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Featuring

Worldwide

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Waste

by Roger A.P. Fielding, BENCHMARKS

Go into the average extrusion plant and list the waste: wasted materials, wasted labor, wasted money! The waste you list represents lost profits, or, perhaps more importantly, the opportunity to significantly increase profits.

Most extrusion presses will be equipped with a billet saw or shear, gas fired billet furnace, run-out table, integrated handling system to transfer the extruded lengths to the stretcher, saw table and finish cut saw. From the finish cut saw, cut lengths will be transferred to the age ovens. Additional equipment includes billet quenches (which are designed to achieve isothermal extrusion) and press run-out quenches, forced cooling systems mounted above the run-out and under the handling system (which are required to achieve mechanical properties).

In your search for waste, start with the cut billet or log. Check that the dimensions are as ordered. Examine the surfaces of the billet or log for evidence of casting defects. Check the ends for evidence of internal defects, and ensure that the ends are cut square. (On pusher furnaces, an off-square cut can push the billet or log through the wall of the billet/log furnace.) Why check the dimensions? Because small variations in diameter affect the weight of the billet, and hence our ability to plan correctly. Why bother with the surface quality? Because a rough surface traps dirt (which gets into the die) and traps air (which can cause blisters). Surface roughness increases the surface area of the billet and hence the quantity of metal which must be left in the butt.

At the billet furnace, list the obvious sources of waste. Repair poorly installed or damaged insulation. Look for evidence of improper combustion control. Check for leaks around the end doors. If the furnace is equipped with log shear, stop any oil leaks. Ensure that the shear blades are set up correctly, so that the end-distortion, which is inevitable during the shearing of hot billet, is minimized.

At the extrusion press, again list the obvious sources of waste. When visiting a new client, I always climb on top of self-contained press installations to inspect the hydraulic systems and see how well the maintenance crew does their job. There should be no oil leaks! If there are leaks, catch the oil in tin cans suspended below the leaks and recycle it.

In the absence of upgrades, the press should cycle as it was designed to by the original manufacturer. Time is wasted when the press dead cycle is extended. Time is also wasted when the press isn't properly operated.

Hydraulic machines are most efficient when operated at their design pressure. When extruding most of the common extrusion alloys, this means that when a full-length billet is loaded, the press should reach its designed operating pressure at the start of every extrusion stroke. In this way, extrusion speed is maximized.

As we can see, time is wasted at the extrusion press through extended press dead cycles and by failing to maximize extrusion speed. Time is also wasted by extended die changes; stops

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President's Message

Lawrence R. Difatta
President of Granco Clark

Our campaign of continuous improvement has now come to the issue of design, the stage at which equipment quality begins. In this issue we announce the utilization of SolidWorks 3D modeling software as our new design tool of choice.

Mechanical design has come a long way in its journey to the technology of today. For many years technical drawings were done by hand. Small changes in design meant erasing and redrawing. More substantial design changes would often necessitate that the entire drawing be recreated. Furthermore, if a change to one component affected other related components the design team would have to recognize the domino effect of components involved and make corresponding revisions to the other drawings as well—an enormously time consuming endeavor introducing many opportunities for error.

In the '50s design made the leap from drafting table to computer system—big computers, big price tags, limited design capabilities. Precursors of what we recognize as CAD were developed in the mainframe computers of the '60s. CAD fundamentally changed design, and industry quickly took notice. But even by the end of the '70s, after a flurry of CAD R&D, the technology was basic and costly by the standards of the time—a typical CAD system consisted of a 16-bit minicomputer with maximum of 512-Kb memory and 20 to 300 Mb disk storage. The cost . . . $125,000.

In the '80s, the introduction of PCs revolutionized the business world, and for engineers, this soon led to the possibility of CAD access for every desktop. Although the first solid modeling software began to show up in the '70s, the CAD techno-leap of the '90s was the development of increasingly sophisticated solid modeling programs that, because of numerous advantages, began to displace the 2D CAD of the past.

