SineWave® Microimager

Provides high-resolution 360° borehole images of fine formation details in recorded and real-time formats

Applications

- Identifying natural and drilling-induced fractures
- Interpreting fracture orientation to determine tectonic stress
- Determining fault location and orientation
- Evaluating thin-bed formations
- Acquiring structural-dip, wellbore-stability, and geomechanical information
- Characterizing facies and stratigraphic dip
- Evaluating secondary porosity

Features and Benefits

- Image resolution is equivalent to that produced by wireline microresistivity imagers.
- Image quality is largely unaffected by stick/slip BHA motion.
- The microimager produces 16-, 32-, or 64-bin real-time images, as well as 128-bin recorded azimuthal images, with 360°, full-wellbore coverage.
- Rapid-acquisition electronics acquire high-resolution images at a rate of up to one image per second.
- The 0.20-in. and 0.50-in. diameter-focused measurement electrodes provide high-resolution images in a wide range of formation-resistivity values and borehole conditions.
- Replaceable stabilizers minimize standoff and optimize image quality for various bit sizes.
- Full 360° borehole coverage and real-time images enable proactive geosteering and early formation evaluation.

Tool Description

The Weatherford LWD SineWave microimager provides high-resolution borehole images while drilling. High-quality SineWave images—comparable to those acquired by wireline microresistivity sensors—reveal natural and induced fractures, faults, vugs, and fine-scale bedding features to provide detailed structural and stratigraphic information. By capturing comprehensive formation data, the SineWave microimager enhances reservoir understanding and helps operators maximize production. Combined with the HEL™ MWD system, the SineWave microimager can provide real-time borehole images in 16-, 32-, or 64-bins allowing proactive geosteering and formation evaluation.

