

# Glossary

## **aluminium-equivalent**

See **equivalent area**

## **angle tower**

A pylon which supports powerlines which deviate from a straight line. They are classified by the maximum deviation they allow, usually 10, 30, 60 or 90 degrees. All current designs of angle tower are also **tension towers**, but some early designs also used **suspension towers** for small deviations.

## **arcing horn**

Metal loops or sticks around the top and bottom of insulator strings. In the event of extreme over-voltages such as from a lightning strike, the electricity will jump between the arcing horns (as a spark or electric arc) rather than travelling over the surface of the insulator, possibly damaging it.

## **bundles**

A group of conductors supported on the same crossarm. Bundles can comprise from 2 to 4 conductors, usually separated by spacers.

## **conductivity**

How well a material conducts electricity. The four metals with the greatest conductivity are silver, copper, gold and aluminium in that order. Gold and silver are expensive and very heavy, so are not used for electrical wiring. Copper is used in house wiring and aluminium on pylons as it is much lighter and stronger than copper and doesn't corrode.

## **conductor**

- (1) Any substance through which electricity easily flows, such as metals or carbon fibre.
- (2) The electricity-carrying wires supported by pylons.

## **conductor clashing**

When conductors, which should be kept separate, touch or come close enough for electricity to jump between them.

## **copper-equivalent**

See **equivalent area**

## **crossarms**

The arms which project from the body of a pylon, supporting conductors.

## **current**

The flow of charge around an electrical circuit. Measured in amperes (amps).

## **damper**

A device which reduces unwanted vibrations or oscillations, mainly to protect conductors from abrasion by the clamps which support them.

## **earth peak**

The highest part of a pylon, above the top crossarm, which holds the earthwire.

## **earthwire**

An unpowered wire running between the tops of adjacent pylons, to protect the conductors from lightning strikes and to carry the current safely to earth. Earthwires often also incorporate fibre optics to carry voice and data communications.

## **equivalent area**

A way to express the thickness of a conductor in comparison to one with the same conductance made from aluminium or copper. For example, a steel-reinforced aluminium conductor with a cross sectional area of 484 mm<sup>2</sup> might have an

aluminium-equivalent cross sectional area of 414 mm<sup>2</sup>, because aluminium conducts better than steel. Copper conducts better than both aluminium and steel so has an even lower figure: 260 mm<sup>2</sup>.

**flashover**

A discharge of electricity across insulators.

**galloping**

Vertical waves travelling along one or more conductors caused by high winds. Galloping imposes mechanical strains on the insulators and the clamps supporting the conductors and can also lead to **conductor clashing**.

**height extension**

Extra sections added to pylons to raise them above standard height

**insulator**

- (1) Any substance which does not conduct electricity such as glass, plastic, ceramic, wood.
- (2) An insulated support for a conductor (insulators in the form of flexible chains of units are insulator strings).

**insulator string**

A length comprised of insulating discs and spacers (either ceramic or glass) which is attached to the pylon crossarm as a whole, with the other end attached to the conductor.

**junction tower**

An unusually strong design of tower to handle the situation where one power line is linked into another.

**kilovolt**

1,000 volts. Abbreviated kV.

**national grid**

- (1) Originally applied to the 132 kV network built between 1928 and 1933 to link up all the major power stations in Great Britain. Now also applied to the **supergrid** built from 1952.
- (2) National Grid plc is the company which owns the electricity transmission network (275 kV and 400 kV) in England and Wales and operates the network for the whole of Great Britain.

**normal span**

The average design span for a tower series. It's not either the longest or shortest possible span, but about the most economical. Most 132 kV towers have a normal span of 300 m while for most 275 kV and 400 kV towers it is 360 m.

**phase**

A recurring part of a cycle. In the UK we use three phases for our electricity supply, each 120 degrees apart, and each crossarm on a pylon holds a conductor carrying a different phase.

**quad bundles**

See **bundles**

**safety clearance**

The distance which should be left around a conductor in order to avoid danger.

**spacer**

A device which holds apart conductors in the same bundle.

**span**

The distance between two pylons.

**standard height**

The basic design height for a tower series. On completely flat land, standard height towers spaced at the **normal span** provide the required safety clearance above ordinary agricultural land use.

**substation**

A fenced-off enclosure containing equipment for controlling the flow of electricity around the network. This equipment may include switches to select where the power goes or transformers to increase or decrease the voltage.

**supergrid**

The name given to the 275 kV and later 400 kV networks built from 1952 to supplement the original 132 kV **national grid**. The term supergrid is now largely obsolete and the whole national transmission network is referred to as the national grid once again.

**suspension tower**

A pylon with insulator strings which hang down vertically from the crossarms. In current tower designs, suspension towers are only used where the transmission line is perfectly straight. Some early tower designs used suspension towers where there was a small deviation in the line; these are easily recognised as the insulators do not hang straight down.

**tension tower**

A pylon with the insulator strings almost horizontal rather than hanging down from the crossarms. All current **angle towers** are tension towers, as are **junction** and **terminal towers**.

**terminal tower**

A pylon intended for use at the end of a power line. These are very strongly built towers capable of taking the tension of the conductors on one side only without a balancing load on the other side. Once the line has arrived at a terminal tower, it either goes down into a substation or goes underground.

**tower body**

The main part of a pylon, not including the crossarms.

**triple bundles**

See **bundles**.

**twin bundles**

See **bundles**.

**voltage**

The electrical pressure that pushes the current round a circuit. Measured in volts.