

BEI Perspectives

BEI Designs New Chrysler Phoenix Engine Plants

SUMMER, 2008

Chrysler to Manufacture Fuel-Efficient High-Tech Engines in Michigan and Mexico

It is not often that an Architectural/Engineering firm becomes involved in a critical program that means so much to a corporation that is reorganizing itself, to consumers who urgently need fuel efficient transportation, and to an economy that needs investment in basic manufacturing. BEI had just this opportunity, bringing together a considerable depth of experience in designing Chrysler's manufacturing facilities over the past fifteen years to make a difference in its involvement in Chrysler LLC's "power train offensive" code named Phoenix.

Together with a team of consultants contributing complementary skills and minority involvement including Harley Ellis Devereaux (HED), Gala Associates, and ACK Associates, among others, BEI Associates provided professional architectural and engineering design and construction follow-up services for Chrysler's 2010 MY Phoenix Engine Program, which included plants located in Trenton, Michigan, as well as Saltillo, Coahuila, Mexico. A parallel project for the manufacture of axles was also accomplished at Marysville, Michigan.

This program that began in the third quarter of 2006 with site selections, involved the simultaneous design of all three plants at three independent locations on a very aggressive schedule. The total program consists of approximately 2,500,000 sq. ft. of new Greenfield Construction over three locations in two countries.

Each site included the development of the site and infrastructure as well as the design of facilities for manufacturing, assembly, material handling, administration, employee



Rendering of the Trenton Engine Plant

services, full service cafeteria, energy center, high voltage power supply, plant utilities, waste treatment, water supply and treatment, fluid storage tanks, distribution piping, site utilities, pavement, landscaping, guard houses, and site security. The energy centers included the design of central chilled water, compressed air, and cooling towers.

The three plants were designed and constructed on a fast track construction managed basis, with owner occupancy for equipment installation scheduled in 12 months from start of construction.

The new Trenton Engine Plant accommodates production of 440,000 six-cylinder engines annually. This 819,000 square foot project is located on the same overall site as an existing Trenton Engine Plant but is maintained as a completely separate operating facility. The 40-acre site was very tight and required a creative approach to develop a layout that met the production needs of Chrysler, fit within the constraints of the existing Engine Plant buildings, and met requirements of the City of Trenton. The final solution required that we obtain zoning variances and also involved the relocation of a major storm sewer.

The Saltillo Engine Plant is also designed to produce 440,000 engines annually. The new 900,000 square foot Saltillo Engine Plant is located on a very large site one half mile from an existing truck assembly plant. This remote location required the development of 210 acres and the creation of a virtually independent infrastructure, including new water supply, water treatment, waste water treatment, and storm water systems.

In addition to the facility design of the Trenton and Saltillo Engine Plants, BEI has prepared the drawings and specifications for the installation of the production equipment at each of these new plants. This installation activity included the setting of equipment and the connection of all mechanical and electrical services to the production equipment and overhead cranes.

The Marysville Axle Plant included the design of a 730,000 square foot axle manufacturing plant and the complete development of a 211 acre greenfield site including high voltage power supply, sanitary sewers, highway access, roads, water mains, pump houses, underground utilities, and water retention ponds.

Both the Trenton Engine Plant and the Marysville Axle Plant are designed to be "Green" facilities using the U. S. Green Building Council LEED rating system. Each building is registered with USGBC and in the process of being LEED certified.

The Chrysler Trenton and Saltillo Engine Plants are both vital parts of "Phoenix", and BEI is very pleased to play an integral role in the launch of the new facilities. ■

STRIVING TO BE THE BEST

President's Corner

DETROIT REGION NEEDS TO MOVE FORWARD

"You may be disappointed if you fail, but you are doomed if you don't try"

Beverly Sills

The City of Detroit, The Detroit Region, and even the entire State of Michigan have become embroiled in the controversy of Detroit Mayor Kwame Kilpatrick's alleged personal indiscretions and pending legal proceedings.

The City Council is spending an inordinate amount of time dealing with this matter. City Government is not functioning as it should because of the mistrust between the Executive and Legislative branches. Conventions that were scheduled to come to Detroit chose to go elsewhere.

The major casualty of this paralysis is the proposed, and critically needed, Cobo Hall Expansion. This was clearly evidenced at the recently held Detroit Regional Chamber's Leadership Policy Conference on Mackinac Island.

The "Big Four" failed, during their traditional discussion moderated by Paul W. Smith, to agree on a blueprint to get the job done.

In the meantime, there is the real possibility that the International Auto Show may be forced to move elsewhere if concrete action is not taken soon.

