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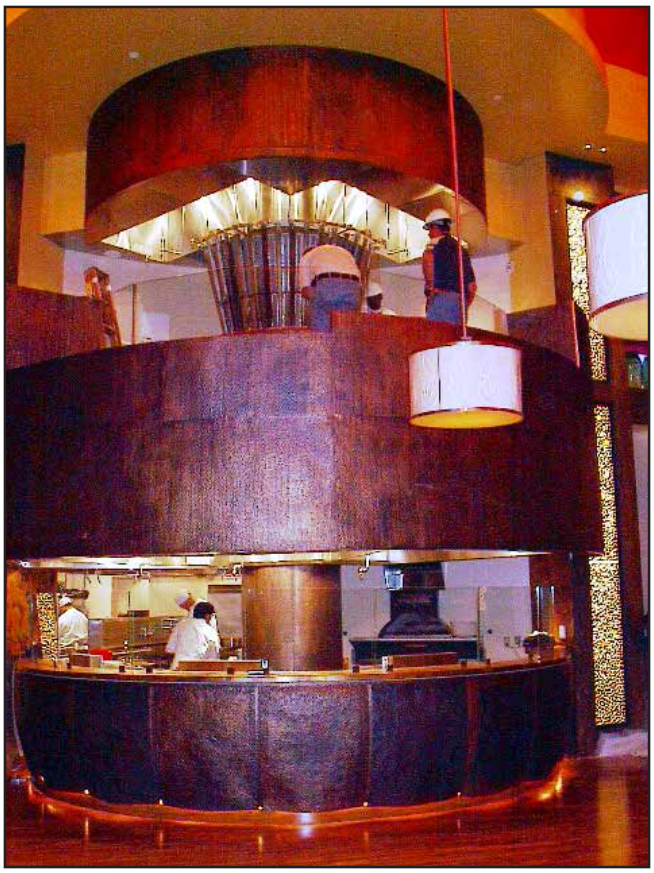
ARCHITECTURAL METAL EXPERTISE
PERFORMANCE · TRAINING · STANDARDS

A SMACNA Contractor Helps A Celebrity Chef Take A Gamble In Las Vegas

Architect: *Rockwell Group, New York*

Sheet Metal Contractor: *Royal Metal Works Inc., Las Vegas*



The exhibition grill station features 24 oz. copper cladding, hammered with an antique finish and clear powder coating.

Diners cannot stop buzzing about Bobby Flay's Las Vegas Mesa Grill. Not only is the cuisine distinctive, but so is the decor thanks to SMACNA member Royal Metal Works Inc.

The restaurant's color palette, characterized by its interesting architectural elements and vivid colors, is full of bright greens, blues, reds and yellows that radiates high-energy. "Our goal with Mesa Grill has always been to create an atmosphere of what I call serious fun. Behind the exciting, playful food, there is a strong vision of American cuisine," says Chef Bobby Flay.

The Mesa Grill at Caesars Palace in Las Vegas is Bobby Flay's first restaurant to open outside of New York City. The 9,000-square-foot space is dominated by a 20-foot rotisserie with a grill and quesadilla oven.

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A SMACNA Contractor Helps A Celebrity Chef Take A Gamble In Las Vegas

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Royal Metal Works Inc., of Las Vegas, was the sheet metal contractor who was hired to supply, fabricate and install all of the food service equipment as well as refrigeration and the architectural metals for the bar tops and copper cladding.

For all of the food service equipment a 304 stainless steel with a #4 finish was used. The 24 oz. copper cladding of the spectacular hoods were hammered with an antique finish and then clear powder coated before being certified by the National Sanitation Foundation (NSF). The custom fabricated bar tops were made with .093 copper that was flamed and NSF clear powder coated.

Since the exhibition grill station was designed in a tea cup shape, it required custom fabricating. All of the copper was hammered and flamed in house. In addition, Royal Metal Works also custom-built a vertical rotisserie on the mezzanine level of the restaurant.

