ENGINEERING NON ENGINEERED BUILDINGS, FROM NON-ENGINEERED TO 3D NON-LINEAR ANALYSIS, PERFORMANCE BASED DESIGN

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ABSTRACT

Almost every year earthquake disasters occur in many places in different parts of Indonesia and cause damage and destruction to non-engineered buildings. Despite of the many human casualties and the severe impact on the regional economy and development, it seems that relatively little is being done to prepare, prevent or mitigate the effects of future earthquakes.

The March 6, 2007 West Sumatra earthquake is a repetition of all past occurrences and is a demonstration that not much has been done with regard to non engineered buildings. Based on findings from all past earthquakes in Indonesia, the damage and collapse of non engineered buildings were mostly caused by poor quality of materials and workmanship, particularly detailing of connections. With the re-occurrence of the same mistakes until today, it is time to review about "the earthquake problem in Indonesia ".One other major cause of damage and collapse is deterioration of buildings due the lack of maintenance. This paper also discusses about how technology can impact the lives of ordinary people by studying the results from the simulations produced by the 3D mathematical models making use of non-linear analysis performance based design to get a better understanding of non engineered buildings when shaken by earthquakes..

ABSTRAK

Hampir setiap tahun terjadi bencana akibat gempa bumi diberbagai tempat di Indonesia yang merobohkan bangunan non engineered. Walaupun kerusakan tsb menimbulkan korban jiwa serta dampaknya besar terhadap ekonomi dan pembangunan daerah di wilayah tsb, kelihatanya sedikit sekali yg telah dilakukan dibidang kesiapan, pencegahan dan mitigasi akibat gempa yang akan datang.

Gempa Sumatra 6 Maret 2007 merupakan pengulangan dari kejadian serupa dimasa lalu dan merupakan petunjuk yg jelas bahwa belum banyak yang dilakukan berkaitan dengan bidang kegempaan terutama yg berkaitan dengan bangunan non engineered. Berdasarkan temuan di hampir semua gempa yang terjadi di masa lalu di Indonesia, kerusakan dan robohnya bangunan non engineered disebabkan oleh mutu bahan dan mutu pengerjaan yang buruk, terutama detail sambungan yg salah. Masih terjadinya kesalahan yg sama hingga saat ini, sudah waktunya untuk menelaah kembali "permasalahan gempa bumi di Indonesia". Hal lain yang merupakan penyebab kerusakan dan robohnya bangunan adalah bangunan lapuk karena kurangnya pemeliharaan. Tulisan ini juga membahas bagaimana teknologi dapat berdampak pada kehidupan rakyat dengan mempelajari hasil simulasi yg dihasilkan model matematik 3 D dengan memanfaatkan analisa non linier, performance based design untuk mendapatkan gambaran yg lebih baik tentang prilaku bangunan non engineered kalau digoncang gempa.

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