Largely silent in this stalemate is the business community. While it has avoided taking any sides in the Mayoral controversy, it must play a key role in resolving The Cobo Hall matter as quickly as possible. The business community should provide the needed leadership to fill the vacuum created by the political turmoil to insure that the Cobo Hall Expansion becomes a reality and that additional investment in the City continues to occur.

With respect to the Cobo Hall Expansion, perhaps the Detroit Renaissance and the Detroit Regional Chamber can jointly be entrusted by the "Big Four" to resolve the impasse in a fair business-like basis to include appropriate participation by State Government and possibly other interests, which would benefit from increased Convention activity.

The business community can appoint a strong leader/facilitator, similar to what John Hertel is currently doing with the Transportation issue, and what Mike Duggan did in the past with Comerica Park and Ford Field, to facilitate the implementation of the Cobo Hall Expansion.

Otherwise, by the time the political controversy in Detroit runs its course, the International Auto Show may be "long gone". ■



QUALITY CORNER



Chris Katsikas, PE, Ph.D., is Vice President of Operations and Quality Director

BEI under ISO 9001:2000 has learned and understands how to interface the quality management system, (QMS), to its business processes. The QMS must have a strong business focus and lead to specific objectives and measurable improvement. Following ISO guidelines BEI must continually improve the QMS effectiveness utilizing the tools of the system including monitoring and measurements, analysis of the data, corrective and preventive actions.

SUSTAINING QUALITY WITH A BUSINESS FOCUS

The BEI QMS recognizes the following key features of ISO 9001:2000:

- It is process focused and requires that all management processes are measured, monitored and improved.
- It requires that business quality objectives be established at relevant functions and levels of the organization.
- It requires top management to insure that the planning of the management system will be carried out.
- It requires top management to be proactive to ensure that QMS is suitable and effective for the organization. Also, to assess opportunities of improvement along with any need for changes to the QMS.

BEI's Quality Operating Committee (QOC) in order to sustain project quality must fine tune the QMS and align it closer to the above key features of ISO 9001:2000 for a successful business operation.

BEI has entered its sixth year of operation under ISO 9001:2000. BEI's Quality Operating Committee will meet after the next re-certification surveillance by BSI, scheduled for later this year, to elect its new Quality leadership. I have served as BEI's Quality Director for six years. It has been a rewarding experience working with the Quality Operating Committee and many BEI employees. The renewed QOC will continue to reinforce BEI's commitment to improve the QMS effectiveness. ■



David Oz, PE
Senior Associate
and Project Director

SIPHONIC ROOF DRAINAGE SYSTEMS

One of the newest technologies in the field of plumbing engineering is the application of siphonic roof drainage systems. This approach to roof drainage has resulted in many benefits to our clients. These systems can save up to 50 per cent of the construction costs associated with conventional roof drainage designs. In addition, utility coordination issues can be mitigated using this technology. Another benefit realized by building owners is a greater flexibility for future facility renovations.

The siphonic roof drainage approach employs the same materials, same installation methods and the same construction trades as a conventional roof drainage system. While relatively new to the United States, siphonic roof drainage has been practiced for nearly 50 years in Europe, so the technology has been proven. It was first introduced in the United States in the late 1990's after thorough scrutiny by plumbing inspectors and plan reviews. Upon realizing the many benefits, siphonic roof drainage is now becoming accepted as a viable option to conventional roof drainage systems.

Any roof drainage system has, as its objective, the removal of water from a roof during a storm. A conventional roof drainage system employs a two-phase (air and water) flow within the drainage piping.

The piping is sloped (typically at one per cent) to keep the water flowing during a storm.

The energy that drives the water flow in a conventional system is derived from the gravitational effects of the sloped piping. A siphonic drainage system employs a single phase (all water) flow within the piping. The energy driving the flow of water in a siphonic drainage system is the static head of the building height, many times greater than in a conventional system.

By utilizing the full cross-sectional area of the pipe and the increased energy to drive the water flow, a siphonic piping system is able to use smaller pipes than those associated with a conventional roof drainage system. In most cases, siphonic pipe sizes are in the range of one half of the pipe sizes that would be required by a conventional system. With smaller piping, our clients realize lower installed costs without sacrificing system performance.

One of the most obtrusive overhead utilities in a building is the roof drainage piping because of the fact that the piping slopes. At one per cent slope, the horizontal run of a typical roof drainage pipe can easily use up to three or four feet of available ceiling or truss space. With the myriad of utilities necessary in a manufacturing facility, numerous interference problems emerge due to the roof drainage pipes. By employing a siphonic roof drainage system, the piping is smaller and is installed flat, without slope. These two advantages result in a significant reduction in utility coordination efforts.

