COMPUTERIZED OPTIMIZATION OF THE BASE WIDTH OF TRANSMISSIONTOWERS IN SRI LANKA

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Declaration

"I declare that this is my own work and this thesis 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

Transmission line towers were mainly used in electrification works in all over the world. Optimization of base width of the transmission towers becomes necessary in order to reduce the cost and to avoid public objection. The use of narrow width tower becomes essential, as the land value appreciates drastically in Sri Lanka. This research is to design the transmission towers with reduced base width to minimize the coverage land with optimum weight and adequate strength.

There were number of models selected with 14.2m base width and analyzed by reducing the width in steps from 1m to 3.2m. For this purpose computerized model analysis software named PLS Tower was used. Accordingly cost analysis was carried out for different steel prices and the cost of land. As per this study Optimum base width of 6.2m was found considering both the land & steel price.

When compared with the towers used in Sri Lanka, it was found that the narrow width towers designed from this study showed a considerable amount of saving in cost and favourable impact on environmental issues.

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Notations

BS – British Standards for Design & Construction

CEB - Ceylon Electricity Board

ISO – International Organization for Standardization

OPGW – Optical Fibre Ground wire

PLS – Power Line System software

TDL - **T**ower **D**ouble circuit**L**ine

TD1 - (**T**ower **D**ouble circuit –Deviation angle **0°- 10°**)

TD3 - (**T**ower **D**ouble circuit –Deviation angle **10°- 30°**)

TD6 - (**T**ower **D**ouble circuit –Deviation angle **30°- 60°**)

TDT - (**T**ower **D**ouble circuit **Terminal)**

WS_1 – Wind span 01

WS_2 – Wind span 02

W_1 – Weight span 01

W_2 – Weight span 02

For Earth wire (OPGW)

- Ne –Numbers
- De (mm) - Diameter
- We (kN/m) - Weight
- Te (kN) – Tension
- Pe (kN/m^2) – Wind pressure

For Conductor

- Nc – Numbers
- Dc (mm) - Diameter
- Wc(kN/m) - Weight
- Tc (kN) – Tension
- Pc (kN/m^2) – Wind pressure

For Insulator

- Ni – Numbers
- Di (mm) - Diameter
- Wi(kN/m) - Weight
- Li (kN) – Length
- Pi (kN/m^2) – Wind pressure

Spans & deviation

- Sw – Wind span
- Sw_1 – Max. Weight span
- Sw_2 – Min. Weight span
- Ø – angle of Deviation

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