

# MZ-Xpress System Saves 6.5 Days of Rig Time by Minimizing Completion Trips Offshore Indonesia

Single-trip, multizone completion system expedites integrated gravel packing operations using ClearFRAC fluids in a challenging subsea reservoir

## CHALLENGE

- Minimize rig time to complete a deviated subsea gravel- and frac-pack through two casing sizes in a reservoir with multiple weak, unconsolidated sand layers, including long intervals and short zone spacing.
- Pump high-quality, nondamaging gravel packs in a remote area with limited rig space.

## SOLUTION

- Reduce trips by designing the well with an MZ-Xpress\* single-trip multizone frac- and gravel-pack system.
- Limit equipment and material footprint on the semisubmersible rig by tailoring a FlexSTIM\* modular offshore stimulation system.
- Transport gravel and improve performance by using ClearFRAC\* polymer-free fracturing fluids.
- Enable real-time flow control of multiple zones by installing formation isolation valves in the upper completion.

## RESULTS

- Saved 6.5 days of rig time compared with conventional stacked completion.
- Successfully pumped gravel packs in three zones and frac packs in two zones, including dynamic redesign of the pumping schedule to accommodate unexpected downhole conditions.



## Complete a deviated well through multiple sand layers

The Jangkrik field is in the Makassar Strait 100 km [62 mi] east of Balikpapan, Kalimantan, and features multiple unconsolidated and laminated gas sand layers stretching too long for a uniform, efficient gravel pack or frac pack to keep sand and fines out of the well. Instead, the reservoir is stimulated in intervals, which must be isolated for gravel or frac packing. Adding to the challenge, no dedicated stimulation vessels are available to pump stimulation operations. Finally, the long, layered completions also challenge production inflow performance: Conventional inflow control device technology can distribute the flow across a long lateral, but it cannot change with downhole conditions to maintain that balance over the life of the well.

The conventional practice to complete wells in these laminated sands is to run a stacked completion, which requires multiple time-consuming trips for perforating, cleanout, and sand control operations. The operator chose the stacked completion technique for 7 of 10 wells in its Jangkrik deepwater campaign. Simple, effective process improvements throughout the project reduced the stacked completion time. For wells with three or more zones, however, the time and cost efficiency could further be increased by completing all zones in a single trip.

In particular, one well in the project included a challenging 60° deviation through five producing layers in two casing sizes, with long intervals (more than 35 m [115 ft]), and short spacing between zones (as little as 25 m [82 ft]). To save time and reduce rig costs, the operator asked Schlumberger for an integrated solution that could expedite the completion without compromising sand control or well productivity.



MZ-Xpress system was part of an integrated sand control strategy to save time on multizone completions.

**Improve efficiency by integrating completion tools and services**

To complete the well, Schlumberger recommended the MZ-Xpress system, which speeds up multizone sand control completions with single-trip operations. After the zones of interest are perforated and the well is cleaned, the MZ-Xpress system hardware is run into the well in a single trip, permitting rapid gravel or frac packing. The intermediate completion string with annular and tubing formation isolation valves is then installed to selectively isolate intervals, followed by the intelligent upper completion, which enabled real-time flow control of multiple zones to optimize production over the well life.

To minimize operation time, it was critical to integrate the full completion and gravel packing operations and ensure equipment and materials logistics. For the full campaign, Schlumberger tailored a FlexSTIM system, placing modular equipment on a standard supply vessel to reduce the footprint on the semisubmersible rig.

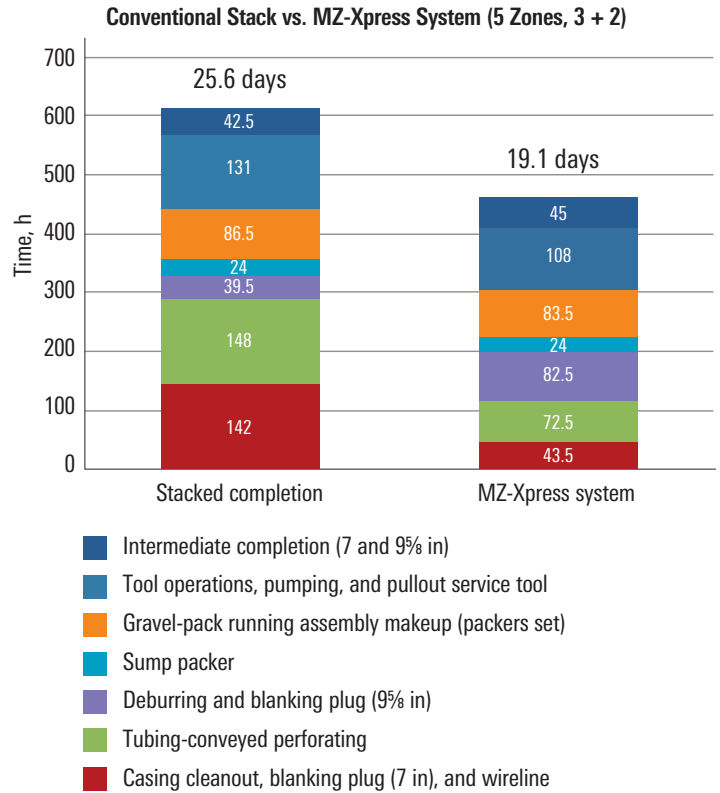
Engineers designed the gravel- and frac-pack treatments to be performed using ClearFRAC fluids to minimize formation damage and avoid fracture growth into water zones—critical to achieve the operator’s production goals—while still being able to carry the ceramic proppant to efficiently pack the screens. The fluid viscosity properties also helped ensure smooth completion tool operation.

**Save rig time without compromising completion quality**

To cover the full lower completion length of 1,143 m [3,750 ft], Schlumberger deployed 7- and 9½-in [178- and 244-mm] MZ-Xpress system completions in sequence. The robust completion architecture combined with fluid design to reduce the risks of tool sticking.

In fact, unexpected formation weakness led to an early and hard screenout of the first gravel pack (in the 7-in section). A restress was performed, and all MZ-Xpress system valves were cycled and tested to verify their functionality. Before the next pumping operation, Schlumberger engineers redesigned the fluid loading, proppant concentration, and pump rates to suit the unexpected downhole conditions while ensuring operation of the completion tools and surface equipment. All subsequent stages were pumped as designed.

The well was completed, from casing cleanout to final service tool recovery, in 23.7 days—6.5 days less than an optimal stacked completion. The time savings came primarily from eliminating repeated trips to run tools and perforating guns and clean the well after perforating. Additionally, the system saved time despite the extra deburring runs required after each casing perforating operation and the need to deploy separate MZ-Xpress systems for each casing size.



*Integrating the completion and stimulation operations with the MZ-Xpress system saved 6.5 days of rig time, mostly by eliminating repeated trips into the well.*