Transmission Lines
High Level Structural Design Criteria - Guideline

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1. Introduction

1.1 Purpose

The purpose of this document is to provide a high level overview of Powerlink's transmission lines structural/civil design criteria.

1.2 Scope

The scope of this document includes:

- Definitions of high level structural/civil requirements for Powerlink's transmission lines.
- Reliability requirements.
- Construction and maintenance requirements.

1.3 References

Document code	Document title
AS/NZS 7000	Standards Australia (2010) *Overhead Line Design*

1.4 Defined terms

Terms	Definition
OPGW	Optical Fibre Ground Wire

2. High Level Design Criteria

2.1 General

The Powerlink's transmission network consists of 66kV, 110 kV, 132 kV, 275 kV and 330kV transmission lines in single and double circuit configurations. The predominant structure type is a double circuit lattice tower. The lines traverse a verity of terrain and climate conditions.

Typical structures used by Powerlink are shown in Appendix A.

2.2 Overall Requirements

The lines are designed in accordance with AS/NZS 7000 Overhead Line Design and other relevant Australian standards and legislation. The line structures and the associated foundations are designed and constructed to have a design service life of 50 years with minimum maintenance required.

2.3 AS/NZS 7000 – Required Security Level

All the line components are designed to satisfy the Line Security Level III – AS/NZS 7000 Table 6.1.

2.4 Structure Materials

Structures are generally constructed from galvanized steel or concrete. Other materials can be considered if those materials can satisfy the functional and durability requirements.

2.5 Maximum Length between Strain Structures

The maximum length of the line between strain structures is generally limited to 10km.

2.6 Foundation Types and Materials

In general, foundations are constructed from concrete. Direct buried structures such as concrete and steel poles can be used however the corrosion issues associated with buried steel have to be addressed. Alternative foundation types such as screw piles, driven piles and micropiles are sometimes used, depending on soil conditions.

2.7 Construction and Maintenance

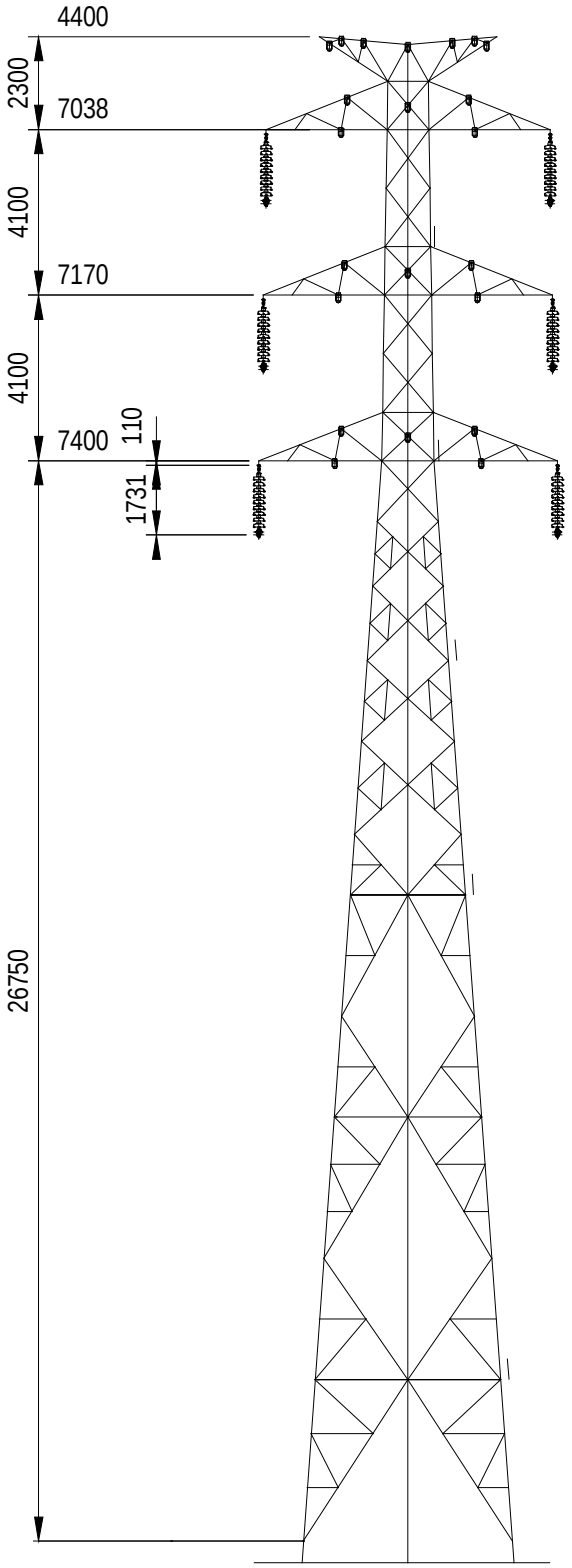
Powerlink overhead line structures are designed to facilitate maintenance. The following is considered:

- Climbing and work positioning of personnel, tools and devices
- Conductor/Earthwire/OPGW stringing and tensioning
- Insulator and fittings replacement
- Structure erection
- Line dismantling
- Helicopter maintenance
- Live line and bare hand maintenance.

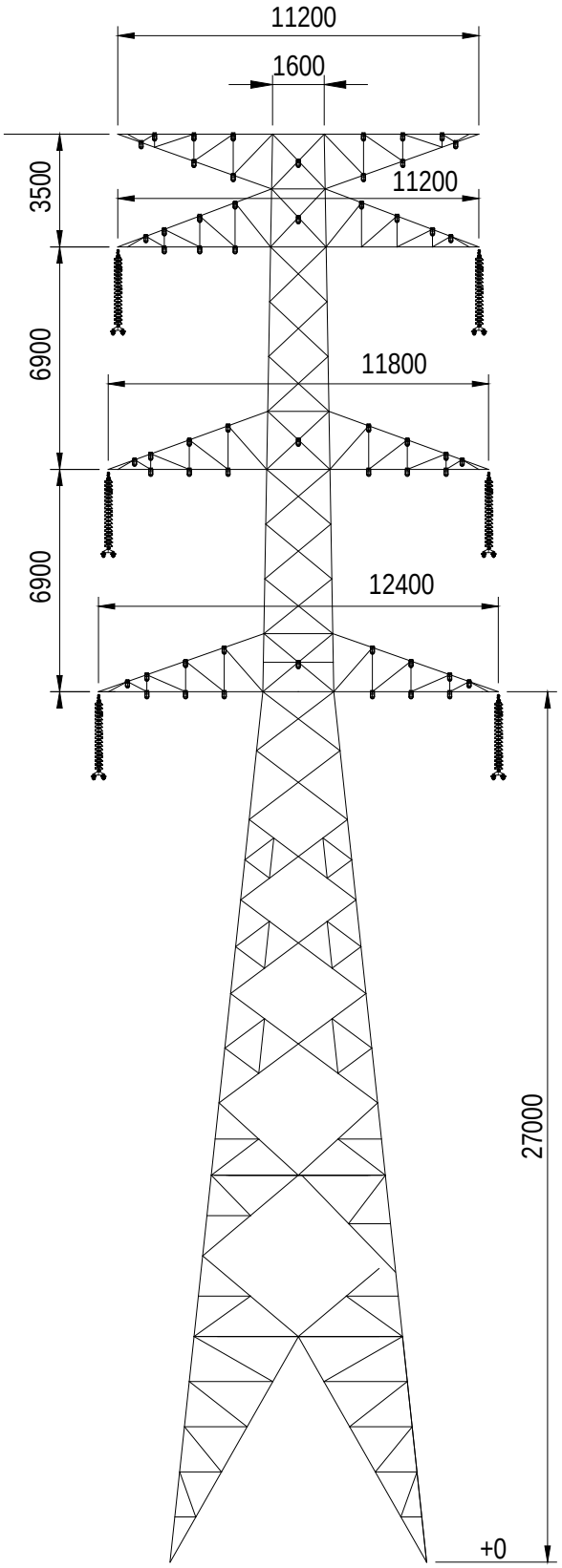
2.8 Interaction with the Existing and Future Infrastructure