The SolidWorks 3D CAD system provides numerous advantages that will enable our engineers to reduce design time and increase manufacturing accuracy. These are benefits that will ultimately be passed on to our customers in the form of shorter lead times and enhanced quality equipment and systems. The software will also make it even easier for Granco Clark to provide the design flexibility to manufacture systems that very specifically meet customers' individual needs, a topic elaborated on in a previous Granco Clark Newsletter (Volume 7, Issue 3).

Proven state of the art design—another solid step forward in Granco Clark's campaign of continuous improvement.

New Equipment Installations

North America

Leed Himmel Industries

Hamden, Connecticut, USA

Leed Himmel Industries—a single-source supplier of architectural and industrial extrusions, anodizing, painting and fabrication—has selected Granco Clark to supply all heating and handling equipment for their new extrusion line.

Extrusion Handling System

The scope of supply includes a billet heating furnace, complete handling system and aging oven. A key component of the system is the Granco Clark cut-on-the-fly double puller. This puller will provide a reduction in scrap and improved positioning of extrusions for downstream operations.

The runout is a raise/lower design with high temperature fabric covered rollers. The cooling table features a belt transfer from the raise/lower runout. A 50-ton stretcher, automated batching, and sawing system complete the handling system.

According to Leed Himmel, selection of Granco Clark was based upon the purchasers' visits to other extrusion plants that were using Granco Clark equipment.

Temroc Metals

Hamel, Minnesota, USA

Temroc, an engineered products division of Quanex, has selected Granco Clark to supply a capacity upgrade of their aging area. The upgrade provides two new end flow age ovens, which will significantly increase capacity. Temroc's selection of Granco Clark was based upon the excellent performance of an existing Granco Clark aging oven at Temroc.

Extruded Metals

Belding, Michigan, USA

Extruded Metals, a brass extrusion company located in Belding, Michigan, is modifying an existing direct extrusion press to indirect extrusion and has selected Granco Clark as their supplier of billet heating equipment for this project. The new high-efficiency Twin Model "SST-Hot-Jet" Brass Billet Heating Furnaces will heat 60 billets per hour to a temperature of 1350 degrees Fahrenheit, each billet being 10 inches diameter and 52 inches in length.

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A Solid Approach to Extrusion System Design

Enhanced quality extrusion systems produced with shorter lead times . . . sound good to you?

No problem.

The engineers at Granco Clark now have a state-of-the-art tool that will ultimately provide these improvements in quality and service—SolidWorks™, computer-aided design software.

A Smarter Image

Visualization is a critical tool for the design engineer, and SolidWorks 3D modeling software facilitates the design process by precisely and efficiently depicting solid models of complex design parts and assemblies.

While the capabilities of this tool are extensive and elaborate, the interface is friendly and flexible. Basically, the SolidWorks user begins by sketching a design on the computer screen. The program then shapes the sketch into a shaded model that can be built upon with further details and modifications.

Using SolidWorks, modeling parts and combining them into pieces of equipment mirrors the manufacturing process used to fabricate the equipment. This allows the engineers to readily see how components fit together and where interference or mal-fitting assemblies exist.

Because the 3D modeling capability of SolidWorks enables engineers to more fully analyze design elements, overall product and system design is more accurate. By contrast, in 2D CAD design, relationships between parts within an assembly become more difficult to establish as the assembly increases in complexity. This is not the case with SolidWorks. Engineers can make design edits at any stage as the model is built. The user is alerted to the resulting changes in component relationships within the design, and the design updates itself. No backtracking. No recalculating. No time wasted.

