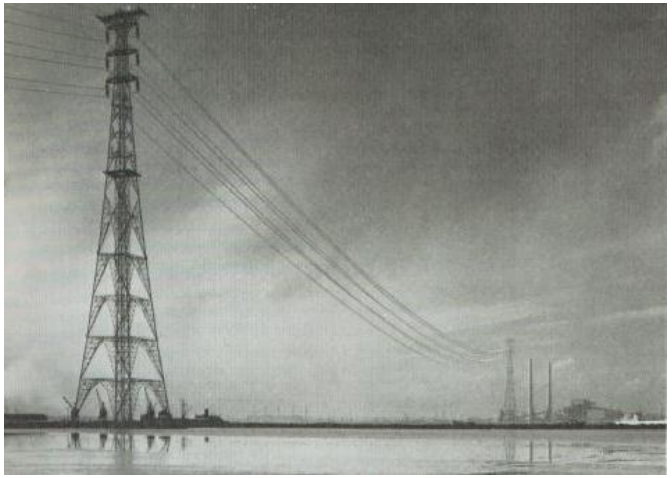
Spotters' Guide to Pylons - River Crossings

Issue 1

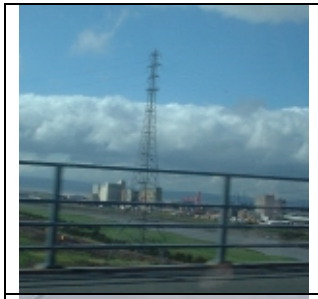


Where power lines need to cross water, a different design of pylon is needed. They have huge height extension to give them the ability to span the river with the wires.

The photograph above shows the Thames crossing at Thurrock. These are the two tallest pylons in the UK, at 630 feet (192 metres) high they are even taller than the Post Office Tower. They can be seen clearly from the Queen Elizabeth II motorway bridge, and the surrounding area.

You may also see squat shaped pylons helping to take the strain of the wires as they lead up to the river crossing itself. One of these strainers is shown opposite.

Here are some more specific pairs of pylons for you to spot.

	The Avon crossing at Avonmouth, near Bristol. Viewed from the bridge on the M5.	**Notes:**
	A strainer near the Forth crossing at Kincardine, Fife. The crossing's cables carry 380kV.	**Notes:**
	One of the Severn crossings, a pylon on the south side.	**Notes:**
	A pylon supporting cables as they cross the Great Ouse.	**Notes:**

Spotter's Guide to Pylons - The L2

Issue 2

L2 are a specific series of pylon design. They are very common and can be found across the UK.

Designed in 1956, they were the first design which could carry 400kV on their wires, although many are used for 275kV.

They can easily be recognised by the fact that all their arms are the same length - unlike other designs where the middle pair of arms are longer.

The most famous L2 was the Pink Pylon, featured in the film "Among Giants", and painted pink as part of the storyline. It even has its own website at www.pinkpylon.com.

Sadly the Pink Pylon was decommissioned in November 2003 and now lies in small pink pieces. It's shown in the photo above, while it was still standing proud.

There are so many L2s, and they are so similar, that it would be impossible to pick examples for you to spot on your journeys.

Instead, why not look out for L2s whereever you are, and note down their locations.

An L2 at Glastonbury Festival, Somerset

Notes:

Spotter's Guide to Pylons - Deviation Pylons

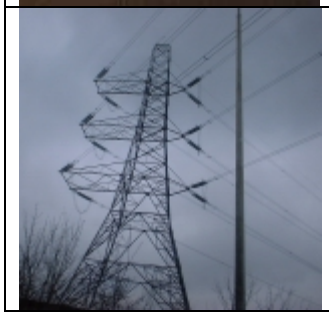
Issue 3

Where power lines have to turn a corner, you need a deviation pylon!

They are a very particular shape. The arms are often of unequal length and the base can be more squat than usual, in order to provide appropriate balance.

They are described by the deviation of the wires from their original course, so if the wires turn through a 90 degree angle, the pylon would be called a D90.

There are many different series of pylon design (such as the L2, featured in issue 2), and within each series there will be some deviation pylon designs. Most series contain D30, D60 and D90 to handle angles of 30, 60 and 90 degrees. A few series also contain D10, but as the wires deviate by only 10 degrees, these are harder to identify.

	What looks like a D10 is being maintained by men on a gantry.	**Notes:**
	A D30. As you can see, different styles of pylon can handle deviation.	**Notes:**
	A pair of D60s. The wide angle makes the deviation of the wires obvious.	**Notes:**
	A D90 - the king of deviation pylons! The different arm length is quite clear.	**Notes:**

Spotter's Guide to Pylons - Terminal Pylons

Issue 4

Terminal pylons are used where power lines end. Perhaps they terminate at a substation, or continue their journey underground.

There are a few standard designs, such as the one above going into a substation, with three arms instead of two.

In other cases the pylon appears to have a bucket-like frame around it, and the wires descend to the bucket.

