

ABSTRAK

Beton porous menjadi alternatif material konstruksi yang signifikan dalam mengatasi permasalahan genangan air dan penurunan muka air tanah akibat peningkatan penggunaan beton konvensional. Penelitian ini bertujuan untuk mengevaluasi pengaruh penambahan zeolit terhadap kuat tekan dan porositas beton porous yang mengandung silica fume. Zeolit dipilih sebagai bahan substitusi pasir karena sifatnya yang menyerupai pasir, mudah diperoleh, dan ekonomis.

Penelitian dilakukan di Laboratorium Pengujian Material Fakultas Teknik Universitas Negeri Medan dengan menggunakan metode eksperimental. Variasi kadar zeolit sebesar 12,5%, 17,5%, 22,5%, dan 27,5% diuji untuk menentukan kuat tekan dan porositas beton porous. Pengujian kuat tekan dilakukan sesuai dengan standar ACI 522R-10, sedangkan porositas diukur berdasarkan volume rongga dalam beton.

Hasil penelitian menunjukkan bahwa kuat tekan optimum diperoleh pada kadar zeolit 22,5% dengan nilai 4,62 MPa, melebihi standar minimum ACI 522R-10 sebesar 2,8 MPa. Namun, pada kadar zeolit 27,5%, kuat tekan menurun menjadi 2,22 MPa. Porositas beton porous memiliki hubungan terbalik dengan kuat tekan, dengan nilai optimum sebesar 18,43% pada kadar zeolit 22,5%, yang memenuhi rentang standar ACI 522R-10 (15%-30%). Penelitian ini menyimpulkan bahwa penambahan zeolit pada kadar 22,5% memberikan keseimbangan optimal antara kuat tekan dan porositas, menjadikannya pilihan yang potensial untuk material alternatif pada perkerasan jalan.

Kata kunci : Beton Porous, Kuat Tekan, Porositas, Silica Fume, Zeolit.

ABSTRACT

Porous concrete has emerged as a significant alternative construction material to address waterlogging and groundwater depletion issues caused by the extensive use of conventional concrete. This study aims to evaluate the effect of zeolite addition on the compressive strength and porosity of porous concrete containing silica fume. Zeolite was selected as a sand substitute due to its sand-like properties, availability, and cost-effectiveness.

The research was conducted at the Material Testing Laboratory, Faculty of Engineering, Universitas Negeri Medan, using an experimental method. Variations in zeolite content of 12.5%, 17.5%, 22.5%, and 27.5% were tested to determine the compressive strength and porosity of porous concrete. Compressive strength tests were conducted following ACI 522R-10 standards, while porosity was measured based on the volume of voids in the concrete.

The results show that the optimum compressive strength was achieved at 22.5% zeolite content with a value of 4.62 MPa, exceeding the minimum standard of 2.8 MPa set by ACI 522R-10. However, at 27.5% zeolite content, the compressive strength decreased to 2.22 MPa. Porosity exhibited an inverse relationship with compressive strength, with an optimum value of 18.43% at 22.5% zeolite content, which complies with the ACI 522R-10 standard range of 15%-30%. This study concludes that the addition of zeolite at 22.5% provides an optimal balance between compressive strength and porosity, making it a viable option for alternative road pavement materials.

Keywords: Porous concrete, zeolite, silica fume, compressive strength, Porosity