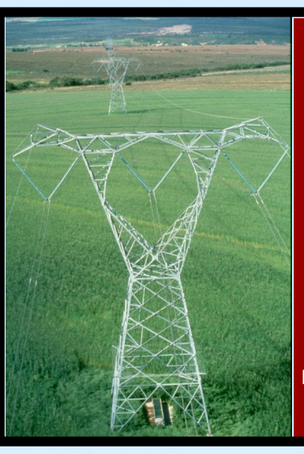
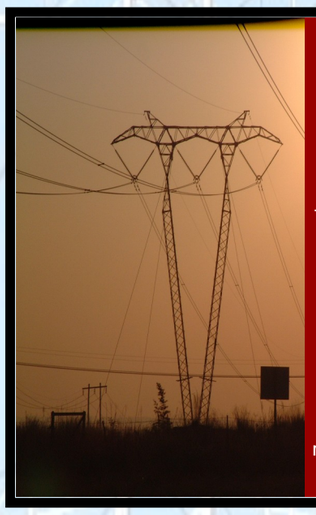
Transmission's Suspension Towers



506A
Self - Supporting Suspension Tower
Voltage: 400kV
Developed: 1974

This structure is typical of most single circuit structures in use at the time, having been developed to support Eskom's introduction of 400kV lines to the national grid. It typically carries twin Dinosaur conductor, a relatively light configuration.
The use of a V-string assembly allows for compaction of phase spacing, which in turn results in both structural and electrical efficiency.

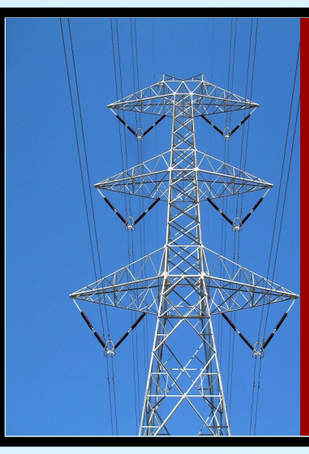


520 B
Guyed-Vee suspension Tower
Voltage: 400kV
Developed: 1988

This structure was developed by Eskom for optimal use with the quad zebra configuration. The guyed-vee towers has one large foundation and four guys therefore four smaller foundations. Guyed-vee towers provide the best protection from lightning impulses due to the groundwire and cross arm configuration. Tower cross bar helps with the live line maintenance. Problems with guyed-vee towers are that they limited to relatively flat terrains and helicopters are needed when cranes restricted.

528A
Insulated Crossrope Suspension
Voltage: 400 kV
Developed: 2002

This structure is a progression of the 525A Compact Crossrope Structure. The structure uses taller masts to increase the range of attachment heights, and a single central foundation. The Insulated Suspension assembly was also modified by removing the floating metal point and using a triangular insulator arrangement, to facilitate Live Line Maintenance.

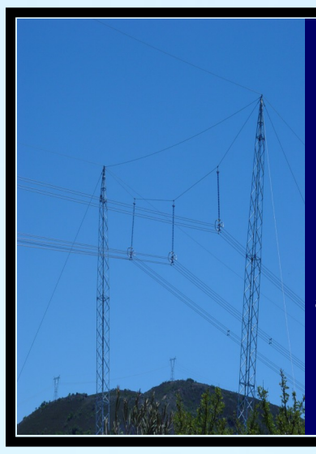


513A
Self - Supporting Double Circuit Suspension Tower
Voltage: 400kV
Developed: 1978

The double circuit towers were developed to reduce servitude needed by two parallel lines. These towers were used on the Ariadne Hector line. The tower utilized the V assemblies with twin dinosaur conductors and silicone rubber (composite) insulators. This tower was developed by Powerlines, but Eskom has the copyright.

524A
Crossrope Suspension
Voltage: 400 kV
Developed: 1994

The crossrope tower concept, which was first utilised in Canada, embodies a highly efficient solution for High Voltage structures.
Forces from the earthwires, tower guys, and conductors are transferred only to the two mast peaks, thus eliminating direct bending moments in the structure, and resulting in cost savings in the order of 50% per tower.



