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## Total Productive Maintenance — TPM

by Roger A.P. Fielding, BENCHMARKS

Ask any recent visitor to Japan about their trip, and, at some point, they'll refer to the "Bullet Train." First introduced in 1963, the "Shinkansen" or "New Train" tracks now service all the major population centers. Trains between downtown Tokyo and Osaka, the most heavily traveled route (about the same distance as from Washington to Boston or Detroit), now carry close to 400,000 people daily at speeds up to 200 miles per hour, relegating air travel to 5% of the traveling public.

The visitor will comment on their speed, their prompt departures and arrivals (they are always on time),

crew. The regular traveler will also comment on the ease with which one can change from one train to another. Even if owned and operated by another railroad company, all long distance timetables are integrated with convenient connections between trains. They will also note how thousands of people arrive at their designated place on the departure platform, just in time for their train, and are transported on their way, to be replaced, a few minutes later, by the next trainload.

About six million people move in and out of Tokyo each day. Thousands take the Shinkansen. Each person

*Kaizen means improvement. In the workplace it means continuous improvement involving everyone, managers and workers alike.*

the range of service available on the trains, and the fact that they always stop at the correct place in the stations! They'll comment on their cleanliness and comfort, and the appearance and presentation of the train

has a specific departure time, many have reserved seats. Traveling by surface or underground train from all over the Tokyo area, most reach their departure point within minutes of leaving. If they arrived earlier, there wouldn't be room for them

### Implementing TPM

1. Eliminate the six big losses to improve equipment effectiveness.
2. Develop autonomous maintenance by operators.
3. Schedule maintenance.
4. Train operators and maintenance personnel.
5. Manage equipment purchases.

to wait! Each person (and there are thousands of them) makes their way to the train station to arrive "just in time." This level of precision is possible because every part of the transportation system — people and machines — work properly all the time.

Last year, General Electric's Jack Welch set a quality target of "Six Sigma" for all activities in the company — meaning that 99.9996% of all activities will be executed properly. Like the Japanese transportation systems, all the General Electric group of companies, its people and machines, and its suppliers, will be required to work properly all the time. This

see "TPM" continued on page 2

Worldwide

Lawrence R. Difatta  
President of Granco Clark



*Is it business as usual? With all the mergers, buyouts and industry consolidation, one has to wonder about the implications for those who operate within this shifting landscape. The concept of survival of the fittest has leaped to the forefront — again.*

*For those in newly configured entities, a certain amount of fear, uncertainty and doubt will prevail while everyone determines how they, individuals and groups, will be affected. The introduction of new people, approaches and culture will cause a shift in the way some do business. There will be initiatives aimed at driving cost out of the business by becoming more efficient in every way. This may lead to greater implementation of best practices, as companies will seek high-end technology advantages. The extent to which these objectives can be achieved will have much to do with the level of success of the enterprise.*

*For those of us in the equipment supply business, we too have reasons to take notice of these developments. As our customers essentially become fewer but larger, the possibility becomes less remote for our industry to behave like the automotive industry. That may be good for some and devastating for others. Suddenly there will be even more downward price pressure as customers expect more for less. There will be farther reaching advantages or consequences for good and bad performance. The net result could be that some equipment suppliers may not survive in this new environment.*

*At Granco Clark, we have taken great care to position ourselves to function effectively in a rapidly changing environment. The people, products and technology we offer to the market form the foundation of our organization and will continue to be well received as a result of our comprehensive execution on every project. The addition of ISO-9001 certification will further demonstrate our ability to operate as a contributing partner to our customers, both large and small. Frankly, we welcome the changes in the industry because we believe that the demands that will emerge cannot be satisfied by all equipment suppliers. This will narrow the field and only the fittest will survive. We fully expect to be there.*

level of performance can only be achieved by embracing TPM — Total Productive Maintenance.

## Kaizen and Total Productive Maintenance

The successful extruder's engineering, maintenance and operating personnel ensure that the billet furnaces and die ovens are clean and that the heating and circulating systems operate as specified. They ensure that billet and dies are delivered to the press at the correct operating temperatures, and that dies are not left in the die ovens for extended periods. They ensure that container heating (and cooling) and die slide heating systems work as specified. They inspect and maintain the dimension and surface finish of the pressure plate, the die slide (die cassette), the butt shear, and the container bore and container face. They ensure that the press is properly aligned.

Recovery from billet or log is maximized by correcting all functions of the press and handling system which might generate scrap. Throughput is maximized by ensuring that the press operates as designed, with minimum lost time.

*Kaizen* means improvement. In the workplace it means continuous improvement involving everyone, managers and workers alike. *Kaizen* is the umbrella concept covering most of those practices which are often considered to be "uniquely Japanese," such as *Kanban*, total productive maintenance (TPM), and Zero Defects. But with the introduction of the word *Kaizen* into management-speak and labour agreements in North America, it can no longer be considered the sole prerogative of the Japanese.

