The Club's Laser Cutter: Setting the Scene and What Next

Mick Moignard

August 2026

Recently, the Club Trustees requested information on what we might do next with the club's laser cutting provision.

Our existing machine is a 10-year old HPC CO2 laser cutter. It works well, and has been much used. It has a big enough bed to be valuable up to 7mm scale modelling. However, it is 10 years old, and there are better technologies out there that can outperform it. It has a 0.3mm beam size. Beam size – the width of the cut line – is taken into account when designing CAD artwork. It will cut and engrave plastics and wood up to around 8-10mm think, but it will not cut metal. It requires a separate computer to operate it; this need not be a high-spec machine.

A CO2 laser operates at a specific wavelength. Machines with other laser wavelengths exist; the most common are fibre and diode lasers.

A fibre laser will cut the metals that we commonly use for modelling; brass and nickel silver, and will do it with a finer beam than the existing machine. However, fibre laser cutters are expensive.

Diode lasers are cheap, but somewhat limited in scope. They'll happily cut opaque plastics and wood materials, and have a fine beam (0.1mm), which has advantages especially in small scales when engraving as opposed to cutting – think 2mm scale brick here as an example.

What we do know is that ownership of the laser cutter has been game-changing for many of our members; it has encouraged all sorts of creative modelmaking in many scales, and we would be immeasurably poorer as a club without it. We also know that several times members have asked about metal cutting, which the current CO2 machine won't do. Given the usage patterns that we have had with it, coupled with the CAD skills that members have developed to take advantage of the machine, stepping up to being able to cut metal is a far smaller step for club members than the initial purchase was. However, we also need to be aware that fibre laser machines are expensive; which means that we need to search for machines that make sense both financially and in capability.

Laser Cutter Types in detail.

Fibre

Fibre laser cutters generally utilise a more powerful source and generate a certain wavelength of laser beam which can cut through metals including steel, brass and aluminium. They're part of the solid-state laser group that can produce powerful and stable beams, with intensities 100 times higher than that of the CO2 lasers using the same amount of power.

The fibre-optic cable inside the fibre laser cutter concentrates light more accurately than a CO2 laser cutter, as the beam is smaller and straighter than other types of lasers, making it useful in metalwork and the construction industry. The high-power laser beam is produced using stimulated radiation and amplified by the fibre optic cable. They're also generally extremely low maintenance and have a far longer lifecycle than a CO2 laser.

Until recently, fibre cutters have been exclusively used in industry; they are large, require more power than can be supplied from a 13-amp plug, and are expensive; think £30k or more. But nowadays much cheaper machines are becoming available, some if which, as we will see later, could cater well for our needs.

CO2

CO2 laser machines are the more common type of laser machine. They're cheaper and lighter duty machines than are fibre cutters and work with a smaller range of materials. They are perfect for engraving and cutting materials such as wood, plastic and fabrics.

The CO2 laser uses a CO2 filled tube and fully reflective mirrors to create a beam light powerful enough to cut through a wide range of materials. This type of laser machine is one of the most popular due to its less intense nature and more affordable price range. It can typically be found in education environments, as well as engineering, sign making and design sectors.

Diode

A diode laser cutter uses semiconductor blue light (typically 455 nm) to engrave and slice through materials. Modern high-power options (20W to 40W+) can cut thick wood and dark acrylic, serving as an affordable, compact alternative to CO2 lasers. They do not cur transparent materials such as acrylic sheet at all.

These three most popular styles of desktop lasers work on different materials to varying degrees. Diode lasers are more affordable, but at the low end are only good at etching organic material. CO2 lasers can slice and dice nearly any organic material and all acrylics, but their price and large size are more suitable for entrepreneurs or hobbyists with a large budget. Fiber lasers are very niche and primarily work on metal.

Options

The existing machine offers an A3-sized working area. It's been suggested that we should aim for something that will cut an O-scale coach side in one piece; which is around 70 * 500, or an O-Scale boiler at 170 * 200; larger is also of benefit – think retaining walls in HO, 4mm or even 7mm - but the A3 size is probably as big we can practically use or afford. Larger applications such as cutting baseboard shapes is something that we would very rarely need and a such doesn't have a justifiable case, particularly in financial terms.

Software wise, Lightburn these days seems to be a popular choice of control software. Pretty much all the machines I looked at either come with Lightburn or will work with it. Lightburn works with many familiar file formats including DXF, which many members already generate with ProgeCad, so we should find that existing artwork can be carried forward, though adjustments may need to be made for different beam widths in some cases.

Diode Cutters

Diode cutters are available from around £300 upwards. There are club members who own diode machines, and they can be asked for opinions on their machines.

