FICHAS BIBLIOGRÁFICAS - ESTUDIOS PROBABILISTAS DE RIESGO EN COLOMBIA

Título: Fully probabilistic seismic risk assessment considering local site effects for the portfolio of buildings in Medellin, Colombia

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RESUMEN

A fully probabilistic seismic risk analysis using a comprehensive approach is conducted for Medellin, the second largest city of Colombia, using a building by building database constructed and complemented from aerial images, considering characteristics such as building use categories, socio-economic levels and replacement values. The seismic hazard used for the analysis corresponds to the most updated study available in the country with the same model that was included in the national building code maps definition. Spectral transfer functions are determined for each of the seismic microzonation zones in order to take into account the dynamic soil response and amplification effects in the risk analysis. Several building types are defined for the city and individual vulnerability functions are assigned to each of them. Risk results are presented in the state of the art metrics such as the loss exceedance curve, probable maximum losses for different return periods, average annual losses and risk maps. The obtained results can be classified by use and socio-economic sectors as well as by structural systems that may help the stakeholders to identify where the risk concentrates.

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ORIGINAL RESEARCH PAPER

Fully probabilistic seismic risk assessment considering local site effects for the portfolio of buildings in Medellin, Colombia

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Abstract A fully probabilistic seismic risk analysis using a comprehensive approach is conducted for Medellin, the second largest city of Colombia, using a building by building database constructed and complemented from aerial images, considering characteristics such as building use categories, socio-economic levels and replacement values. The seismic hazard used for the analysis corresponds to the most updated study available in the country with the same model that was included in the national building code maps definition. Spectral transfer functions are determined for each of the seismic microzonation zones in order to take into account the dynamic soil response and amplification effects in the risk analysis. Several building types are defined for the city and individual vulnerability functions are assigned to each of them. Risk results are presented in the state of the art metrics such as the loss exceedance curve, probable maximum losses for different return periods, average annual losses and risk maps. The obtained results can be classified by use and socio-economic sectors as well as by structural systems that may help the stakeholders to identify where the risk concentrates.

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PALABRAS CLAVE	Probabilistic seismic risk analysis, local site effects, loss exceedance curve, averagu annual losses, probable maximum losses

COMPONENTES DE LA EVALUACIÓN

AMENAZA	1. Tipo de amenaza: sismo 2. Métricas de intensidad: Peak Ground Acceleration (PGA) 3. Escala/resolución: Local 4. Resultados: - 5. Localización: Medellín, Colombia 6. Metodología: Estudio de amenaza sísmica nacional (Comité AIS-300, 2009). CRISIS 2007 (Ordaz et al. 2007), Microzonificación sísmica Medellín 7. Períodos de retorno (años): 475
VULNERABILIDAD	1. Tipo de vulnerabilidad: Física 2. Metodología: Analítica. 3. Tipología estructural: - 4. Representación: Función de vulnerabilidad; PGA vs. Valor esperado de la pérdida.
EXPOSICIÓN	1. Tipo exposición: Edificaciones 2. Portafolios: Residencial, comercial, industrial, institucional 3. Localización geográfica: Medellín, Colombia 4. Valor de reposición total: 146,608 U$D * 10^6 5. Área expuesta (m2): -
RESULTADOS DE RIESGO	1. Modelo utilizado: Ordaz et al. (1998), Ordaz (2000) 2. Métricas de riesgo: Pérdida Anual Esperada (PAE), Pérdida Máxima Probable (PML) 3. PAE: 4.1 ‰ Medellín 4. PML: 100, 250, 500, 1000 años de Período de retorno 5. Representación del riesgo: Curva de excedencia de pérdidas, Mapas de pérdida anual esperada