



HyCAL Corp Facility

Rehabilitation
& Expansion

BOARD FEET
1,363,342

CARLISLE
SPRAY FOAM INSULATION



HyCAL Corp Facility Rehabilitation & Expansion

PROJECT DESCRIPTION

Since 1983, Ferragon Corporation has grown into one of the nation's leaders in toll processing by being a one-stop source for a full range of hot rolled toll processing, cold rolled processing/ inspection, cold rolled conversion services and aluminum slitting/inspection. Ferragon oversees the operations of Ferrous Metal Processing Co., FerrouSouth, Ferrolux Metals Co., Ferrous85" Co., Autolum Processing Co., and Ferrous Metal Transfer Co. They are ISO 9001:2008 Registered and/or QS 9000 Certified at every location.

In 2012, Ed Gonzales, President of Ferragon Corporation, began searching for a location to install a new Tier I Automotive Steel Processing Facility. This facility would house the first of its kind, 100% hydrogen continuous anneal line for processing advanced ultra high strength steel which would attract the industry's most notable automotive manufacturers. The High-Tensile Strength Annealing line (a process involving heating metal and quickly cooling to increase its strength) provides ultra-high-performing steel for automotive chassis, ideally housed in a bright and professional space.

Ferragon pursued numerous locations in Northwest Ohio and Southeast Michigan, all strategically located near the automotive industry hub. Ultimately, the corporation decided on the old McLouth Steel Facility in Gibraltar, Michigan (built in 1954). More than \$2.2M in loans and a grant have been awarded by the Michigan Department of Environmental Quality to help redevelop the site, including a \$1M Clean Michigan Initiative Brownfield Redevelopment loan, a \$1M Revitalization Revolving loan and a \$245K Clean Michigan Initiative grant. Additionally, HyCAL is investing \$53M in plant upgrades, including: roof lighting, drainage, and other infrastructure.

All construction means and methods were approved by the funding agency's engineers prior to their implementation—the Brownfield plan was previously approved by the Wayne County Brownfield Redevelopment Authority, Gibraltar City Council and the Commission's Committee on Economic Development. The Gibraltar plant is expected to be operational by the beginning of 2017, following the removal of hazardous materials, interior demolition and retrofitting.

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This is a terrific reuse of an inactive steel plant, and the jobs are most certainly welcome. The cleanup also is very good news because of the refuge, the nearby Detroit River, marshes and other wetlands.

— Commissioner Joseph Palamara
D-Grosse Ile Township

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With the help of our manufacturer's support, we were able to communicate all of the benefits of utilizing Closed Cell spray foam insulation at 2" thick on the walls and 3" thick on the interior roof deck.

— Jack L. Moore, Jr.
President/CEO West Roofing Systems, Inc.

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INNOVATION

Among numerous hazardous environmental concerns, HyCAL also needed to solve their finished interior condition and aesthetic concerns. Approximately $\frac{2}{3}$'s of Bay 5's and Bay 4's (which is Phase II of the project) roof deck was poured gypsum, while the balance of the roof deck was corrugated sheet metal roofing. The walls were also corrugated sheet metal, while approximately $\frac{1}{3}$ of the wall area was the original glass pane construction (typical of the early 50's style). There were three primary issues with the interior of the facility. First, the finished space needed to be bright, requiring a luminous white finish on the walls and ceiling. Second, the sheet metal walls and roofing were galbestos coated panels (galbestos is a metal sheeting lined with bitumen that is impregnated with asbestos). Third, the glazing in the windows contained asbestos. Ferrolux needed to insulate the building and provide a professional appearance while, at the same time, ensuring a clean and non-hazardous facility.

Many options were considered to alleviate these concerns. For example, the exterior of the building was slated to receive a new metal siding, so insulated metal panels and various types of insulation were explored. Additionally, different types of insulation were researched for interior application. Only a spray polyurethane foam (SPF) system could meet all of the general construction needs and DTE Energy's (aka Detroit Power) incentive requirements— an R-13 on the walls and an R-19 in the roof assembly.

