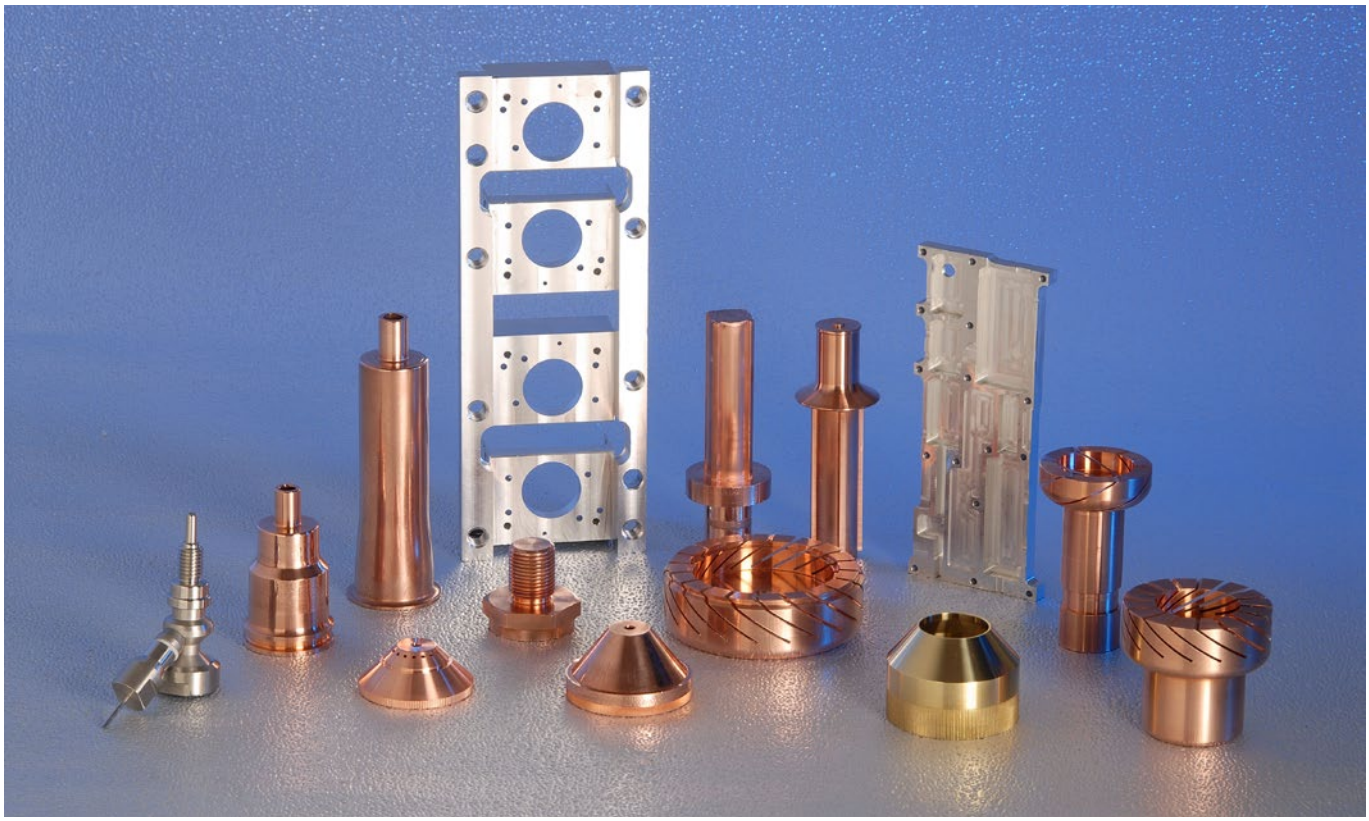
Making metal work harder

Technical article

Dawson Shanahan
Precision Engineering & Cold Forming



Improving manufacturing processes can increase output, boost production quality and maximise plant profit. To meet the growing need to provide all these benefits, engineering companies that manufacture metal parts are taking new approaches.

Engineering firms are constantly seeking new opportunities to apply more cost-effective measures that will save energy, carbon and, of course, money. Targeting energy consumption is always high on the agenda but such measures as installing energy-efficient components can sometimes be ignored because they seem to demand a longer payback period than can be justified. The truth, however, is that upgrading gearboxes, drives, couplings and motors can create huge savings.

Similarly, material costs for manufacturers of metal components are sometimes judged to be a fact of life to be endured but the truth is that there are now an increasing number of options available with which to cut costs and achieve a more efficient and sustainable manufacturing programme.

You can't control the market cost of the metal you use, but how about considering production methods that could allow you to use less of the same? Dawson Shanahan has pioneered a metal manufacturing process that can cut production costs without sacrificing the quality of components. Indeed, this process offers not only big material savings but also an enhanced surface finish and improved mechanical characteristics. And because it retains the integrity of the metal, while also producing parts with highly polished surfaces, the performance of a component can be improved dramatically.

The process is called cold forming and its impressive list of benefits means that, along with producing simple, high volume components, cold forming is now increasingly used to produce precision components in, for example, laser applications, where cold-formed nozzles can increase cutting precision significantly.