There were several aspects of this high profile project that made it unique and challenging. Two weeks prior to the restaurant opening, the original design was altered due to mechanical changes. These changes did not allow for the original hood design. Another obstacle that Royal Metal Works had to overcome was that the copper hood enclosure was damaged on route to the job and had to be repaired onsite moments before the restaurant's grand opening gala.

This $700,000 project was filmed for the Food Network from March through its completion in September of 2004. The footage taken during the project was aired on a special on the Food Network called "Bobby's Vegas Gamble."

On The Cover

The bar tops were custom fabricated by Royal Metal Works.

A 304 stainless steel with a #4 finish was used for all of the food service equipment.

Council Members To Speak At Annual CSI Convention

Members of SMACNA's Architectural Sheet Metal Council Steering Committee will be guest speakers at the 50th annual Construction Specifications Institute (CSI) show and convention at Las Vegas.

Robert Zahner of A. Zahner Company of Kansas City., Mo., and Harold Munder of the New York Roofing Company of Long Island City, N.Y., will be speaking on "Incorporating Sheet Metal Details in Restoration Project Design." The session will illustrate the importance of incorporating proper architectural sheet metal details in project design with emphasis on restoration. How to use SMACNA's Architectural Sheet Metal Manual properly will also be discussed and demonstrated. Additional items to be addressed include site evaluation, site logistics and knowledge of related trades and how these items are interrelated with the "Architectural Sheet Metal Manual."

This session will be on Thursday, March 30, 2006 from 4:30 to 6:00 p.m. For more information on the CSI show and convention go to *www.csinet.org.* ■

Colored Stainless Possibilities

By: Catherine Houska, TMR Consulting

Stainless steel offers a broader range of color possibilities than for other architectural metals. This is the second installment of a two-part article on coloring methods for stainless steel. Part 2 features the nickel oxide, plating and painting coloring techniques. Part 1 featured the electrochemical and ceramic coloring process.

These coloring options provide a broad range of opaque colors and provide considerable design flexibility. The service life of these coloring processes varies considerably. Some will last the life of the building, if they are used appropriately and well maintained, while others are limited by the coating life in the service environment. The higher corrosion rates of other metals can result in premature color loss and aesthetic failure. Stainless steel's superior corrosion resistance makes a more durable option.

Nickel Oxide Ceramic Coatings

This proprietary coloring process was developed in Japan to obtain the appearance of weathered copper while offering the higher strength, improved corrosion resistance, wind uplift resistance, and increased fire resistance of stainless steel. It also eliminates potential problems with discoloration of surrounding materials and environmental concerns that can be caused by copper run-off.

This pre-weathered nickel oxide ceramic coating process produces dull green and green-gray colors. Like the ceramic coatings discussed in Part 1 of this article, this is a stable, durable finish that will not change color over time. This finish is less scratch resistant than the other ceramic coatings and it is also not repairable. It should not be used in locations where scratching or exposure to wind blown abrasives, such as sand, are likely. The color does not change when viewed from different angles but there will be a slight color lightening at sharp bends.

Figure 2: Terne-coated stainless steel roof and elevated wall panels on the Carnegie Mellon University student union building, Photo courtesy of Nickel Institute, Catherine Houska photographer.

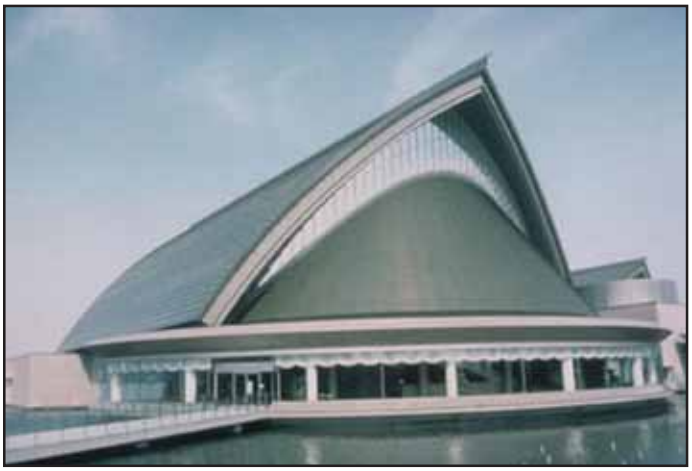

Figure 1: Nickel oxide coated stainless steel roof. Photo courtesy of Nippon Metal Industry.

