ANALISIS DAMPAK PEMADATAN TANAH TERHADAP KESTABILAN STRUKTUR YANG BERDEKATAN MENGGUNAKAN APLIKASI PLAXIS 2D

(STUDI KASUS PT. TERUNA PERKASA OPTIMAL NEW FACTORY PROJECT, TANGGERANG-BANTEN)

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ABSTRAK

Penelitian ini dilakukan karena disinyalir bahwa pemadatan getaran menggunakan mesin vibro roller menyebabkan keretakan pada struktur bangunan seperti struktur pelat lantai, struktur kolom beton, dan struktur balok, baik itu retak yang berukuran kecil berbentuk kulit kura-kura hingga berukuran 5 mm.

Penelitian ini sangat penting untuk dilakukan agar mengetahui penyebab keretakan struktur beton tersebut baik bangunan lama yang berdekatan maupun bangunan yang sedang dikerjakan.

Metode yang digunakan adalah metode kuantitatif yaitu metode penelitian yang menggunakan data numerik kemudian diolah dan dianalisis menggunakan bantuan aplikasi Plaxis 2D. Berdasarkan hasil simulasi perhitungan aplikasi Plaxis 2D didapatkan hasil bahwa pemadatan getaran dengan jarak 0.5 meter dari banguan didapat penurunanan sebesar 2.2 cm dan tekanan tanah sebesar 153.2 kN/m^2, Jarak 5 meter penurunan sebesar 0.97 cm dan tekanan tanah sebesar 140.6 kN/m^2, Jarak 10 meter penurunan sebesar 0.32 cm dan tekanan tanah sebesar 137.0 kN/m^2, Jarak 15 meter penurunan sebesar 0.29 cm dan tekanan tanah sebesar 135.5 kN/m^2.

Disimpulkan bahwa penggunaan mesin vibro getaran untuk pemadatan pada jarak 0.5 meter masih aman karena nilai penurunan tanah masih di bawah tolerasi SNI 8460:2017 yaitu 2.5 cm, namun untuk lebih aman disarankan pemadatan dengan getaran dengan jarak minimal 5 meter dari bangunan.

Kata Kunci : Pemadatan Tanah, Kestabilan Struktur, Struktur Berdektan, Plaxis 2D

ANALYSIS OF THE IMPACT OF SOIL COMPACTION ON THE STABILITY OF ADjacent STRUCTURES USING THE PLAXIS 2D APPLICATION

(CASE STUDY OF PT. TERUNA PERKASA OPTIMAL NEW FACTORY PROJECT, TANGGERANG-BANTEN)

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ABSTRACT

This research was conducted because it was suspected that vibration compaction using a vibro roller machine caused cracks in building structures such as floor slabs, concrete columns, and beams, ranging from small tortoiseshell-shaped cracks to 5 mm in size.

This research is crucial to determine the cause of cracks in these concrete structures, both in existing adjacent buildings and in the building under construction.

The method used is a quantitative method, a research method that utilizes numerical data, which is then processed and analyzed using the Plaxis 2D application. Based on the simulation results using the Plaxis 2D application, vibration compaction at a distance of 0.5 meters from the building resulted in a settlement of 2.2 cm and a soil pressure of 153.2 kN/m2. At a distance of 5 meters, the settlement was 0.97 cm and a soil pressure of 140.6 kN/m2. At a distance of 10 meters, the settlement was 0.32 cm and a soil pressure of 137.0 kN/m2. At a distance of 15 meters, the settlement was 0.29 cm and a soil pressure of 135.5 kN/m2.

It was concluded that the use of a vibratory compaction machine for compaction at a distance of 0.5 meters is still safe because the settlement value is still below the SNI 8460:2017 tolerance of 2.5 cm. However, for greater safety, it is recommended to use vibration compaction at a minimum distance of 5 meters from the building.

This research was conducted because it was suspected that vibration compaction using a vibro roller machine caused cracks in building structures such as floor slabs, concrete columns, and beams, ranging from small tortoiseshell-shaped cracks to cracks measuring 5 mm.

This research is crucial to determine the cause of cracks in concrete structures, both in adjacent existing buildings and in the building under construction.

The method used was quantitative, a research method that utilizes numerical data, which is then processed and analyzed using the Plaxis 2D application. Based on the results of the Plaxis 2D application calculation simulation, it was found that vibration compaction at a distance of 0.5 meters from the building resulted in a settlement of 2.2 cm and a soil pressure of 153.2 kN/m2, a distance of 5 meters resulted in a settlement of 0.97 cm and a soil pressure of 140.6 kN/m2, a distance of 10 meters resulted in a settlement of 0.32 cm and a soil pressure of 137.0 kN/m2, a distance of 15 meters resulted in a settlement of 0.29 cm and a soil pressure of 135.5 kN/m2.

It was concluded that vibratory compaction at a distance of 0.5 meters was still feasible because the 2.2 cm settlement simulation using Plaxis 2D was still below the tolerance of 2.5 cm according to SNI 8460:2017, but was close to the tolerance limit, and was therefore recommended as critical. The soil pressure at this distance was 153.20 kN/m2, still below the allowable pressure of 335.5 kN/m2.
The largest settlement observed during the vibratory compaction simulation using Plaxis 2D using a 12-ton vibro roller was 2.2 cm at a distance of 0.5 meters from the building site.

The recommended type of equipment for vibratory compaction for safety is a vibro roller with a capacity smaller than 12 tons.

Keywords: Soil Compaction, Structural Stability, Adjacent Structures, Plaxis 2D