

Vol XXI, Issue 2

PLAINS TALK

A Publication of West Plains Engineering, Inc.

April/May 2019

Startup to Staple: Iowa Brewing Company

Strategic Direction Report: Supporting the Science of Beer

Maximizing Micro-brews: Gruner Brother's Brewing

Chopping Block to Brewpub: Lion Bridge Brewery

westplainsengineering.com

MECHANICAL ELECTRICAL PLUMBING POWER

AN ENGINEERING SOLUTION CENTER

IN THIS EDITION...

As we were putting this edition of Plains Talk together, we couldn't help echo the immortal words of one Homer J. Simpson:

"Mmmmm....beeeeerrr."

What the iconic character puts so simply, is more true now than ever. Our country (and our team) loves its suds – just look at the numbers.

The popularity of microbreweries locally producing craft beers has more than doubled in the United States in the past decade. And these drafts aren't only available in small batches at your local haunt, breweries are installing sophisticated canning and packaging operations in-house and taking their products to taps and shelves hundreds of miles away.

Whether it's a brand new building, or a creative renovation of an old structure – the mechanical and electrical systems to support these spaces are unique. HVAC, plumbing and electrical schemes need to support fermentation, grain milling, canning/packaging, cold storage, clean-up/wash down, tap rooms and event spaces – to name a few.

In the following pages, we'll share the stories behind a few of our recent brewery adventures and dig deeper into the complex mechanical world of beer making.



Darla Bromwich was crowned our 2019 NCAA Championship bracket winner! Darla is the administrative assistant in our Rapid City office and apparently one heck of a hoops genius. Congrats Darla!

Reinhart Elected to WPE Board of Directors

We are pleased to announce the addition of a new member to the West Plains Engineering Board of Directors. Jeff Reinhart, P.E. now joins other board members – Doug Feterl, Marty Christensen and Todd Weidner.



The position is a result of the stock shareholder vote in 2019, made official at the annual meeting on March 12, 2019.

Jeff Reinhart, a long-term manager was elected by the firm's owners as part of a slate of directors. He has been a valuable team member for West Plains for more than 15 years, previously serving as the Cedar Rapids Office Manager. He now focuses on leading the electrical engineering staff in Iowa and expanding our market in complex electrical projects.

The WPE Board of Directors sets policy and company direction by strategic planning, governance oversight of management activities. If you have any questions, please call our Corporate Office at (605) 348-7455.

First Annual WPE Employee Indoor Golf Outing

Our Sioux Falls office beat cabin fever this winter by holding the 1st Annual WPE Employee Indoor Golf Outing. The 18-hole course featured foam golf balls, a "water hazard", and one particularly tricky shot through a cardboard cutout of drafter Neil Schmid.



Mike Fisher celebrating Harlan Osterloo's "Closest to the Hole" award



Asa Brocar (who may not be using a legal putter) and Isaac Anderson tap tap tap it in...



Neal Schmid taking on "Neal"...



PROJECT PROFILE

RENOVATION

Iowa Brewing Company
Cedar Rapids, IA

Team
Aspect, Inc.

PROJECT UPDATE

In 2016, we featured an article in Plains Talk about a new brewery we were helping design in Downtown Cedar Rapids, IA. The then start-up microbrewery had big ideas for full craft beer production, fermentation, grain milling, cold storage, public tasting and product development. Three years later, we're happy to say Iowa Brewing Company has not only delivered on those ideas –they've exceeded all expectation.

The 12,600 square foot brewery has taken root in it's renovated industrial warehouse. Not only does the space produce, distribute and sell craft beer, it also hosts a number of indoor and outdoor events, concerts and social functions. The focus, of course, is always what's in the production barrels, but by designing an inviting taproom and outdoor space, Aspect, Inc. helped IBC make the brewery a true gathering space.

To meet growing demand, they have recently added new fermentation tanks for production, while adding a bottling line for the thriving retail market. They are in the works to add a future canning line for distribution at larger events. With 29 different varieties served throughout the year at their location, craft beer has definitely become a hot commodity.



Mike Hessman, P.E. is a Mechanical Engineer in our Cedar Rapids office. He was the Project Manager and Lead Mechanical Engineer for the Iowa Brewing Company project. mike.hessman@westplainsengineering.com

The fermentation process is still supported with a low pressure 15 psig steam boiler with stainless steel tank jackets and heat exchangers at the hot liquor tank, mash tun lauter tun tank, and the brew house general kettle tank. A low-temperature chiller provides 28 degree glycol/chilled water solution to cool the general fermentation tanks, brite tank and the cold liquor tank. A granular activated carbon (GAC) filtered water system serves the water make-up for the brewing process.