Powerlink's lines often interact with other infrastructure. The line structures are selected and positioned to facilitate construction and maintenance with minimum disruption to the adjacent or crossing infrastructure such as roads and railways. Capacity of the line structures to resist line termination loads is an important factor in this interaction.

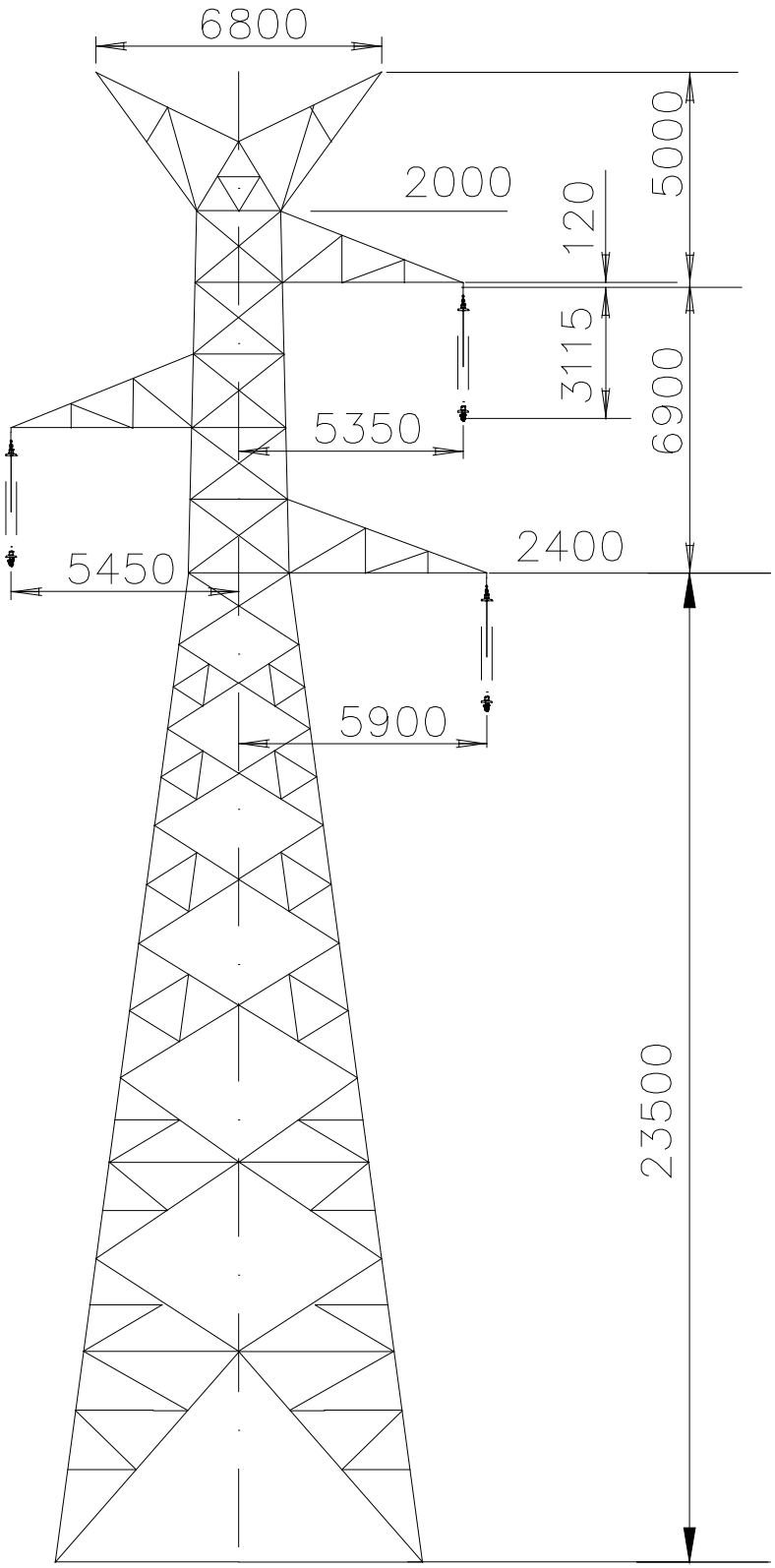
Appendix A. Typical Powerlink Structures



