

# Expandable steel patches restored casing integrity for sidetracking after cement squeezes proved ineffective

**When cement squeezes could not restore pressure integrity in a deviated well, custom-engineered Saltel expandable steel patches mechanically sealed and structurally protected the severely damaged casing. As a result, the operator was able to proceed with a sidetrack and access additional reserves.**

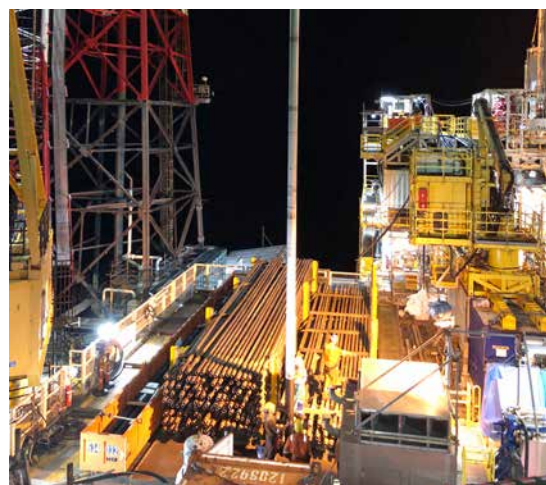
### Compromised well integrity prevented sidetracking

OMV New Zealand was preparing to drill an 8½-in sidetrack from an old well in a mature field where new drilling is restricted, but a pressure test indicated a leak in the 10¾-in casing. Subsequent tests and a multifinger caliper run revealed severe damage, including holes in the casing. Because of the high dogleg severity (DLS), the damage was attributed to drillstring rotation against the casing when the well was drilled. Casing wear is a significant risk in deviated wells, and fluid or mechanical drillstring torque and friction reducers do not always succeed in protecting the casing while drillpipe is run in and rotated. Two remedial squeeze operations pumped 95 bbl or 63,042 lbm [28,595 kg] of cement slurry, but the cementing operations, drillouts, and pressure tests seemed to worsen the leak.

### Optimally selected and configured steel patches provided an efficient solution

The operator asked SLB to perform a mechanical repair using internal casing patches made with Saltel Xpandable™ expandable steel technology. The patches enable casing remediation and mold to irregular geometries after expansion with an inflatable packer downhole; once anchored, they can withstand the lateral forces and wear anticipated when drilling ahead.

An initial design with four overlapping patches was prepared. However, it required revisions after a second multifinger caliper log to evaluate casing condition showed that the damage had significantly worsened and included fully penetrating longitudinal wear across 26 ft [8 m]. The steel patch design



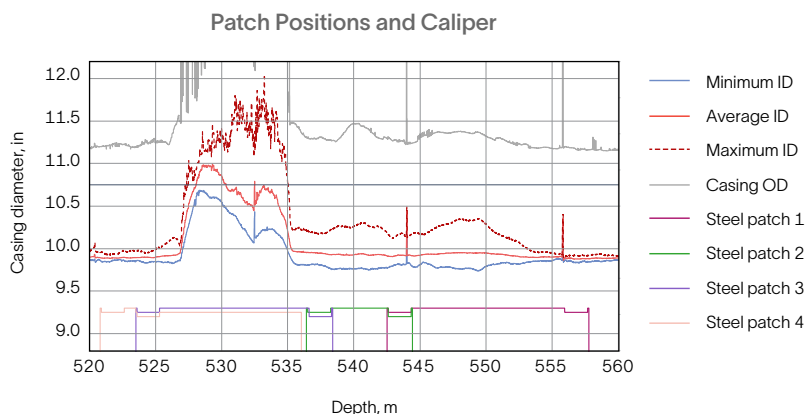
A steel patch is being lifted preparatory to installation.

was reconfigured in close collaboration with OMV, and the casing patches were custom engineered to cover the damage, taking into account the limits imposed by the height of the derrick.

Extra anchoring strips were added to the exterior of the patches to mitigate slippage risks due to axial loads. All the patches would have some overlap, and patches 3 and 4 would overlap across the entire length of the casing breach to provide the extra reinforcement deemed necessary. The overlaps necessitated inflatable packers with two different ODs—8½ in and 6¾ in—to expand the patches. Because of the slight reduction in casing ID, the whipstock was placed in position below the Saltel casing patches before installing them. A minimum 8.6-in [218-mm] drift ID was maintained to enable the 8½-in drill bit to pass through.

### OMV's Drilling Engineering team succeeded in accessing additional reserves for production

With expedited patch assembly, deployment, and installation, casing integrity was fully restored in 10 days, as confirmed by pressure testing to 650 psi [4,480 kPa]. OMV was able to proceed with the sidetrack and enhance production from the existing well slot inventory. The job proved the viability of using overlapping internal casing patches to remediate well integrity issues and enable well reentry.



The expandable patches were installed with significant overlap, especially across the casing breach, to provide the necessary casing reinforcement.