

The Changing Industrial Landscape

COMPANIES WEIGH IN ON GREEN TECHNOLOGY AND SUSTAINABILITY EFFORTS

Matthew Jaster, Associate Editor



Gleason Cutting Tools installed a centralized chiling system to conserve energy and reduce shop floor costs (Courtesy of Gleason).

What makes a gear green? How can energy efficiency lead to more profitable cutting tools? Why is sustainability the word of the day? These are questions that have recently been discussed in manufacturing boardrooms across the country. While green technology has been utilized to some degree by manufacturers for decades, corporate leaders are realizing its full potential in

2009. It's no longer a question of why such programs should be implemented, but how companies can most effectively practice what they preach.

In a manufacturing industry that deals with heat treating, lubrication and a plethora of waste materials, it's difficult not to be skeptical when higher-ups preach environmental awareness. However, even the most industrious

tree hugger can't fault a company for doing everything it can to reduce its environmental impact. In today's economy, even the smallest contribution has remarkable results.

Facility, safety, human resource and operations personnel have added "green guru" to their growing list of day-to-day responsibilities. It's simply a sign of the times. Understanding the need

for sustainability and energy efficiency has allowed these initiatives to get the boardroom face time they justifiably deserve.

Lean, Green and Remarkably Clean at Gleason

Sustainability has always been a part of Gleason's worldwide business philosophy. Each plant has an individual representative on its global sustainability team that monitors and communicates environmental issues. This team is made up of facility managers, environmental engineers, IT managers, supply chain directors, development engineers and controllers. The global team receives its strategic direction from a committee made up of Gleason senior staff members and the team regularly reports plans to the entire global staff.

Tom Sawyer, facility manager at Gleason Cutting Tools, is the designated representative at the plant in Loves Park, IL.

"Green manufacturing has different phases throughout a product's life cycle, and it takes a holistic approach," Sawyer says. "Products are evaluated not only for efficiency but the multiple reuses of the product. We then consider the types of materials and chemicals used in the manufacturing process and what impact they might have on the environment."

The non-direct aspects—building and grounds, lights, heat, air conditioning, air quality, housekeeping, transportation and packaging—are then evaluated by using the 3 Rs (reduce,

reuse, recycle), according to Sawyer.

"When the product reaches its end life, we ask how we can recycle it at its highest potential," Sawyer says.

Environmentally sound manufacturing starts in the break room at Gleason, where an in-depth bulletin board focuses on issues regarding sustainability and ISO 14001, an environmental standard that is requested by many of Gleason's customers.

"ISO 14001 is recognized globally and audited by a third party registrar, showing our commitment to prevent pollution through continual improvement," Sawyer says.

The objective of the bulletin board is to keep the staff of the entire plant

updated on the sustainability goals of the organization.

"Our commitment to green technology was first demonstrated in 2001 when our first facility was registered to the ISO 14001 standard," Sawyer says. "Today, we have programs in place that address operational procedures, green manufacturing, green building design, lean manufacturing, and recycling. We work with our vendors and suppliers daily to find new ways to reduce, reuse and recycle."

In addition to ISO 14001, Gleason is involved in green heat treating as well as new machine technology that produces products with less energy and waste. The company also follows

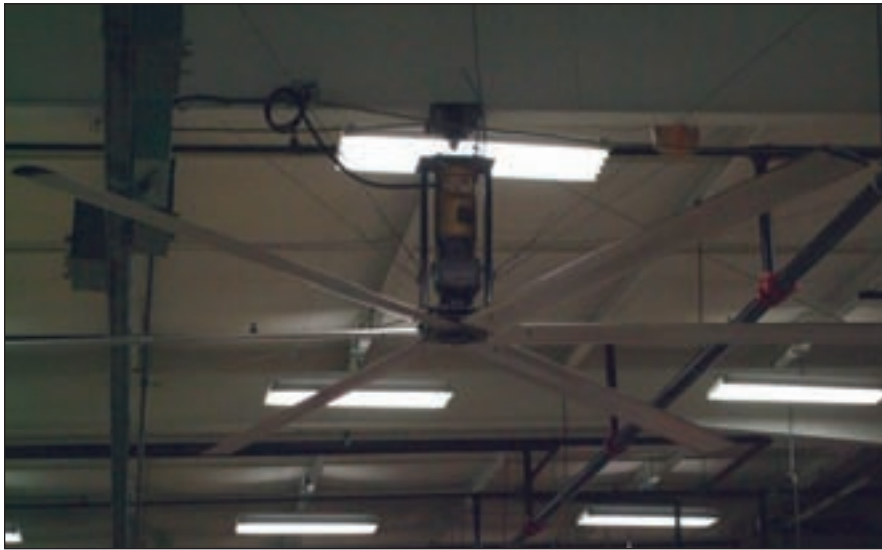
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Forest City Gear created a green plant area in the middle of the shop to promote green manufacturing (Courtesy Forest City Gear).