Space conditioning and moisture control is provided by a 30-ton dehumidification rooftop unit, which provides air-conditioning, natural gas heat, economizer exhaust, and dehumidification for the entire space.

A trench drainage system serves the brewery tanks draining, clean-in-place operation, and wash down activities including a keg washer.



SUPPORTING THE SCIENCE OF BEER

Michael Heinrich, P.E.
Senior Mechanical Engineer

At 7,000 years old, beer is the oldest recorded recipe in the world, originally scribed into Papyrus scrolls by the Egyptians in 5000 BC. Before the Egyptians, the Mesopotamians were believed to have partaken in the “effects” of beer all the way back in 10,000 BC.

Since then, brewing beer has matured into a fascinating process. It’s a complex, multi-step journey that takes raw grain through mashing, boiling, fermentation, filtering, packaging, dispensation and ultimately – delicious consumption. The process of brewing has evolved into a very precise science, which as engineers (and beer lovers), we highly respect. It’s our job to make sure the environment surrounding this science is designed to support the entire process – start to finish.

One of the biggest ways we do that is on the mechanical spectrum. The chemical reactions taking place during brewing require constants in both the air and water – which is in part controlled by a well-designed HVAC and plumbing system.

Before brewing ever begins, the equipment used in the process must be sanitized to a degree typically seen in the highly regulated food manufacturing industry. Most brewery equipment is stainless steel, which uses high-pressure steam from a steam boiler for cleaning and sterilization.

Once the equipment is ready for production, brewing can begin. The importance of water can’t be overlooked in this equation. Not only must the water be highly filtered, which is typically handled by the brewing equipment itself, but it must be at a constant flow and temperature. The plumbing systems bringing water into the building must be designed to assure the water entering the equipment for brewing does not change or the quality of the beer will change with it.

Next, chemistry begins. The grain is mashed, boiled and fermented, all of which creates a chemical reaction that ultimately produces beer. But in the meantime, the boiling

process creates a significant amount of steam and the carbon dioxide used in the canning process can create poor indoor air, which must be addressed via the building ventilation system.

During this part of the process, humidity control is also a critical component. If the humidity is too high, it can translate into too much moisture affecting the raw materials, or cause difficulties in the packaging process. Conversely, too low humidity levels can lead to static electricity – which creates potential fire hazards. The ability to set the humidity to an expected relative constant not only makes for safer brewing, but it allows the brew-masters to make better beer.

The importance of the HVAC system continues even after those frothy kegs are ready for consumption. In America, we typically store (and drink) our beer cold, and for breweries, this means a walk-in cooler. The mechanical design team must take into consideration the temperatures in all areas, not just the cooler, and design systems that work efficiently together to maintain them all collectively. These can vary from the 28-degree walk-in cooler to a 45-degree loading dock to a 72-degree taproom.

We should also point out that electrical design plays a big role in breweries as well. To begin with, power designs are often unique because of all of the brewing components involved, each with different power and control requirements. Lighting is also key so that the brew-masters can observe the process and modify the recipe as needed. Additionally, having redundant power systems and battery backup in case of a power outage is critical. After all, losing power in cold storage or during the brewing process has the potential to spoil a whole lot of beer in a very short time. And that, well, that would just be sad.

Download Other Strategic Direction Reports

Visit www.westplainsengineering.com/SDR or follow the QR code below to download other FREE engineer-authored white papers from West Plains Engineering.



Michael Heinrich, P.E. is a senior mechanical engineer and head of the Mechanical Department in our Rapid City office. He has been with West Plains since 2000.
michael.heinrich@westplainsengineering.com



PROJECT PROFILE

RENOVATION

Gruner Brothers Brewing
Casper, WY

Team
GSG Architecture



Andrew Maxwell has been an Electrical Designer in our Casper office since 2008. He is a Casper native, and has been involved in the electrical design for numerous renovations to historic structures in Wyoming – including Gruner Brothers Brewing.
andrew.maxwell@westplainsengineering.com

MAXIMIZING MICRO-BREWS

Beginning in 2017, West Plains Engineering worked with a team of architects and engineers on a complete renovation of the Petroleum Club building and property into a new brew pub in Casper, WY.

While microbreweries are nothing new to the area, Gruner Brothers Brewing is anything but micro. This massive 22,180 square foot building includes brew tanks, a canning facility, walk-in keg cooler, tap room, event space and deck with sweeping views of Casper and the mountains beyond. The brewery itself is capable of producing more than 8,000 barrels a year – on par with many of the veteran breweries in the Rocky Mountain region.

Given the age and original use of the building, the project began with site improvements and a canning room and loading addition. The site now includes a fenced and gated area for grain silos and chillers. The loading addition consists of an enclosed 25' x 86' area for loading ramps and storage, with a dock leveler and an outside deck on top.

In the second phase, the north wing of the building was converted into the brew room and grain handling room, with a new access drive and overhead door. The brewing operation utilizes a steam plant, chiller and compressors, reverse osmosis water treatment system and refrigeration rooms.

Finally, the upper level of the south wing was renovated into a lounge and tap room, with an indoor/outdoor stage and access to the new deck. The lower level of the south wing was converted into a beer storage and packaging area.

The entire facility was provided with updated HVAC and electrical systems, including an expansion of the fire suppression system into the new addition.

Planned future improvements to the building include a fenced beer garden area with outside bar, silo, pergola and game area, and a new access drive on the northwest side.



Partner Spotlight



Gruner Brothers Brewing

Ben and Daron Gruner aren't out to save the world...they're just two brothers who love to make beer.

The Wyoming natives and their family are dedicated to their home state, and the hardworking people who live there. They grew up with tales of the family ranch near Beulah, WY – and how two other brothers (their grandfather and great uncle) built a life there. One of their favorites is the story behind a rusted old 1927 Chevy truck that Ben, Daron and their sister used to clunk around in during the 1980s. It was purchased as a ranch truck brand new (a big deal in the 20s) and hauled everything from grain to turkeys until it was replaced more than a decade later. Today, that same truck has been given a new purpose – hauling beer. The brothers refurbished the 90-year-old beauty, complete with the Gruner Brothers logo, and actively use it today as a delivery truck.



Like many new breweries, making beer began as a hobby for the Gruners – not a career. In fact, Ben and Daron started in business together more than 20 years ago in a very different field when they opened Compression Leasing Services. The company provides compressor and support equipment leasing, servicing and repair for industrial customers throughout the region. It's been the success of this endeavor, however, that's allowed Ben and Daron to pursue their passion for the barrel.

The purchase of the historic Petroleum Club in Casper put the Gruners one step closer to their dream. Originally used as a social club for the wealthy oil elite in Wyoming, the space readily lent itself to the tap room and event space of a brewery – but major modifications had to be made to the site to accommodate storage silos and a canning addition. Throughout the renovation, the architectural and design style stayed true to its historic roots, while the mechanical and electrical systems were updated and altered to support a fully functional, modern production facility.

Gruner Brothers Brewing officially opened in November 2018, and hosts locals and visitors alike with between 14-18 rotating taps. Always on the menu however, are the six Gruner Brother's brews – all of which feature a rich, malty profile as opposed to the more popular IPAs and sours. Why? It's what Ben and Daron like to make...and what they like to drink. Judging by the crowded tap room, bustling canning line and busy delivery trucks – clearly they aren't alone.

233 West Broadway, Bismarck, ND 58501

(701) 751-7322

1750 Rand Road, Rapid City, SD 57702

(605) 348-7455

4609 S. Techlink Circle, Sioux Falls, SD 57106

(605) 362-3753

145 S. Durbin, Suite 205, Casper, WY 82601

(307) 234-9484

215 2nd Avenue SE, Suite 200, Cedar Rapids, IA 52401

(319) 365-0030



PROJECT PROFILE

NEW CONSTRUCTION

Lion Bridge Brewing
Cedar Rapids, IA

Team
Paulson Electric



Jeff Reinhart, P.E. is an Electrical Engineer in our Cedar Rapids office. He has been designing electrical systems in Iowa for more than 25 years, and was recently elected to the WPE Board of Directors. jeff.reinhart@westplainsengineering.com



CHOPPING BLOCK TO BREWPUB

A lot changed in Downtown Cedar Rapids after the 2008 flood. Many businesses were forced to rebuild, some left entirely and much of the historic landscape was in jeopardy of disappearing. But thanks to company's like Lion Bridge Brewing – the area found new life.

Lion Bridge was built in what began as Cedar Rapids' first supermarket more than 80 years ago. The building was purchased after it had been under 11 feet of water, and was on the city's chopping block. But thanks to the Owner's vision and commitment to saving the structure, the Czech Village landmark is now a place where locals find great beer and delicious food – as their tag line states a "catalyst to community and conversation"

West Plains Engineering worked with Paulson Electric on the electrical renovation work – with particular attention paid to the lighting. The Owner was focused on creating a certain type of environment, and the lighting was an important element. True to the style of the building, lighting in the dining and lounge areas consists of historic "school-house" pendant fixtures with track lighting for supplemental illumination. This approach blends well with the exposed original brick of the exterior walls. Additionally, accent lighting was installed in the production space to highlight the "main event" – the brewing equipment.