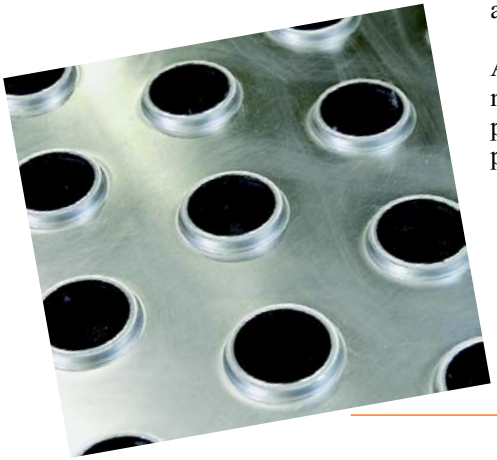
Aero-Heat puts freeze into food processing

Custom forms sheet to finished parts with Shear Genius

Fabricating sheet metal parts for stainless steel refrigeration units that can be as large as 200 ft long, 19 ft wide, and 20 ft high is routine for Aero Heat Exchanger Inc., Richmond, B.C. The Canadian company is a designer and manufacturer of a wide range of specialized refrigeration equipment and systems for the global food-processing industry. After being founded in 1979, Aero-Heat quickly became of major supplier of refrigeration coils and Individual Quick Frozen freezing systems.

Aero-Heat custom builds its freezers to suit the needs of each individual food-processing customer. Its freezing tunnels, blast freezers, food processing plants, and cold storage warehouses are used for processing a wide variety of foods, including fruits, vegetables, french fries, and poultry among other foods. Its fabricating equipment must match the ability of its application engineering staff and manufacturing craftsmen to produce units that fit the space, as well as the cooling requirements of each installation.

After thoroughly studying available sheet metal fabrication equipment to replace its two mechanical turret punch presses in 2001, the company selected the Shear Genius 6.4 Flexible Manufacturing Cell (FMC) from Finn-Power International Inc. Criteria considered included information on technology, turret layout, tool capacity, speed, and the availability of local service. Steven So, Aero-Heat's purchasing manager, says, "We chose the Finn-Power Shear Genius because it was the best value for the money with all its features, functions, and options."



A refrigeration condenser endplate (3 mm-0.125") with extrusions was formed with a one-hit, single tool using the 3 $^{1}/_{2}$" upforming station. Reverse upforming was used to accommodate the high extrusion in the thick material.

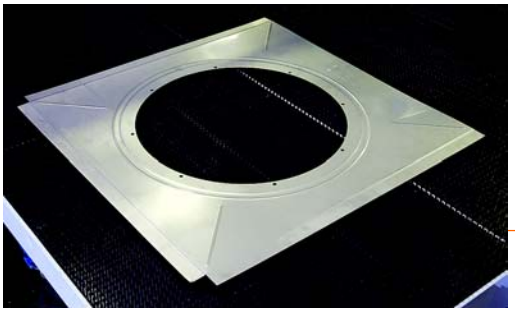
Before purchasing the Shear Genius, Aero-Heat's fabrication department made parts on older mechanical turret punch presses by either nibbling out of a precut blank or blanks were sized in-house using a 12 ft shear and then punched. All the freezer chambers and fan housings were strengthened with welded stainless steel gussets and plates.

Finn-Power's applications engineer Andrew McCarlie (left) inspects an "upformed" part with Aero-Heat's operator Kwok Hung Chau. Upward forming option provides more accurate forming and greater forming heights up to 16 mm (0.63") and 5" in diameter.

This refrigeration access door assembly is punched, sheared, and ribbed with the Aero-Heat logo on the Shear Genius 6.4 FMC.

With the addition of the Shear Genius, time-consuming nibbling out of the part profiles with a small indexable 0.5" square was eliminated. This included parts up to 12 ft long in 10 gage 304 stainless steel. In addition, secondary shearing operations were eliminated and standard material sizes were used, eliminating both work in process and a reduced part process time.

