

## INTISARI

Dalam rangka memudahkan perancangan bangunan Gedung *ACI 314-16 Guide to Simplified Design for Reinforced Concrete Buildings* dapat digunakan sebagai alternatif perancangan khususnya bangunan tingkat rendah. Pedoman (*Guide*) tersebut mudah diaplikasikan dan telah merangkum seluruh prosedur perancangan dari berbagai standar.

Di Indonesia peraturan mengenai perancangan bangunan tahan gempa telah diatur dalam SNI 1726:2019, SNI 1727:2013, dan SNI 2847:2019. Tugas Akhir ini dilakukan perancangan ulang gedung dengan menggunakan *ACI 314-16*.

Perancangan ulang dilakukan terhadap Gedung Educational for Sustainable Development Pusat Studi Lingkungan Hidup UGM sesuai Peraturan *ACI 314-16* dengan bantuan program SAP 2000 agar memudahkan dalam menganalisis elemen struktural bangunan. Gedung beton bertulang ini direncanakan 4 lantai dengan mengacu pada peraturan SNI 1727:2013 tentang Beban Minimum untuk Perancangan Bangunan Gedung dan Struktur Lain, dan SNI 2847:2019 tentang persyaratan Beton Struktural untuk bangunan Gedung.

Perancangan ulang struktur didapatkan dimensi pelat P1 135 mm yang semula 120 mm, P2 125 mm, P3 100 mm yang semula 80 mm. Pada balok terdapat 13 Jenis Balok Berbagai Ukuran yang kemudian dirancang ulang menjadi 3 jenis saja yaitu B1 450×800 mm, B2 300×450 mm, B3 250×400 mm. Pada Kolom terdapat 6 Jenis Kolom berbagai ukuran yang kemudian disederhanakan menjadi 1 jenis saja kolom K1 600×600 mm. Perancangan grade beam kolom GB1 450×800 mm, pelat tangga dengan tebal 150 mm, dan dinding geser SW1x yaitu 400×6000 mm. Desain ini memerlukan 2 dinding geser pada tiap sumbu utama dan juga dinding geser pada area lift karena memiliki momen yang besar akibat gempa, sehingga perlu dilakukan penyesuaian denah arsitektural terhadap DED struktur hasil perancangan ulang. Berdasarkan perhitungan secara manual dan perhitungan dengan bantuan program SAP 2000, terdapat selisih perhitungan pada Gaya Dalam Balok Induk rata-rata sebesar 28,86%, balok anak Ba 1 rata-rata sebesar 21,6% dan Balok anak Ba 2 rata-rata sebesar 11,05%. Setiap elemen struktural telah memenuhi dimensi minimal yang telah disyaratkan pada *ACI 314-16* dan masih memenuhi kapasitas strukturalnya.

**Kata Kunci:** *ACI 314-16, Redesign, Dinding geser, Bangunan tingkat rendah, Beton bertulang*

## ABSTRACT

To facilitate the design of buildings, *ACI 314-16* Guide to Simplified Design for Reinforced Concrete Buildings can be used as an alternative design, especially for low-rise buildings. These guidelines are easy to apply and have summarized all the design procedures of various standards.

In Indonesia, regulations regarding the design of earthquake-resistant buildings have been regulated in SNI 1726: 2019, SNI 1727: 2013, and SNI 2847: 2019. This final project will redesign the building using *ACI 314-16*.

The redesign was carried out on the Educational for Sustainable Development Building, UGM Center for Environmental Studies following ACI 314-16 Regulation with the help of the SAP 2000 program to make it easier to analyze the structural elements of the building. This reinforced concrete building is planned for 4 floors by referring to the SNI 1727: 2013 regulation concerning Minimum Load for Designing Buildings and Other Structures, and SNI 2847: 2019 concerning Structural Concrete requirements for buildings.

The redesign of the structure obtained plate dimensions P1 135 mm which was originally 120 mm, P2 125 mm, P3 100 mm which was originally 80 mm. In the beam there are 13 types of beams of various sizes which were later redesigned into 3 types, namely B1 450×800 mm, B2 300×450 mm, B3 250×400 mm. In Columns, there are 6 types of Columns of various sizes which are then simplified to only 1 type of column K1 600×600 mm. The design of the GB1 column beam grade is 450×800 mm, the ladder plate is 150 mm thick, and the SW1x shear wall is 400×6000 mm. This design requires 2 shear walls on each main axis and also a shear wall in the lift area because it has a large moment due to the earthquake, so it is necessary to adjust the architectural plan to the DED of the redesigned structure. Based on manual calculations and calculations with the help of the SAP 2000 program, there is an average difference in the calculation of the internal force of the main beam by 28.86%, the Ba 1 beam on average 21.6%, and the Ba 2 beam an average of 11.05%. Each structural element has met the minimum dimensions required in ACI 314-16 and still meets its structural capacity.

**Keywords:** *ACI 314-16*, redesign, shear walls, low-rise buildings, reinforced concrete