IMPACT OF NEW GENERATION CONDUCTORS ON TECHNO ECONOMICS OF 132kV TRANSMISSION LINES.

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Degree of Master of Science

Department of Electrical Engineering

University of Moratuwa Sri Lanka

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

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DECLARATION

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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ABSTRACT

Demand for the electric power has been increasing rapidly due to human activities all over the world. It is essential to generate, transmit and distribute the power requirement to load centers as they demand. Therefore, Capacity of transmission network needs to be increased frequently either by uprating, upgrading of existing transmission lines or/and adding of transmission lines to the transmission network.

It is getting harder and harder to find routes for transmission lines due to increased social objection cause due to their uncountable social impact and environmental damage during the construction which cannot be totally compensated.

Therefore, requirement of delivering more power to the load centers through overhead conductors has come to a discussion and large variety of new generation conductors (HTLS - High Temperature Low Sag Conductors and LL-Low Loss conductors) are introduced with the intention of mitigating some of the disadvantages shown by the conventional conductors and to uprate and upgrade the existing transmission lines. Among them, enhanced power capacity, low loss performance, improved conductor sag behavior and anti-cohesiveness behaviors can be considered vital.

However, it can be observed that, conventional conductors are still used more frequently for new transmission lines by power utilities around the world due to lack of service experience in use of new generation conductors over conventional conductors that have been given a greater service in power transmission.

Therefore, impact of new generation conductors for on techno economics of 132kV double circuit transmission lines is studied by designing and modelling of transmission lines for different ground terrains with different types of new generation conductors over conventional conductor.

Accordingly, new generation conductors show promising results in overall techno economic viability of transmission line over conventional conductors, and among them low loss conductors show superior performance.

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Abbreviation		Description
ACSR	-	Aluminium Conductor Steel Reinforced
AAAC	-	All Aluminium Alloy Conductor
ACCC	-	Aluminum Conductor Composite Core Conductor
ACCR	-	Aluminum Conductor Composite Reinforced
ACSS	-	Aluminum Conductor Steel Supported Conductor
CEB	-	Ceylon Electricity Board
TCR/L	-	Top Conductor Right/Left Side
MCR/L	-	Middle Conductor Right/Left Side
BCR/L	-	Bottom Conductor Right/Left Side
ROW	-	Right of Way
HTLS	-	High Temperature Low Sag
LL	-	Low Loss
EMF	-	Electromagnetic Field
KPT	-	Knee Point Temperature
TACSR	-	Thermal Resistant Aluminium Alloy Conductor Steel Reinforced
ZTACIR	-	Thermal Resistance Aluminium Conductor Steel Reinforced
CCC	-	Current Carrying Capacity
NPV	-	Net Present Value
IEE	-	Initial Environment Examination
PGR/L	-	Peak Ground Right/Left Side
POR/L	-	Peak OPGW Right/Left Side