First, the local governing body approved SPF as an asbestos encapsulant over the galbestos panels and the glazing of the windows. The SPF provided the solution to two of the primary concerns, encapsulating and insulating, while the required bright white finish was accomplished with International Fireproofing Technologies, Inc., DC 315 intumescent coating (an interior thermal barrier coating for spray polyurethane foam insulation). Using Paint To Protect™'s special order White, HyCAL was able to match the paint being utilized on the structural steel providing a clean, bright white finished appearance that makes the structural members “disappear” into the walls and ceiling. Utilizing this combination of products met all of the local code requirements for an interior SPF application.

BEST PRACTICES

The project requirements were very strict regarding Health and Safety. HyCAL is a drug-free workplace with stringent documentation and policies in place. In addition to standard practices, all employees involved with the project were required to pass the 10-panel drug screening test (a more extensive test than typically required). Additional project specific safety requirements included the following: weekly tool-box training; conducted job-specific safety tool-box talks; weekly copies of the discussion topic and attendance roster, daily production logs and Daily Safe Task Analysis (STA)/Job Safety Assessment (JSA; a 10-minute daily stand-up that discussed the tasks for the day and how we will mitigate or eliminate hazards) all turned into the project manager and owner; and safety checklists and quality control documentation.

As this project was set for completion in late fall 2016, the ambient temperatures, dew points and humidity levels were monitored (utilizing a Kestrel Anemometer) and recorded three times throughout

the day to confirm efforts were within the acceptable manufacturer's guidelines to provide a proper coating film (critical, should any future concerns arise in the event of a fire). Wet film gauges were utilized, as well as verifying material usage over surface area confirmation to ensure the proper application rates. Daily safety inspections were conducted by our on-site safety coordinator containing corrective actions taken. Provided checklists included the following: Respirator Cartridge change-out schedule (when powered air-purifying respirators were not being used); daily start-up and shut-down procedures (per SPFA Certification Guidelines); Personal Protective Equipment (PPE) documentation (critical due to the presence of Asbestos Containing Material (ACM); non-friable condition); and Safety Data Sheet (SDS) log maintenance. All of this documentation was made part of the contract requirements and contingent upon the release of payments.



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Evaluating all the options for accomplishing the desired results, the spray foam insulation offered the best energy solution, at the best price, with the fastest installation, and a bright aesthetically pleasing surface.

— Steve Swan
General Manager HyCAL Corp.

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PROBLEM SOLVING

The team was faced with many logistical challenges. The walls were 50' tall and, with the slope of the gabled roof, the height of the ridge was 75'. The structural steel acted as a "spider web" which created difficult access even out of man lifts. And to make the application interesting, the owner continued constructing the new annealing line as the SPF application continued. While iron workers and concrete contractors continued their work in Bay 6, HyCAL moved onto Bays 3, 4, and 5—Bay 5 is 100' wide by 950' long, and Bays 4 and 5 are 100' wide by 1,350' long. The team installed a 6 oz. non-woven fabric over the floor to provide overspray protection and visqueen over the ancillary structures, and crane rails that needed protection. The fabric provided a non-slip surface that was also durable enough to withstand the man lifts running over it. Additionally, the prep that was performed (power washing the walls and ceilings performed by others) generated a considerable amount of debris. After completion of sections of the application, a telescoping boom fork-lift with a bucket attachment was used to pick up the fabric and debris.

Phase II consisted of a total of 492,664 square feet (sf)—114,650 sf of walls/windows at 2" inches thick and 378,014 sf of ceiling at 3" thick, requiring 1,363,342 board feet (approximately 290 sets) of SPF to be installed and 6,700 gallons of intumescent coating be installed, all prior to the target completion of Thanksgiving (with the hope of favorable temperatures late in the year). With this very tight time frame, with plant operations continuing in Bays 3, 4 and 5, and while the new annealing line continued construction in Bay 6, the team needed to deploy (3) Graco H-40 Reactors for the foam application and (2) Graco Bulldog Coating rigs to meet the deadline and impending cold weather. Each section of the bay was divided into three working areas—a 45' man lift for the walls, a 65' man lift from the eave to mid-way up the slope and an 85' man lift for the highest portions of the work area. This required significant choreography between the three applicators and the respective man lifts to keep things moving smoothly. Each lift had both an applicator and an operator in the basket to maintain focus. To alleviate

struggles with hose and wand extension lengths, a "T" in line of the main coating line was installed to provide coating applicators with two guns—one long wand and one short wand. The foam technicians also came up with numerous depth probe gauge devices. They attached these devices to poles in order to spray continually rather than stopping frequently to verify depth. An additional two-man crew kept the grounds clear and the proportioners fed.

