

Transmission innovations article

With photos of old and new towers

Eskom's transmission lines team has introduced a number of innovations which have reduced the capital cost of Eskom's build programme and helped to counter the theft of steel from the pylons supporting high voltage transmission lines.

Installation of the new transmission lines from Medupi saw the introduction of several changes to standard tower design. These have now become standard practice in Eskom's transmission line design and construction.

Two new anti-theft measures were implemented to curb the theft of tower steel, which can cause towers to collapse, threatening network reliability. These included the use of a new anti-theft bolt for the structures as well as marking of the steel members with the Eskom name at 300mm to 500mm intervals. The new anti-theft bolts cannot be removed with the use of normal tools.

Eskom has developed a cross-rope tower structure on its 400kV lines that uses less steel and reduces costs. It is currently developing a 765kV cross-rope structure to achieve the same benefits as was achieved for the 400kV lines.

The cross rope towers and guyed-v towers will have saved more than 15% capital cost over the standard self-supporting structures. They are also expected to perform better and have stronger withstand to extreme weather events. The structures are considered more visually pleasant, and fade into the background when viewed from a distance. They consume much less steel and are much quicker to erect thus saving cost and time.

The line cost/km in South Africa is among the lowest in the world. A recent study done as part of a CIGRE ([International Council on Large Electric Systems](#)) workgroup exercise found that the Medupi 400kV lines were the cheapest per kilometre considering the total cost, i.e. materials, construction and land cost.

