational School, Diponegoro University, Indonesia
[4] Industrial Technology Department, Vocational School, Diponegoro University, Indonesia

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## Abstract

On the previous research, the foil shaped has been proposed to improve the drag force characteristics of the conventional zinc anode as sacrificial cathodic protection. As a part of the previous research efforts, the aim of this research is to evaluate the hydrodynamics characteristics of fin shaped geometry for sacrificial anode body to reduce the hull appendages effects. The configuration of fin shaped geometry has been proposed in order to improve the total drag force that has been generated by the conventional geometry design of the existing sacrificial anodes. The unstructured grid of computational fluid dynamic model has been developed for estimating the total drag force, the drag force coefficient and the flow pattern of the fin shaped geometry. The flow velocity has been defined on the vessel service speed of 5 knots, 8 knots and 10 knots. Comparison with the conventional geometry has been made to measure the influence of the configurations of fin shaped geometry on the total drag force and the drag force coefficient. The results show that the proposed fin shaped geometry has effectively reduced the total drag force of the conventional design.


## Keywords

Fin Shaped Zinc Anode; Drag Force; Flow Pattern; Sacrificial Anode and Hull Appendages

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# Artificial Intelligence and Statistical Techniques in Short-Term Load Forecasting: a Review

Ali Bou Nassif[1], Bassel Soudan[2*], Mohammad Azzeh[3], Imtinan Attilli[4], Omar Almulla[5]

[*] *Corresponding author*

*Authors' affiliations*

[1] Department of Computer Engineering, University of Sharjah, United Arab Emirates
[2] Department of Computer Engineering, University of Sharjah, United Arab Emirates
[3] Department of Data Science, Princess Sumaya University for Technology, Jordan
[4] Department of Electrical Engineering, University of Sharjah, United Arab Emirates
[5] Distribution Control Centre, Dubai Water and Electricity Authority, United Arab Emirates

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## Abstract

Electrical utilities depend on short-term demand forecasting to adjust proactively the production and the distribution in anticipation of major variations. This systematic review analyzes 240 works published in scholarly journals between 2000 and 2019 that focus on applying Artificial Intelligence (AI), statistical, and hybrid models to Short-Term Load Forecasting (STLF). This work represents the most comprehensive review of works on this subject to date. A complete analysis of the literature is conducted in order to identify the most popular and accurate techniques as well as existing gaps. The findings show that although Artificial Neural Networks (ANN) continue to be the most commonly used standalone technique, researchers have been exceedingly opting for hybrid combinations of different techniques to leverage the combined advantages of individual methods. The review demonstrates that it is commonly possible with these hybrid combinations to achieve prediction accuracy exceeding 99%. The most successful duration for short-term forecasting has been identified as prediction for a duration of one day at an hourly interval. The review has identified a deficiency in access to datasets needed for training of the models. A significant gap has been identified in researching regions other than Asia, Europe, North America, and Australia.


## Keywords

Artificial Intelligence; Statistical Methods; Short-Term Load Forecasting

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# Finite Element Analysis of Electric Field Distribution for 115-kV Underground Power Transmission Systems

Arak Bunmat[(1*)], Theerapong Thothumpol[(2)], Nanthawut Yotphet[(3)], Pamon Saengsuwan[(4)]

[(*)] *Corresponding author*

*Authors' affiliations*

[(1)] Department of Electrical Engineering, Faculty of Engineering, Rajamangala University of Technology Isan Khonkaen Campus, Thailand
[(2)] Department of Electrical Engineering, Faculty of Engineering, Rajamangala University of Technology Isan Khonkaen Campus, Thailand
[(3)] Department of Electrical Engineering, Faculty of Engineering, Rajamangala University of Technology Isan Khonkaen Campus, Thailand
[(4)] Department of Electrical Engineering, Faculty of Engineering, Rajamangala University of Technology Isan Khonkaen Campus, Thailand

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## Abstract

A penetration of an electric field intensity generated by an underground cable and a detailed model for demonstrating the actual characteristics are still a challenge. Hence, this article has proposed a mathematical model for diagnosing the electric field intensity of the 115 kV underground power cable, using the 3D finite element method to simulate the electric field while the 115 kV underground cable is available. The proposed finite element method-based 3-D model utilizes a linear sub-derivative equation method, which consists of the weighted residuals and the Galerkin's methods. The flat and the trefoil formations are considered for the modeling and the simulations of the electric field distributions using the proposed 3-D finite element method. The simulated results demonstrate that the proposed method can reveal the graphical electric field distribution in 3-D around the 115 kV underground cables with detailed characteristics. Moreover, the electric field distributions using the proposed model at various underground depths are demonstrated in comparison between the flat and the trefoil formations. Thus, the proposed method can demonstrate the actual characteristics of the underground cable and the cable arrangement penetration at the various formations.



## Keywords

Electric Field; Underground Power Transmission Line; 3-D FEM

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