Because siphonic roof drainage piping is installed flat, the entire piping system can be installed overhead. With a conventional roof drainage system, the horizontal runs are limited by the amount of ceiling or truss space available due to the slope of the piping. Plumbing engineers typically route conventional piping as far as is practical, and then route the piping down a building column or pipe shaft to underground. Should the piping ever fail, underground repair is costly and disruptive to the building's operations. In addition, in many manufacturing applications, future building requirements often require pits and other underground installations. With the siphonic piping installed overhead, these types of modifications can be accomplished with greater ease adding value to our clients.

Siphonic roof drainage is a relatively new design concept in the United States, but more and more building owners are inquiring about it. With the obvious benefits and its continuing acceptance by building codes, this technology will continue to grow in popularity. BEI Associates has become a leader in the application of this technology and will continue to provide the benefits of siphonic roof drainage to our clients. ■

Mr. Oz has over 20 years in the architectural engineering industry with focus on industrial, commercial and institutional facilities. He has held leadership positions in both project and functional management and has the ability to manage projects with demanding schedules and tight budgets in a customer-driven environment. He provides practical solutions and contributes to design quality, schedule adherence and profitability.

AMERICAN AXLE AND MANUFACTURING PLANT RENOVATION

Oxford, Michigan

BEI's A/E design included interior renovations to the Administration Building, the Manufacturing Building Compressor Room and the Locker Room. We provided an addition to the north side of an electrical room.

DELPHI, MICHIGAN TECH CENTER CONSOLIDATION

Auburn Hills, Michigan

BEI Associates, Inc. is currently designing a 135,000 square foot research and development laboratory for this Tier one automotive supplier. The completed facility will feature vehicle component testing and new product validation.

GUARDIAN INDUSTRIES OFFICE RENOVATION

Carleton, Michigan

BEI Associates, Inc. provided A/E services to Guardian Industries to convert approximately 8,000 square feet of existing research and testing areas into general office space.

CITY OF NOVI NEW PUBLIC LIBRARY

Novi, Michigan

BEI Associates, Inc. is the A/E of record for the new two-story 55,000 square foot, \$12.5 million dollar project. Diamond and Schmitt is the Design Architect.

DTW NORTH TERMINAL

Romulus, Michigan

Detroit Metro Airport's new North Terminal will be opening for travelers this fall. BEI has had active involvement in the Design of the Mechanical and Plumbing systems for the Airlines fit-up area and also is performing Construction Administration services, including those for the Electrical work. URS is the Architect for this portion of the North Terminal and Gensler is the Master Architect for the entire North Terminal.

BEI SOFTBALL TEAM

The 2008 softball season is well underway: the first game was held on April 24, 2008. BEI's team coaches this year are Steve Ebel, Dustin Gaydos, and Brad Shepler. So far this season, they have coached the team to a record of 11 wins and 1 loss and are in first place in their division as the playoffs approach. The 2008 softball team is a combined venture of BEI, HRC, and Illitch Holdings. ■



NEW FACES / WELCOME ABOARD

BEI would like to welcome: Dan Blazeovich, Structural CAD Designer; Melvin Butler, Electrical CAD Designer; Ed Nagel, Electrical Engineer; Dave Sharkey, P. Eng. Director, Electrical Engineering; and Al Blair, AIA, who returns to BEI as Director, Design and Architecture. ■

AUGUST 25TH TIGERS' GAME

There will be a Tigers game on Monday, August 25th, 7:05 pm, against Cleveland. As a treat, the employee club members will get 2 tickets to a night out with the Tigers. The People Mover will be available to transport the employees from the office to a fun outing at Comerica Park. A brisk walk is a healthy option. ■



GREEN GROWTH

Tough economic conditions appear not to have slowed environmentally friendly construction. In an interview appearing in CAM magazine's June 2008 issue, Patrick Smithbauer, P.E., LEED AP, Executive Vice President of BEI, said, "Green buildings are doing nothing but grow". Under the LEED rating system of the U.S. Green Building Council, the State of Michigan had 60 certified projects last year, including new construction, major renovations, and existing buildings. Patrick is Vice President, and founding member of the Detroit Regional U.S. Green Building Council. From beginning to end, Smithbauer noted LEED certified projects involved the green movement's triple bottom line: Environment; Economics; and People. ■

BEI EMPLOYEE CLUB NEWS

In honor of Cinco de Mayo, the Employee Club sponsored a Mexican luncheon on May 7th, 2008. Club members ate Mexican cuisine that included cheese enchiladas, chicken enchiladas, beef & bean burritos, chicken tacos, beef tacos, guacamole, salsa, tortilla chips, rice, and refried beans. All of the employee club members enjoyed the food. Monthly luncheon events range from American, Chinese, and Mexican food, to Middle Eastern cuisine. ■

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