

Testing Verifies BroadShear Rams' Shearing Ability of Hardbanded Tool Joints and Off-Center Tubulars

Single set of rams completes seven shear tests of various drillstring components

CHALLENGE

Prove shearing ability of BroadShear* off-center tool joint shear rams through extensive shear testing.

SOLUTION

Use BroadShear rams on various drillstring components, including tool joint hardbanding and off-center tubulars.

RESULTS

Successfully sheared all drillstring heavyweight and tubular components in test using a single set of BroadShear rams.



In a series of rigorous tests, BroadShear rams demonstrated their ability to shear casing diameters up to 16 in, tool joint hardbanding, and off-center tubulars, which have long been considered unshearable using conventional technology.

Reliably shear drillstring components for enhanced offshore safety

The ability to shear the drillstring inside the BOP has long been a qualification and or regulatory requirement. In a well control kick situation, the subsea controls may be triggered to initiate a defined sequence of functions, including shearing. Operators must have confidence that the shear rams inside the BOP will shear the string and allow the rig to disconnect and move off site.

Further, industry regulations are becoming more stringent. The Bureau of Safety and Environmental Enforcement (BSEE) added new provisions to its 30 CFR 250 regulation in 2016, including that each shear ram must ensure shearing upon activation and that the subsea BOP system must mitigate compression of the pipe stub between the shearing rams when both shear rams are closed.

Perform stringent testing to verify rams' shearing ability

Cameron developed the BroadShear off-center tool joint shear rams to shear any drillstring component above the BHA, including tool joint hardbanding and off-center tubulars—components previously considered unshearable. To verify the rams' shearing capability, Cameron devised an extensive shearing test at one of its test facilities in Houston. BSEE representatives were also in attendance.

CASE STUDY: Testing verifies BroadShear rams' shearing ability of hardbanded tool joints and off-center tubulars

Cameron included seven separate drillstring components in the test:

- 6 $\frac{5}{8}$ -in FH, 8 $\frac{1}{2}$ -in-OD, 4 $\frac{1}{4}$ -in-ID S-135 tool joint
- 6 $\frac{5}{8}$ -in FH, 8 $\frac{1}{2}$ -in-OD, 4 $\frac{1}{4}$ -in-ID S-135 tool joint hard banding
- 16-in, 109-lbm/ft VM 125 HC casing
- 12 $\frac{1}{4}$ -in-OD, 1 $\frac{1}{8}$ -in-wall Q-125 casing
- 12 $\frac{1}{4}$ -in-OD, 1 $\frac{1}{8}$ -in-wall C-110 casing
- 6 $\frac{5}{8}$ -in FH, 50-lbm/ft S-135 off-center drillpipe
- 6 $\frac{5}{8}$ -in FH, 8 $\frac{1}{2}$ -in-OD, 4 $\frac{1}{4}$ -in-ID S-135 off-center tool joint.

These tests represent some of the toughest performed in the industry to date.

Successfully sheared each component with a single ram set

One set of BroadShear rams successfully sheared the seven drillstring components, demonstrating their ability to shear any drillstring component above the BHA. The rams are currently the only technology in the industry that can shear tool joint hardbanding and off-center tubulars.



The BroadShear rams are the industry's only technology that can successfully shear tool joint hard banding (above) and drillpipe forced to the side of the BOP (below).