This finish is appropriate for exterior roofing and wall panel applications and many interior applications. Figure 1 shows a building in Japan with a green nickel-oxide coated stainless steel roof. Because the coating is nickel and nickel is an alloying element in the stainless steels to which it is applied, the coloring process does not limit the recyclability of the stainless steel.

Terne and Tin/Zinc Coatings

Terne metal (80 percent lead, 20 percent tin) and zinc/tin-plated coatings on stainless steel have primarily been used for roofing. There have also been some exterior wall panel applications. Traditional lead-containing terne coatings are no longer available because of environmental concerns. Tin/zinc coatings were developed to replace lead/tin coatings. The coating enhances the contractor's ability to solder roofing panels. Figure 2 shows a terne-coated stainless steel roof and elevated wall panels of the student union buildings at Carnegie Mellon University.

These metal coatings weather to a medium to dark gray tone but the color is dependant on the environment. Scratching or abrasion can easily damage the coating. These coatings can be applied to either Type 304 or Type 316 stainless steel. Although the coating will corrode first to protect the stainless steel, it should not be considered a substitute for specifying a more corrosion resistant stainless steel in more aggressive environments.

If a custom painted stainless steel roof is desired, tin/zinc coatings can be painted using manufacturer recommended primers and paints. This is generally an easier field painting process than painting bare stainless steel.

Zinc coatings are not desirable when recycling stainless steel and this should be considered if environmental friendliness is important. Capturing zinc roof run-off can also be a consideration in fragile environments.

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Colored Stainless Possibilities

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Plating with other Metals

Stainless steel can be plated with other metals including gold, copper alloys, and other metals. Copper-plated stainless steel has had limited use in roofing applications; it combines the strength of stainless steel with the color of copper. Gold plating has been used for some applications but the same color is more cost effectively achieved using ceramic coatings. Gold is soft and easily abraded and should not be used in applications where damage is a concern.

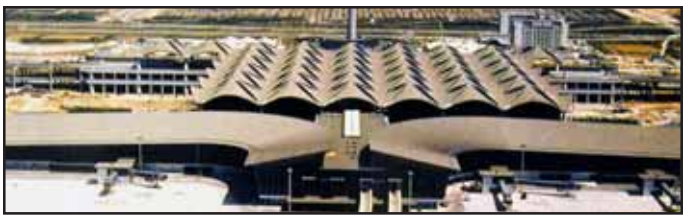

Figure 3: Coil coated stainless on the roof of Kuala Lumpur International Airport, Photo courtesy of Outokumpu.

Figure 4: Powdered coated stainless tunnel panels. Photo courtesy of the Nickel Institute.

Painted Stainless

Stainless steel is coil or resin paint coated in the same manner as other metals except that it is done for aesthetic reasons rather than corrosion protection. Coil-coated stainless steel is particularly popular in Japan but it is also used in Europe. North American applications have been more limited but the product is available. Suppliers generally stock the most popular colors but custom paint colors are available if multiple coils are purchased. Figure 3 shows the custom green coil coated roof of the airport in Kuala Lumpur, Malaysia.

Powder coating stainless steel is also an option. This technique produces a durable finish and has been used for reflective panels in corrosive tunnel environments and for adding recessed color to embossed stainless steel. Figure 4 shows powder-coated stainless steel tunnel reflector panels that replaced badly corroded enameled carbon steel.

