

ABSTRAK

PENGARUH RIB PADA PERILAKU LENTUR PANEL FEROSEMEN LANTAI SATU ARAH AKIBAT BEBAN TERPUSAT

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Perkembangan konstruksi menuntut penggunaan material struktur yang ringan, ekonomis, namun tetap memiliki kekuatan dan kekakuan yang baik. Pada elemen lantai sering terjadi lendutan dan retak akibat beban terpusat, sehingga diperlukan inovasi struktur seperti panel ferosemen dengan penambahan rib sebagai pengaku. Penelitian ini bertujuan untuk menganalisis pengaruh rib terhadap perilaku lentur panel ferosemen serta membandingkan hasil pengujian laboratorium dengan analisis numerik menggunakan SAP2000. Metode penelitian yang digunakan adalah metode eksperimental melalui pengujian beban terpusat hingga panel mengalami keruntuhan. Hasil penelitian menunjukkan bahwa penambahan rib terbukti meningkatkan kapasitas beban dan kekakuan panel. Panel dengan rib memanjang memiliki kapasitas beban maksimum tertinggi, Sedangkan kombinasi rib keduanya menunjukkan kinerja paling optimal dengan lendutan terkecil sebesar 8,11 mm (kekakuan yang tinggi) dan regangan tarik terbesar yaitu 0,0042 (daktilitas terbaik) serta pola retak yang lebih terkendali. Perilaku lentur panel terdiri atas fase elastis, retak awal, dan kapasitas maksimum. Kapasitas lentur hasil pengujian lebih besar dibandingkan hasil teoritis yang menunjukkan adanya kerja komposit antara mortar, tulangan, dan kawat ayam. Selain itu, hasil pengujian laboratorium dan analisis SAP2000 pada nilai lendutan cenderung lebih besar sedangkan regangan tarik dari hasil pengujian lebih tinggi yang disebabkan keterbatasan model numerik dalam merepresentasikan kondisi aktual struktur. Berdasarkan penelitian, penggunaan rib pada panel ferosemen lantai satu arah mampu meningkatkan kinerja struktural panel terhadap beban terpusat sehingga berpotensi menjadi alternatif elemen lantai yang lebih efisien dan ekonomis.

Kata kunci: ferosemen, rib, perilaku lentur, panel lantai satu arah, beban terpusat

ABSTRACT

THE EFFECT OF RIB ON THE FLEXURAL BEHAVIOR OF ONE-WAY FERROCEMENT FLOOR PANELS UNDER CONCENTRATED LOAD

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The development of construction demands structural materials that are lightweight, economical, while still having good strength and stiffness. In floor elements, deflection and cracking often occur due to concentrated loads, therefore structural innovations such as ferrocement panels with rib reinforcement are needed. This study aims to analyze the effect of ribs on the flexural behavior of ferrocement panels and to compare laboratory test results with numerical analysis using SAP2000. The research method used was an experimental method through concentrated load testing until the panels failed. The results showed that the addition of ribs increased the load capacity and stiffness of the panels. Panels with longitudinal ribs had the highest maximum load capacity, while the combination of both ribs showed the most optimal performance with the smallest deflection of 8.11 mm (high stiffness), the largest tensile strain of 0.0042 (best ductility), and more controlled crack patterns. The flexural behavior of the panels consisted of elastic, initial cracking, and maximum capacity phases. The flexural capacity from experimental testing was greater than the theoretical results, indicating composite action between mortar, reinforcement, and wire mesh. In addition, differences were found between laboratory testing and SAP2000 analysis, where the deflection values from numerical analysis tended to be larger, while the tensile strain values from experimental testing were higher due to the limitations of the numerical model in representing actual structural conditions. Based on the results of this study, the use of ribs in one-way ferrocement floor panels is able to improve the structural performance of panels under concentrated loads, making them a potential alternative for more efficient and economical floor elements.

Keywords: ferrocement panel, flexural behavior, rib, concentrated load, one-way slab