

## High-Tech Hammer

BBJ TOOLS TRANSFORMS THE TRADITIONAL FLUID HAMMER INTO A REVOLUTIONARY DRILLING TOOL

By Mike Byfield

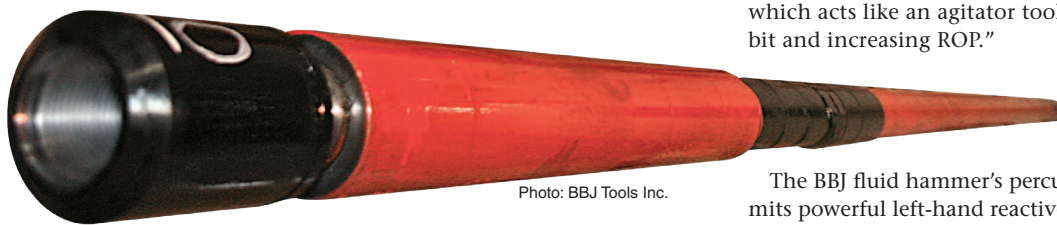


Photo: BBJ Tools Inc.

**IN THE SPRING** of 2010, Suncor Energy Inc. drilled a Foothills horizontal wellbore to 6,500 metres using a fluid hammer from top to bottom. That feat had never been achieved previously with this type of tool. “ROP [rate of penetration] was improved by 30–50 per cent,” explains Brad Cote, president of Calgary-based BBJ Tools Inc. “Our fluid hammer represents a revolutionary improvement in terms of maintaining drill bit integrity, steering ability, operating flexibility and other critical performance factors.”

BBJ carries fluid hammers for all standard hole applications. Its patent-pending proprietary hammer maintains the drill bit in constant contact with the rock face, creating axial percussion force directly above the bit and exerting tremendous percussive force at hundreds of cycles per minute. BBJ’s fluid hammer incorporates a positive displacement motor and adjustable housing, which enables the driller to steer the drill bit, unlike conventional fluid hammers, which cannot be steered.

The recent Foothills well was drilled with tri-cone insert rock bits. Today, however, most wells are drilled with polycrystalline diamond compact (PDC) bits. “The synthetic diamond cutters are much more delicate than roller cones, so we had to undertake focused research and development to tailor the fluid hammer to PDC applications,” Cote says. The fluid hammer has been proven viable for a number of PDC applications. BBJ credits Tourmaline Oil Corp. as a tremendously helpful customer for its PDC development.

The percussion force is developed in the lower housing directly above the bit box. When weight is applied to the bit, the fluid hammer engages while keeping the bit in compression, delivering axial movement to the outer housing. “This design provides efficient weight-to-bit transfer for centre percussion force,” Cote says. “This design allows for diversified percussion control as rock formation compressibility variations are encountered. For example, when the driller needs more force, he

simply puts more weight on the bit. If all weight is removed from the bit, the hammer cycle stops, which is unique to BBJ’s fluid hammer design.”

The BBJ fluid hammer is integrated with major components of the mud motor. “Not only can our tool compete in every application where a mud motor is used, it outperforms them,” Cote says. “Mud flow and type are not restricted or diverted. Our technology eliminates flow issues for LCMs [lost circulation materials, like sawdust], high solids content and torque beads. In addition, there are no interruptions to the MWD [measurement while drilling] signal. With the cycling of the hammer, it develops movement to the outer housing which acts like an agitator tool, eliminating drag to the bit and increasing ROP.”

The BBJ fluid hammer’s percussion mechanism transmits powerful left-hand reactive torque to the housing. “Reactive torque was our most difficult engineering hurdle,” Cote comments. “We came up with an anti-backoff connection that in itself is a breakthrough. This concept has other possibilities that we’ll work with in the future with respect to mud motors.”

### FROM HOCKEY ENFORCER TO TECHNOLOGY DEVELOPER

Brad Cote spent much of his boyhood in North Battleford, Sask., on the ice. While still in high school, he competed at a major-junior level in the Western Hockey League, playing for the Portland Winterhawks and later the Moose Jaw Warriors. However, “to save my hands,” the hard-hitting left-winger quit hockey and entered the oilpatch.

“I’ve always wanted to know how things worked,” recalls the president of BBJ Tools Inc. The mechanically inclined youth was soon roughnecking for a major drilling contractor. “From the moment I first set foot on a rig, I developed a passion for the industry and technology,” Cote recalls.

Eventually, he became toolpush of one of Canada’s deepest-rated rigs and a senior troubleshooter. “The inspiration for BBJ Tools’ technology originated from a desire to improve project efficiencies in the oilsands and Foothills,” the company co-founder comments.

BBJ was launched in 2004, making its first mark with the slotted-liner assist tool and cuttings bed removal tool. Combined, these two devices broke new ground for drilling modern extended-reach and steam assisted gravity drainage wells. The fluid hammer followed, outclassing any competitive device from a major company. “Luis Guzman [a co-owner of BBJ] and I produced this tool in less than two years,” Cote says. “I’m still amazed at what our small team has been able to achieve in a short time.” ■



#### controlled impact

*Traditional fluid hammers exert continuous percussive force whether the rig is drilling ahead or not, an action that cannot be controlled from surface. The BBJ hammer is operator-controlled through the weight placed on the drill bit — less WOB and the mechanism stops.*