There are some examples opposite of slightly different designs of terminal tower. Why not look to see which designs there are in your area?

	A "bucket style" terminal pylon, this one at Stratford, East London.	**Notes:**
	Another view of a three-armed pylon in a substation, this one in Allerford, Taunton.	**Notes:**
	A one-armed terminal pylon with "bucket", seen on the M1 between London and Birmingham.	**Notes:**
	A small pylon at the side of the M5 between Bristol and Taunton. Wires are seen going directly to the ground.	**Notes:**

Spotter's Guide - Transposition Towers

Issue 5

There is one very special design of pylon called a Transposition Tower, which we do not require in the UK - but that does not mean there's nothing to spot! Its purpose is very specific - to swap the electricity from one wire onto another.

Why is this needed? Well, each pylon carries wires in multiples of three. In each set of three, one wire will be for each phase. Each wire needs to have the same capacitance as each other. However, the different heights at which each line is carried means there can be a small difference between them.

This is not a problem in the UK because our powerlines don't run very far, but in areas such as across Africa or Continental Europe where the lines run for hundreds of miles, the differences between the sets of wires can be enough to cause problems. So a transposition tower is used to swap the electricity from one line onto another, so that over the entire route, the capacitance of each line will be more-or-less the same.

You might think this means there is nothing to see, but that's not the case! Early power lines in the UK *did* use transposition towers, but when they proved to be unnecessary, the transpositions were removed when the powerlines were replaced. The old transposition towers are just used as ordinary pylons, but the extended top and bottom crossarms are clearly visible. That's what's happened to the pylon shown on the left - a PL1b series tower.

What I've said applies for double-circuit transpositions (where there are a pair of wires at each height, one on each side). Single-circuits (where there are just three wires on each pylon) work differently.

Imagine a long line of pylons with one arm out on one side and two arms out on the other. The way to make the transposition is to put one pylon the other way round to all the others. That way you can achieve the transposition in two spans. It looks very odd but neatly avoids the need for a special tower. These pylons were left in place, so when you are looking at a line of single-circuit pylons, you might spot one which is positioned the wrong way round.

A transposition has been spotted in Redruth, Cornwall – on a pole! It's shown below, next to a transposition tower in Beilen, Netherlands.

Transposition towers are quite rare – can you spot any?

Spotter's Guide to Pylons - Low Height

Issue 6

Low height pylons have two main uses:

- They impact less on the landscape, so are used in areas of outstanding natural beauty
- They are able to be used near flight paths as they are less high than other designs

As you may be aware, there are many different series of pylons, such as the L2, L6 and L12, which have different purposes and were designed at different times. Each series contains regular pylons as well as deviation pylons to go around corners.

The L12 series contains low height pylons within it. There is also another series, L9, which is a low height implementation of L6 pylons. An L9 near Bristol is shown in the main picture above.

See if you can spot these two designs, and note their likely purpose based on their location.

	Several L9s are used so that the visual impact of pylons on the skyline is reduced in this natural area.	**Notes:**
	An L9 LD60 (60 degree deviation pylon) is used near Filton airfield.	**Notes:**
	A low height L12 pylon in Thirsk, North Yorkshire.	**Notes:**
	Two low height L12s, one an LD30 (30 degree deviation pylon).	**Notes:**

Spotter's Guide to Pylons - The PL1b

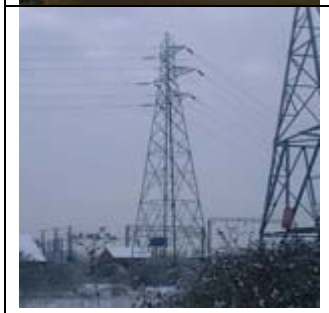
Issue 7

Before 1928, we did not have any standard pylon designs in the UK. A competition was run by the Central Electricity Board. The winning design was chosen by the architect Sir Reginald Blomfeld and became the series PL1 and PL1b.

These days there are lots of 132kV single circuit PL1b towers in existence, but very few double circuit ones.

After World War II, a new range of slimmer 132kV towers were brought out. There are lots of double circuit towers around, but the single circuit ones are rare.

So if you are looking at a small 132kV pylon, if it is single circuit it is likely to be an early PL1b, and if it is double circuit it is likely to be post World War II.

	Single circuit PL1b towers near Allerford substation, Taunton, Somerset.	**Notes:**
	Rare double circuit PL1b towers near Kirknewton, West Lothian.	**Notes:**
	Double circuit towers post WW2 (slimmer design) near Currie, West Lothian.	**Notes:**
	Double circuit D60 tower (60 degree deviation) with huge height extension near West Ham, London.	**Notes:**

Spotter's Guide to Pylons - Height Extension

Issue 8

All pylon types have a "standard" height. In some cases they need to be raised, so various height extensions are also available.

For example, with L12 series pylons, these come in 3 metre increments and are designated E3, E6 and so on up to E15. (You can also have height reductions, these are designated M3 and M6.)

