DESIGNING A PROTOTYPE VORTEX INDUCEDVIBRATIONS BASED HYDROELECTRICITY GENERATING SYSTEM

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Degree of Master of Science

Department of Electrical Engineering

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Thesis/Dissertation submitted in partial fulfillment of the requirements for the degree Master of Science in EI

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Abstract

With the inevitable concerns on energy crisis and environmental pollution, various types of alternative energy resources such as, hydro, wind, solar, tidal, wave, etc.,havebeen harnessed using various novel technologies. Among all of them vortex induced vibrations (VIV) based hydro energy has identified as one of the most favorable source of energy, which has a betterpotential and the most environmentally benign forms of electricity generation.

Vortex induced vibrations is a technique, which makes linear motions from the water flow.TheVIV based hydro electricity generation system can be operated inlow speed water streams where the turbines cannot be used. Also, the design is cost effective compared to other renewable energy sources.

This research presentsdesigning and implementation of a prototype VIV based hydroelectricity generation technique. The results of the study indicate the capability of generatingelectricity using the VIV based hydro system,and its applicability in low speed streams in Sri Lanka. The VIV based hydroelectricity generation can be identified asone of the mosteffective renewable energy sources for Sri Lanka.

Keywords:*Alternative energy source,Hydro electricity generator,Hydro kinetic energy, Linear generator,Low speed flow,Renewable Energy, Vortex Induced Vibrations, VIV.*

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List of Abbreviations

Abbreviation	Description
CFD	Computational Fluid Dynamics
EPRI	Electric Power Research Institute
MREL	Marine Renewable Energy Laboratory
VIV	Vortex Induced Vibrations
VIVHEGS	Vortex Induced Vibrations based Hydro Electricity Generating System