Cold forming is a manufacturing process by which metal is shaped

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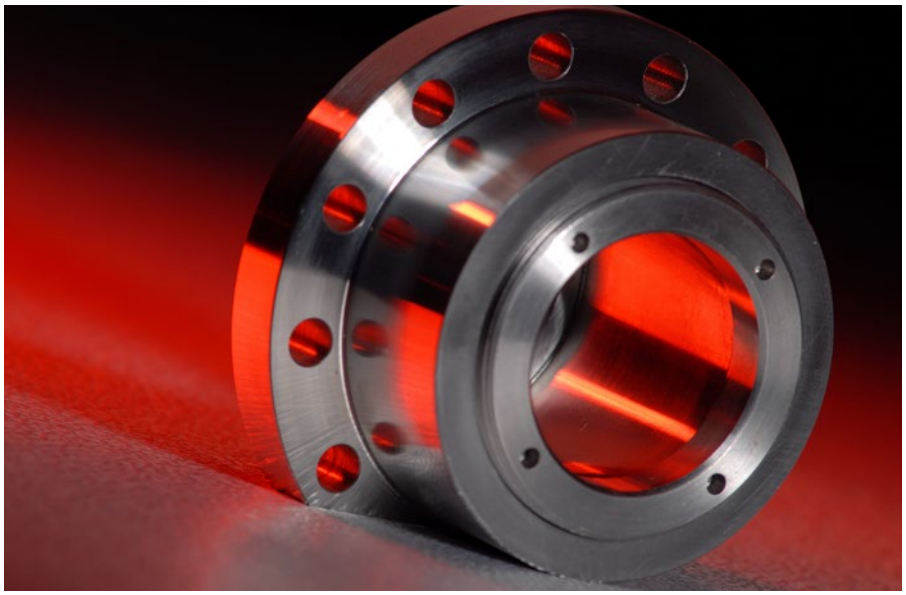
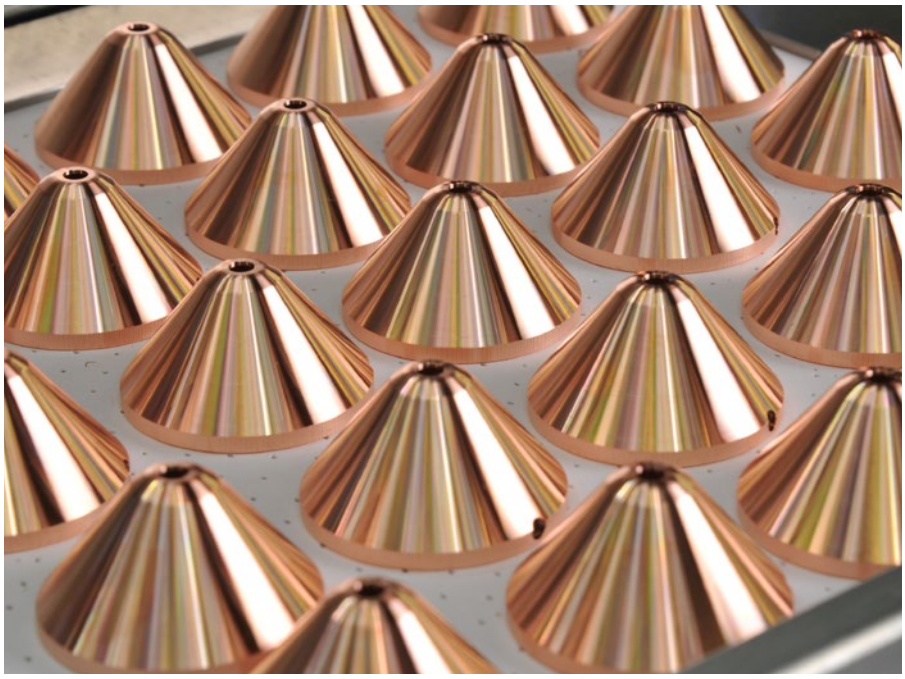


without removing material. A simple blank (either sawn or cropped from a round bar or wire or as a cold headed pre-form) is placed within a die and a punch is pressed into the blank at ambient temperature. The blank then takes on the form of the punch and the die. Put more simply, cold-forming is making a shape from material at room temperature, just like Plasticine when it is pushed into a mould. With appropriate force, hard material such as copper, aluminium, brass and now even stainless steel can be formed to the required shape. Other precious materials, such as gold and silver can also be cold formed.

Thanks to cold forming, up to 80% material savings can be achieved, as well as time and costs saved that would otherwise have been incurred by machining. As mentioned above, component performance is also improved through the enhanced qualities cold forming brings to the structure of the metal.

For example, Dawson Shanahan precision engineered laser nozzles exhibit a significant improvement in cut quality over conventional machined nozzles because of their internal surface finish of just around 0.1µm.

The enhanced mirror finish and curved internal nozzle profile gives better, less turbulent gas flow, resulting in the improved cut quality and speed. Nozzle damage by misalignment and clipping of the laser beam is also reduced. YAG (yttrium aluminium garnet) laser nozzles, traditionally difficult and expensive to manufacture due to the length of the tapered bore, can also be manufactured using Dawson Shanahan's technology.



Looking beyond cold forming, there are other relatively new methods of saving on costs that have recently gained attention. New systems that use vacuum pumps to automatically collect swarf from the machining process, for example, offer strong potential, and the bigger the company, the greater the possible saving.

Honda UK Manufacturing (HUM) is using a swarf collection system to process a massive 1,000 tonnes of swarf waste every year. Manufacturers can land themselves with tonnes of valuable metal using this method and if they can conduct recycling operations in-house without contracting out, the benefits are greater still.

So, those who have not seriously considered methods such as swarf collection and cold forming can make a major reduction in costs by avoiding the waste of the precious metal they buy.

Dawson Shanahan (Wales) Limited
Henfaes Lane, Welshpool, Powys, SY21 7BE
Tel: +44 (0)1938 551700 | Email: info@dawson-shanahan.co.uk