

# Technology

## *Trends*

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# Enhancing capability and productivity with robotics – The Cimotech way

■ K. N. Srinivasan

For the first time in India, a small fabrication shop exponentates, its capability and productivity with robotics. It's none other than the Bangalore-based Cimotech Hydro Machines (P) Ltd., a

machinery like oxy-acetylene cutting by use of templates, hydraulic shearing machine 12mm x 3 mtr, hydraulic press brake 250 tons x 4 mtr, MIG welding machines, a moving column milling and boring machine (to envelope a

### Analysis

The Robotic Plasma Cutting System developed by M/s. Plazma Pune is the first of its kind in India. Recently this system won the best design CMTI-PMT award at IMTEX'2004.



Cimotech's Newly Installed Plasma Robotic System

volume of 6 mtr x 1 mtr x 1.6 mtr) needed to be upgraded to CNC Control machines and effective material loading systems were also to be installed to obtain true benefit of machines. The new facilities that have been added to upgrade the infrastructure are:

1. CNC Robotic Plasma Cutting Machine( 2.5m x 8m)
2. CNC Hydraulic Press Brake(300 tons x 4 mtr)
3. CNC Shearing

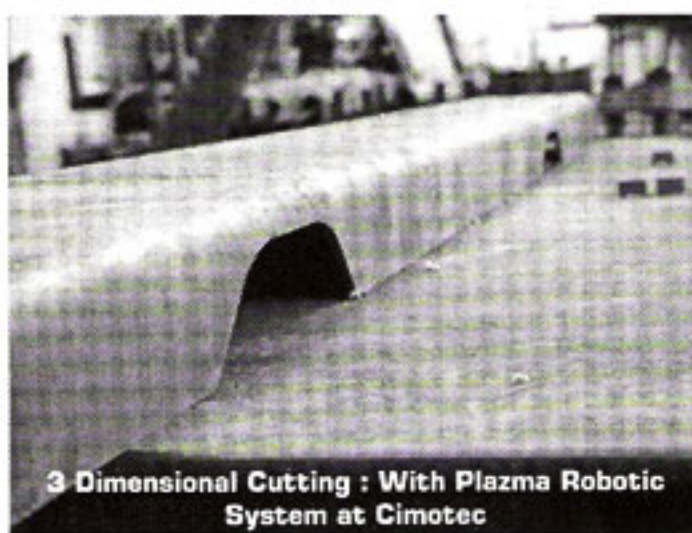


New horizons for cimotech with this export job

small scale industry engaged in the manufacture of medium/heavy fabrication catering to multinationals viz. Otis Elevators, Ingersoll-Rand, Tata Trucks, Tracktech International, L. M. Glasfiber India, APW President Systems, Westfalia Sperator India, SAB Wabco, etc.

It is an ISO 9001-2000 certified by Lloyd's Register of Quality Assurance. The company was hitherto using skilled labour and producing quality products for the above clients with the help of weld fixtures, templates, drill jigs etc. Customer's confidence in quality resulted in large volumes of parts to be produced, with became difficult to meet consistently and hence the seed of automation was implanted in their minds.

The existing infrastructure of conventional



3 Dimensional Cutting : With Plasma Robotic System at Cimotech

Machine(13mm x 3 mtr) and modifications in materials handling systems.

### The Plasma Robotic System Production

At our plant in Bangalore the system is carrying out two shift production with the following results.

As one is aware, Plasma is a state of matter achieved by the ionization of gas at high temperatures to conduct an electric current and focusing the current by means of an electrode and nozzle results in a beam of high intensity. The reference gas in our case is air, which is freely available. The basis of selecting a plasma source for cutting was primarily considered due to the fact that the cutting speeds compared to oxy-gas cutting is faster (at least 3 times). Laser cutting was not considered as the price was prohibitive and cutting of material beyond 12mm thickness with a good edge is not attainable by laser. Coordinate table with either oxy gas/laser is common which can cut



on two axes only. As mentioned earlier we were using templates and manual cutting.

- a. Port holes opening on Hydraulic Tank meant for Ingersoll-Rand India
- b. Side walls of channels used for Truck chassis meant for Tatra Trucks.

The process was very slow, resulting in very low volume of production. Broadly put, we were using 11 persons to make 5 sets of chassis over a period of 1 week (1 set



High Cut Quality : Nested Profiles

comprises 12 channels). With the plasma cutting we now produce 15 sets of chassis with 4 persons over a period of one week.

Besides this, as everyone in the fabrication industry is aware that bevelling is done on plates most of the time for weld preparation. Currently, this was made either by using a hand torch or milling machine. By the hand torch method, the finish was very bad, very uneven beveled edge. By the milling machine, we would obtain an excellent cut edge but the time taken and cost involved were very high. By the robotic plasma

machine, we have been able to achieve a high cut edge finish in shortest possible time. We have recently completed a number of export jobs with the desired quality and in time delivery.

### Operation

The Robotic Plasma cutting machine mainly consists of the following:

#### Hardware:

1. Robot
2. Robot controller and teach pendant
3. Air compressor
4. Plasma source
5. Torch cooler
6. Cutting table

#### Software

1. Offline Robotic Software
2. Nesting software

In a digital workcell the entire system is calibrated with respect to the actual installed system. This enables complete simulation of the complete cut cycle making 3D and 2D cutting operator-friendly. The CAD drawings of a wide range of parts to be produced are automatically nested with all cut parameters. The analyzer software automatically sets cutting current in the plasma power source once the program is transferred to the robotic

controller. The distance between the torch



Accurate Large profile  
(Size: 1800x3000x3Thk. / Accuracy =  $\pm 1$ mm)  
Cut with Plasma Robotic System at Cimotec

and the workpiece is automatically maintained by arc voltage sensing. This results in the plasma robotic system machine producing accurate parts with a quality cut edge, at a much faster output and at reasonably reduced costs. The programming of the system is simple and fast. A typical nested plate takes around 8-10 minutes to program and start cutting.

### Conclusion

Invest in the future is our motto. This Plasma Robotic System is our competitive edge for the export and Indian fabrication scenario. It was supplied by we now have extra capacity to take on new challenges.

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The Plasma Robotic System was supplied by Plasma Cutting Equipment Pvt. Ltd., Pune., Ph: 020-27121617, 27128928, Fax: 27123062.

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