

# Wintershall Norway Perforates Interval Using Wireless Selective Electronic Firing Head

Acoustic firing commands eliminate need for pressure pulse activation

## CHALLENGE

Achieve real-time, accurate drillstem test (DST) data using wireless telemetry to monitor the well and activate the perforating guns.

## SOLUTION

Run Symphony\* live downhole reservoir testing Connect wireless selective electronic firing head and Measure wireless quartz gauges—both united by Muzic\* wireless telemetry—to obtain continuous transmission of downhole pressure, efficiently activate perforating guns, and monitor DST data.

## RESULTS

- Activated the firing head quickly and reliably using acoustic firing commands.
- Optimized perforations under optimal underbalance conditions.
- Confirmed perforating gun activation through downhole real-time pressure monitoring.
- Completed the industry's first post-perforating activation through application of wireless telemetry.
- Verified successful use of wireless telemetry for multiple perforating operations.

## Obtain real-time downhole pressure data during perforating operation

Wintershall Norway sought to achieve real-time downhole data transmission during perforating and DST operations. The complexity of well test operations requires real-time access to accurate bottomhole pressure data to monitor well performance, enable informed decision making, and optimize test duration. Real-time bottomhole pressure information is also valuable to help optimize pressure underbalance before perforating the well.

## Design integrated solution featuring Symphony testing Connect firing head united by Muzic telemetry

Schlumberger recommended Wintershall Norway run the Symphony testing Connect firing head united by Muzic wireless telemetry to significantly increase the reliability and safety of perforating operations. The firing head allows the operator to trigger the perforating guns using acoustic signals compared with conventional technology that requires pressure pulse commands. It does this by combining sensors, battery power, microprocessors, and control switches—replacing rupture discs, shear pins, and other mechanical activation devices, which require high overpressure or mechanical movement of the toolstring. Furthermore, the Symphony testing Connect firing head enables the operator to achieve optimal underbalance conditions prior to firing the perforating guns.

## Completed the perforating operation using wireless telemetry

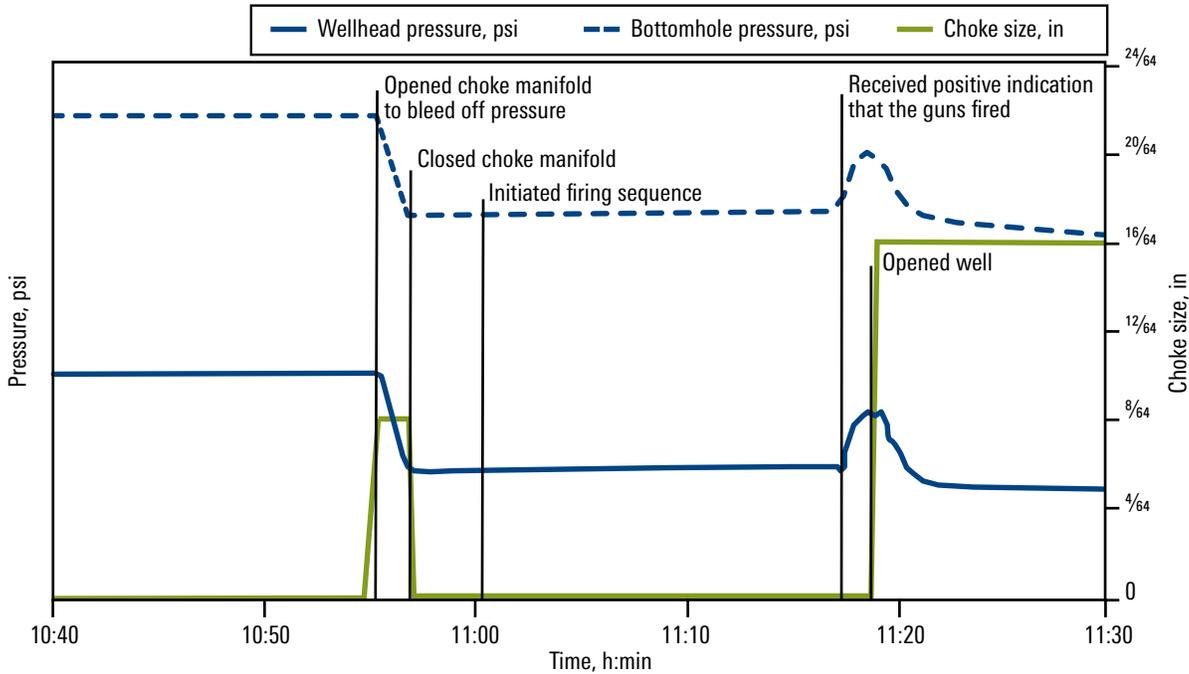
Acoustic activation of the Symphony testing Connect firing head enabled the well to be perforated quickly and efficiently, eliminating use of pressure pulse activation commands. Bottomhole pressure data delivered in real time by the Symphony testing Measure gauges enabled critical optimization of underbalance prior to perforating the zone.

After flowing the well at the end of the buildup, a second wireless firing head, located at the bottom of the same toolstring, was activated to test postperforating shock functionality and acoustic communication across the perforating gun string. Feedback and tool status received wirelessly from the Symphony testing Connect firing head confirmed gun activation, and monitoring of bottomhole pressure confirmed successful perforation minutes later.



Schlumberger engineer preparing the wireless-enabled DST toolstring to run in hole.

## CASE STUDY: Wireless selective electronic firing head eliminates need for pressure pulse activation



Real-time pressure history data optimizing precise initiation of firing sequence and validating perforation operation.

Real-time bidirectional communication enabled better informed decision making and validation of objectives before ending the well test. The Symphony testing Connect firing head united by Muzic telemetry successfully activated the perforating guns through wireless commands. This eliminated the use of pressure pulse initiation, achieving Wintershall Norway's well test and perforating objectives.

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