ABSTRAK

Premature failure pada rod pump menjadi permasalahan utama di Sumur "DURI A13-8" akibat kondisi formasi *unconsolidated sandstone* yang menyebabkan produksi pasir (sand production) berlebih dan merusak komponen pompa. Dampak yang ditimbulkan meliputi downtime produksi sebesar 390 barel serta peningkatan biaya operasional hingga 9.516 US$. Upaya *clean out* pasir dan pemasangan rod pump baru belum efektif karena kegagalan kembali terjadi dalam waktu kurang dari 30 hari.

Solusi yang diterapkan adalah desain ulang sistem rod pump dengan penambahan *tail screen* sebagai penyaring pasir. Sampel pasir hasil *clean out* dianalisis menggunakan sieve shaker sebanyak 200 gram. Hasil sieve analysis menunjukkan D50 sebesar 0,42 mm dengan distribusi ukuran pasir 250–420 mikron. Berdasarkan metode Gillespie, dipilih slot screen 150 mikron yang berada pada rentang D40–D70 untuk menjamin terbentuknya bridging effect tanpa menurunkan laju alir fluida. Desain ini dilengkapi safety joint berkapasitas 60.000 lbf (12 shear pin) yang memungkinkan pemisahan tubing saat terjadi pump stuck tanpa memerlukan rig workover.

Sebelum pemasangan tail screen, sumur DURI A13-8 mengalami empat kali kegagalan pompa dalam setahun dengan downtime mencapai 60 hari dan kerugian operasional signifikan. Setelah desain tail screen diterapkan—dengan slot 150 mikron, open flow area optimal, dan penempatan tepat di zona perforasi downtime berhasil ditekan menjadi hanya 0,5 hari, dan produksi stabil di 24 BOPD. Evaluasi keekonomian mencatat penghematan biaya hingga US$ 22.620 per kejadian, dibandingkan potensi kerugian US$ 40.468 tanpa safety joint. Inovasi ini terbukti efektif secara teknis dan ekonomis dalam menangani kepasiran dan memperpanjang usia rod pump.

Kata kunci: rod pump, sand production, tail screen, sieve analysis, safety joint.

ABSTRACT

Premature failure of the rod pump is a major issue in Well "DURI A13-8" due to the unconsolidated sandstone formation, which causes excessive sand production and damages pump components. The impact includes a production downtime of 390 barrels and an increase in operational costs reaching IDR 172,011,816. Conventional mitigation such as sand clean-out and rod pump replacement has proven ineffective, as failures repeatedly occurred within 30 days after well servicing.

This study proposes a technical solution by redesigning the rod pump system with the addition of a tail screen to filter formation sand. A 200-gram sand sample obtained from clean-out was analyzed using a sieve shaker. The sieve analysis showed a dominant particle size distribution in the 250–420 micron range, with a D50 of 0.42 mm. Using the Gillespie method, a 150-micron slot screen was selected within the D40–D70 range to ensure optimal bridging effect without reducing fluid flow. The design also incorporated a 60,000 lbf safety joint (12 shear pins) to enable tubing separation during pump stuck conditions without requiring a rig-based workover.

Before the installation of the tail screen, Well DURI A13-8 experienced four pump failures within a year, resulting in a total downtime of 60 days and significant operational losses. After implementing the tail screen design—with 150-micron slot size, optimized open flow area, and precise placement at the perforated zone—downtime was reduced to just 0.5 days, while production remained stable at 24 BOPD. Economic evaluation showed a cost saving of up to US$ 22,620 per event, compared to a potential loss of US$ 40,468 without the safety joint. This innovation has proven to be technically and economically effective in addressing sand production and extending the operational life of the rod pump.

Keywords: rod pump, sand production, tail screen, sieve analysis, safety joint