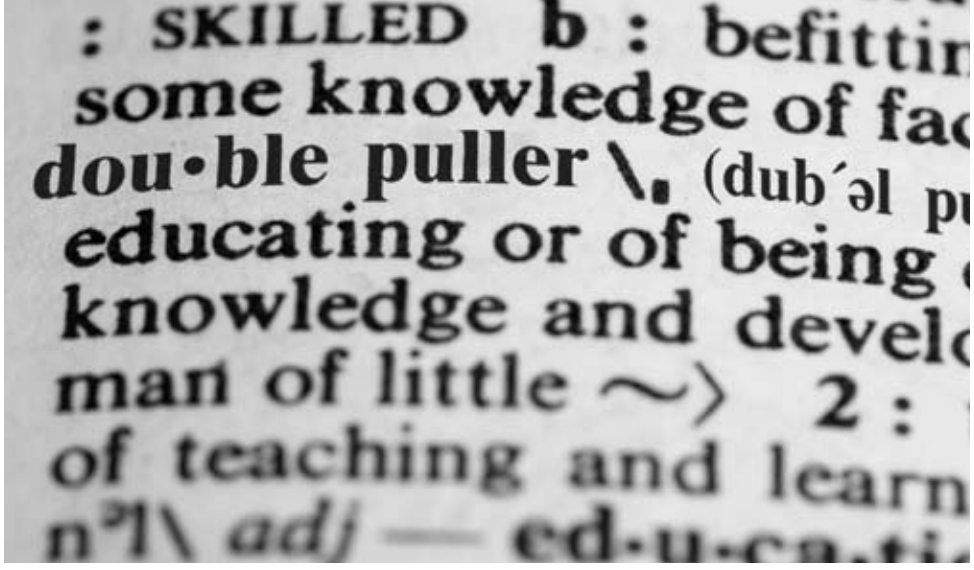
GRANCO CLARK WORLDWIDE

Profiles

Volume 13, Issue 3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BENCHMARKS
by Roger A. P. Fielding

Understanding the Operation of the Granco Clark Double Puller System.

Editorial Note: Recently, Granco Clark has experienced a surge in orders for our proven Double Puller with "cut-on-the-fly" capability. So we felt it might be appropriate to revisit an article written by Roger Fielding that provides a good understanding of this technology, and how it can help maximize the productivity of an aluminum extrusion operation.

Granco Clark Double Puller

You don't have to travel far to find businesses where extrusions are still being manufactured in a series of disconnected steps, where production is entirely dependent on people for the completion of each step, and for moving the extrusions from step to step.

In such operations, billets are selected from stock, or sawn from log. They are then moved to the press area and loaded into the furnace by someone using a fork truck or crane. The heated billet is transferred to the extrusion press by the press operator "calling" the billet. The extrusion process is started and controlled by the operator, and the extrusions are guided down the run-out table (and often transferred to the cooling table) by hand. Even in plants equipped with pullers, people are to be seen feeding extrusions into the puller at the start of each billet, and "helping" the transfer to the cooling table. In such operations, you can still find walking beams being used to move extrusions to the stretcher while they are cooling, and walking beams transferring the stretched extrusions to the saw feed conveyor. The extrusions are invariably moved into and out of the stretcher by hand. At the finish cut saw, the extrusions are lined up by one man, and the saw is worked by another. The cut extrusions are stacked by hand.

Earlier we showed that the true cost of poor recovery is buried in the labor, materials, and energy used to produce scrap—and in the cost of the additional labor, materials—and energy required to "do it right" the second time. We showed that understanding the problems that cause the scrap, allows us to continuously improve the whole extrusion production system. We demonstrated that modern extrusion systems have a direct impact on reducing the source of waste labor, time, and materials.

This article focuses on the operation of the Granco Clark Double Puller system and shows where it contributes to reducing waste in the extrusion plant. The multiple activity charts describe how the double puller operates in different modes and applications, and how the system is integrated with the extrusion process. The article highlights those features which increase productivity and recovery by reducing and eliminating waste.

continued on inside

Preventive maintenance or extra service calls: it's *your* call.

In the previous issue of *Profiles*, we discussed the importance of maintaining an inventory of selected parts in reducing downtime. This time, we'd like to focus on an issue that might be even more important: maintaining your *extrusion equipment* properly. A little extra commitment in this area may not only head off the need for a service call, but also maximize your productivity in the process.