Total Productive Maintenance, TPM, maximizes equipment effectiveness, eliminates breakdowns, and promotes operator maintenance through day-to-day activities involving the total workforce. TPM trains operators to share responsibility for routine inspection, cleaning, maintenance, and minor repairs with maintenance personnel. TPM dramatically increases productivity and quality, optimizes equipment lifecycle cost, and broadens the base of every employee's knowledge and skills. The five steps to the successful introduction of Total Productive Maintenance in an extrusion plant will be discussed in subsequent articles. ●



The ET2000 Seventh International Aluminum Extrusion Technology Seminar and Exposition is

only months away! From May 16-19, at the Hyatt Regency Chicago, you will see our booth #328 as soon as you walk through the door. For more information, visit the American Extruders Council web site at [www.aec.org](http://www.aec.org).

# SCRAP: Money to Burn?

sys•tem (sis'təm), n: a regularly interacting or interdependent group of items forming a unified whole

*Would you pick up a nickel if you saw one on the ground? A dollar? How about \$400,000?*

Depending on the size of your press, reducing your scrap output by 1% could amount to a few hundred thousand

## System Components and Scrap

The effectiveness of each component within your system, from log shear to aging oven, also has a powerful impact on the amount of scrap produced.

A log shear enables you to cut billets to the precise length needed. Granco Clark's "Quick Cycle" Log Shear provides the maximum squareness of cut, allowing the short pieces to be combined into two-piece "compensation cut" billets. A unique, patented storage gear assembly eliminates the need for a heating box and transfer mechanisms used to accomplish compensation cuts on other systems. With the right size billet always available, production is more efficient and scrap losses are greatly reduced.

Taper quenching, a process refined and patented by Granco Clark, is a method of differentially cooling a uniformly heated billet to compensate for the heat generated during extrusion. The precise temperature control of Granco Clark's triple-patented Taper Quench creates the linear taper necessary for isothermal extrusion, minimizing air entrapment, allowing for maximum possible ram speed, and ensuring uniform properties along the length of the product. Taper quenching can help reduce the production of poor quality extrusions destined for the scrap pile.

Pullers grip and guide the extrusions as they emerge from the press, preventing twisting and keeping them on the runout table. When multi-hole dies are used, pullers ensure that the extrusions emerge at an even rate, reducing runout differential. Granco Clark's Double Puller offers benefits that far exceed those of single pullers. The Double Puller design cuts on the fly at the die mark, significantly reducing the amount of scrap and eliminating an additional cut at the finish saw. It also offers the option of several operating

modes, one of which allows extrusions to be run from a single billet, even if they are longer than the runout table, providing continuous production with fewer dead cycles and only one butt end.

Reducing the cost of labor is only one of the benefits of incorporating more automation into your extrusion line. The more an extrusion is handled, the more opportunity there is for damage to occur. Even when handling is not manual, outmoded conveyors, tables, and walking beam belt systems can damage profiles, increase scrap and reduce your profits. Granco Clark's automated Profile Handling Equipment and Stacking Systems are engineered for superior surface quality protection, giving you maximum throughput and high quality profiles.

Advancements in technology and commitment to quality within our industry continue to increase productivity by reducing scrap, downtime and other inefficiencies. In today's competitive extrusion market, you need to make every minute — and every profile — count.

For more than 45 years, Granco Clark has directly participated in the progress of extrusion technology by introducing a number of innovations to meet the productivity challenges facing extruders. For a more detailed treatment of Granco Clark's role in extrusion technology and efficiency advancements, look to the October/ November issue of *Aluminium Today*. ●

scrap (skrap), n: manufactured articles or parts rejected or discarded and useful only as material for reprocessing

in•ef•fi•cient\, in'ə-fish'ənt\ adj: operating procedures wasteful of time or energy

dollars in annual savings. Is scrap eating up your profits?

Some scrap is unavoidable, even in state-of-the-art extrusion lines. Butt-ends and damage caused by

stretcher jaws can't be avoided. However, scrap resulting from inconsistent profile lengths, poor extrusion quality, obsolete handling equipment, and imprecise measurement and cutting can and must be avoided if your company is to remain competitive.

## The System Approach

An extrusion line functions as a system. Productivity is compromised when a line is composed of assorted components, equipment from different sources that wasn't designed to work together. For operations to be carried out with maximum accuracy and efficiency, all equipment must interface smoothly, functioning as an integrated unit.

The nerve center of an extrusion line, the computer control system that coordinates operations, has system-wide impact on the accuracy of production and the resulting amount of scrap. Granco Clark's SCS Extrude (Supervisory Computer System) has a number of productivity enhancing features. SCS Extrude manages equipment parameters so that setup is precisely duplicated every time. This means that you consistently produce more high-quality product and less scrap.