The earlier designs of pylon, which were built to imperial measurements rather than metric, use the same manner to indicate height extensions but in this case the number refers to feet and not metres! So an L2 series pylon can come in E8, E16, E24 and so on.

The pylons above are at Beckton, near Barking, and are raised to carry wires across a road flyover.

There are some examples opposite of slightly different pylons with huge height extensions. Look out for the same designs in your area. Nearby structures can help you to guess their height.

	The open diamond shapes can often be seen in the structure of extended height towers.	**Notes:**
	This small pylon near West Ham has a huge height extension.	**Notes:**
	This pylon is raised to carry wires over water.	**Notes:**

Spotter's Guide to Pylons - Unusual Designs

Issue 9

Here we are dealing with the anomalies - pylons which are unusual shapes rather than the more common standard designs.

As they are made for a particular purpose, you can often find them near to substations, or where one power line crosses another - where regular designs either won't suffice or need to be adapted to meet the requirements.

For example, the pylons above are used to route one line under another, into a substation. They can be found in a field near Cressing village, in Essex.

Unusual pylons are hard to find, and it is not possible to list them all!

Look out for odd shapes wherever you are, and note down their locations.

Here are a few more examples to give you some ideas on what to look for.

The first two are from around the UK, the last mad-looking pylon is from Europe. In fact near Disneyland, USA, there are even pylons shaped like Mickey Mouse.

Notes:

Spotter's Guide to Pylons- Building Towers

Issue 10

Let’s look at how pylons are built, repaired and eventually dismantled.

We are very fortunate to have some photos of a tower in New Zealand being built, with the base assembled first and the other parts dropped in by helicopter.

It's necessary for a team of men to climb the structure in order to secure each part in place. Then the wires are added and tensioned.

Similarly, if maintenance is needed, a gang of men are required to ascend and make the necessary changes, as is shown in the top photo on the right, where a crossbar is being removed. The tower was being reconfigured to hold a higher voltage, which requires larger arms and longer conductor strings to give the appropriate spacing between power lines for safety.

It is also possible for a gantry to be suspended below the line being worked on, to provide access, as pictured.

Sometimes, line checks are performed from the air - for this reason pylons bear name plates near the top for easy reading, as well as those seen just above your head from the ground.

When a tower is destroyed, it is much easier to remove it than it was to erect it in the first place. For example, the pylon in the third photo was damaged by a factory fire, and simply craned away.

There are no obvious things to look out for on your journey, as it's quite unusual to see a pylon being built or repaired, unless there has recently been damage e.g. from a storm.

You can watch for repairs being made, and by following planning decisions made by your local council you can sometimes find out when pylons are going to be built or deconstructed.

For example, the pylons shown at the bottom photo, in Purfleet, were in the process of having their wires removed before being dismantled, sitting in the middle of a building site.

Spotter's Guide to Pylons – L6 and L12

Issue 11

The most commonly seen pylons in the UK are the L2, L6 and L12 series. We have already covered the L2, identified easily by all the arms being the same width.

L6 and L12 have wider middle arms than those top and bottom. They were built for greater capacity than the L2 series. L6 was built in the 1960s, while L12 was its replacement, introduced in the 1980s.

The L12 is slimmer than the L6 and slightly shorter, standing at around 46m – whereas the L12 reaches 50m tall. Therefore the L6 looks a little more “chunky” than the L12.

However, the easiest way to distinguish between the L6 and L12 is by looking at the shape of the arms – the L12’s are more upturned.

Another difference (although subtle) is that in the L12 series, the deviation pylons are D25 and D55 (25° and 55° respectively) whereas earlier designs use D30 and D60 (and they all use D90 of course).

In the photo above, L6 is on the left and L12 on the right.

Here are some more images for you to compare.

A range of L6 pylons on the left, and the slimmer L12s on the right.

Notes:

Spotter's Guide to Pylons – Wooden Poles

Issue 12

Some enthusiasts do not include wooden poles in the term “pylon”. However, many do and so this guide would not be complete without them.

In fact, National Grid only own one wooden pole circuit, which runs for 5km between Staythorpe and Newark - it consists of 69 sets of poles carrying 25kV. But other distribution companies own many more.

They are used where a lower voltage is needed, e.g. to supply a small number of houses in the countryside.

Where the row of poles end, next to buildings, a transformer (such as the one shown on the left) takes the place that a substation would serve in a more populated area.

In fact this transformer was seen in the grounds of a service station in Essex, in an otherwise rural location.

There are various different designs seen, but they are generally based around two vertical wooden poles, with metal crossbars.

The small insulator strings tell you that these are not high voltage wires being carried – typically 25kV or 33kV.

Here are some examples: On the left, poles in Essex, and centre is a design seen from the train passing through Somerset.

On the right is an extremely rare sight – a 33kV transposition on wooden poles, in Redruth, Cornwall.

Notes: