

Sustainability is 'the Quickest Draw' at John Wayne Museum

A building designed to preserve even the toughest Western actor's memorabilia

Known to many as "The Duke," Western film superstar John Wayne rode on to broader vistas in 1979, leaving a legacy rivalled by only a handful of Hollywood greats. From "True Grit" to "Chisum" to "Hondo" to "Sands of Iwo Jima," Wayne's acting could only be described as natural.

The breadth and tenure of his career left much to be admired by fans, young and old. In an attempt

to collect and safeguard as much of that history as possible, the John Wayne Birthplace Society added a facility to the superstar's historic birthplace property.

On Memorial Day, May 25, grand-opening festivities were held at the new John Wayne Birthplace Museum, adjacent to Wayne's childhood home in Winterset, Iowa.

"This project has been talked about for 10 years," said Brian Downes, executive director of the

society. "In 2008, we got serious and started planning. The society really needed a central location where John Wayne fans could come see memorabilia and celebrate Wayne's accomplishments."

BOWLEGGED AND BUILT TO LAST

A thin strand of environmentalism sauntered through much of Wayne's career, perhaps most prominent in a scene out of "McLintock." Wayne's character,



ENHANCED EFFICIENCY: Anthony Sherman, owner of Sherman Co. LLC in Adel, Iowa, checks a 5.5-ton Modine Geothermal unit; one of two similar units at the museum.



CONTROLLED CLIMATE: Dick Burhans, president of ReBearth Products Inc., checks the building's set point temperature.

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G.W. McLintock, spoke with his daughter about preserving the land he owns. One would have to guess, based on the Duke's love of wild spaces, that conserving natural resources for generations of Americans to come would be of interest were he still alive today.

Like the man himself, the museum also tips its hat to environmental sustainability. It's only fitting that the facility embodies Wayne and his career — architecturally and otherwise. The Southwestern-styled 6,100-square-foot building is rugged, unembellished, and built to last.

Stone, stucco, and a standing-seam metal roof wrap the insulated concrete form (ICF) structure, which is punctuated by glazed, argon-filled windows. Inside, Modine geothermal units coupled with Aprilaire energy recovery ventilator (ERV) and air-filtration systems ensure an optimal environment for the artifacts and visitors.

"We wanted to build a timeless structure that would last 100 years and provide the owner with the lowest life cycle costs possible," said Mark Thiessen, principal of Angelo Architectural Associates in Des Moines, Iowa.

And, that they did. The crew had no shortage of John Wayne fans, because nearly everyone on the job sought out involvement based on a mutual interest. In addition to Thiessen, Downes worked with Dan Bush, president of Newcastle Enterprises; Anthony Sherman, owner of Sherman Co. LLC in Adel, Iowa; and Dick Burhans, president of manufacturer's rep firm ReBearth Products Inc. in Truro, Iowa, for expertise during design and integration of the geothermal and ERV systems.

As the project broke ground in April 2014, two separate, vertical geothermal exchange fields were drilled. Designed by ReBearth Products and drilled by Grimes, Iowa-based Iowa Geothermal Services, each field consists of four holes bored to a depth of 300 feet. The holes were then filled with GeoPro Inc.-enhanced bentonite grout mix for maximum performance.

"Bentonite alone grants a thermal conductivity factor of 0.4," said Burhans, whose company started out nearly 30 years ago as an environmental consulting firm. As it grew, they started supplying equipment and material for the environmental, geothermal, and horizontal-vertical drilling markets

before moving into HVAC.

"By adding four bags of silica sand for each bag of bentonite, the conductivity factor more than doubles," he continued. The company's background and experience make them an invaluable asset for contractors looking to tackle geothermal projects large and small.

TOUGH PARAMETERS

"There's more going on in this building than in most high-end homes," said Sherman, in regard to the HVAC components. "It could've been a nightmare getting all the accessories to integrate, but Modine's onboard controls made it simple. It was all very intuitive."

Inside the building, the pair of 5 ½-ton water-to-air heat pumps draw from the exchange fields. A downdraft unit serves the upstairs and gallery area only, where all the valuable John Wayne artifacts are on display or stored. The other unit, an updraft configuration, conditions the first floor's entry,

gift shop, theater, and office.

"About 95 percent of our projects include geothermal and ICF," said Bush, whose construction firm focuses on high-end commercial and residential projects. "Here, the main challenge was designing for the people load in such a tight building envelope. Maximum

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“These heat pumps have a strong airflow, which was a big plus downstairs where they’re pushing air quite a distance. At the same time, they’re surprisingly quiet, which was important in the theater and museum.”

—Dick Burhans, president, ReBearth Products Inc.

occupancy is about 150 people, and we need to maintain stringent set points. It’s a lot different than building a tight home.”

The 4,000-square-foot gallery contains one-of-a-kind items that are sensitive to humidity and temperature fluctuation. A \$75,000 Andy Warhol painting of The Duke, scene props, letters, signs, costumes, and no shortage of leather wearables fill the space.

After some research and thorough discussion with larger museums around the country, Downes determined the ideal environment for the artifacts is between 66° and 68°F, with humidity levels around 60 percent. The latter is accomplished via Aprilaire steam humidifiers

that serve each of the main supply ducts. The units include an outdoor air sensor for optimum performance in automatic mode.

To further protect artifacts and building occupants, MERV-13 filtration is installed on both of the Modine geothermal systems. Two 200-cfm ERV units serve the building, as well — one on each trunk line.

MULTI-LEVEL ZONING

“These heat pumps have a strong airflow, which was a big plus downstairs where they’re pushing air quite a distance,” said Burhans. “At the same time, they’re surprisingly quiet, which was important in the theater and museum.”



DIAGRAMMING FOR THE DUKE: (From left to right) Mark Thiessen, architect, Angelo Architectural Associates; Sherman Burhans; and Dan Bush, owner of New Castle Enterprises discuss the blueprints while on location at the John Wayne Museum.

The museum proper and upstairs is served by a single zone, but with a twist. On the west side of the building is a large display window that showcases Duke artifacts. The window area is isolated from the museum by concrete walls, the ceiling, and a heavy steel door — in the event someone manages to gain entry through the glass.

Given the room’s mere 30-square-foot space and the mas-

sive window, the solar gain would raise the temperatures to levels that could, over time, damage display items. To avoid this, Sherman technicians installed a 3-inch vent and in-line fan off the main supply duct. The fan operates off a thermostat.

The main unit downstairs serves two true zones. One is comprised of the lobby and gift shop and includes the entry way and office. The second zone covers the theater, which is full

of seats from the world-famous Grauman’s Chinese Theater in Los Angeles. The theater zone has three levels of ductwork. As more people come into the space, supply increases, as needed.

“I was a bit concerned about the units’ ability to comfortably handle the heating load in the entry area based on all the large windows,” said Thiessen. “But we’ve now gone through one full heating season without an issue of any kind. I think that says a lot for both the technology and solid design on the front end.”

While system efficiency was a main design consideration, the goal for the heating, cooling, and ventilation systems within the building was to provide a comfortable environment for visitors and a safe atmosphere for priceless antiques.

The John Wayne Birthplace is the only museum dedicated to John Wayne and contains more than \$2 million worth of artifacts. So far, the HVAC design has proven more than capable in terms of occupant comfort, sustainable operation, and protection of artifacts.

If he were here to see it for himself, the Duke would likely regale the construction team with appreciation, saying, “Welllll, that’s a mighty fine job you’ve done there, fellas.”

Information courtesy of Dan Vasty, an account manager and writer for Common Ground. Vasty writes about HVAC, hydronic, plumbing, mechanical, radiant heat, geothermal, solar, and broad building systems industries. For more information, call 717-664-0535 or email cground2@ptd.net.

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