529A
Standard Cross Rope suspension
Voltage: 400kV
Developed: 2004

This structure was developed as a cost efficient alternative to the 524A. The tower is higher but has the same footprint therefore boasts a larger number of attachment heights. The design utilized a higher grade of steel producing a lighter and more efficient mast. Optimal conductor configuration is 3 Tern or Bersfort with composite insulators. The structure allows for larger swing angles therefore permits the use of lighter conductors. The tower is compact as the phase spacing is reduced from 8.2 to 7 meters.

515 H
Self - Supporting Suspension Tower
Voltage: 400kV
Developed: 1983

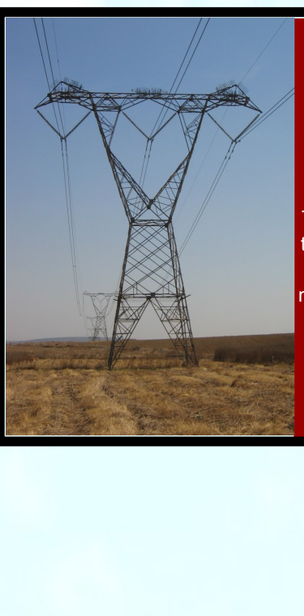
The 515 H tower has an IVI insulator configuration. This configuration was developed due to a reduction in cost of the structure depending on various aspects. 515 H was optimally designed to support the quad wolf conductors in conjunction with the 120KN glass insulators. This structure was designed by Eskom. This structure was not used as frequently as the 518H although it was used on the Beta Delphi 1 line.

525A
Compact Crossrope Suspension
Voltage: 400 kV
Developed: 1997

The crossrope tower concept was modified in a unique design which introduces an inverted delta configuration, in which all phases are approximately equally spaced.
This configuration results in greater electrical efficiency over long distance links, and also enables the reduction of related substation equipment costs.

530A
Single Mast Suspension tower
Voltage: 400 kV
Developed: 2004

Developed for use on the Plamiet-Stikland line by Eskom. Designed for use with triple kingbird conductors. The 530A tower has a smaller footprint than the cross rope structure and less steel used to manufacture this tower due to the single mast design. This structure has a delta configuration and V strings to support the conductors.



518 H
Self - Supporting Suspension Tower
Voltage: 400kV
Developed: 1988

This is a typical Eskom designed self supporting tower and utilizes a V assembly to allow for compaction of the phases. The structure was optimized to carry 190KN glass insulators which support quad zebra conductors. Commonly used before the cheaper guyed and cross rope structures were designed.

527B
Guyed Multi-circuit suspension tower
Voltage: 400 KV/132 KV
Developed: 1997

This tower holds both the 400KV transmission and distribution's 132KV circuits thereby reducing the need for parallel lines and large servitude widths, whilst power transfer was not compromised. The tower was optimized for use with triple kingbird, single kingbird for the 400KV and 132KV lines respectively. Eskom developed this tower and used it on the Ariadne Eros line as well as the Dedisa Grassridge line.

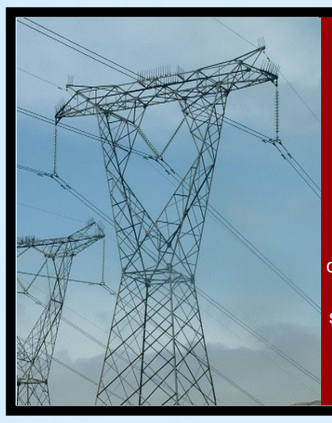
531AS
Steel pole Suspension
Voltage: 400 kV
Developed: 2007

This was an Eskom developed tower for use in the cape, Palmiet Stikland line. The single circuit tower supports rigid composite post insulators, with triple kingbird conductors. The tower comprises of a hot dipped galvanized steel pole. It is ideally suited to urban areas where servitude is limited. The tower is stack created and strung on ground level therefore reducing the risk of climbing but ladders and fall arrest systems are available. Longer spans are possible due to the seven meter phase clearance. In the region of 595 meters with an attachement height of 36 meters.

