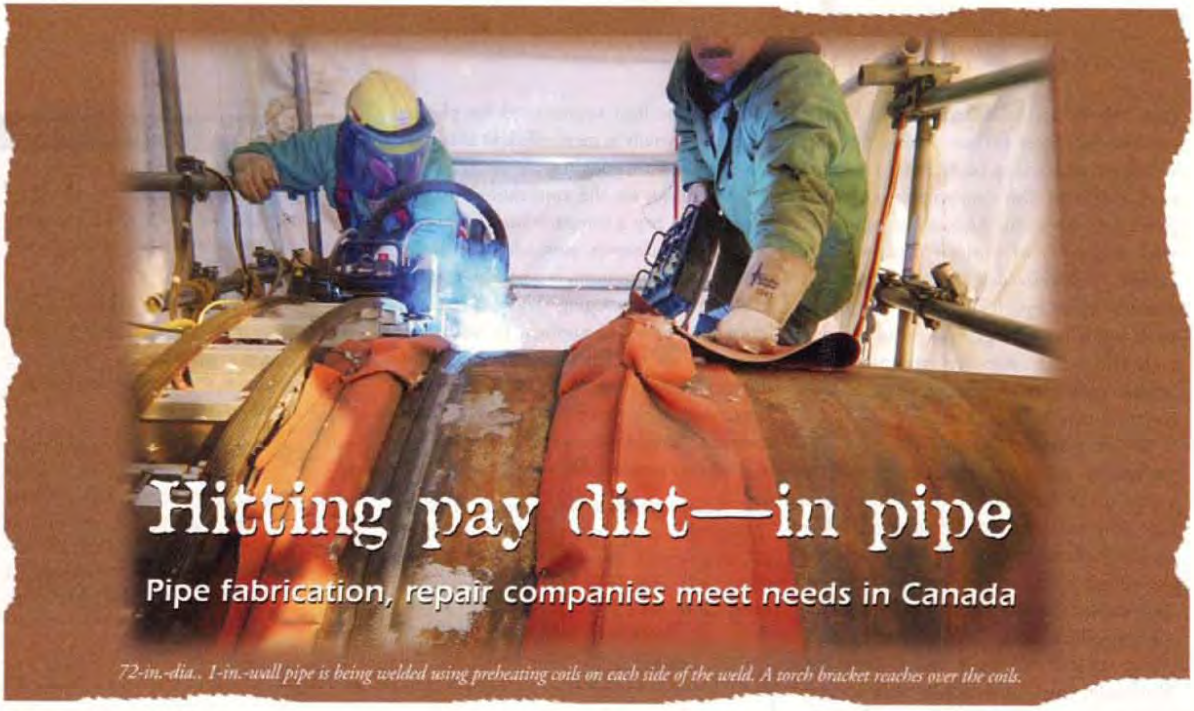

Hitting pay dirt—in pipe

Pipe fabrication, repair companies meet needs in Canada

72-in.-dia., 1-in.-wall pipe is being welded using preheating coils on each side of the weld. A torch bracket reaches over the coils.

By Stephanie Vaughan, Associate Editor

Oil refineries aren't the only ones hitting pay dirt in Canada.

Northern Alberta is the land of opportunity for welders and pipe fitters these days. Increased international oil prices and advances in extraction techniques have created a flurry of activity in recent years as oil refineries have sprouted and continue to expand.

For example, just two years ago integrated energy company Suncor output 220,000 barrels of oil a day. The company plans to increase its capacity to 350,000 barrels a day by 2008 with a $3.6 billion investment in its facilities.

The Canadian Association of Petroleum Producers predicts that 2 million barrels per day of oil from oil, or tar, sands will be mined and refined by 2010.

With three major oil sands containing an estimated 1.7 trillion to 2.5 trillion barrels of bitumen, Alberta is the largest known oil reserve in the world, according to the Oil Sands Discovery Centre, Fort McMurray, Alberta.

According to the Centre's data, at least 18 energy companies are mining Alberta's tar sands.

Tar sands deposits near the surface can be recovered by open pit mining techniques. Essentially, open pit mining uses large hydraulic and electrically powered shovels to dig up tar sands and load them into trucks that can carry up to 320 tons of tar sands per load. Hot water is added to the sand, and the resulting slurry is piped to the extraction plant. The hot water process is used to separate the bitumen from sand, water, and minerals.

In-situ production methods are needed for bitumen deposits buried too deep for mining to be economical. In one method, superheated steam is generated; transported by heavy-wall pipelines; and pumped underground to warm up the very thick, heavy oil deposits, which are thinned out enough to be pumped to the surface.

And where there's pipe, welders and pipe fitters are needed to install and repair it. That's where John Page comes in.

Choosing the Right Equipment

Page, who started working on tar sands projects with Syncrude and Suncor in 1978, knows all about how important pipe is to Canada's oil industry today.

The owner of John W. Page Welding Consulting Ltd., Page has worked from coast to coast in Canada on orbital gas metal arc welding (GMAW), gas tungsten arc welding (GTAW), and flux-cored arc welding (FCAW) pipeline projects. These days his company supplies orbital welding systems; project planning; procedure and program development; end preparation; training; and hands-on technicians for installations and repair work at refineries.

Page works on shutdown and new construction jobs in the tar sands. Typically, he works with larger contractors on the projects. He subcontracts to companies and trains their welders to use the equipment he supplies. Also, because he's used the equipment he supplies for the job, he remains hands-on throughout the contract.

"It's a unique little niche," he said.

Tar sands work is challenging, Page said. Unlike Page's previous pipeline work, tar sands projects involve more alloy materials, confined spaces, and welding uphill on one side and downhill on the other. Welding codes also are stricter in refineries.