Ronson Gears has focused for many years on technology and has now also turned its attention to sustainability (Courtesy Ronson Gears).



Forest City Gear installed a *Big Ass* fan on the shop floor to assist with cooling (Courtesy FCG).



KAPP Technologies is headquartered in Boulder, CO, an eco-friendly city with several green initiatives (Courtesy KAPP Technologies).

and quality.”

Ronson Gears: Sustainability at Square One

Ronson Gears began in Melbourne, Australia as a small workshop that in 1954 included a lathe and a gear hobbing machine. Through the years, the company dedicated itself to learning the latest developments and trends in gear manufacturing and has earned an impressive reputation as a leading gear manufacturer in Australia with global ties to the gear community.

Gordon New, managing director at Ronson, has recently championed the green technology movement by simply reducing as much waste as possible that affects the environment.

“If a company is known to be green, then it may be favored with orders ahead of competitors that are not,” New says. “Customers may be charged less due to their supplier’s reduced operating costs.”

Ronson is in the early stages of green manufacturing initiatives but is focused on several key areas moving forward.

“Initiatives are in place including recycling cutting oil, scrap metal and paper. Skylights mean less reliance on artificial lighting, thereby reducing our carbon footprint,” New says. “The heat generated from our shop floor is being retained within the factory area to reduce reliance on artificial heating in winter.”

In the near future, the company plans to reduce the need for air conditioners in the summer by installing external sun blinds. It also plans to install water tanks to collect rainwater from the factory roof to be used for flushing toilets. The continuation of lean initiatives will reduce process times, thus saving more energy.

Ronson has dedicated many years to the most advanced technology and equipment in the gear industry. This, alone, leads to a huge energy savings and a commitment toward sustainability.

“A staff can really achieve job security by being involved with a company that follows these directives,”

LEED (Leadership in Energy and Environmental Design) practices, a whole building and site approach to sustainability.

Active recycling programs include scrap metal, cardboard/paper, inks, cathode ray tubes, e-waste (cell phones, printers, monitors, etc.), oil reconditioning, coolant waste water, light bulbs/lamps, batteries and ballasts, waste oil, solvents, rags, absorbent quill pads, hand towels, packaging reuse program/recyclable packaging material, sand media reclaiming for heat treating, refrigerant reclaiming and aluminum can collection.

In the case of the Gleason plant in Illinois, one can merely take a stroll through the plant’s heat treating department to see how far the company has come. The heat treating today is a far cry from the methods utilized in the

past. Clean floors, oil-free machines and various lean principles solidify Gleason’s stance on green manufacturing.

“With the growth of alternative energy and environmental awareness, it is in our best interest to show our commitment to green technology and environmental sustainability as it makes eco-business sense,” Sawyer says.

In the near future, the company plans to create a larger role for sustainability and energy efficiency on its website as well as establish a broader green strategy within the organization.

“Creating a ‘green brand’ is a new marketing effort that is currently the focus of senior management,” Sawyer says. “As it stands now, each plant shares its best practices and ties all the resources of Gleason together, from design and purchasing to manufacturing

New says. "However, some initiatives are expensive and their introduction is delayed due to lack of funds. It also takes a long time to educate the entire workforce and get their involvement. We would like to address these actions faster, but a limitation of resources means a slow but steady approach."

It's Always Green at Forest City

Forest City Gear's approach to sustainability and energy efficiency began with the realization that new equipment increased productivity and created higher quality products. Simply by purchasing the latest machine innovations, CEO Fred Young was able to make a significant energy savings.

"Fred's always been active in regards to new technology, trying to get state-of-the-art equipment that works better than the old machinery," says Larry Cass, safety manager at Forest City Gear. "These new machines today run faster and create a far cleaner working environment."

Cass, in addition to his work as a safety manager, oversees many of the green business practices that have become part of Forest City's daily operations. These include bottle and paper recycling programs, reusing packaging materials and maintaining light and heating initiatives.

"There's always a bit of skepticism at first when you try to disrupt people's daily routines," Cass says. "Anytime you impose something that's different, people seem to be less enthusiastic. But we're seeing a more conscientious push from the entire staff to follow these guidelines."

As an avid sportsman, fisherman, hunter and wildlife advocate, Young has made an effort for many years to promote sustainability at Forest City.

"We try to get everyone involved in green technology, from the top to the bottom, by creating a certain mindset," Young says. "We've been coordinating some of these green efforts here for 25-30 years. It's simply about being as efficient as you can possibly manage."

Whether it's recycling chips, changing lights or installing an

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obnoxiously large ceiling fan, Young notes that the small, creative steps are just as important as the larger projects. Shutting off the lights during lunch breaks, planting fruit trees behind the manufacturing plant and adding vines that assist in cooling the manufacturing floor during the summer are a few noteworthy things that Forest City has done to promote green manufacturing.

Young even created a green plant area in the middle of the shop with a

park bench where employees can take a break. It was something he discovered while visiting a gear manufacturer in Italy.

“This isn’t a complete solution, but it’s a great start,” Young says. “If everyone pitches in one way or another, even these small steps can be very significant. We want to be a good citizen as a corporate entity as well as individuals.”

And what’s the payback for some of

these green programs?

As a result of shipping out small, recyclable containers to its customers, Forest City regularly receives new shipments in the same containers. Even customers not affiliated with Forest City have received the containers that prominently display the Forest City logo.

“You cut down on shipping costs and there’s also the benefit of free advertising,” Young says. “The message seems to be working.”

Once employees are fully acclimated into the green culture, savings can be significant for lighting, heat and cooling expenses.

Cass adds, “Many of our employees are doing some of these green directives in their own homes, and they’ve begun to do the same in the office. It’s as simple as turning off the bathroom lights when no one is using it.”

For the record, during a recent tour of the Forest City Gear facility, the bathroom lights were, in fact, turned off and areas of the manufacturing floor not being utilized remained dark to conserve energy.

In an effort to strengthen green technology at Forest City, Young would like to install solar panels on the roof and purchase a modest-sized wind turbine.

“We fancy ourselves to be on the cutting edge, so the next step for us would ideally be in the alternative energy sector,” Young says.

Both Young and Cass are in the process of going back through Forest City’s history to attempt to tie in sales with these various green initiatives.

“A \$16,000 savings on the electric bill gets our attention,” Cass says.

Meanwhile, Young just wants to know that the efforts Forest City makes to improve sustainability and energy efficiency can be done without raising prices.

“This is the real challenge and it’s what Forest City is focusing on.”



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Sustainability: Start Small, Think Big

Companies both large and small sometimes struggle to get innovative directives in place on the manufacturing floor that promote energy efficiency and sustainability. No company can become lean and green overnight. It takes time, money and plenty of resources. Here's a quick look at some green initiatives to consider:

BUILDING & OPERATIONS

- Energy efficient lighting system
- Energy efficient heating/AC units
- Ceiling fans for cooling manufacturing floor
- Roof insulation projects
- Skylights and sun-reflecting covers
- Plant trees, shrubs and plants all around the grounds
- Tinted windows
- Centralized chilling system for machines
- LEED (Leadership in Energy and Environmental Design) practices
www.usgbc.org/DisplayPage.aspx?CMSPageID=222
- ISO 9001:2000/ISO 14001:2004
www.iso.org/iso/home.htm
- New machine technology
- Green heat treating; zero waste, computerized controls
- Lean manufacturing principles: kanban, kaizen, total productive maintenance (TPM)
- Visual management for light usage (turn lights off during lunch, keep unused areas of the manufacturing floor dark)

- Adjust heat/air on weekends and major shutdowns
- Check frequently for air leaks in the building
- Replace bottled water service with filtered tap water
- Hybrid vehicles for company use
- Diesel trucks for delivery

RECYCLE

- Spin oil out of chips
- Separate various types of scrap metal
- Cardboard and mixed paper
- Aluminum cans
- Plastic bottles
- Shrink wrap
- Reuse solvents
- Reuse packaging materials
- Use absorbent quill pads, rags and hand towels
- Cell phones, printers, circuit boards, monitors, etc.
- Inks for printers
- Oil reconditioning/Waste oil
- Batteries and ballasts
- Sand media reclamation
- Refrigerant reclamation

KAPP Serves

Eco Rich Community

KAPP Technologies has had environmentally safe practices in place since the Boulder, CO facility was first built in 1992. The building was designed and constructed without floor drains, eliminating the potential hazard of plating chemicals or waste getting into the local water and sewer systems. All spent chemicals are stored in double containment tanks for periodic disposal utilizing licensed waste haulers and facilities.

Along with paper products, magazines, cardboard, wood, cans and plastic, the company recycles batteries, cell phones, computers and office electronics. They have also been creative with other materials. Instead of discarding old letterhead, for example, employees converted them into office note pads. Lights are kept off in unused areas of the building including common areas.

"As sustainability practice grows, the demand for manufacturers who are part of the solution increases," says Jim Buschy, vice president and general manager at KAPP. "For example, the wind energy market is growing rapidly and many of our customers' end-users will be manufacturing more and more gearboxes. This means that we must make our customers aware that we have the ability to do this kind of work."


Last year, KAPP launched the Rocky Mountain Gear Finishing School. As part of the program, the company took the group to the National Renewable Energy Labs for a tour of the gearbox facility.

"This helped our customers identify new wind energy technologies in development and it gave us the opportunity to present our machines as a possible solution for their production needs," Buschy says.

Boulder itself has been in the business of sustainability for many years. Eco-programs offer public transportation alternatives and a drop-off site for hazardous waste materials. It was one of the first cities to offer curbside recycling back in 1976. In 2005, a zero waste

resolution was passed to support the county's sustainability efforts. Carbon gas emissions released by industrial processes in Boulder represent only five percent of the city's total. The Boulder Energy Strategy Task Force oversees programs in areas of conservation and offers rebates and incentives for energy efficiency practices.

As the city continues to look for ways to participate more in sustainability efforts, KAPP follows suit.

"We are focused on what's important to our customers; machine tools that will serve their requirements and offer efficiency, time-saving technology and increased productivity. All of these factors contribute to overall green technology," Buschy says. 

For more information:

Forest City Gear
11715 Main Street
P.O. Box 80
Roscoe, IL 61073-0080
Phone: (866) 623-2168
Fax: (815) 623-2168
www.fcgear.com

Gleason Corporation
1000 University Ave.
Rochester, NY 14692
Phone: (585) 473-1000
Fax: (585) 461-4348
sales@gleason.com
www.gleason.com

KAPP Technologies
2870 Wilderness Place
Boulder, CO 80301
Phone: (303) 447-1130
Fax: (303) 447-1131
info@kapp-usa.com
www.kapp-niles.com

Ronson Gears Pty Ltd.
18 Teton Ct, Highett
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Headquarters
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FAX: +82.32.814.5381

Correction: In the Jan/Feb 2009 issue of *Gear Technology*, information was omitted from Table 3 (p. 66) of the technical article "Gear Failure Analysis Involving Grinding Burn," written by G. Blake, M. Margetts and W. Silverthorne (p. 62). For the full technical article please visit www.geartechnology.com/issues/0109/.

Table 3—DOE Test Matrix with Post Etch Results.					
Test	Ammonium Persulfate %		HCl %		Detection of Etch Indications
1	18.6	Max	9.0	Max	↑
2	18.6	Max	3.0	Min	↑
3	6.0	Min	9.0	Max	→
4	6.0	Min	3.0	Min	→
5	9.1	Typical	6.0	Typical	↗
7	6.0	Min & min time	9.0	Max and max time	↘
8	6.0	Min & min time No glass bead	9.0	Max and max time	↓