## Yearly Cost for 1% of Profile Scrap\*

Scrap processing (100,000 lbs. x \$0.27)	\$27,000
Cost of lost production (40 hrs. x \$1,200.00)	\$48,000
Total	\$75,000
If you do not have excess press capacity add:	
Cost of lost sales (100,000 lbs. x \$3.25)	\$325,000
<b>TOTAL</b>	<b>\$400,000</b>

Notes: 10,000,000 pounds per year NET (2,500 lbs./hr. x 4,000 hrs./yr.)  
 \$0.27 scrap cost (\$0.15 tolling charge plus \$0.12 handling/carrying costs)  
 \$10.00 per pound sales value x 32.5% gross margin:  
 buff-anodized and fabricated (cut to length and holes punched)

\*1% = 100,000 pounds per year

# New Equipment Installations

## North America

### Caradon Indalex

*Mississauga, Ontario, Canada*

The Mississauga plant has placed an order for the first of several expansions of an existing extrusion line at this facility. The new equipment additions will allow for a substantial increase in extrusion speeds. With the new equipment, Caradon will be able to greatly increase their extrusion throughput.

"We have a long history with Granco Clark," explained Vice President of Manufacturing Dave McCallen. "During that time, we've been very pleased with the quality of their products and services. In my opinion, Granco Clark's exceptional service is one of the factors differentiating them from their competitors. They have a knowledgeable engineering staff, and the 24-Hour Parts Hotline allows us to quickly get materials, whenever they are needed."

### Caradon Mideast Aluminum

*Mountaintop, Pennsylvania*

The new Granco Clark double-length handling system and furnace shear on Mideast's new 2750-ton

press has been commissioned. The line features twin pullers with an adjustable hot saw. A three-media high-pressure waterquench and auto-positioning stretcher are also part of the line. With their new Granco Clark system, Caradon is experiencing substantial gains in productivity.

### Thermalex, Inc.

*Montgomery, Alabama*

We have been honored with yet another order for a log furnace, log shear, water quench and air drier by Thermalex, Inc. They continue their expansion with the addition of their fifth press line. This line, like the previous two, will be a coiling line. As with the existing four lines at Thermalex, the new Granco Clark equipment will be controlled by the Granco Clark SCS Extrude Supervisory Computer System.

### EASCO Aluminum

*Elkhart, Indiana*

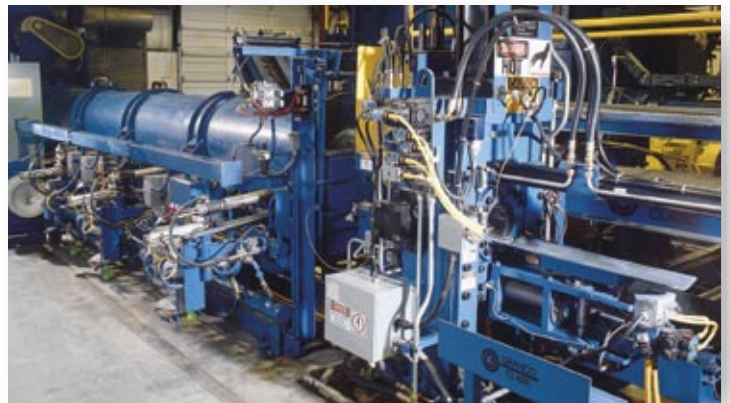
EASCO is currently commissioning the first of two furnace shear systems. The new equipment is part of an expansion of the facility. The model 69-35-3

"Hot Jet" furnace is coupled with a model 7/9 log shear. Not only does EASCO expect to improve their output, but it is also looking for improved billet temperature uniformity and metals inventory reduction.

The second furnace shear system will be commissioned later this year. It includes a Granco Clark model 57-30-3 "Hot Jet" log furnace and model 6/8 log shear.

Steve Gibson, General Manager, was to the point when explaining why Granco Clark systems were chosen: "Granco Clark has high-quality products at a good price."

*SST - Hot Jet Furnace and Quick Cycle Log Shear*



### Ta Tung Aluminum Company, LTD.

*Jia Yih County, Taiwan*

Ta Tung Aluminum is a custom extruder located north of Tainan, Taiwan. They have a three-press plant, which produces primarily architectural shapes such as balcony enclosures, car ports and entry archways.

Ta Tung is upgrading their heating equipment on an existing 1800-ton press. This will be their first experience with a gas-fired heating system, as all previous billet heating was done electrically. The unit that Ta Tung selected was a Granco Clark Model 57-25-2 "SST Hot Jet" billet heating furnace. This furnace will be used with an 1800-ton press, providing up to 1900 Kg per hour of 7" (178mm) diameter billets.



# Worldwide

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