



The Olympic torch for London 2012 was manufactured using Prima Power machines, in particular the creation of eight thousand holes to guarantee contained weight and optimal heat dissipation. A huge honour for the company in Collegno and also a great challenge overcome with professionalism.

by Tony Bosotti

# The queen of rings

Prima Power, the machinery division of Prima Industrie Group and specialists in laser machinery and sheet processing, had the task and honour of creating the Olympic torch for the London 2012 games. One of the most important parts of the torch, designed and developed by Edward Barber and Jay Osgerby in collaboration with The Premier Group (supplier of the Olympic Committee and Prima Power's historic client, very competent in the automotive sector and in particular laser processing), was its series of 8,000 holes.

These holes have a symbolic and practical function. In fact, they represent the 8,000 torchbearers who will carry the Olympic flame on their travels across the UK from the 19th May to the 27th May 2012, when the Games officially begin in the Olympic Stadium. The holes also have a practical purpose

because they offer visibility of the mechanism that keeps the flame lighting inside the torch. They also reduce weight and guarantee heat dissipation to avoid it reaching the handle.

**An important symbol.** "Being of symbolic importance, - explains Ezio Basso, Managing Director of Prima Industrie, Prima Power division - the number of holes on the torch was a fundamental requirement. Our 2D Sincrono laser machine proved unbeatable to cut 8,000 holes quickly and with high quality. The parallel kinematic structure and numerical control allowed us to reach very high speeds, even if the trajectory was decisively complex due to the dense texture of the torch. You could say that cutting these holes was an "Olympic challenge" for Premier, overcame

Above: Lord Coe, Chairperson of Locog (London Organising Committee of the Olympic Games and Paralympic Games), with the Directors of The Premier Group, George Mollison (left) and Gez Halton (right).



Syncrono, the Prima Power 2D laser machine used to cut holes in the Olympic torch.



Ezio Basso, Managing Director of Prima Industrie, Prima Power division.

with experience, talent and the professionalism of our client and the help of our technology".

According to Basso, since there were so many holes and all varying in diameter, it was practically impossible to finish the job in time with a machine other than the Syncrono. It was only possible, thanks to the guaranteed acceleration offered by Syncrono, to create the torches required before the start of the Olympics.

"As often happens - states Ezio Basso - winning choices are made at design level to provide a very flexible and productive machine, without restricting inspiration for the project".

Another symbolic element of the torch was its triangular shape, which represents the number three with its multiple meanings linked to the Games: the three Olympic values of respect, excellence and friendship; the three words composing the Olympic motto: 'Faster, higher, stronger!'; the third time the Olympics are being held in London, etc.

**Lightness and strength.** The particular shape of the torch is obtained using aluminium sheets cut by Premier and shaped using a special press. Aluminium is widely used in the automotive and aerospace industry because, despite being very light, has good resistance to stresses and heat. The

Olympic torch is therefore light, but very resistant. The Premier Group used Prima Power technology to weld the various parts of the torch with a regular and continuous joint and cut holes in the welded areas.

The welding and cutting operations of this highly particular piece after forming were conducted by the 3D Prima Power Optimo laser machine with Vivida technology. Thanks to a very simple tool change system, Optimo can quickly change from one process to another, thereby avoiding use of various machines.

**High technology.** It is interesting to note that parallel kinematic technology, found on the most advanced Prima Power 2D and 3D machines, held such a fundamental role in this prestigious order. The models used were: Syncrono for two-dimensional work, a machine with 6g acceleration, while for the three-dimensional work the Optimo Vivida was used, with 1.2g acceleration. "The functioning principle is simple - explains Basso - even if implementation is rather complex and substantially requires implementation of a proprietary CNC. It is a bit like a crossover filter in an audio hi-fi system, where the low music frequencies are reproduced with a woofer, the medium ones using a midrange and the acute



Optimo, the Prima Power 3D laser machine that cut and welded the torches for the 2012 Olympics in London.

ones with a tweeter; in the same way, our CNC divides the moving parts based on the acceleration required and distributes them to the appropriate moving units”.

As aforementioned, the torch is made entirely from aluminium. Laser cutting this metal leaves the surface clean and does not require further treatments before varnishing.

Longitudinal welding too does not have any particular criticalities that require further work.

However, welding the die-cast ends is different for reasons relating to production tolerances and is conducted through wire feeding and requires any roughness to be manually cleaned if created during the process.

**Vivida up close.** Let's take a closer look at the welding operations (3D laser). What exactly is Vivida technology? “Vivida is the name we gave to the parallel kinematic technology we applied to our three-dimensional machines – says Ezio Basso. Basically, the machine head can move at high acceleration with a small work volume with coordinated movement with the rest of the axes. The possibility guarantees important improvements in the cutting and welding cycle time both for small detail such as holes, slots, etc, but also for piece edging where it avoids reduced speed on the edges.

The Prima Power manager's opinion is that in this case laser technology, thanks to its flexibility, enabled designers of the torch to move fairly freely and without having to worry too much about manufacturing details. And not just that, the production volumes required and the narrow time to market would not have enabled use of traditional systems based on milling or blanking. This shows how important the laser is. It is not just versatile, but also suitable for situations with high production volumes are required.

“It is fascinating – concludes Ezio Basso – how laser technology, a modern and advanced light application, can contribute to creating the Olympic flame, an ancient form of light that represents the most noble and traditional of sporting events. We are proud that our technology helped The Premier Group produce this splendid and highly relevant object”.