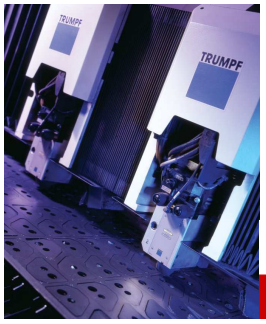
An introduction to sub-contract laser cutting



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David Lindsey
Laser Process

What is laser cutting?
Laser cutting is a process whereby material is cut to shape using a laser beam under computer control. A wide range of materials can be cut in this way although today they tend to be mainly metals with other non-metals such as plastics and ceramics being cut by high pressure water jet and other methods.

Why laser cutting?

The virtues of laser cutting have been promoted fairly rigorously since the process started to take off as a sub contract service around twenty five years ago. However, there is still a misconception in some quarters that laser cutting is a high-tech process for high-tech applications. It is true that laser cutting is being used more and more in areas such as aerospace, motorsport and other highly technical and high precision industries but the fact remains that a large percentage of work passing through jobshops (laser cutting subcontractors) is of a fairly mundane nature, without a requirement for tolerances measured in microns.

A large amount of laser cutting work would, at one time, have been carried out by gas cutting. It has often been said to potential customers, in the past, that if they were buying gas cut components and were happy with them then they should stay with them, because laser cutting would never compete on price, but if they had to flatten them, dress the edges or machine in holes and cut outs then laser cutting would offer a better and more economical alternative. Laser cutting does not cause distortion through heat, it leaves a clean edge and is able to include holes and cut outs of (almost) any shape and size. Laser cutting provides customers with a consistent product that can, in most cases, be integrated immediately into their product. The fact that standard tolerances for

laser cutting are around 20 percent of those for gas cutting is an added bonus to many customers and not a strict requirement.

One of the more important advantages of laser cutting is that of time (and therefore cost) saving. The need for hard tooling is eliminated and this can save many thousands of pounds and several weeks delay. Modifications can be made instantly and samples produced within hours. Stock levels can be reduced significantly because the quantities required to make a pressing operation viable do not apply to laser cutting and reduced lead times give manufacturers more control over their scheduling. Another popular misconception about laser cutting is that it is too expensive. The growth in the number of machines sold and in the number of jobshops belies that. It is true that the machines are not cheap, with a typical machine from one of the market leaders costing in excess of £300,000 but improvements in the process capabilities of these machines mean that they are now able to produce items at a lower cost than was possible 25 years ago.

Economy in the use of material has been a major promotional point for laser cutting from the beginning but this probably has more relevance today than it ever has. Steel prices are rising almost daily and some items are beginning to become scarce. We are told that this situation is going to get much worse before it gets better (if, indeed it ever does). Laser cut components can, depending on shape, be nested very closely to obtain maximum yield and therefore minimum cost.

Laser cutting has allowed designers to think 'outside the box' and to design specifically for the process. Many items are produced, by laser cutting, which would not have been possible by other methods or which would have been prohibitively expensive to produce. There are many examples of artists and designers using laser cutting technology to produce innovative concepts, especially with the use of soft bending - a process whereby slits cut into the profile allow for bending by hand.

Why sub-contract?

The first, and most obvious, answer to this is one of cost. Most small to medium manufacturers, sheet metal workers, fabricators would not have the wherewithal, or inclination, to purchase a machine costing as much as these do. You would also need a lot of work for the machine; if you are not able to run a machine productively for at least 12 hours per day it will not be cost effective. These machines are expensive to maintain, with most work

requiring specialist knowledge and the question of re-sourcing whilst the machine is out of action can be a problem. Over the years a large number of fabricators/sheet metal workers have installed their own machines because they thought that their spend on sub contract would warrant it. They have, in a lot of cases, decided not to renew their investment and have returned to using jobshops.

Over the last 25 years it is subcontractors who have provided the impetus for the development of laser cutting systems. It is they who have bought the machines in ever increasing numbers, it is they who have invested heavily and taken sometimes huge gambles with that investment. The laser cutting subcontract industry is now as valid a part of the manufacturing environment as traditional operations such as punching, profiling or powder coating etc.

The foremost jobshops have a policy of continual investment and are keen to ensure that they always have the latest available technology at their disposal. The power of laser cutting machines is increasing all the while with the increased power bringing the ability to cut ever thicker sections at greater speeds, the biggest benefits being with stainless steel and aluminium. Control systems are also continually improving bringing further increases in cutting speeds. The more conscientious jobshops are always looking at the latest improvements with a view to providing better and more cost effective services to their customers.

There is a growing trend these days towards subcontracting generally. More and more manufacturers are becoming what might be called meccano operations where they buy in completed components and simply 'bolt' together to form the finished assembly. Some laser cutting subcontractors have become full blown fabricators and there are arguments for and against this but the more general trend is for them to add certain secondary operations such as bending, tapping or studding etc. There are other instances of subcontractors forming partnerships of complementary disciplines in order to provide complete sub assemblies.

The thinking behind this, of course, is that use of sub-contractors relieves the manufacturer of the responsibility of maintaining a workforce that may not always be employed effectively. In other words he only pays for the labour he needs. The costs of maintaining highly specialised, high value, equipment and the training and employment costs that go with it are better left with the specialist as is the responsibility to see that, if a machine goes

down, capacity can be maintained.

Laser jobshops have the expertise, the equipment and the mindset to deal effectively with the requirements of their customers, customers who demand the right quality at the right price delivered at the right time. It is an intrinsic part of their philosophy to provide the service that their customers demand - and deserve.