BlazeX offer a small machine - the M3 10W, which offers 0.04mm spot. That small dot size could well be useful in 2mm scale for brickwork engraving and suchlike. It has a small working area (150*200mm or 6*8 inches; suitable for many items in 4mm scale or smaller but of less use to S and 7mm scale modellers. This M3 machine will cut plywood and soft wood, dark acrylics (but not clear), paper, card and so on, but it will not touch metal. Such a machine is listed at £490 but (Aug 26) is on offer for £240; however once an air handler – which for all laser cutters is not an option – that rises to about £350. https://blazexlaser.com/en-gb/products/blazex-m3-pro-10w-laser-engraver-and-

laser-cutter?variant=44930508554294&gad_source=1&gad_campaignid=23902823211&gbraid=0AAAABDEMo-6tQRPdaO5ZwVgxm9n4Gk_4Z&gclid=CjwKCAjw-rTUBhAiEiwADv8gBENHh0CCn3gZYLDbGn6E8kbvHRm3Xq8uaZbdaZaNN94rChEmPWrqrRoClwYQAvD_BwE

There are many other small diode laser machines available - choices comes down to working area size in many cases.

The question for a diode laser is whether we need one at all, given that such a machine won't do anything the existing machine can't do. It does have the advantage of size, weight, portability and the smaller dot size.

CO2 cutters

The club's current machine is a CO2 laser. The case for replacing this with another CO2 laser cutter is thin, given that the current machine is working and working well, though as noted, it is now over 10 years old. Technology has moved on, but even then, unless the current machine were to fail in a non-repairable manner, there isn't a clear case for a like for like replacement.

Fibre cutters

Fibre lasers can cut metal. Being able to cut brass or nickel-silver up to, say 1.5mm thick would be a game-changer for club members, in that they would be able to CAD design and make metal components similar to those in etched or pressed kits. Such machines are however expensive, though "hobbyist-level" machines are beginning to appear.

An example of this is the Gweike MCORE Desktop machine, which sports a 400W fibre laser and an 80W CO2 laser. It has the option of a conveyor that can extend the working space. It does need a supply of compressed air when cutting metal to clear melted metal and cuttings. This machine is priced at £5234 plus £1271 for the compressor. It's still in pre-order as it is a new model. https://uk.gweikecloud.com/products/m-core

Gweike also offer their G3 model https://uk.gweikecloud.com/products/g3-basic which is a combined Fibre and Diode laser. One option is 50W fibre and 20W diode. It offers a working area of 170mm square, or with an optional conveyor, 170mm * 1000mm. It can cut up to 2mm brass. Currently priced at £2841 for the 50/20W model, air handler extra. Currently out of stock, at least in the UK. Gweike tell me that these need to be air-freighted over from China.

XTool offer their F1 Ultra machine which contains a 20W Fibre laser and a 20W diode laser, plus a range of accessories such as a conveyor table to enlarge the working area, and air purifiers. The air purifier isn't cheap; these three together would be around £5500. It claims to cut brass, stainless steel and aluminium, but being a 20W machine, which can cut only only 0.4mm thick brass I think we'd grow out of it very quickly.

From my searching, I would say that a 50W fibre laser is the absolute minimum, and 100W would be more valuable to us. However, small desktop/hobbyist machines of this power and working area are currently few and far between. The Gweike machines seem to have the best value for money, but as noted, are not currently available in the UK, to be unavailable, though it may be possible to back-order. There are small fibre lasers about on the marketplace, but these are aimed at the craft

engraving market and not at hobbyist metal cutting. Most have small working areas and very low powered lasers.

For contrast, HPC Laser, from whom we bought the current machine do have a new “desktop” system just coming on the market, but it’s both quite small and also way out of our price range (£22500) as well requiring more power than can be delivered with a 13-amp plug.

Conclusion and Recommendations

Right now, there’s few options for adding or upgrading our capability. As noted, there is no major case for replacement of this with another CO2 machine.

There has been a suggestion to obtain a simple diode machine to install in the coach at Quainton, but there are a number of practical issues we’d need to face: such as fire risk and emissions issues what with the coach being inside another building, operator training sessions and other relevant H&S issues, plus I think permissions from QRS itself.

Acquisition of a metal-cutting fibre laser would be the way to go, but right now, availability of such a machine to meet our needs in terms of work area and price just isn’t there, unless or until the Gweike Mcore or G3 machines arrive.

A possible alternative is a 3-axis or more CNC machine. A laser cutter is essentially a two axis machine with a little action in the Z axis - depth, as when marking a pattern. A multi-axis CNC machine would enable more complex jobs to be done, similar to what a 3D printer can do, but in other materials such as wood, metal or rigid plastics. 3D CAD skills would of course be required. An example of such a machine is the IFMaker M5
https://www.kickstarter.com/projects/ifmaker/ifmaker-m5-fully-integrated-desktop-5-axis-cnc?ref=2qmejq&cmid=f75111c7-e4d6-4330-b6d3-9eba05463c88#h:Meet-IFMAKER-M5

Potentially the next step is to place this in front of club members, possibly at the AGM, and see if the appetite is there to fund the acquisition of a Fibre laser. We will also need to consider where such a machine is kept. It should be at club premises and not at a club members house.