



CRANE ENGINEERING

PROBE

VOL.12, No. 1, FIRST QUARTER 2005

# Art Meets Science

## Helping to beautify St. Paul

How does a metallurgical engineer get involved in the creation of outdoor sculpture? Not by demonstrating his profound grasp of color palettes or delicate detailing, we assure you! Crane Engineering's John Brynildson claims he doesn't have those talents, yet he still has been able to dabble in the arts.

Several years ago Brynildson volunteered through Public Art St. Paul to assist several artists in their selection and treatment of metals for sculptures erected in an outdoor environment. Public Art St. Paul is a nonprofit group responsible for the conservation and creation of public artworks in our capital city. It oversees the maintenance and restoration of a variety of existing art - from statues and monuments to commemorative plaques - and partners with public agencies to commission new projects.

Two particular St. Paul projects Brynildson has worked on are the New York Life Eagle sculpture in Lookout Park and the kinetic sculpture *Muscle* that sits in Lowertown, across from the Farmer's Market. Sculpted by Augustus and Louis Saint-Gaudens, the bronze eagle was perched atop St. Paul's New York Life Insurance building from about 1890 until the building was razed in 1962. The eagle was saved and sat outside for 37 years before internationally renowned artist and restoration specialist Kristin Cheronis spent two years removing years of oxide and patina buildup.

"Kristin restored the sculpture to its original coloring and finish," Brynildson explains. "I assisted in identifying the eagle's metal chemistry and later helped select anchoring plates and tie-down fasteners that would resist environmental corrosion." The most compatible material turned out to be a silicon bronze, with stainless steel as a backup choice. In summer 2004, the refurbished eagle was installed in its new home on a pedestal of stone

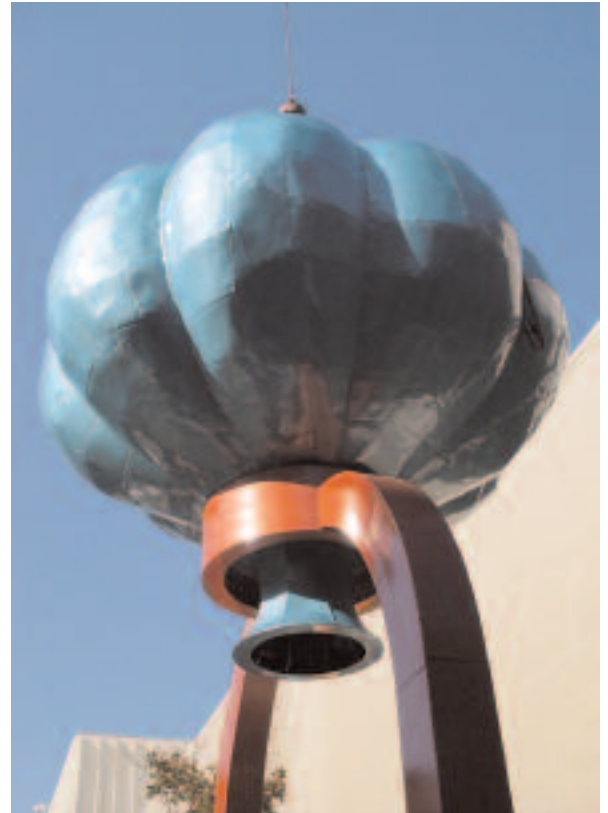


Photo: Ron Jacobsen

*Brynildson assisted artist Amy Toscani with the design and planning of her sculpture Muscle. "Each viewer sees something different in the piece," he explains. "It is a perfect piece to represent the diversity of artists in Lowertown, in particular, and the Twin Cities area, in general."*

quarried in Kasota, Minn.

*Muscle* is a whimsical but robust painted stainless steel sculpture by Amy Toscani, who was chosen by Public Art St. Paul to design and fabricate a piece of outdoor art for the Lowertown location. Toscani contacted Brynildson about helping her choose the best metal and determine any processing needed to prevent or minimize environmental damage. He recalls: "*Muscle* consists of several different structural

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# Hidden Hazard

## What you can't see or smell can hurt you

Colorless and odorless, carbon monoxide (CO) gas is a toxic byproduct of the combustion of fossil fuels. While many people are aware that CO poisoning can be fatal at high levels, it does not seem widely understood that the gas can be generated in large volumes by seemingly small devices.

Take, for example, a small, gasoline-fueled portable electric generator. It may be 1/25 the horsepower of a light truck engine, but it can easily produce higher levels of CO in its exhaust. That same light truck, equipped with a catalytic converter that reduces exhaust emissions, might only generate 0.04 percent of its exhaust as CO, whereas the generator might produce 1.00 percent. If both these engines ran at the same engine speed (RPM), however, their CO output totals would be about the same due to the difference in the displacement size of the engines. However, a small gas-engine generator runs at 3,600 RPM and the light truck at about 600 RPM. As a result, the generator puts out about six times as much CO as the truck – and has the potential to be equally deadly.

Any other internal combustion engine running on gasoline without a catalytic converter can also produce large amounts of CO. This means that candidates for high CO production include portable gasoline-powered pressure washers, water pumps, concrete cutters and other portable tools. Currently, such engines are exempt from catalytic converter requirements. In some states, however, this may change. California, for example, may begin requiring catalytic converters on lawn mowers, generators and other gas-powered equipment if the state tightens pollution laws.

Even outfitted with catalytic converters, internal combustion engines carry a high risk of CO poisoning when operated in poorly ventilated areas. Underground parking ramps, large industrial buildings, barns, basements and sheds are often considered safe locations in which to run these engines. But inadequate air flow can allow CO to accumulate to higher levels in local areas and air-intake vents can recirculate it.



*Even small, portable generators such as this can easily produce 1 percent of their exhaust as carbon monoxide.*

The CO hazards of small engine CO can develop rapidly. A farm owner died of CO poisoning after just about 30 minutes of using an 11-HP, gas-powered pressure washer. A municipal employee lost consciousness while trying to exit an area in a water treatment plant where he had been working with an 8-HP gas-powered pump; the doors adjacent to this area had been open while he worked.

Given how dangerous CO can be, don't run any internal combustion engines indoors – snow blowers, snowmobiles, lawnmowers, chainsaws, leaf blowers, ice augers, generators and many other pieces of equipment. That also applies to lighting charcoal grills in enclosed or semi-enclosed spaces and warming up an automobile in a garage, even with the garage door open.

Increased awareness of the CO poisoning potential of fuel-burning devices both small and large is necessary for a thorough investigation and diagnosis of carbon monoxide incidents. 🏠

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We all quote Murphy's Law, first expressed by Capt. Edward A. Murphy in the late 1940s: "If anything can go wrong, it will." A faithful reader of this column recently inquired if there are any similar laws that I personally give credence to. The answer, of course, is yes.

There is a proliferation of such laws, and the ones I subscribe to are listed below. The question I would pose here is, which laws of this type have you encountered that are important

enough to (1) pin on your bulletin board, (2) send to friends or colleagues, or (3) keep a copy of in your wallet or diary because they are too profound to share with just anybody?

The aim of this column is, therefore, to invite you to email me your favorite two or three laws, which we will compile and share with all readers in the next issue of the Probe.

To let you know where we are headed on this expedition, here are some examples:

- **Stewart's Law of Retroaction:** It is easier to get forgiveness than permission.
- **Uhlmann's Razor:** When stupidity is a sufficient explanation, there is no need for recourse to any other.
- **Law of Historical Causation:** It seemed like the thing to do at the time.
- **Beardsley's Warning to Lawyers:** Beware of and eschew pompous prolixity.
- **Churchill's Commentary on Man:** Man will occasionally stumble over

the truth, but most of the time he will pick himself up and continue on as though nothing has happened.

- **Fetridge's Law:** Important things that are supposed to happen do not happen, especially when people are looking.
- **The Law of Selective Gravity (The Buttered Side Down Law):** An object will fall so as to do the most damage.
- **The Law of the Perversity of Nature (Mrs. Murphy's Corollary):** You cannot successfully determine beforehand which side of the bread to butter.
- **The Swipple Rule of Order:** He who shouts loudest has the floor.
- **Weiler's Law:** Nothing is impossible for the man who doesn't have to do it himself.

As always, keep your noise moist and your tail up, and I look forward to receiving your responses at my email address below. 🐾

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"Art Meets Science" continued from page one



Photo Andy King

components, including a three-arm wind scoop on top. Amy and I discussed the strength and corrosion resistance each element would require. We selected a particular grade of austenitic stainless steel, and the creation began!" Periodically Brynildson provided guidance to Toscani on welding, cleaning, passivation and other metallurgical aspects of the piece prior to it being painted and erected.

According to Christine Podas-Larson, president of Public Art St. Paul, sustainability has emerged as an important goal as cities build infrastructure,

buildings and artworks. There's also growing recognition of the need for more responsible stewardship of our public art. Brynildson is happy to join the cause. "As a metallurgist and area resident, I feel privileged to lend my skills to the art community in a way that will help more generations of Minnesotans enjoy these prized St. Paul possessions." 🐾

John Brynildson, P.E., has been a metallurgical engineer at Crane Engineering since 1987. He may be reached at johnb@CraneEngineering.com.

*Metallurgist John Brynildson lent his expertise to the restoration of the New York Life Eagle sculpture in St. Paul's Lookout Park and other projects coordinated by Public Art St. Paul. The group's president, Christine Podas-Larson, says, "John stepped forward and has voluntarily provided invaluable advice in diagnosing corrosion problems and suggesting treatment products and processes." The artist who restored the eagle sculpture, Kristin Cheronis, credits Brynildson with teaching many local artists and conservators how to ensure their sculptures remain durable in their urban environment. "I cannot imagine how we would have solved some of these technical problems without John's assistance," she says. "The Twin Cities arts landscape is more beautiful, stable and long-lasting due to his efforts."*

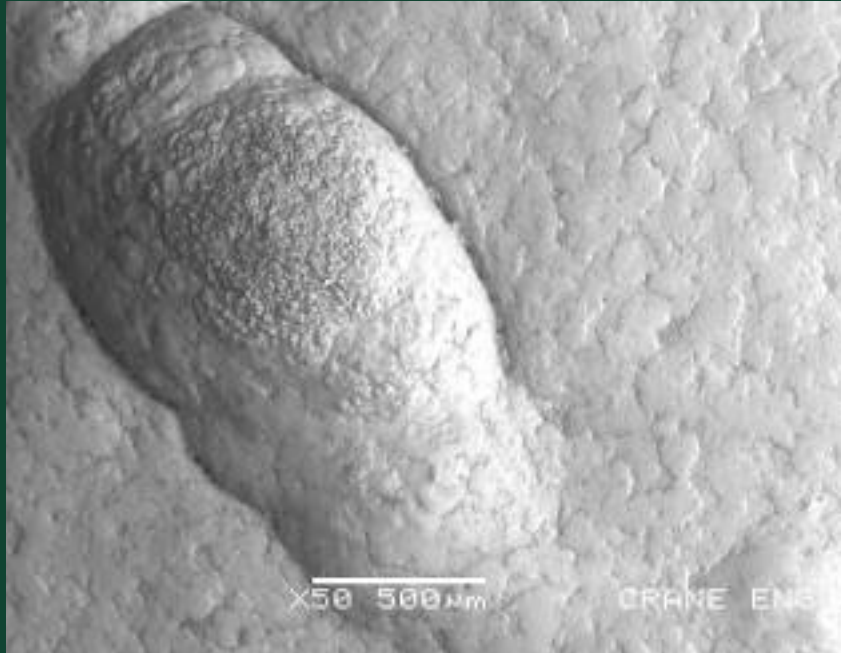
## CROSS-SECTIONS

**New location coming soon.** Later this year Crane Engineering will be moving to a new location in Plymouth – not too far from where we are now. It will give us more space for our expanding staff and services. We'll keep you posted on our move and notify you of our new address

### Past articles available on-line.

Previous editions of Crane Engineering's Probe newsletter are available at [www.CraneEngineering.com/news/index.cfm](http://www.CraneEngineering.com/news/index.cfm). There you'll find articles on gas explosions, structural compliance and failure, quality welding practices, after-market auto parts and more!

## SEM MYSTERY IMAGE



**Feeling cooped up? Take a crack at this one. See below for the answer to this issue's mystery image.**

# Collaboration at Crane

## Working together, achieving objectives

If you look up *collaboration* in a dictionary, you will find a definition along the lines of “to work together in a joint intellectual effort.” At Crane Engineering, collaboration takes two forms: internal and external.

Internally, our team of professionals and support staff work together to provide the best possible consulting services to our many clients. Externally, our engineers, scientists and technicians establish close working relationships with our

clients' representatives to determine the best combination of resources needed to achieve their objectives.

When retained for litigation purposes, our professional staff develops the technical foundation that works congruently with the pertinent legal issues and strategies. With research and industrial clients, we work in partnership to generate the questions that will most effectively address the problems presented; then collectively, we arrive at the answers.

Keeping our clients' objectives in mind, Crane Engineering dedicates all necessary resources to deliver the insight they're seeking. Collaboration – within our organization and with those clients – ensures success. 🍷

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### SEM Mystery Image Answer (see above for image)

*The answer to "Feeling cooped up? Take a crack at this one." Taken using Crane's SEM/EDS, the mystery image in this issue is an eggshell. Be sure to look for another mystery image in our next Probe newsletter.*



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