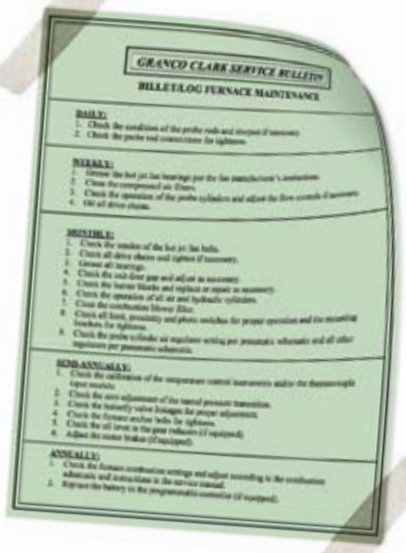
Lack of a consistent maintenance effort can lead to frequent small problems, and help those small problems grow into big ones. Jeff Brach, Controls Engineering Manager at Granco Clark, identifies a few key maintenance problems that are often ignored…and become a much "bigger deal" later on.

Billet/Log Furnace. Let's start with what is perhaps the most popular and pervasive Granco Clark technology. Preventative maintenance can help ensure proper log or billet heating, and the most efficient use of heating energy dollars. Make sure to check regularly for the following situations that call for immediate attention:

1. Pressure controller out of adjustment
2. Exhaust damper linkage out of adjustment
3. Zone combustion valve linkage out of adjustment
4. Worn or broken seal around door
5. Defective or erratic slidewire feedback from zone drive motors
6. Worn, missing or misadjusted parts on temperature probes
7. Main flame too rich or too lean

Double Puller. Another popular Granco Clark technology—a real workhorse in moving profiles along the extrusion line. Preventive maintenance helps ensure a consistent, uninterrupted power supply, smooth transport in pulling profiles, and accurate cutting and "hand-off" of profile segments. Keep regular watch for the following:

1. Incorrect friction offset adjustment
2. Worn or seized wheel bearings
3. Worn shoes on sliding contact electrical feed system
4. Clamp accumulator not charged
5. Poor extrusion support near the die
6. Inconsistently worn or partially replaced chain
7. Brake drag


GRANCO CLARK SERVICE BULLETIN
BILLET/LOG FURNACE MAINTENANCE
DAILY:
WEEKLY:
MONTHLY:
SEMI-ANNUALLY:
ANNUALLY:
Granco Clark service bulletins serve as handy checklists of recommended maintenance procedures on most Granco Clark technologies. Call and ask for copies!

High Pressure Spray Quench. An important area for maintaining line speed and ensuring profile quality. Some items that may frequently require attention:

1. Filter plugged
2. Nozzles plugged
3. Nozzles missing
4. Suction line obstructed

President's Message

Larry Difatta
President of Granco Clark

Still the one.

Elsewhere in this issue of *Profiles* you'll find an article about furnace efficiency. And it's a good one. But I must tell you that whenever I think about furnaces, I get a warm feeling! (Sorry for the little joke.) Why?

The aluminum extrusion industry is always looking for the next innovation, the next new technology, the next improvement in the process that will help extruders be more productive and make more money. That's great; here at Granco Clark we're doing that, too. And in the last couple of years, we've come up with some excellent new technologies. (Hint: you can expect to be introduced to another one at ET 2008, Booth 409; be sure to stop by!)

But why am I so proud? Well, in that environment where everyone has a burning passion to improve, invent, and do things better, guess whose billet furnace is *still* the state of the art in the extrusion industry?

Granco Clark pioneered the furnace almost 50 years ago. And while we've certainly made it better over the years, it is still the design of choice. Our Hot-Jet furnace is the most efficient available. And that's a big deal with fuel costs being what they are. The Hot-Jet has a unique capability to return hot air and gases to the pre-heat chamber so it's re-used to keep heating billets. It's simple, but rather ingenious. Heating billets is wise. Heating air is waste.

Trust me, we're not resting on our laurels. We're always looking to make our technologies even better, and the billet furnace is no exception. We know that, like Babe Ruth's home run record or Joe DiMaggio's consecutive game streak, eventually someone is going to come up with something better and beat it.

We're working very hard to make sure that when it happens, we're the ones who do it!

She's real fine, Booth 409!

