



Top tubes

531, 753, 953... the numbers are as emblematic as the frame stickers. **Dan Farrell** visits a 110-year old British company: Reynolds Technology Ltd

In a quiet corner of the factory, nestled amongst some bicycle frames, is a framed photograph of a cyclist on the Champs-Élysées in Paris. Closer inspection reveals some handwriting – ‘All the best, Greg LeMond’. Nearby is a picture of Bernard Hinault. Both Tour de France winners are linked to this area of Birmingham by patent number 24,931, ‘Improvements relating to the Manufacture of Tubes.’ The inventors were Alfred Reynolds and John Hewitt.

The Reynolds name is inextricably linked to cycling, and legends such as Charly Gaul, Jacques Anquetil, Eddy Merckx and Miguel Indurain are a few of the many – 27 Tour de France winners since 1958 – who have ridden to victory on Reynolds-tubed frames. But heroes of many different kinds have relied on Reynolds tubing, with the company supplying 25,000 miles of light alloy tubing for, amongst others, WW2 aircraft like the Bristol Blenheim and the Supermarine Spitfire. The oxygen cylinders used during Hilary and Tensing’s successful Everest ascent

in 1953 were supplied by Reynolds. The chassis of Thrust 2, later to propel itself into the record books at 655mph, was built in Reynolds’ own factory using 531 tubing.

British steel

The origins of the company can be traced back to 1841, when Alfred Reynolds’ grandfather, John, established himself as a nail manufacturer. This company (John Reynolds & Sons) grew quickly and was awarded a gold medal for quality and excellence at the Great Exhibition in 1851. Alfred joined the family business in 1884, and shortly afterwards, scarcely ten miles away, the Rover Safety bicycle was unveiled to the world by JK Starley. This bicycle re-defined cycling as a pastime for all, and with the demand for bicycles increasing, scores of cycle factories appeared in Birmingham and Coventry.

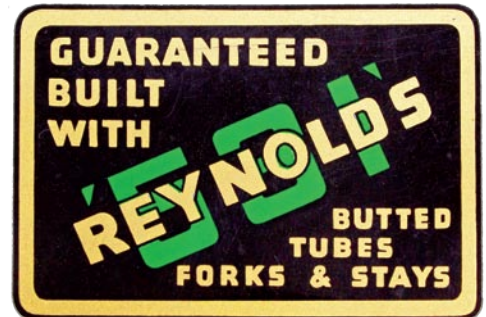
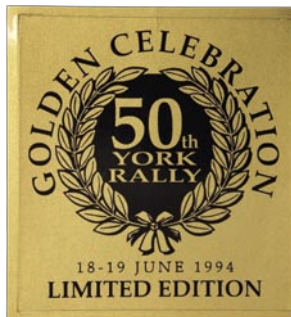
Looking for opportunities to expand, Alfred Reynolds considered the problems that cycle makers had in joining thin tubes to thick lugs. With the help of his foreman Hewitt, Reynolds devised the ‘butting’ process – the manufacture of tubes



(Top) Sizing dies for butted tubes. Reynolds invented the process of butting (Above) Alf Hodson has been with Reynolds for over five decades. He may have drawn the tubing for Anquetil’s Tour de France winning frames

with the ends of a greater thickness than the body. Production began at the Crown Nail Works, but within a year ‘The Patent Butted Tube Company’ was established as a separate undertaking, supplying butted and tapered tubes largely to the cycle industry.

One hundred and ten years later, butted steel tubes for bicycles are still Reynolds’ core product. Their processes are similar, and on viewing the factory one could be forgiven for thinking that some of their solid, British-built, machines could be the originals. This is not the case, but Managing Director Keith Noronha is unapologetic, »



» pointing out a modern machine that is 'not strong enough for our current generation of steels'. Keith has been involved with Reynolds for many years and, having seen ownership pass from the Tube Investments (TI) Group (into which Reynolds was absorbed in 1928) to Coyote Sports. After the bankruptcy of Coyote, he led a management buyout in 2000 to take control of Reynolds and keep them in their Birmingham factory.

They have since had to move from their home for 90 years, Hay Hall in Tyseley, and are now resident in Hall Green, barely a mile away. There was no question of moving overseas. 'We need our staff, we need our machines,' explains Keith. 'Setting up somewhere else would be unthinkable and almost impossible.'

Magic numbers

Raw materials are brought in from around the world. The air-hardening materials (631, 853) originate from Germany and are also used for side-impact beams in cars. The latest 953 material is the result of a development project with Carpenter in the USA. Reynolds, as ever, draw the material down to the required size, using an internal butting bar to achieve the required profile. The tube is then passed between spinning 'reels' that increase the tube diameter, allowing the butting bar to be withdrawn.

A final pass through a sizing die, followed by straightening, leaves the butted tube ready for any heat treatment that may be required. Some tubes (particularly chainstays) need further processing to create the desired shape. Huge rotary hammer presses are used for these tube manipulations ('manips'). Each profile has its own tooling set.

This is skilled work, and Reynolds' craftsmen have had plenty of practice. Anquetil won four of his Tour de France victories on 531 tubing that may have been drawn by Alf Hodson, now in his 52nd year at Reynolds. Others in the 12-strong workforce have notched up over 30 years of service. Keith stresses that whilst metallurgical advances push mechanical properties higher and higher, it is thanks to the experience and

(Clockwise from top left) 953 has twice the tensile strength of 531. Reynolds produce titanium tubing as well as steel. Reynolds release special 531 transfers to celebrate the 50th York Rally

depth of knowledge of his staff that cyclists get to ride frames built from these new steels.

Space age tubing

It is easy to forget that steel tube is not Reynolds' only product. Whilst the company's reputation was forged by the success of the immortal 531 manganese molybdenum (introduced in 1935 and still in use today) and 753 (effectively heat-treated 531) steels, both aluminium and titanium feature in the product range. Reynolds were the first company to supply butted 6/4 titanium tubes, and their X-100 aluminium-lithium tubes were a spin-off from NASA's space shuttle project.

As more industries demand increased strength and less weight, boundaries are being tested – Reynolds 953, recording twice the tensile strength of 531, is one result of this push. This remarkable 'maraging' stainless material has superior strength-to-weight properties compared to aluminium and titanium, as well as very high impact strength and fatigue resistance.

The increasing specialism of Reynolds' products is key to keeping the company manufacturing in England. In the 1970s, production peaked at 10,000 tubesets per week, but as volume bicycle manufacture has all but left Britain, Reynolds now base their business around high quality, custom-drawn tubes – the most popular being 853 – sold to customers worldwide. With increasing interest from outside cycling, Reynolds materials are now found in products such as ice-skates, suspension arms, sports wheelchairs and motorcycles.

As companies become more environmentally and safety conscious, the demand for high-strength, lightweight tubing continues to increase. Reynolds' expertise often makes them the first port of call for such requirements. It is not difficult to see why. As Production Manager Paul Murphy says, 'Reynolds have the materials, the equipment, the technical knowledge, and the experience.'

For more about Reynolds tubing, see the website, www.reynoldstechnology.co.uk