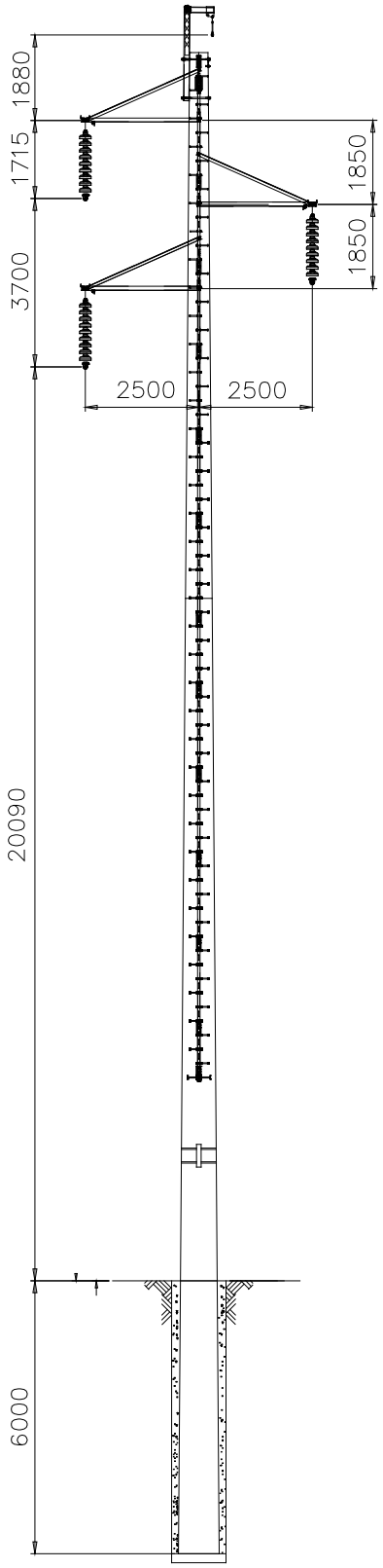
Double Circuit 132kV Lattice Tower



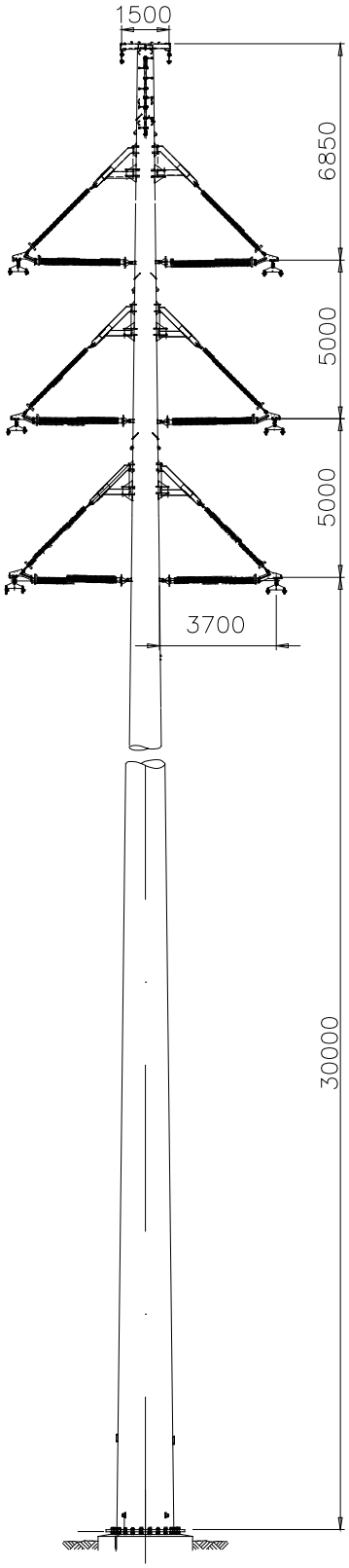
Double Circuit 275kV Lattice Tower



