20 HOURS OF DESIGN TIME REDUCED TO 20 MINUTES AT DIAL TOOL

Changing the paradigm with great results

At Dial Tool Industries, Inc. (DTI) in Addison, Illinois, the Automation Division had long utilized a tried-and-tested system for equipment development. The three main elements they seek to satisfy on every project, according to Sean Fraser, director of the division, are concept, embodiment and detail design. “The design that ultimately succeeds is the one that meets or exceeds our customer’s needs, can be delivered on time and produced with products readily available. These are the factors that drive our design direction,” Fraser notes.

The company serves a variety of industries with custom-built automated assembly equipment, incorporating PLC’s, multi-axis motion control, servomotors, metal stamping, resistance welding, pneumatics, vacuum generators, vision systems and vibratory feeders, all mounted to a frame as a free-standing cell or modified to customer requirements for inline integration. Those industries currently served include automotive, electrical, aerospace, telecom, semicon, lighting, sensors of many types and more. The Automation Division sprung up ten years ago as a separate entity from the parent company, which focuses on its mainstay manufacturing technologies of metal stamping/toolmaking and plastics molding. It was seen as a revenue source as well as a means of providing substantial added value for customers. DTI today runs its Automation Division at its facility near Chicago.

Traditionally, the DTI designers would draw up the proposed machine, then spec out as many standard parts as possible, before proceeding to the design and production of the custom parts needed. Whether produced in the DTI machine shop or outsourced to a local shop or component supplier for custom, low-volume production, this process had attendant expense, time and higher associated machine maintenance cost, plus less modularity in the utilization of custom parts on other machine builds.

Upon the determination of the assembly and other process requirements for a project, the designers begin to review the components available. One supplier, according to Fraser, has fundamentally changed the paradigm at DTI, in this area. MISUMI USA, a supplier to DTI for about three years, offers an array of configurable components for factory automation and is gradually increasing its part contribution to DTI machine builds, primarily in linear shafts, locating pins, rollers and stop pins as well as stop blocks. As Fraser explains, “With their CAD configurator and product catalog in hand, we found we could design machines better and much faster, realizing both time and cost savings through the utilization of configurable components.” Fraser went on to explain, “Since so much of our work is one-off or very low quantity, we often find ourselves in a bind, trying to make custom components in-house or through a local machine shop.” DTI finds MISUMI configurable components lessen the use of custom components. “The MISUMI configurable component is much more cost and time effective then going custom so we literally have reduced the overall cost and time it takes to build a machine,” explained Fraser. Furthermore, according to Fraser, DTI can source configurable components with no minimum ordering quantities and no set-up charges. Additionally, the online CAD configurator allows DTI to configure components online, download the native CAD files

and insert these files into their assemblies. Purchasing can even use the MISUMI web ordering system to then order the components online.

Fraser noted that custom components will always have a place in a machine build, but now many of the custom components can be replaced with configurable components. He explained that this has given DTI a new option during the machine build." The old way was to start by specifying the standard components then complete the build with custom components. The new way is to specify the standard components then specify all the configurable components and lastly finish the build with custom components," said Fraser.

DTI has found this fundamental change in the mindset of their design engineers has greatly benefited the company. "We're finding we often can reduce our design time on a particular section of a machine from 20 hours down to 20 minutes by using configurable components from MISUMI. "The time savings for our engineers, plus the machine shop time and expense savings we realize are simply outstanding," explained Fraser who also noted that the largest savings for DTI is realized by using configurable components. DTI is now able to reduce the average component count of 2,000 per machine to the range of 1,500 per machine and Fraser expects this to decrease further as the usage of configurable components increases. One example involves using configurable Hexagonal Posts from the configurable component supplier MISUMI instead of drawing and machining these as custom components. "It literally takes 5 minutes to configure these online at the MISUMI web site where in the past it would take us hours to draw the Hexagonal Post and send these drawings to a machine shop so they could be quoted and then eventually ordered," noted Fraser.

Today, DTI can use the MISUMI catalog or web site to choose the right material, length, diameter and alterations for the job. As Fraser explained, "Before, Hexagonal Posts often became custom components because we would need to machine these either internally or externally and this created a lot of estimations and approximations on what was exactly needed for the machine." Now Fraser and DTI have removed these types of uncertainties because MISUMI places all the material, length, and diameter as well as alteration information for its configurable Hexagonal Posts both in the catalog and on the web site. This allows DTI to quickly and easily obtain all the information they need to make the right decisions for the machine and configure the Hexagonal Posts to the exact specifications needed. As a result, less custom components are needed and this reduces the overall component count for the machine. Additionally, DTI has found that more configurable components typically translates to less design compromises as configurable component suppliers design the components to easily snap together resulting in a high-quality fit every time. This also allows machines to be more modular as not only do the configurable components offer a high-quality fit, but also each have their own part number that can be added to the bill of material for the machine. So, when the machine needs maintenance it's much easier to change a configurable component listed on the bill of material with a part number than to change a custom component that does not have a part number and is not on the bill of material.