TRANS-AFRICA PROJECTS

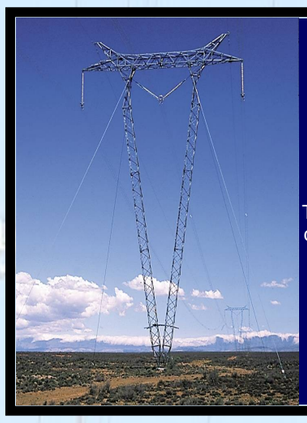
Eskom Enterprises

Transmission's Suspension towers



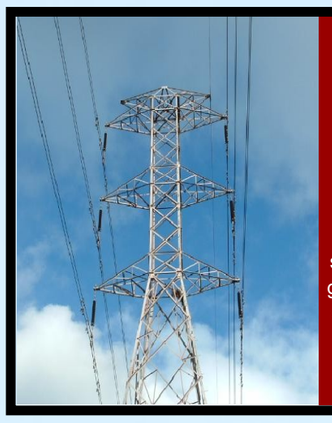
240A
Self Supporting Suspension
Voltage: 132 kV
Developed: 1980

The 240A tower was designed by Transdeco, Eskom has the copyright. The structure was designed for optimal use with a single bear conductor in an “I V I” hardware configuration as shown in the figure. This structure was used on the Dwaalboom spitskop line.



436B
Guyed-Vee
Suspension
Voltage: 275 KV
Developed: 1990

This tower resembles the other Guyed-Vee towers designed for other voltages but differs as it has an “IVI” hardware assembly configuration using twin bear conductors . The tower was Eskom developed and utilized on the Bloukrans Tugela line.

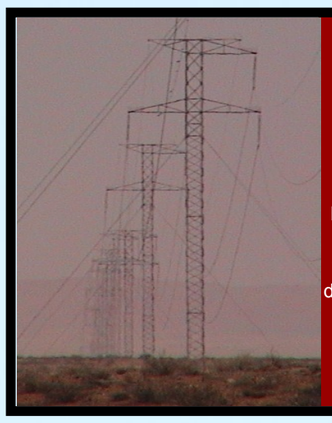


247A
Self Supporting Double Circuit Suspension
Voltage: 132 kV
Developed: 1986

The tower was developed by Powerlines but Eskom has the copyright. It was designed to support the twin bear conductors utilizing 70KN glass insulators. The tower has additional clearance for live line work. This tower was used on the Aurora Saldanha line.

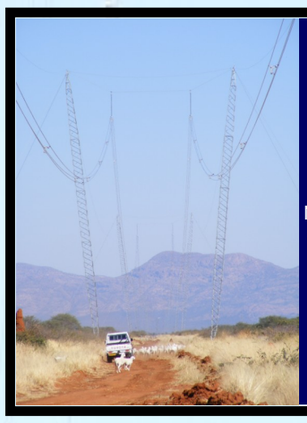
438 A
Cross Rope
Suspension tower
Voltage: 275 KV
Developed: 1996

The tower was developed by Eskom and implemented on the Arnot-Kruispruit and Spenser-Tabor lines. The structure was designed from the 524 A tower and was designed to support twin Bear conductors. The 438 A was designed to allow different attachment heights which were not previously available.



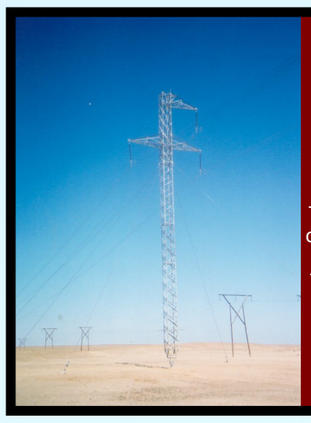
255A
Single Mast Suspension
Voltage: 132 kV
Developed: 1990

Eskom developed tower providing cost savings compared to the self supporting towers. The tower was designed to carry a single wolf conductor in conjunction with 70KN glass insulators. 255A tower was used on the Gabarone spitskop line.