While Page enjoys his successes in this line of work, he's also had to appreciate several challenges that have dictated the types of equipment he uses for the tar sands projects. One of the biggest hurdles is the small spaces in which welding needs to take place.

In many cases, welds are impossible to perform by hand, according to Page. One such situation is welding on carbon monoxide boilers in oil refineries.

In addition, many jobs have been large in scale and have required high weld deposit rates on large-diameter, heavy-wall pipe. For example, one job involved two 130-inch-diameter pipes, each with 1-in. wall thickness. In this particular application, expansion bellow welds were made underneath a large, Y-shaped diverter valve. This thick material had to be preheated to 300 degrees F, making manual welding uncomfortable.

From his years of working for Hobart Brothers and Lincoln Electric in Canada—as well as his experience as an automatic welding technician and time with orbital welding—Page has learned about various welding processes and their suitability for different applications. This gave him a jump-start when it came to deciding what process and what equipment would work best with the tar sands conditions and requirements.

"From years of working for equipment manufacturers, I know all the different types of welding processes," he said, noting that he felt that orbital GTAW and FCAW had the best characteristics for welding pipe in the tar sands. "I've worked with this equipment since the 1980s, so I knew the strengths and weaknesses of the equipment."

Because he knew what kind of equipment he wanted, Page started shopping around for suppliers who specialized in automated orbital welding equipment. The first two attempts at working with suppliers didn't work out.

"They didn't meet their delivery schedules and promised equipment that hadn't been built yet. They let me down," he said. On his third try, he contacted Magnatech Limited Partnership, East Granby, Conn.

Page has used a variety of pipe welding systems in his tar sands work, which present unique pipe welding challenges, many of which are space-based.

For example, return bends on boilers and hydrogen reformer tubes and pigtails frequently are limited to tight spaces. To accommodate for this, Page uses a Pipemaster power source and D-head to accommodate tight clearances between pipes and adjacent obstructions in the field.

Over time Page has seen a positive return on his investment in automated orbital welding equipment. For example, he said, mechanized FCAW offers up to six times the productivity of shielded metal arc welding (SMAW), partly from the higher weld metal deposition rate of the FCAW wires. That increase, he said, is multiplied by the greater operating factor of nonstop passes with mechanized travel and continuous wire feed.

"Mechanized welding doesn't replace welders, but makes them more productive with better quality and less fatigue," Page said. "I have seen mechanized welding extend the careers of many, many welders who are no longer young and agile enough to do manual welding, but they have the savvy to recognize what's going on in the arc and recognize a good weld from a bad weld.

Mechanized welding equipment helps welders stay more comfortable while working near the 300-degree-preheated pipe.

"I have been on mechanized pipeline jobs, welding as much as 7 kilometers of 42-in. pipe in a day, with nil repairs and a crew of more grandfathers than a Legion on Saturday afternoon," Page said. "It's about working smart, not hard. We give them the tools to take advantage of their expertise as tradesmen. Putting unskilled operators on the equipment would likely only produce larger volumes of junk in a hurry, discrediting the technology."

John Emmerson, president of Magnatech, explained how this type of productivity can apply to the Pipeliner GMAW/FCAW system.

"The FCAW process equipment is not used very frequently in the U.S. for welding pipes … there is still some deep-seated suspicion in this country based upon problems when the GMAW solid wire process was first introduced," he said. "But if you have sufficient work to justify the cost to use the Pipeliner, it can be a very productive alternative to stick electrode welding. Every pass

A 130-in.-dia., 1-in.-wall pipe is welded using a Magnatech Pipeliner II weld head on a magnetic track.

with stick requires that half the pass be ground away to remove the slag. With self-slagging FCAW wires available on the market today from many suppliers, the welder has to use only a wire brush to knock the slag off after each pass and possibly touch up the starts and stops with a grinder."

Besides some of the biggest technical requirements for welding in the tar sands projects, Page has overcome other obstacles this type of work presents. Often welders are working not only in tight spaces, but also high off the ground in extreme weather. To protect the in-process work from the weather, Hex-Hut™ shelter systems are used. The Calgary, Alberta-based company's portable welding shelters are designed to provide an optimal welding environment for a variety of pipe welding applications.

Labor Needs

Some media reports speculate that labor will be a challenge if oil sands output triples in the next decade as it is expected to.

In a January Reuters report, Canadian Association of Petroleum Producers Vice President Greg Stringham predicted a labor squeeze during several construction projects in 2008. Most projects should proceed, he said, but their schedules will be delayed.

To boost the labor supply, Stringham said Canada is initiating programs to attract workers nationwide.

Page doesn't see labor as an obstacle to the oil sands projects' success. Part of this is because, for example, Edmonton, Alberta's capital, is only a five-hour drive to Fort McMurray, around which the world's largest tar sands lie. Another reason is that oil companies are planning to fly workers in and out of their work zones. Workers come in during the construction seasons to work and either move there or live there temporarily, he said.

Page's attitude also helps the tar sands projects he works on move forward, Emmerson said.

"John has a very good rapport with the boilermakers and company welders who operate the equipment because he emphasizes that this [mechanized welding equipment] is a productivity-enhancing tool. Too often the project managers look at the mechanized equipment as a tool to eliminate some of the welders on the job site, which really isn't true and certainly creates bad blood with the craftspeople," he said.

Page sees a bright future for work in the tar sands of Canada—for welders and pipe fitters, as well as himself. He plans to continue buying more equipment as each larger project he's scheduled to work on requires it.

"I have several additional technicians I'm training and getting a bigger fleet of equipment to handle bigger jobs," Page said. "I see a strong demand for the services my company can supply." ■

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