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Specifications

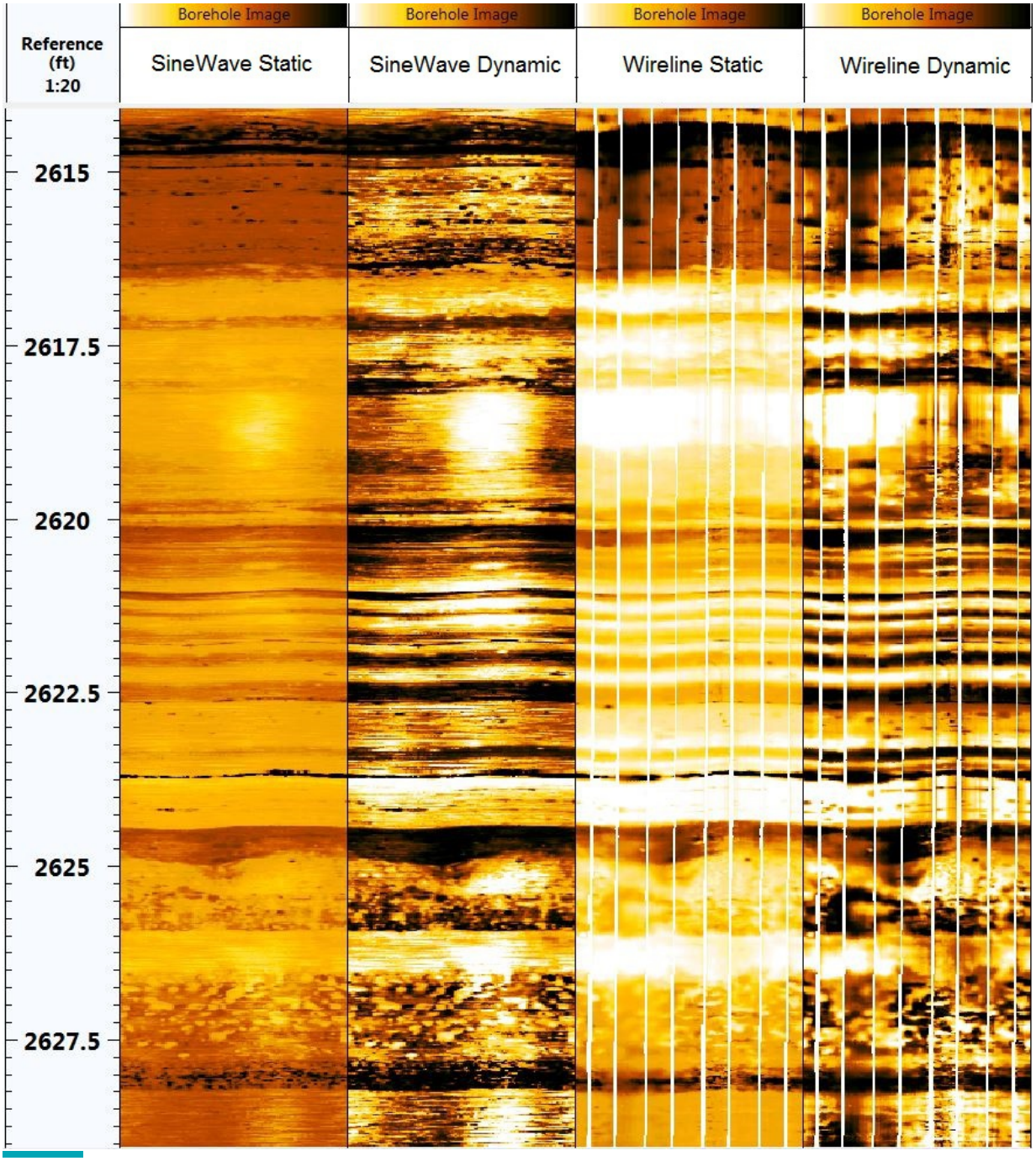
Sensor

Size	4-3/4 in.	6-3/4 in.
Sensor type	Electrical	
Measurement point from bottom of tool	4.75 ft (1.45 m)	
Vertical resolution	0.20 in. (0.50 cm)	0.50 in. (1.27 cm)

Mechanical

Size	4-3/4 in.	6-3/4 in.
Hole size range	6 to 6-3/4 in.	8-1/2 to 8-3/4 in.
Maximum collar OD	5.37 in. (136.40 mm)	7.40 in. (187.96 mm)
Length	14 ft (4.27 m)	
Weight	906 lb (411 kg)	1,400 lb (635 kg)
Top connection	3-1/2 IF box × pin	4-1/2 IF box × pin
Bottom connection	3-1/2 IF box × pin	4-1/2 IF box × pin
Make-up torque	9,900 to 10,900 ft-lb (13,424 to 14,780 N•m)	28,000 to 32,000 ft-lb (37,968 to 43,392 N•m)
Maximum torque	16,700 ft-lb (22,645 N•m)	44,700 ft-lb (60,605 N•m)
Maximum tension	528,000 lbf (2,348,661 N)	978,000 lbf (4,350,361 N)
Bending strength ratio	2.10	2.53
Maximum dogleg severity, rotating, per 100 ft (30 m)	15°	8°
Maximum dogleg severity, sliding, per 100 ft (30 m)	30°	16°
Equivalent bending stiffness OD × ID	4.75 × 2.29 in.	6.75 x 4.39 in.
Maximum operating temperature	Standard: 302°F (150°C) Optional: 329°F (165°C)	
Maximum operating pressure	Standard: 20,000 psi (138 MPa) Optional: 30,000 psi (207 MPa)	
Maximum flow rate	350 gal/min (1,325 L/min)	700 gal/min (2,650 L/min)
Maximum sand content	2%	

Log Presentation



The side-by-side comparison above shows high-resolution borehole images of the same well recorded by the SineWave microimager (left two columns) and a wireline microimager (right two columns). Note that the quality of the SineWave log is comparable and in some areas higher than the wireline log.