Of further benefit to DTI, according to Fraser and DTI automation engineer, Mike Hanes, the MISUMI configured components could often be utilized for other jobs or even retrofits and reworks on existing machines, including those with other suppliers' parts onboard as original equipment. Here again, they observe that the time-compression savings to DTI in man-hours and delivery scheduling, plus raw material and stocking cost containment,

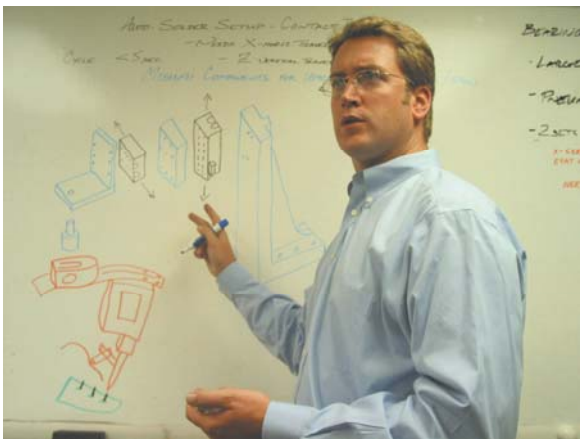
all benefit the company in documented terms. Hanes cited an example on a job currently in-house. There were ten uprights surrounding a dial indexer that needed slight modifications. A standard MISUMI component was found, configured online to suit the application and ordered for express shipping. According to Hanes, the price of the delivered part was about what DTI would have paid for the raw material.

On another recent project, an automated microweld/inspection machine was built for use on the elements of an automotive sensor. According to Fraser, by designing the tooling with multiple MISUMI components, DTI was able to develop a very cost-effective and simple tooling changeover solution. When any problems with the tooling or a machine crash occurs, he says, DTI is able to supply replacement parts with no time or expense internally and very low cost from the vendor, even on previously configured parts, in quantity of one. This benefit results directly from the MISUMI CAD configurator and online ordering system, whereby a configured part design immediately generates the part number, which translates into a machining code sequence at the part manufacturer. In DTI's case, many MISUMI components are produced at its Suruga manufacturing facility, also in Addison, Illinois. MISUMI partners with hundreds of machine shops, molders and others worldwide to maximize the production efficiency and cost containment on its products, according to the manufacturer.

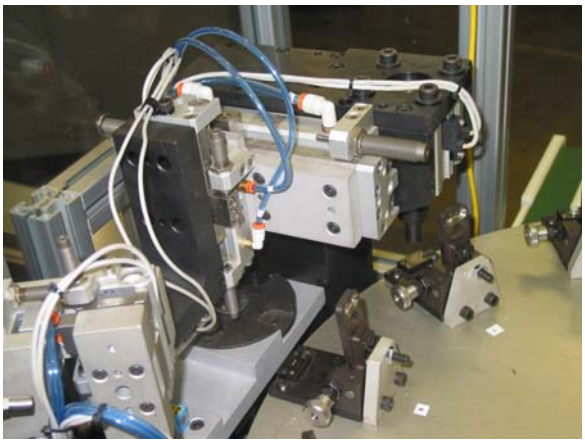
Sean Fraser credits MISUMI senior account manager, Mike Ricketts, who "lit the light bulb for us on many of the components we now use on various machine builds. We design with the MISUMI catalog in hand now, precisely because the time we spend sourcing a finished configured part through this vendor is less than we'd spend sourcing the raw material alone."

Dial Tool was founded over 50 years ago by CEO Gregory Pagliuzza, whose sons Mario and Steve run the company today. DTI comprises three divisions, metal stamping/toolmaking, plastics molding and the automation division. All the divisions work together in what Sean Fraser calls a symbiotic relationship, as the company is today able to supply more finished parts to its customers, as well as enhanced secondary operations and the automated assembly machines. This commitment to flexibility and versatility for its customers has yielded trackable benefits to DTI, especially in its main markets of automotive, aerospace, telecommunications and military ordnance. DTI has recently partnered with a molding and manufacturing company in China to further explore new business opportunities and maintain a competitive advantage in its markets.

DTI is ISO/TS16949 and ISO9001 Registered. More information on the company may be found at www.dialtool.com. The company is located at 201 S. Church St. in Addison, IL and its phone number is 630-543-3600.



Director of the Automation Division at Dial Tool, Sean Fraser, discusses the initial design concept for a machine section that will solder contacts onto a printed circuit board. Fraser says his company now designs with the MISUMI



This section of a DTI machine, used to solder, assemble and test automotive ignition components, incorporates a majority of MISUMI parts, either standard or configured. Native CAD files can be downloaded in various formats (ProE, Inventor, IGES, et al.) directly into assemblies such as this one, thereby saving considerable design and development time.