The paint systems applied to stainless steel are identical to those applied to other metals but some processing modifications are needed to obtain sufficient paint adherence. Resin-based paints provide a shorter service life than other coloring methods for stainless steel. Like all paint systems, they will fade over time and will eventually fail. Paint systems generally last longer on stainless steel substrates because peeling due to corrosion under the paint is not an issue. Service life is instead determined by the performance of the paint system.

Eventually the stainless steel will have to be repainted based on the manufacturers' recommendations. Alternatively, the residual paint can be removed and the surface left bare if the stainless steel provides adequate corrosion resistance for the environment.

Stainless steel can also be painted after installation but the paint system's service life is generally shorter than that of a factory applied coating. The surface finish must be clean, dry, and rough enough for proper adherence. An appropriate primer and paint system should be selected with the assistance of a paint system supplier. The No. 2B or No. 2D mill finishes and rougher polished finishes, such as a No. 4, have been painted successfully.

Conclusions

Ceramic coated, plated, and painted stainless steel offer a variety of opaque color options. Suppliers can provide samples and work with designers to obtain unique finishes. The durability and recyclability of these stainless steel finishes varies considerably and should be taken into consideration during selection. The appearance of colored stainless steel surface finishes is not defined by standards, so a finish sample should be used as a visual standard.

It is important to select an appropriate stainless steel for the service environment or the finish will eventually deteriorate due to corrosion. Additional information on stainless steel selection is available from the Nickel Institute at *www.stainlessarchitecture.org*. The Specialty Steel Industry of North America (SSINA) has a free brochure on special finishes for stainless steel which can be downloaded from their Web site at *www.ssina.com.* ■

Acknowledgement:

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Author Bio:

Catherine Houska, CSI, is a metallurgical engineer with an MBA in industrial marketing. She is an internationally recognized expert in architectural metal applications and is senior development manager at TMR Consulting, a consulting firm in Pittsburgh, Pa. She can be reached by e-mail at chouska@tmr-inc.com.

The Preferred Material For Fastening Into Treated Wood

Recently, Paul Steckel of San Leandro, Calif. and member of the Architectural Listserv shared his knowledge on alkaline copper quaternary (ACQ) chemicals for treating wood and the preferred fastener materials and coatings for fastening into treated wood.

Take a look at what he had to say, then sign up for the Architectural listserv. You do not have to participate in the discussions unless you want to. You can just read valuable comments, like the following educational information.

Question: With the wood treating industry's voluntary phase-out of chromium copper arsenic (CCA) chemicals and the switch to alkaline copper quaternary (ACQ) chemicals for treating wood, I am wanting to learn what is the preferred fastener material and coating for fastening into treated wood. What suggestions do architectural sheet metal contractors have with regard to fastener material and/or proprietary fastener coatings?

Summary Of Studies Related To Corrosion Of Metal Connections In Preservative-Treated Wood Structures

ACQ (Alkaline Copper Quaternary) is among preservatives that have been shown to produce accelerated corrosion of steel compared to CCA (Chromated Copper Arsenate). It should be noted that corrosion rates depend on many factors and although testing evidenced the accelerated corrosion rates, the actual degree of increase for each combination of factors is still largely unknown.

For example, one factor is the treating solution carrier used as carrier that delivers the active chemicals inside the wood structure. Carriers for ACQ can be ammonia-based or amine-based or hybrid. The preservative containing ammonia in the carrier was observed to be more corrosive than amine-based. Corrosion rates also depend on chemical retention levels of wood. For

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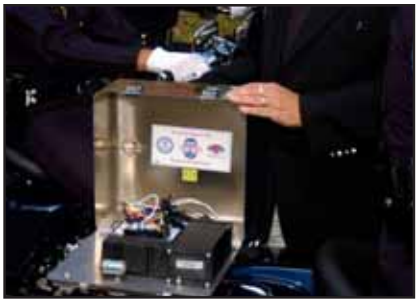
FAB FOCUS

Indianapolis Motorcycle Drill Team Salutes SMACNA Chapter and Local

Custom Fab Project: *Radio Boxes for the Indianapolis Police Department Motorcycle Drill Team*

Sheet Metal Contractor: *Central Indiana SMACNA Chapter and, Local 20 LMCC Project*



The Central Indiana Chapter of SMACNA was recently contacted by the Indianapolis Police Department's Motorcycle Drill Team seeking information about where they could have new "radio boxes" fabricated. The Motorcycle Drill Team is made up of Indianapolis police officers who travel around the country to perform in parades or special events.

