ANALISIS POLA PENEMPATAN *FLUID VISCOUS DAMPER* (FVD) DIAGONAL TERHADAP RESPON STRUKTUR GEDUNG 15 LANTAI

Rani Sulistia Rahman[1)], Yusep Ramdani[2)], Intan Nuriskha Rachma[3)]

Program Studi Teknik Sipil, Fakultas Tenik, Universitas Siliwangi
Jalan Siliwangi No. 24 Tasikmalaya, Jawa Barat, Indonesia
E-mail: 227011012@student.unsil.ac.id

ABSTRAK

Indonesia memiliki kondisi topografi yang dipenuhi dataran tinggi dan dikelilingi lempeng tektonik sehingga rawan terhadap gempa bumi dan erupsi gunung berapi. *Fluid Viscous Damper* (FVD) dinilai dapat memberikan redaman tambahan sehingga meningkatkan kinerja seismik struktur. Penelitian ini bertujuan untuk menganalisis pengaruh pola penempatan FVD secara diagonal terhadap respon struktur gedung 15 lantai. Analisis dilakukan dengan lima model, yaitu struktur tanpa FVD, penempatan FVD di tepi gedung (tipe 1), penempatan FVD di tengah gedung (tipe 2), tipe 1 dengan pengurangan dimensi balok-kolom sebesar 10% (tipe 3), dan tipe 2 dengan pengurangan dimensi balok-kolom sebesar 10% (tipe 4). Analisis gempa menggunakan metode *Linear Time History Analysis* (LTHA) dengan rekaman gempa yang telah disesuaikan terhadap respon spektra sesuai dengan SNI. Parameter yang dievaluasi meliputi massa struktur, periode fundamental, kekakuan, gaya geser dasar, simpangan antar tingkat, P-Delta, dan kebutuhan tulangan. Hasil penelitian menunjukan bahwa gedung tipe 2 lebih efektif dalam meningkatkan respon struktur. Dibandingkan dengan struktur tanpa FVD, pola penempatan FVD tipe 2 dapat mereduksi waktu getar alami struktur sebesar 15,42%, meningkatkan gaya geser dasar sebesar 18,74%, dan mereduksi simpangan sebesar 15,78%. Pengurangan dimensi balok-kolom sebesar 10% dapat menurunkan massa dan kekakuan struktur sehingga meningkatkan periode fundamental dan simpangan struktur, namun struktur tetap mampu mengendalikan respon struktur serta dapat mengurangi kebutuhan tulangan.

Kata Kunci: *Fluid Viscous Damper*, Respon Struktur, *Time History*

[1)] Mahasiswa Program Studi Teknik Sipil, Fakultas Teknik, Universitas Siliwangi
[2)] Dosen Pembimbing Tugas Akhir

ANALYSIS OF DIAGONAL FLUID VISCOUS DAMPER (FVD) PLACEMENT PATTERNS ON THE STRUCTURAL RESPONSE OF A 15-STORY BUILDING

Rani Sulistia Rahman[1)], Yusep Ramdani[2)], Intan Nuriskha Rachma[3)]

Departement of Civil Engineering, Faculty of Engineering, Siliwangi University
Siliwangi Street No. 24 Tasikmalaya, West Java, Indonesia
E-mail: 227011012@student.unsil.ac.id

ABSTRACT

Indonesia's topography, characterized by extensive highlands and surrounded by active tectonic plates, renders the country highly vulnerable to earthquakes and volcanic eruptions. In response, applying Fluid Viscous Dampers (FVD) is considered an effective solution to provide additional damping and enhance seismic performance. This study analyzes the effect of diagonal FVD placement configurations on the structural response of a 15-story building. The evaluation involves five models: a building without FVD, FVD placement at the corner bays (Type 1), FVD placement at the center bays (Type 2), Type 1 with a 10% reduction in beam-column dimensions (Type 3), and Type 2 with a 10% reduction in beam-column dimensions (Type 4). Seismic analysis was conducted using the Linear Time History Analysis (LTHA) method with ground motion records adjusted to the design response spectra in accordance with SNI standards. The evaluated parameters include structural mass, fundamental period, stiffness, base shear, inter-story drift, P-Delta effects, and reinforcement requirements. The results indicate that the Type 2 configuration is the most effective in improving the structural response. Compared to the model without FVD, Type 2 placement reduces the natural vibration period by 15.42%, increases base shear by 18.74%, and reduces story drift by 15.78%. Meanwhile, reducing the beam-column dimensions by 10% lowers structural mass and stiffness, consequently increasing the fundamental period and structural drift. Despite these dimension reductions, the structure remains capable of controlling seismic responses while successfully reducing reinforcement requirements.

Keywords: *Fluid Viscous Damper*, *Structural Response*, *Time History*

[1)] *Student in the Departement of Civil Engineering, Faculty of Engineering, Siliwangi University*

[2)] *Final Project Advisor*