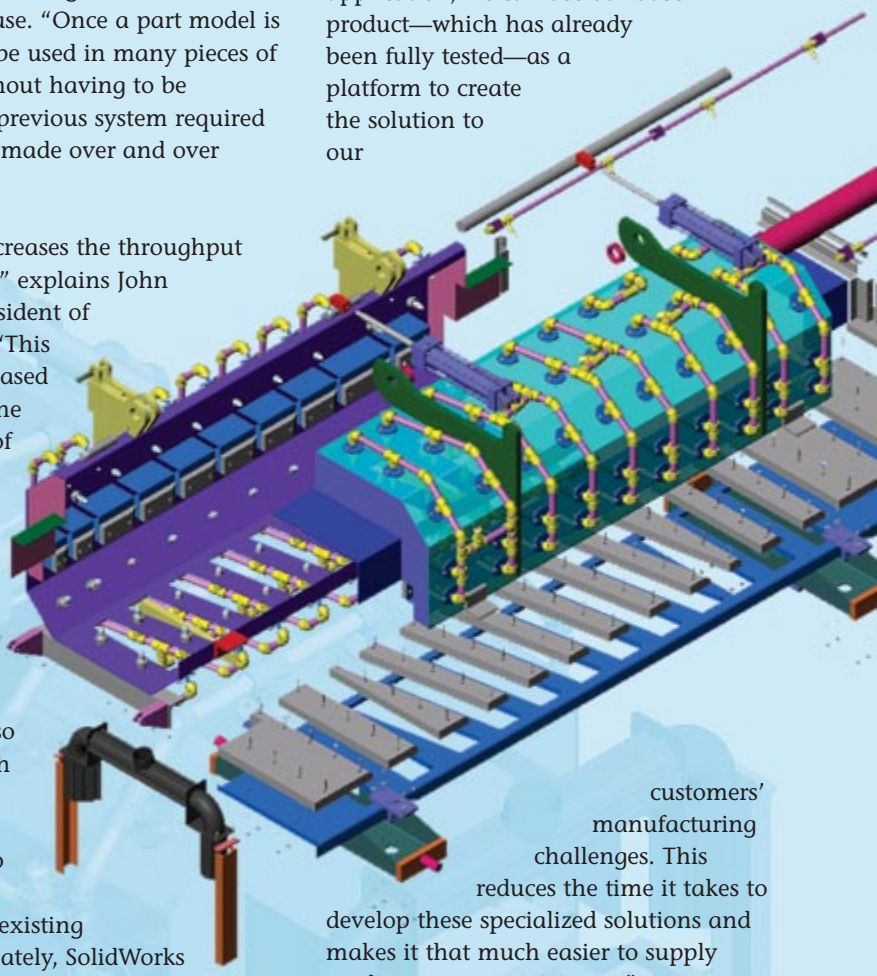
Don't Recreate—Innovate!

Jim Visser, Granco Clark's Chief Design Engineer, sees the enhanced design process as one of the greatest benefits of the program's use. "Once a part model is created, it can be used in many pieces of equipment without having to be recreated. Our previous system required drawings to be made over and over again."

"SolidWorks increases the throughput in engineering," explains John Bugai, Vice President of Granco Clark. "This allows for increased capacity with the same number of people. We can now more efficiently handle a greater number of orders. A higher level of productivity also provides us with more time to develop new products and to continue improving our existing products. Ultimately, SolidWorks will increase Granco Clark's capacity to meet demand."

Granco Clark is already using SolidWorks to innovate. Bugai explains that recently the company used SolidWorks to produce a new product—a quench that is twice as long as any Granco Clark has ever produced. "This double-length quench is particularly advantageous for cooling heavier extrusions and can reduce or eliminate the need for supplemental air cooling. Additionally, because air cooling typically requires a large amount of floor space, a reduced need for air cooling translates into less material in process and more available space."

Scott Buiten, Granco Clark's Mechanical Engineering Manager, believes that the program will make possible many such innovations. "The ability to reuse models allows us to quickly and easily adapt an existing design to our customers' needs. Now, when there is a specialized application, we can use our base product—which has already been fully tested—as a platform to create the solution to our customers' manufacturing challenges. This reduces the time it takes to develop these specialized solutions and makes it that much easier to supply quality, custom equipment."