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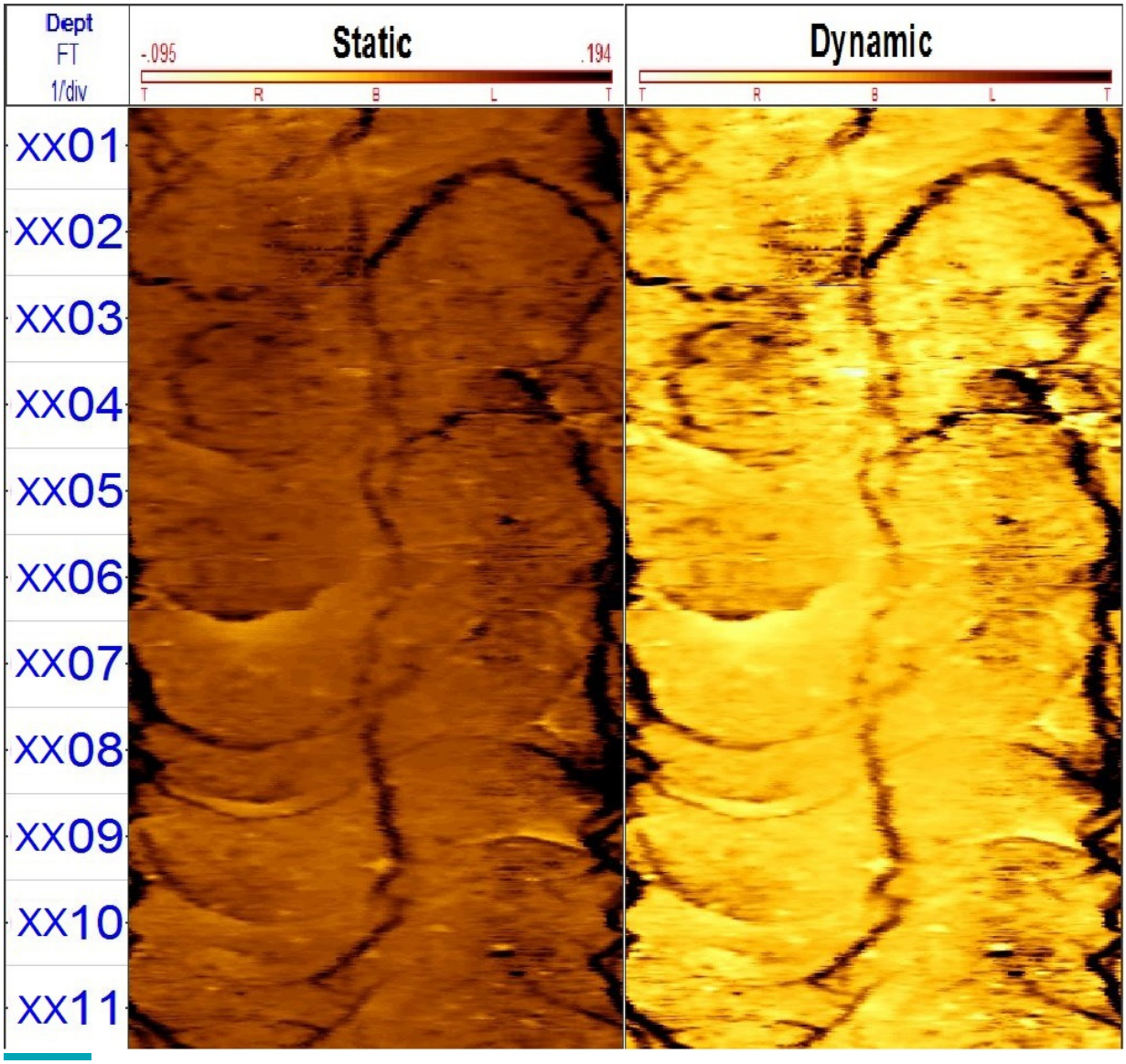
Log Presentation (continued)



The static and dynamic images produced by the SineWave microimager identify natural fractures.