As the cooler temperatures began to set in, the team needed to develop a process to keep the materials warm. A 28' enclosed trailer with a heater was used to store enough material overnight for the next day's work. After the material was removed from the

trailer, three Barrel Blazer® Heating Systems were used to maintain a minimum 65°F material temperature. Most days were 12 hours long—some requiring double shifts—in order to monitor the construction schedule and ongoing processes within the facility.

Temporary protection was another interesting challenge. A release agent was applied to all three man lifts which protected the them from overspray, and a quick power wash was all that was needed to avoid a heavy clean-up fee from the rental house.





RISK MITIGATION

The applicators and the man lift operators wore full body disposable Tyvek protection including hoods, peel away face protection and PAPR's. Rather than employ a system with a compressor and hoses, the team chose to use battery powered PAPR's. Keeping the cartridges changed and batteries charged was the responsibility of the ground support person who closely monitored the "in-work" time and change-out schedules. Due to the difficult facility landscape, lift operation required exceptional care, so harnesses and lanyards were employed 100% of the time.

VALUE OF MONEY

To meet the requirements of the DTE Energy's (aka Detroit Power) energy incentives, the project required an R-13 on the walls and R-19 on the roof deck. The redevelopment is supported by \$9.9 million in reimbursable incentives, which will be covered over 30 years of incremental tax revenue capture, according to the Brownfield contract. The approval of Closed Cell spray foam insulation at 2" thick on the walls and 3" thick on the interior roof deck provided a tremendous cost savings regarding the abatement costs alone.

The DTE Energy's engineers monitored the installation of the insulation to ensure all requirements for the energy incentives are met. Mr. Swan also commented that when the engineers learned that HyCAL was utilizing SPF, they were more confident in the energy efficiencies, in addition to the raw R-value of the insulation. When HyCAL made comparisons between insulated metal panels, vinyl reinforced batten insulation and SPF—the Life Cycle Assessment (LCA) for the SPF far exceeded the other two products, making the decision, as Mr. Swan put it, "clear and easy".

SPEED OF DELIVERY

Insulating 492,664 sf of a 61-year-old steel plant was no small task. The scale of the project combined with the logistics of working around numerous trades, 100% aerial lift work, impending cold weather and a tight schedule, all required an efficient application. Each of the three applicators had to average two sets of product applied on a daily basis, providing enough time to install 6,700 gallons of intumescent coating. This was a monumental task as most of the application was 75' in the air, over equipment, crane rails and plant operations. Constant pressure from the project manager required 10-day shifts for 8 men, with only one full day off to recuperate. On average, the team installed 17,000 board feet of insulation each day and averaged 200 gallons of intumescent coating installed daily.

ENVIRONMENTAL CONCERNS

Utilizing SPF reduced the capital expense for the abatement and reduced the amount of hazardous waste that would have been deposited in strained and expensive landfill space. The use of the intumescent coating provided the "painted" finished appearance the owner was looking for, and its service life far exceeds that of paint, reducing long-term maintenance costs and any duplication of interior finishes that would have been required by other insulation systems. Overall, the decision to utilize a high-performing spray foam insulation for this vast development generated productivity, reduced liability, increased cost savings and helped ensure that deadlines were met appropriately and outcomes exceeded expectations.

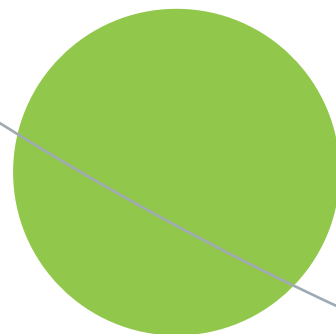


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The SPF installation cost is less than ½ the cost of the abatement of the sheet metal panels alone, providing additional capital to make more improvements we really wanted to make to the facility.

— Steve Swan
General Manager HyCAL Corp.

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