ORMISTON
WIRE SINCE 1793

WHAT'S IN A WIRE?
WHITE PAPER

The Oxford English Dictionary describes wire as, "Metal wrought into the form of a slender rod or thread… by rolling or by the operation of wire drawing, and used in fastenings, ornamentation, electric circuitry, delicate mechanisms etc". As customers of Ormiston Wire know, the 'etc' is significant. Wire can be fashioned for a wide range of uses and we pride ourselves on being able to manufacture almost any type of wire for just about any application, from delicate surgical sutures to robust rigging on ships. In this paper, we take a look at how wire manufacture began, why alternative manufacturing processes meet different needs, and take a look inside to see just what's in a wire.

Archaeological evidence suggests that wire emerged around five thousand years ago as a man-made material produced to make jewellery, and was formed by pulling metal through perforations in stone beads. This technique, which can be traced back to Egypt by the 2nd Dynasty, is similar to the way in which wire is commonly formed today, by drawing the metal through a hole in a die or draw plate. In the UK, wire milling did not become an established

industry until the second half of the 17th century. However, by the late 18th century, a company was set up that is still thriving today, Ormiston Wire, which began trading in 1793 as a manufacturer of spring-wire for corsets and wigs. During the industrial revolution, the company operated from Clerkenwell Road in London, which was a centre of excellence for many scientific and engineering businesses. At this time, mechanical technology was moving fast and so was Ormiston Wire, developing many manufacturing processes that enabled it to serve a wide range of industries. Today, Ormiston Wire can accommodate either ferrous or non-ferrous wire or strands, to any size or length, with facilities for rolling, winding, rewinding, spooling, braiding, bunching, stranding and plastic coating, according to specification.

So why do all these methods of manufacture exist? What's in a wire? A wire is just a strip of metal, isn't it? Well, no it isn't; the wires that handle huge mechanical loads and those that are manufactured for playthings such as the slinky spring are not only formed with different materials, they are also formed with a different internal shape. To begin to understand these differences, let's look at some basic principles.

'Ormiston manufacture to order stranded wire in many metals, sizes and constructions...'

Wire may be solid or stranded. Stranded wire is essentially a number of wires twisted together, a process that offers specific advantages. For example, stranded wire is more flexible, with a higher resistance to metal fatigue. In contrast, solid wire consists of one piece of metal wire drawn through a die. This offers a cheaper option where there is little need for flexibility and, while it is more prone to metal fatigue, solid wire is less vulnerable to corrosion.

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So how many wires make up a stranded wire? The answer depends upon the application. More strands means more flexibility and greater resistance to kinking or breaking, resulting in a stronger wire.

Generally, the more the wire needs to move, the more strands are required to ensure longevity. Take a look at a cross section of a stranded wire and all becomes clear. The cross section looks rather like a child's drawing of a flower, with a central disc surrounded by a ring of further discs. The simplest stranded structure is six outer strands circling around a seventh in the centre, and these strands are multiplied depending upon the specification.

For example, in a length of flexible stainless steel rope, each of the seven strands is formed from seven individual strands, offering increased strength and movement. Strands are multiplied up to the final diameter of the rope.

Based on centuries of expertise, Ormiston manufacture to order stranded wire in many metals, sizes and constructions for use in electronic, medical, scientific, optical and photographic equipment, drawing boards - in fact, any application where a low stretch, strong, small diameter flexible cable is required.

'...stranded wire is more flexible, with a higher resistance to metal fatigue'

Our knowledge of wire manufacture and of the needs of our customers in many applications has enabled Ormiston Wire to develop into more than just a manufacturer; we are now a solutions provider, offering problem solving design capabilities, prototyping and the ability to supply small as well as large volumes, with speedy delivery and exceptional quality control.

So, the answer to the question "What's in a wire?" is more interesting than you might think. And in the case of Ormiston, the wire contains not just complex materials and structures but also more than two centuries of knowledge.

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