The original boxes were chrome "radio boxes" that were mounted on top of the rear fenders of the bikes and had become old and worn. The team's motorcycles are furnished by the city and any special lights or accessories are at the expense of the officers. In addition, the officers receive no compensation for traveling or performing.

Seeing their need for new boxes, the Central Indiana SMACNA chapter and Local Union #20 decided to offer up their support for the drill team. They set to work and fabricated 20 new boxes.

Originally used to hold radio equipment, the boxes now are used for electronic controls for the lights and siren amplifier. They are approximately 14 inches square and are made of 18 gage, 304 stainless steel that is chromed. The chrome required a smooth and blemish free base as it becomes a mirror of what is underneath.

Overall, this project was a joint effort from start to finish. From the training center helping out with the apprentice welding class labor for some of the welding and polishing, to the bulk of the welding and polishing being completed by SMACNA member, Bright Sheet Metal Co. Inc. In addition, SMACNA member Tarpenning-LaFollette Co. Inc. was responsible for the laser cutting and forming.

San Jose Target Delivers Stylish Innovations Inside and Out

Architect: *Target Corp.*

Sheet Metal Contractor: *Air Systems Inc., San Jose, Calif.*

Easy to shop, stylish and clean has served as the prototype for every Target store since the first store opened in 1962. The Target Corporation strives to provide great prices to its customers while also providing stylish innovations to give its stores a one-of-a-kind feeling.

In September of 2004, a new Target store opened in San Jose, Calif., that followed the corporation's guidelines for a clean and stylish design. The store 's facade included copper siding and metal wall panels which required the expertise of Air Systems Inc., of San Jose, Calif. to complete the job.

Finishing their part of the job in an accelerated nine weeks, Air Systems fabricated flat-seam copper panels and Fabral metal wall panels. This $666,397 project consisted of architectural sheet metal expansion joints, composite panels, copper siding and pre-finished siding.

Overall, the scope of the work included: 24,400 square feet of Tyvek commercial wrap underlayment, 9,000 square feet of shop fabricated 16-oz. copper flat seam wall panels and 11,500 square feet of 22 gage pewter 4-inch deep rib siding. There was also 3,900 square feet of Target Red 22 gage hefty rib siding and 2,700 square feet of silver metallic aluminum composite panels as well as vertical and horizontal expansion joints and pre-finished sheet metal copings and counter flashing.

Having a 9-week construction schedule for their scope of the work was one of the biggest challenges that Air Systems faced while working on this project. However, despite time constraints and multiple trades working in close proximity to them, Air Systems was able to successfully complete the job on schedule.

"Target partners with world-class designers to offer the perfect blend of form and function. We are flattered that Target trusted our firm to deliver world-class innovative architectural design and construction on this complex fast-paced construction schedule," said Art Williams, president of Air Systems Inc.

California's Title 24 Impacts Nonresidential Roofing

On Oct. 1, 2005 California's new energy-efficiency building standards took effect.

The new legislation requires contractors to install "cool roofs" – highly reflective, insulated roofing for new nonresidential buildings or when replacing existing roofing. Skylights with controls to turn off electric lighting when natural daylight is available are required for some nonresidential buildings.

These new laws have a broad effect on homeowners, contractors, building inspectors and other involved in the process of repairing and replacing roofing and HVAC equipment in most areas of the state of California.

The standards could potentially reduce energy use in the state by an estimated 180 MW of electricity load and 8.8 million therms (19 000 MJ) of natural gas each year, according to the California Energy Commission.