Okay, maybe that's not exactly how the old Beach Boys' song goes. But it's a good way to remember to visit our booth at ET 2008 in Orlando, May 13-16. If you're already a customer and friend, it will be great to see you again. If not, it's a convenient opportunity for you to get acquainted with a world leader in providing state-of-the-art extrusion systems.

You'll be able to learn more about Granco Clark's many proven extrusion technologies. Plus, we expect to reveal a brand new product that will help you keep the scrap pile even lower, and your productivity even higher!

So remember when you get to ET 2008, all the magic isn't over at "the Kingdom." You'll find plenty at Booth 409. So, uh, "giddyup" and come on over!

Or is Essen in your plans? It's in ours!

Granco Clark will be exhibiting at Aluminium 2008 in Essen, Germany, September 23-25, 2008. It's the industry's 7th World Trade Fair and Conference, and you'll be able to experience more than 715 exhibitors representing more than 40 countries! Of course, the one to put at the top of your must-visit list is Booth 2FO6. See you there, we hope!

Furnace efficiency moves to the front burner.

Minimizing scrap has always been important to extruders. But with fuel costs rising dramatically, many have also started paying more attention to minimizing the waste not just of *metal*, but of the considerable dollars spent to heat it.

So it's only logical that furnace manufacturers have developed technologies that capture heat that would otherwise be lost, and return as much of it as possible for re-use in heating the log or billet.

One goal, different approaches.

The goal, of course, is to maximize the actual heat obtained from every energy dollar. But different furnace manufacturers use different methods to achieve it.

Some furnace makers use strategically positioned fans to return exhaust gas to the pre-heat area, where it can be used to raise billet or log temperature at the preheat stage, prior to its entry into the actual combustion chamber. While effective, this places considerable stress on fans, since temperatures of exhaust gasses used in this configuration can easily exceed 1500°.

Granco Clark Hot Jet Furnace

Another furnace configuration features a counter-flow design that collects exhaust gases and recirculates them through high-pressure piping to preheat billets. A pressurized entrance chamber prevents unwanted "ambient" air from entering the system. Granco Clark's Hot Jet Furnace, the industry's most popular furnace, uses this approach.

Lastly, some furnace configurations use recaptured heat to preheat combustion air, which should mean higher efficiency; less gas is needed with hotter combustion air. However, this method relies upon inefficient heat transfer from furnace exhaust, which only becomes available at meaningful temperatures after the furnace has been running for some time. Also, unless the this type of furnace uses air/fuel ratio controllers that throttle the amount of gas in accordance with the air temperature, furnace burners will not be operating efficiently and may even be polluting.

Efficiency—Buy the Numbers.

Getting solid furnace efficiency numbers from manufacturers can be tricky. Many will cite the peak efficiency of their furnace. While this might be interesting, it's not very helpful; a furnace doesn't always run at its peak efficiency. What you really want to know is its average efficiency. In the real world, it is average efficiency that determines your fuel cost.

If the average efficiency of the furnace isn't stated, you can look to other clues—ambient air, for one. If you're evaluating various furnace technologies, make sure you have an understanding of the amount of ambient air allowed into the furnace. It consumes the same amount of energy to heat one pound (about 3 cubic feet) of air as it does to heat one pound of aluminum. Make sure you'll be heating billets, not air.

Exhaust gasses are another marker of furnace efficiency; the hotter the exhaust gasses, the poorer the efficiency. A lower temperature indicates higher efficiency. However, if you measure the temperature of exhaust gasses, make sure they are not diluted with cooler air before the point in the system at which you measure it.

Evaluating the efficiency of your furnace.

An efficient furnace can make a huge difference in the profitability of your operation. If you would like a simple formula you can use to evaluate the efficiency of your furnace, just contact Granco Clark by phone or through our Web site at www.grancoclark.com.

The Double Puller can be integrated into a number of different extrusion situations.

Program 1

Inconsistent Billet Weight, No Log Shear or Log Saw.

To ensure constant butt length, puller #2 is stopped by the press. This program is used when the billet weight is not controlled, or there are problems with the butt shear.

The program allows for continuous extrusion, and cutting on the fly places the die or weld mark in the stretcher scrap, but use of this program results in variable extruded lengths. And, it wastes press time by extruding scrap.

It is also used when there are problems with die and/or butt shear which could result in metal being pulled from the die by the butt shear.

Program 2

Single Puller Mode with Moveable Hot Saw.

This program cuts the extrusions one customer length from the die face to maximize recovery when using the water quench.