533A HVDC
Cross Rope Suspension
Voltage: 350 KV
Developed: 2006

The 533A structure was developed by Eskom for Nampower (Namibia). The 529 A tower was used as a basis for the development of the 533 A. This tower has two phases transmitting direct current rather than three like the 529 A tower which carries alternating current.

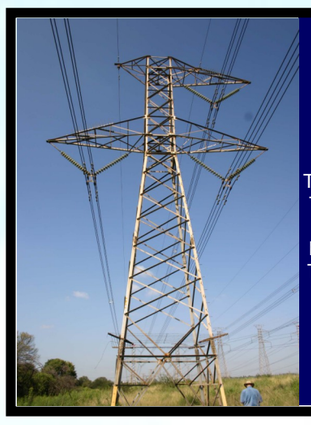


312A
Single Mast Suspension
Voltage: 220kV
Developed: 1999

This Single Mast Suspension structure was developed as an alternative to self supporting structures available at the 220kV voltage level.
This configuration is designed to be highly flexible during broken conductor conditions, resulting in a very light structure.

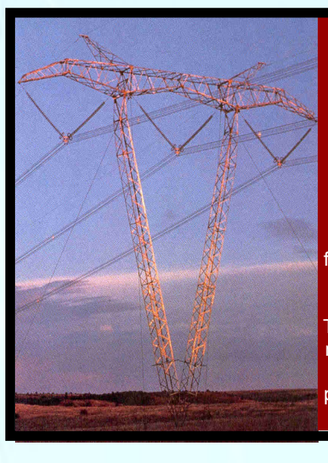
533C HVDC
Self Supporting Suspension
Voltage: 350 KV
Developed: 2006

The 533A structure was developed by Eskom for Nampower (Namibia). This tower is the alternative to the 533A cross rope which is limited to relatively flat terrains. This tower can be used where leg extensions allow for various terrain types and slopes.



424 A
Self Supporting
Suspension tower
Voltage: 275 KV
Developed: 1967

The 424A structure was developed by Powerlines. The structure was developed to carry a variety of conductors namely quad Bear and Zebra. The hardware configuration used was triple V strings. The V assemblies allows for a narrower servitude required. The tower was commonly used on the Esselen Jupiter and the Apollo Croydon lines.

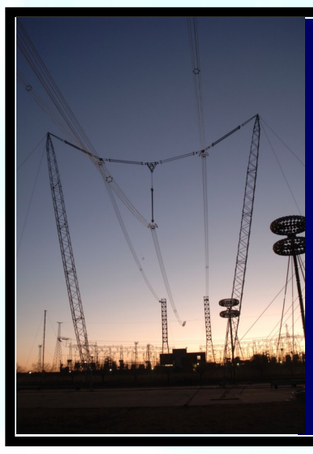


701B
Guyed Vee
Suspension
Voltage: 765 kV
Developed: 1985

Eskom’s 765kV network represented a world first at the time of its inception, being the highest voltage AC line to be constructed at high altitudes in excess of 2000m.
The tower carries a six Zebra conductor configuration, which is required to contain high levels of corona. This configuration has since been superseded by the 703B tower, which uses a more compact phase spacing.

433A
Self Supporting
Suspension tower
Voltage: 275 KV
Developed: 1980

Commonly used tower developed by Transdeco but Eskom has the copyright. The structure was designed to carry quad zebra conductors and tested for use on the Lethabo Makalu line. 433A tower is common on the275KV network.



705 A
Cross Rope
Suspension tower
Voltage: 765 KV
Developed: 2006

The latest 756Kv structure to be developed. It allows for higher attachment heights therefore reduced noise and corona problems. The masts were designed to be of a higher mechanical strength than previous cross rope structures.

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