

## INTISARI

Pada bulan September 2018, terjadi gempa bumi yang diikuti likuefaksi di Provinsi Sulawesi Tengah, Indonesia. Likuefaksi di Sulawesi Tengah berpotensi terulang kembali sehingga identifikasi potensi likuefaksi di wilayah yang pernah terjadi menjadi penting. Sandboils disebabkan oleh *excess pore water pressure* (PWP) yang menyebabkan keluarnya sedimen akibat tekanan air di dalam tanah.

Pada saat bencana tahun 2018, lokasi penelitian di Mpanau, Sigi, Sulawesi Tengah, banyak terdapat *sandboils* dan sumber air baru pasca gempa. Penelitian ini fokus pada likuefaksi akibat kebocoran akuifer akibat gempa bumi dan pemanfaatan sumur bantuan untuk membuang kelebihan PWP. Simulasi dilakukan dengan menggunakan perangkat lunak Settle3 berdasarkan nilai *Cyclic Resistance Ratio* (CRR) dan *Cyclic Stress Ratio* (CSR) akan dibandingkan berdasarkan data *Multi-Channel Analysis of Surface Waves* (MASW) yang ada. Metode yang digunakan adalah perhitungan *Ejecta Potensi Index* (EPI) dan pemodelan dengan SEEP/W. Kebocoran akuifer dapat mengakibatkan kelebihan PWP dan menurunkan tegangan efektif pada tanah sehingga menjadi salah satu faktor peningkatan potensi likuefaksi. Analisis ini dilakukan dengan kondisi awal tanpa sumur dan setelah adanya sumur, kemudian dilakukan penilaian jarak sumur untuk menghilangkan tekanan artesis. Hasil penelitian menunjukkan bahwa pada titik tertentu gempa SPT dan MASW mengakibatkan potensi likuefaksi masih terdapat pada beberapa lapisan tanah khususnya pada saluran Gumbasa.

Perhitungan *upward seepage* yang dapat menghasilkan titik rentan likuefaksi pada BM68 pada kedalaman 11 meter, BM69 pada kedalaman lebih dari 10 m, dan pada BM70 pada kedalaman 9-10 m dan 12 hingga 20 m. Mitigasi likuefaksi diusulkan menggunakan relief well yang dimodelkan dan terbukti efektif mengurangi kenaikan tekanan air pori hingga 78%.

**Kata Kunci :** likuefaksi, *pore water pressure*, kebocoran akuifer, *relief well*

## ***ABSTRACT***

*In September 2018, there was an earthquake followed by liquefaction in Central Sulawesi Province, Indonesia. Liquefaction in Central Sulawesi has the potential to recur, so identifying potential liquefaction in areas that have occurred is essential. Sand boils are caused by excess pore water pressure (PWP) which causes sediment ejecta due to water pressure within the ground.*

*During the 2018 disaster, the research location in Mpanau, Sigi, Central Sulawesi, had many sand boil points and new water springs after the earthquake. This research focuses on the liquefaction caused by aquifer leakage due to earthquakes and on the use of relief wells to relieve excess PWP. The simulation will be conducted using Settle3 software based on methods, then the values of Cyclic Resistance Ratio (CRR) and Cyclic Stress Ratio (CSR) will be compared based on existing Multi-Channel Analysis of Surface Waves (MASW) data. The method used was calculating the Ejecta Potential Index (EPI) and modelling with SEEP/W. Aquifer leakage can result in excess PWP and reduce the effective stress on the soil so that it becomes one of the factors increasing the potential for liquefaction. This analysis was carried out with the initial conditions without wells and after the presence of wells, then assessing the distance of the wells to eliminate artesian pressure. The result of this research shows that at distinct points of the SPT and MASW resulted in potential liquefaction still present in several soil layers, especially in the Gumbasa canal.*

*The calculation of upward seepage which can produce liquefaction potential points at BM68 at a depth of 11 meters, BM69 at a depth of more than 10 m, and at BM70 at a depth of 9-10 m and 12 to 20 m. Liquefaction mitigation is proposed using a modeled relief well and is proven to be effective in reducing the increase in void count by up to 78%.*

**Keywords:** *liquefaction, excess pore water pressure, leakage aquifer, relief well*