Where space for "hand over" is limited, this program maximizes the extrusion speed which can be reached with a given die or alloy.

Program 3

Multiple eXtrusions per Billet: MXB
Eliminates multiple pushes, operating "hand over hand."

The program minimizes the waste time which occurs when multiple pushes are required to extrude light sections. Extrusion is continuous, until extrusion is stopped by the press, and the butt sheared.

Recovery is improved because the longest practical billet can be extruded. The extrusions are under tension throughout the extrusion of each production lot. Compared to the extrusion of successive small billets, only one butt is produced.

Program 4

Multiple Billets per eXtrusion: MBX
Billet on billet extrusion: extruding long lengths of heavy sections.

P2 draws the extrusion down the run-out table as each billet is extruded. When the desired number of billets has been extruded, the press stops the puller and shears the butt.

Program 5

Flat Face Die: Non-Continuous Extrusion.

Using both pullers eliminates the waste time which results when "waiting" for a single puller to return to the press. The program is also used with old tooling which does not justify replacing due to order frequency or order size.

Program 6

Maximize Productivity and Recovery: MPR
The most frequently used program

After the die has been loaded, the extrusion is led out to the puller P2.

The extrusions are then held under tension by P1 or P2 until the die is removed from the press.

The puller stops the press the correct distance from the die face. Excess scrap is left in the butt so reducing melt losses. The exact length is extruded thereby saving time.

This program also has MXB (Multiple Extrusions per Billet) capability.

Cutting on the weld mark minimizes scrap. "The system takes the weld mark and puts it in the stretcher scrap." John Menary, Vice President of Sales, Can Art.

The extrusion is taken to the correct position on the run out.

Programs 7 & 8

For Maintenance Only. These programs allow each puller to be used by itself.

A detailed description of double-puller operation in Program 6.

Program 6

Maximize Productivity and Recovery: MPR
The most frequently used program

Step 1

Puller #1 P1 with the saw is stationary at the press.

Puller #2 P2 stops the press at a distance equal to an integer multiple of the finish cut length plus stretcher scrap, and, if applicable, the sample length. (P2 is pulled back towards the press as the extrusion cools.)

Step 2

Puller #2 At the end of the dead-cycle, P2 continues to pull the extrusion down the runout table.

Puller #1 When the die or weld mark appears, P1 accelerates to extrusion speed, clamps the extrusion and cuts "on the fly" at the die or weld mark.

Step 3

Puller #1 P1 continues down the table at the extrusion speed.

Puller #2 P2 accelerates down the table, slows, and releases the extrusion at the desired location. P2 returns to meet P1 somewhere along the table.

Step 4

Puller #1 P1 continues down the table at the extrusion speed.

Puller #2 P2 slows to a stop when it is about 6.5 feet (2 meters) from P1, and then starts to move down the table in the same direction, but slower than P1.

When P1 is within 1/2" (10 mm) of P2, both pullers will be moving at the same speed.

Puller #2 P2 clamps onto the extrusion; total pulling power is kept constant while the pulling force is transferred from P1 to P2.

Puller #1 P1 withdraws its clamp arm when the P1 pulling force reaches zero.

Step 5

Puller #1 P1 returns to the press position and waits. When P2 is the correct distance from the die, P1 accelerates to extrusion speed, clamps the extrusion, and cuts "on the fly."

Puller #2 P2 continues down the table.

Step 6

Puller #1 P1 continues down the table at the extrusion speed.

Puller #2 P2 accelerates down the table, slows, and releases the extrusion at the desired location. P2 returns to meet P1 somewhere along the table.

Return to Step 4

NEW INSTALLATIONS

INDALEX ALUMINUM

Linconshire, Illinois, USA

Indalex Aluminum Solutions is calling upon Granco Clark to supply the complete heating and handling system to support the new 6000-ton press in its Connersville, IN, facility. The new line will enhance the company's capabilities in serving customers in the commercial, rail, and automotive sectors of the transportation market along with those in the metal distribution market.

Granco Clark will supply a Hot Jet Log Furnace with HBCS Hot Log Saw capable of sawing billets up to 63" long and 16" in diameter. The scope of supply also includes a 1200 GPM High Pressure Spray Profile Quench with dedicated cooling tower, a full-length, dedicated, integral cooling-duct system, and over-table duct cooling with imbedded misting capabilities and airflow control.