To learn more about California's new standards, go to *www.energy.ca.gov/title24/2005standards/index.html.* ■

The Preferred Material For Fastening Into Treated Wood

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wood with actual retention levels greater than 0.40 pcf for ACQ, stainless steel connectors and fasteners are recommended "General Simpson Recommendations," *www.strongtie.com*.

Multiple variables that affect the rate of corrosion make it impossible to apply the test results to all product combinations, installations, and environmental conditions. Generally the test results cannot be correlated to service life.

Minimizing Corrosion

Corrosion-resistant alloys: Alloys such as stainless steel or silicon bronze are very effective against most types of corrosion. The main barrier for these products in the market is their high cost. In addition, stainless steel has increased hardness characteristics making the manufacture of these products more complicated.

Impermeable covering: Covering steel with an impermeable coating (i.e., painting) can inhibit corrosion by providing a mechanical barrier between steel and corrosive agents such as oxygen, water, and other substances. However, this method is vulnerable to imperfections in the coating such as scratches where corrosion can initiate and spread to adjacent surfaces. This method is not recommended for long-term outdoor exposure of structural connections.

Galvanic coating: Galvanic coatings such as zinc are the most common method for protecting connections against corrosion in residential construction. A galvanic coating serves a double function. In addition to working as a mechanical barrier similar to paint, zinc provides a chemical defensive mechanism.

Another type of coating often used with roofing products is referred to as Aluzink 185, an alloy of aluminum and zinc. Aluzink 185 can be several times more effective than zinc, but it is slightly more expensive.

Preventing Corrosion

The use of hot-dipped galvanized steel for wood connectors and fasteners is the most common method for preventing corrosion. The coating is typically applied through a continuous or batch dipping process when the steel is submerged into molten zinc. The continuous process is used with steel coils of lighter gage that are afterwards manufactured into connectors. The batch process is used with heavier gage products that cannot be manufactured from coil steel. Mechanical galvanizing is another method for applying zinc coating to steel.

Based on the thickness of galvanic coating, hot-dip steel products are designated as follows: G60, G90, G185, etc. The number indicates the fraction of ounces of zinc per one square foot of steel treated on both faces. For example, G90 means that the weight of zinc layer of about 0.0008 inches in thickness on each face.

Thicker coatings are expected to extend the service life of connections (galvanic layer is a sacrificial coating that extends service life through bypassing the corrosion process and is effective until the zinc is depleted). G60 is a minimum industry norm for wood connections used with CCA-treated lumber. G90 is also used by the industry for enhanced protection (the required minimum levels of galvanizing provided by the process are covered by ASTM A153 for fasteners).

In light of the new data on the corrosiveness of alternative wood preservatives, the industry is considering requiring G185 galvanic coating or stainless steel products as a new minimum standard. These new requirements are not explicitly included in the model building codes. A consistent policy for use of steel connections with treated wood is currently under development.

Avoiding Galvanic Corrosion By Dissimilar Metals

Fasteners for ACQ treated wood should be galvanized in accordance with ASTM A153. Stainless steel can still be used for maximum service life or severe applications. Where appropriate, copper fasteners may also be used.

Fasteners used in combination with metal connectors must be the same type of metal to avoid galvanic corrosion caused by dissimilar metals. For example stainless steel fasteners should not be used in combination with galvanized connectors.

There may be additional products such as polymer or ceramic coatings, or vinyl or plastic flashings that are suitable for use with treated wood products. Consult the individual fastener, connector or flashing manufacturer for recommendations for use of their products with treated wood. ■

This information was based on research that listserv member Paul Steckel did to find out what is the preferred fastener material and coating for fastening into treated wood. To read more on this subject visit www.strongtie.com.

Subscribing to the Architectural listserv is easy. SMACNA members should send an e-mail to Jeannette Schluderberg at jschluderberg@smacna.org. Your short message can be as simple as ,"Please subscribe me to the Architectural E-mail Listserv." Once you've been added to the list, you'll receive a confirmation from SMACNA and you'll be able to converse with the group members.

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