The Shear Genius concept provides one machine capable of transforming a full-sized sheet into finished parts that can be moved to final production stages for immediate integration directly into final product assembly. Occupying less floor space, about 30 feet, Shear Genius automates the loading, punching, and shearing of parts in the most efficient manner using nesting programs. The level of automation can be customized flexible modular solutions for raw material storage, loading,



Producing this 14 gauge stainless steel fan housing used three different wheel/rollerball technology tools: radial and linear stiffening ribs; offset up flanges, and offset down flanges.

unloading, sorting, and stacking, all of which can be added later as budgets allow and production demand increases.

Savings accumulate

On average, Shear Genius reduces total manufacturing time by 60 percent and saves one blank sheet out of every ten. Eliminated are wasteful skeletons and costly secondary operations such as deburring. Nibble edges on the part exteriors were eliminated through the use of integrated right angle shear.

Aero-Heat estimates that it has realized material savings of 15-20 percent using the Shear Genius, substantial savings when you consider that the cost of 304 stainless steel can be more than $300 per sheet.

Manpower needed to wrestle with sheets that are big and awkward, 60" x 144", is also reduced. “Moving these large sheets is quite difficult and often takes two men to handle them,” explains operator Kwok Hung Chau. “With the Shear Genius, we place the material on the big loader (4.2 meter) and it does all the work. We don’t have to manually put it on another machine for additional operations.”

Also eliminated is the potential of mistakes when the 60" x 144" sheets are manually sheared. In the Shear Genius, the sheet is loaded and squared automatically, and there is no human interference, ensuring very accurate parts. In fact, the same clamps that hold the sheet for punching also hold it for shearing. In essence, the Shear Genius allows the automated process to begin with a full-sized sheet of material and end with a finished part after automated loading, punching, forming, shearing, and unloading—all in one operation.

Aero-Heat is using Finn-Power’s upward forming feature to pierce and extrude holes in both 0.125" aluminum and 14 gage 304 stainless steel in one operation. The ability to reverse form in such thick materials and retract the form die after use enabled cycle time reduction for such parts along with the ability to multiple-nest such parts on sheets up to 60" x 144". The upward forming feature option provides more accurate forming and greater forming heights up to 16 mm (0.63") and 5" in diameter. Another advantage is that all dies are at the same height, reducing risk of material damage and increasing machine uptime.

The Aero-Heat logo was produced using wheel technology tooling/roller ball, replacing the need for a secondary operation with a separate nameplate.

Using Finn-Power’s wheel technology enabled the production of prestiffened panels that reduced production costs by eliminating the need for costly stainless steel stiffening gussets in the wall, floor, and fan panels of the units. Aero Heat was also able to produce customer logos and features on their products that were previously not possible due to time and cost constraints. For example, the Aero-Heat logo was produced using wheel technology tooling/roller ball. Before Shear Genius, the logo part was manufactured as a secondary operation with a separate nameplate.

Aero-Heat estimates that by switching from a mechanical to a hydraulic turret punch press, it has reduced tooling costs by 25-30 percent. Finn-Power employs an individual tool holder concept that allows customers to design their own turret layouts. Specific tool stations are not machined into the turret, and Finn-Power offers a flexible section of tool holders. Any tooling style from Mate Precision Tooling or Wilson Tool can be installed in a Finn-Power turret. Up to ten auto-index, forming, or Multi-Tool stations can be installed in a turret.

Finn-Power’s Multi-Tool stations increase the number of tools available in a turret, allowing multiple tools to be put in one station. Multi-Tool offers 6, 8, 10, or 24 different punch/die combinations in only one station—a turret within a turret. Aero-Heat has two 8-station and one 10-station Multi-Tools.

Aero-Heat operates the Shear Genius two shifts, six days per week. The company estimates that the Shear Genius is twice as productive as the previous two mechanical turret punch presses. As a result, Aero-Heat has increased its production capacity, reduced its work in progress (WIP), and enabled a significantly faster turnaround of this large custom product in its sheet metal fabrication area. **Finn-Power International, www.rsleads. com/311tp-167**

Shear Genius eliminates the potential for mistakes when manually shearing a 60" x 144" sheet as the sheet is loaded and square automatically without human intervention.

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