Also included is a 2500 lb. Double Puller capable of handling 35 lb/ft profiles up to 14" high, a traversing-beam cooling table with timing belts throughout the system, an auto-sample cut saw located on the cooling table, and a 350-ton automated cam-style stretcher.

EXTRUDEX

North Jackson, Ohio, USA

Extrudex Aluminum has chosen Granco Clark to upgrade the handling equipment for the 4000 ton press in its North Jackson facility.

The new handling system will be "double length" allowing for two press cycles of air cooling while the profile is under control of the puller heads. The Granco Clark Double Puller (already in place) is capable of operating in either the double length mode or "cut-on-the-fly" operation that allows the system to extrude multiple profile lengths from a single billet without stopping the press.

Undertable and overhead Air Cooling Systems provide balanced cooling to the top and bottom of the profile.

JIANGSU XINYU GROUP

Jiangsu, China

The XinYu Group is adding a 3600 Ton UBE press to their facility in Jiangsu Province. Granco Clark has been selected to provide all of the heating and handling equipment. This will yield a press line that incorporates import technology throughout the extrusion process.

The heating equipment is a Granco Clark Furnace/Shear. The puller system is the Granco Clark cut-on-the-fly Double Puller. The handling system includes dual-capability quenching. A High Pressure Spray Quench is provided for water quench alloys, and an air-quenching system combines three different technologies: cooling ducts above and jets under the runout table, along with undertable fans.

The contract also includes three additional Granco Clark Double Pullers for the domestic presses that are also part of the current expansion program.

KAWNEER

Lethbridge, Ontario, Canada

The Kawneer Company will upgrade the heating system on its existing press line with new equipment from Granco Clark, including a Model 69 Hot Jet Furnace, a Model HBCS 69 Hot Log Saw, and transport equipment to deliver billets to the press. The saw will eliminate the deformation caused by the existing '80s-era log shear, and provide accurate and consistent length billets to the extrusion press. It also features a "no scrap" cycle that automatically creates two-piece billets at log junctions, enhancing productivity by using the entire log.

GUANG YA ALUMINUM

Nanhai City, China

Guang Ya Aluminum has placed an order for seven flying cut Double Puller Systems from Granco Clark. The company was very impressed with the performance of the Granco Clark Double Pullers currently installed on two of its press lines, and decided to add the productivity-enhancing technology to seven additional press lines.

ULLRICH ALUMINUM PTY LTD.

Auckland, New Zealand

Ullrich Aluminum Pty Ltd. has selected Granco Clark to provide a complete new extrusion handling system at its facility in the Kuri Kuri Industrial Estate located in Hunter Valley NSW, Australia.

The handling system includes a Runout Cooling Duct System along with a High Pressure Spray Quench to provide the greatest rate of heat transfer possible. A Granco Clark Double Puller will deliver "cut-on-the-fly" capability, with two puller heads on the same track. The order also includes a Transfer and Cooling Belt System and 80-ton CVC (Controlled Vertical Crush) Stretcher.

TAIWAN HODAKA TECHNOLOGY

SinShin Township, Taiwan

Taiwan Hodaka Technology as purchased two Granco Clark Hot Jet Billet Furnaces, one for their 7" 1800T Press and one for their 9" 2500T press. Hodaka discovered Granco Clark through the Aluminum Conference in Shanghai in August, 2007, and based its decision on Granco Clark's superior technology of recuperation and worldwide service capability.

ALMAX EXTRUSION PTY LTD.

Brisbane, Australia

Almax Extrusion Pty. Ltd. has chosen Granco Clark to provide a 1000-lb. Double Puller to upgrade the single puller on its 2500T press line. Deciding factors for Almax included increased productivity and a projected scrap reduction of 2%, as well as the local service capabilities available through Furnace Engineering Pty Ltd., the Granco Clark licensee in Australia.

PAN ASIA ALUMINUM

Dongguan City, China

Pan Asia Aluminum has selected Granco Clark to supply three flying cut Double Puller systems. The company based its decision on the successful installation and favorable evaluation of their first flying cut double puller from Granco Clark, which was installed earlier in 2007.

GRANCO CLARK WORLDWIDE

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John C. Bugai – Vice President
Lloyd Fisher – Director, Sales & Marketing
David Jenista – Senior Systems Engineer
Michael Werner – Senior Systems Engineer
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Newsletter Highlights

GRANCO CLARK WORLDWIDE

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