John Bugai has strong praise for SolidWorks and also a firm commitment to overseeing its success at Granco Clark. "SolidWorks is a powerful tool that will make it easier for us to provide our clients with systems solutions that will meet their individual needs. It has been clear from the beginning that our future growth and profitability are directly linked to the success of this implementation. SolidWorks will benefit everyone involved in the process and the product."

Installations from page 2

North America

Alumnitec

Hot Springs, Arkansas, USA

Alumnitec has just completed installation of two Granco Clark partial handling systems for their Hot Springs, Arkansas, plant. These new systems have given Alumnitec the ability to automatically batch extrusions for the saw gauging system. The batch widths have vastly improved the productive throughput in a traditionally trouble-some area of the extruding operation.

Extrusion Cut-off Saw

The new partial systems also include the latest in saw gauging technology. The drop down arbor saw system with its automatic blade height adjustment assures Alumnitec the highest quality of cuts. The "go to position" length stop can be depended on to get the preset cut position accurately each and every time.

Kaiser Aluminum and Chemical Corporation

London, Ontario, Canada

Kaiser Aluminum's London, Ontario, facility has recently installed a Granco Clark high pressure spray quench on their 2400-ton extrusion press line. Granco Clark is also providing additional system upgrade equipment for this press line, including a 500-lb. double puller, an idle roll runout conveyor, and a high efficiency integral runout cooling system.

Abroad

Asia Aluminum

Nanhai City, China

Asia Aluminum has selected Granco Clark to supply a model 812-50-6 billet heating furnace for their new 4000 MT extrusion line. The furnace is capable of providing 6500 kilograms per hour (14,000 lb./hr) of 305-mm (12-inch) diameter billet. Asia Aluminum stated that a major factor that influenced their selection of a supplier was the many years of experience that Indalex has had with Granco Clark. Indalex is a marketing partner to Asia Aluminum.

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for maintenance; and excessive (and often improper) application of lubricants to the billet, dummy block, container and die faces.

Delays at the extrusion press can require that the billet furnace be emptied of billet that has been sitting in the critical heating range too long. This billet can be recovered, but removing it and bringing the next billets up to temperature uses labor and wastes additional time. If the billet has to be sent back to the remelt, an additional recycling cost is incurred.

Billet and dies that are taken to the press at the wrong temperature create scrap, and the extrusions can fail to meet mechanical properties. When either the wrong billet size or the wrong serial number extrusion die is brought the press, recovery is reduced.

Many extrusion run-out tables and saw feed tabl[illegible]use rollers. These are often driven, but can be idle (or free tu[illegible] effect, driven by the friction of the moving extru[illegible] the rollers are jammed, or the drive belts broke[illegible] undersides of the extrusions are marked. I rare[illegible] handling system that does not have jammed r[illegible] drives!

Most press handling systems have long since [illegible] to fabric covered walking beams or belts. Th[illegible] cheaper and easier to maintain than the carbon block[illegible] replaced. And, they don't damage the extrusions! But, from run-out to cooling table, from table to stretcher, and from stretcher to saw table, damage is incurred. Damage is incurred when lift-offs and transfers are not maintained, and when operators interfere with the operation of semi-automatic or automatic equipment.

It's the same at the finish cut saw and after stacking at the saw, during transfer to and loading or unloading the aging oven. Scrap is generated when people don't handle the soft, unaged extrusions carefully, or when those driving fork-trucks or over-head cranes make mistakes.

An audit of waste will show where it's being generated. Cost benefit analysis will measure the financial returns to be made by doing it right!

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Lawrence R. Difatta . . . . . President
John C. Bugai. . . . . Vice President
Roger Postema . . . . . Systems Manager
Gerald (Jerry) McPherson . . . . . Systems Manager
David Jenista. . . . . Systems Engineer
Douglas (Doug) White . . . . . Sales Engineer
Andrew (Andy) Bucko . . . . . Saw Systems Manager

7298 N. Storey Road, Belding, MI 48809
e-mail: gcinfo@grancoclark.com ***www.grancoclark.com***
Phone: (616) 794-2600 **Fax: (616) 794-2878**