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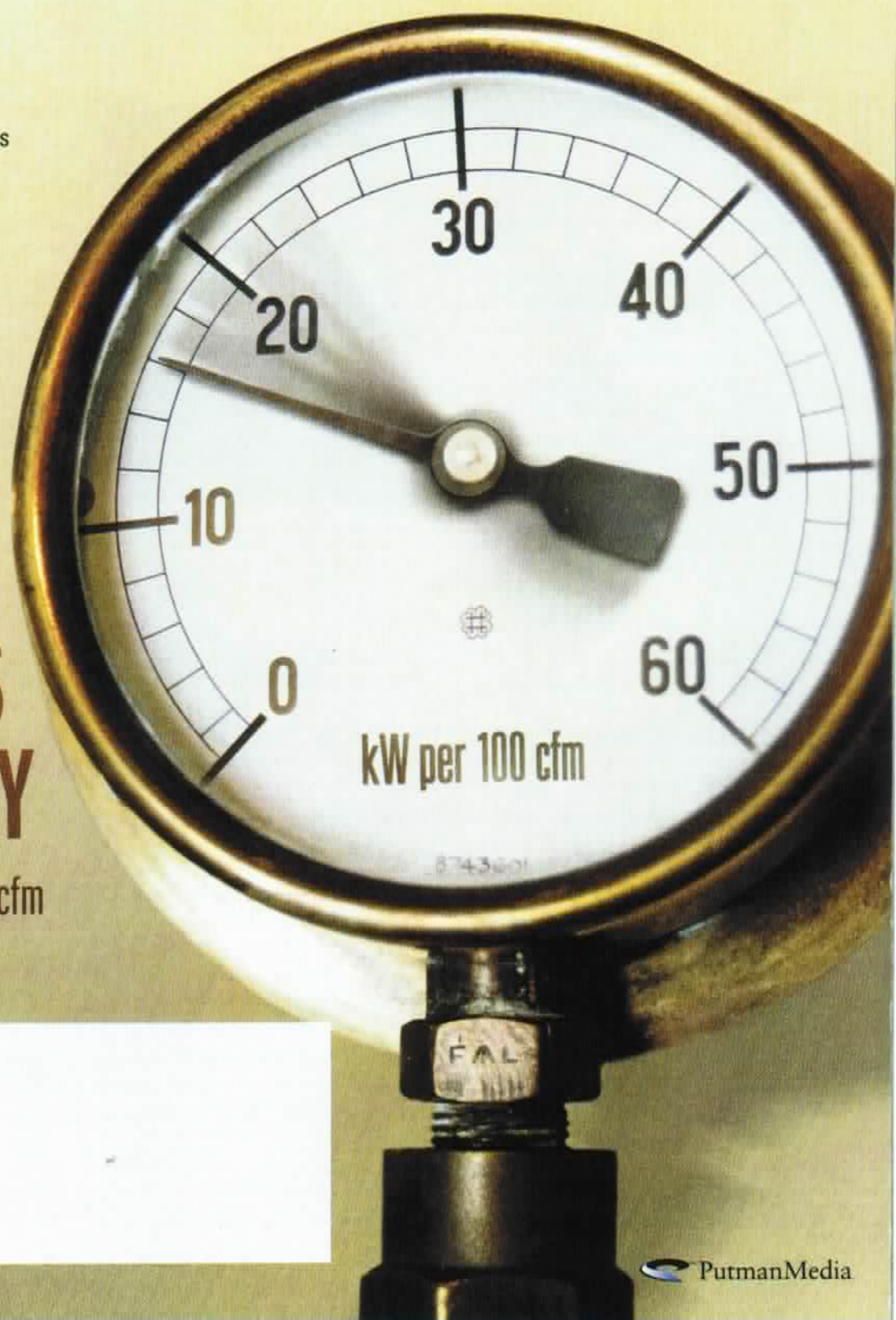
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MAY 2008

 PutmanMedia

Steam valve overhauled on-site

Fast, *in situ* seat repair relied on powerful, portable boring machine

J-S Machine & Valve has been in the valve repair business for more than 25 years. Headquartered in Oklahoma, it has 20 employees and primarily serves the petrochemical and power-generation industries in the Midwest and throughout the state of Oklahoma. Nick Hughes, vice president of the company, has responsibility for the field service jobs.

J-S Machine was recently called upon to repair a main steam pressure isolation valve located at a coal-fired power plant in Oklahoma. The plant has two boilers and two turbines, and each boiler has two isolation valves. These valves feature a carbon-steel base with a stainless steel overlay and see 2,500 psi at about 1,100°F. One valve leaked whenever the unit was cold.

Closer inspection revealed that the valve had a high-pressure steam leak caused by seal surfaces that were significantly out of round. The other three valves also were in need of immediate repair to forestall aggressive erosion that could corrode the base metal. A repair would require that the valve seals be re-machined and roundness tolerance kept within 0.003 in. to preserve the seal's integrity. Not only was the size and depth of the repair unusual – requiring a 14 3/8-in. bore at a 4-in. depth – it also meant that the machinist would be making a blind bore. In addition, the valves were located in hard-to-access areas.

Hughes rented the BB5000 Boring Machine manufactured by Climax Portable Machine Tools, Inc. (www.cpmpt.com). The BB5000 120-V motor option J-S Machining selected provides



The Climax BB5000 Boring Machine is precise and powerful enough to easily remove 100,000-psi tensile strength material so the isolation valve could be re-machined to factory specifications.

128 ft. lb. of torque in a compact and powerful machine. From past experience with the tool, Hughes found he could use the boring bar not only for valve repair, but also to do facing, grooving and threading. The tools' versatility has allowed him to re-imagine how repairs could be done in the field.

The equipment was set up to bore straight down into the blind hole. Hughes developed a sturdy steel base plate for the boring bar by putting the ID mount bearing under the area to be machined to stabilize the bar. The whole assembly was set on top of the valve and was bolted to its stud holes, precisely located by sweeping the assembly into location with a dial indicator.

"The machine easily made a 0.050-in. deep cut in the 100,000-psi tensile strength material to reveal clean base

metal, which then was built up by welding so the valve could be re-machined to less than 0.003-in. out-of-roundness.

Portability was a critical factor in choosing the BB5000. For this job, the valves' internal assemblies were removed and carried to the plant floor for re-machining while the valve bodies remained in-line, and as one valve was being welded, another could be machined.

"Ninety percent of the time, when we make repairs, we're crawling over and through and around catwalks and over pipes," says Hughes. "With some tools you might have to bring them up piece by piece by crane or elevator, but the Climax tool is so portable, there's not one single piece on there that I can't get up and down the stairs, and it's easy to assemble and learn how to operate."

Typically, such valve repairs only require boring to a 1- or 1 1/2-in. depth and can be done in 12 hours. Because these were 14 3/8-in. valves with a 4-in. bore depth, the boring took about 36 hours for machining and welding. On-site repair saved 50% to 75% over the cost of replacing the valve or, alternatively, removing it and shipping it to and from a machine shop, and reinstalling.

After renting the BB5000 for several years and learning its capabilities, Hughes finally decided to buy. He said, "The cost savings for me is in owning the equipment because, although Climax can easily overnight the tool, we never know what kind of repair a valve will need until we open it up. We felt we could respond to our customers faster if we had the boring bar on hand." ☐