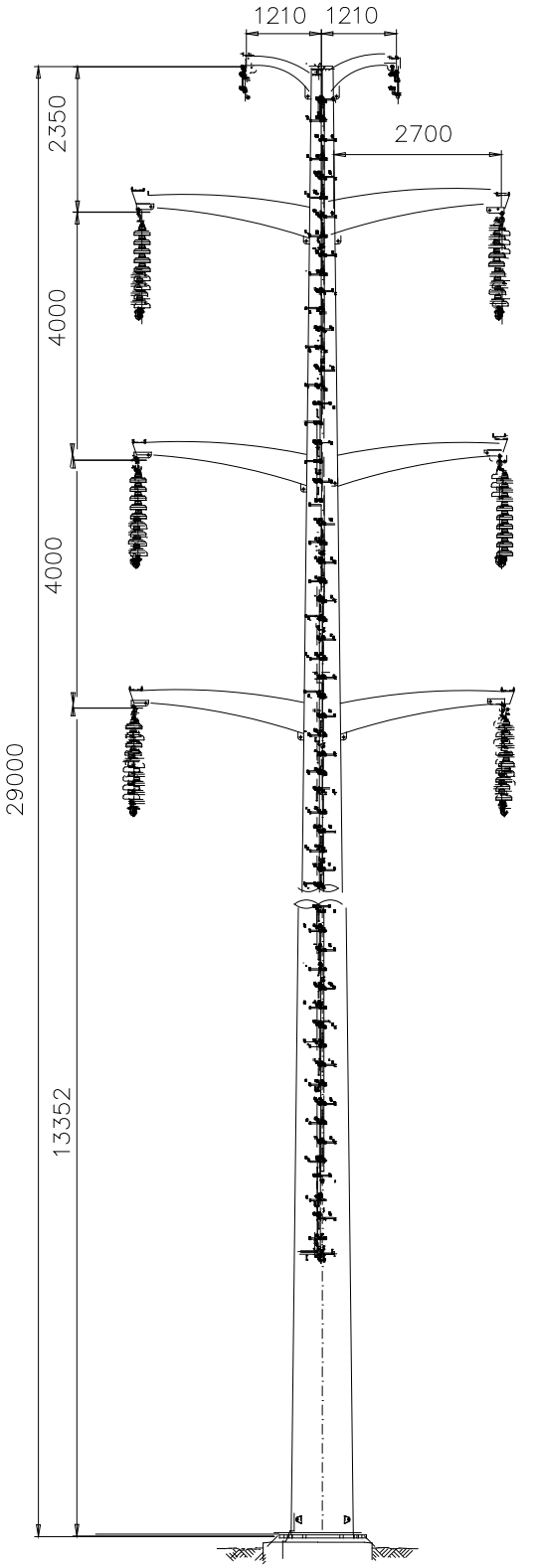
Single Circuit 275kV Lattice Tower



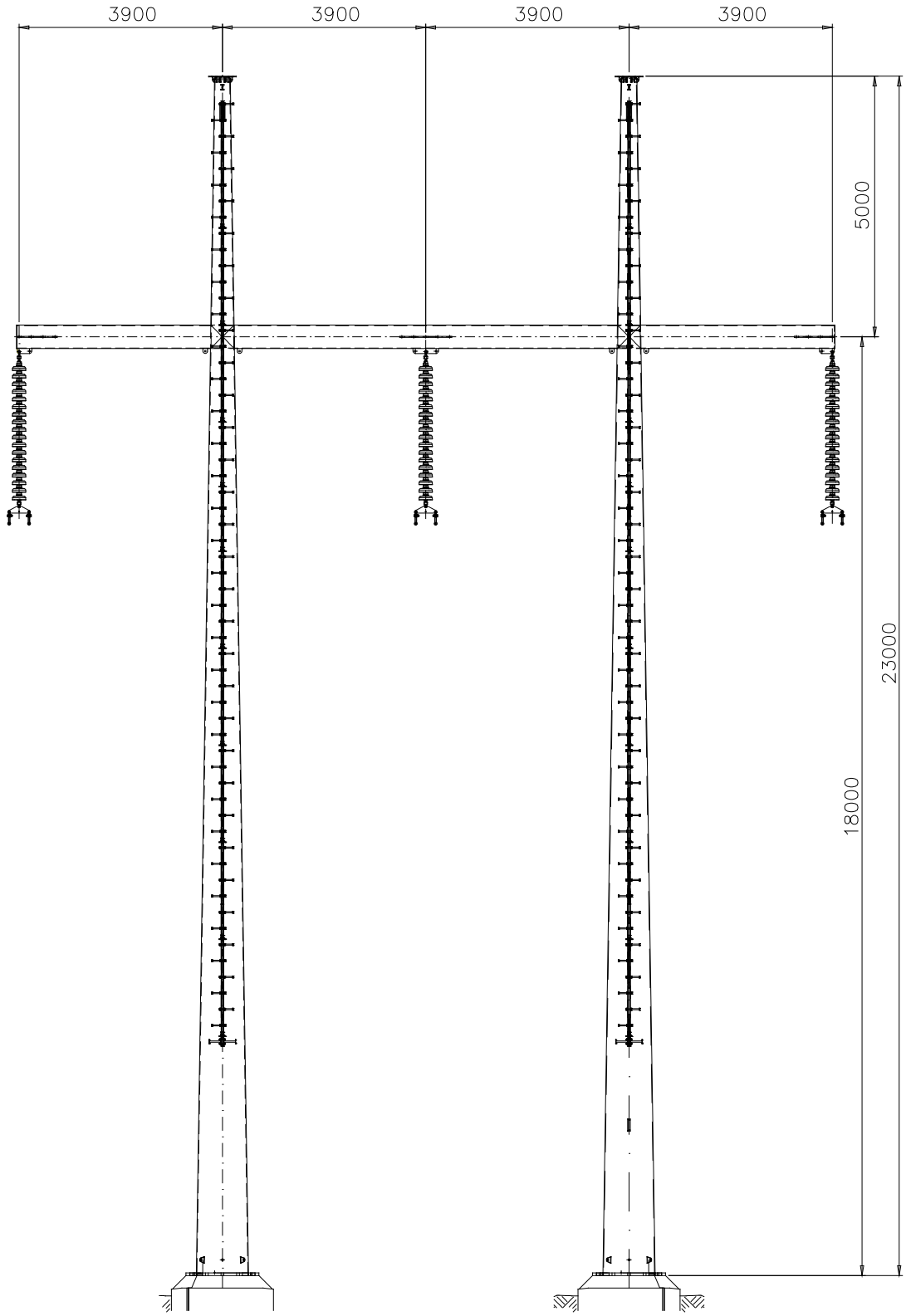
Single Circuit 132kV Concrete Pole



Double Circuit 275kV Steel Pole (DS2S0C)



Double Circuit 132kV Steel Pole



Single Circuit 275kV Steel Pole