TINGKAT KERENTANAN FISIK BANGUNAN TERHADAP POTENSI ERUPSI GUNUNGAPI KELUD

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INTISARI

Gunungapi Kelud mengalami erupsi yang bersifat eksplosif dengan mengeluarkan material batuan, pasir dan abu vulkanik mencapai 200 juta m^3 pada tahun 2014 dengan skala *Volcanic Eruption Index* (VEI) 4. Desa Puncu yang berada pada Kawasan Rawan Bencana (KRB) I dan II mengalami dampak kerusakan bangunan sebanyak 2.195 bangunan. Penelitian ini bertujuan untuk: (1) Mengidentifikasi karakteristik endapan material jatuhan piroklastik di Desa Puncu, (2) Mengidentifikasi karakteristik bangunan yang berpengaruh terhadap kerentanan fisik bangunan di Desa Puncu dan (3) Menganalisis tingkat kerentanan fisik bangunan di Desa Puncu.

Penelitian dilakukan dengan metode wawancara, studi literatur, identifikasi lapangan dan melakukan pemodelan kerentanan pada *software* ILWIS 3.3 melalui *Spatial Multi-Criteria Evaluation* (SMCE). Variabel yang digunakan yakni terdiri dari variabel bangunan berupa kemiringan atap, material atap, rangka atap, tipe bangunan, umur bangunan, orientasi bangunan dan jarak bangunan dari pusat erupsi serta variabel endapan material jatuhan piroklastik berupa beban piroklastik. Jumlah sampel endapan material jatuhan piroklastik yang digunakan yakni sebanyak 4 titik serta sampel bangunan yang digunakan yakni terdiri dari 416 bangunan dengan berbagai macam jenis bangunan.

Hasil penelitian menunjukkan karakteristik endapan material jatuhan piroklastik menunjukkan tebal yakni 14,3 cm -21,8 cm, massa jenis 100,46-187, 82 Kg/m^3, serta beban piroklastik sebesar 15,10-29,30 Kg/m^2. Karakteristik bangunan dominan yakni kemiringan atap 6-35^0 (61,5%), material atap genteng dan asbes (50,2%), rangka atap kayu (92,3%), tipe bangunan permanen (88,5%), umur bangunan 0-20 tahun (46,9%), orientasi bangunan $22,5^0$-$67,5^0$ (63%) dan jarak bangunan dari pusat erupsi sejauh 6-10 km (100%). Tingkat kerentanan fisik bangunan di Desa Puncu yakni terdiri dari kelas sangat rendah (0,7%), rendah (4,6%), sedang (40,1%), tinggi (52,6%) dan sangat tinggi (1,9%).

Kata Kunci: Bangunan, Desa Puncu, Kerentanan Fisik, *SMCE*, Gunungapi Kelud

PHYSICAL BUILDINGS VULNERABILITY TOWARDS THE POTENTIAL ERUPTION OF KELUD VOLCANO

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ABSTRACT

Kelud Volcano has explosive eruptions by removing rock material, sand and volcanic ash reaching 200 million m^3 in 2014 with the scale of the Volcanic Eruption Index (VEI) 4. Puncu Village located in Disaster Prone Areas (DPA) I and II suffered damage up to 2,195 buildings. The purpose of this research is: (1) Identify the characteristics of pyroclastic fall deposits in Puncu Village, (2) Identify building characteristics that influence the physical vulnerability of buildings in Puncu Village and (3) Analyze the level of physical vulnerability of buildings in Puncu Village.

The study was conducted by interview method, literature study, field identification and conducting vulnerability modeling in ILWIS 3.3 software through Spatial Multi-Criteria Evaluation (SMCE). The variables used were building variables such as roof slope, roof material, roof truss, building type, building age, building orientation and the distance of the building from the center of the eruption and then pyroclastic fall variable is pyroclastic load. To identify the characteristics of pyroclastic fall deposits used is 4 points sample and the sample of the building used is consisting of 416 buildings with various types of buildings.

The results showed that the characteristics of pyroclastic fall deposits showed thickness of 14.3 cm -21.8 cm, density of 100.46-187.82 Kg/m^3, and pyroclastic load of 15.10-29.30 Kg/m^2. The dominant building characteristics are roof slope 6^0-35^0 (61,5%), tile and asbestos roof material (50,2%), wooden roof truss (92,3%), permanent building type (88,5%), building age 0-20 years (46,9%), the orientation of the building is 22.5^0-67.5^0 (63%) and the distance from the eruption center is 6-10 km (100%). The level of physical vulnerability of buildings in Puncu Village consists of very low class (0,7%), low (4,6%), medium (40,1%), high (52,6%) and very high (1,9%).

Keywords: *Buildings, Puncu Village, Physical Vulnerability, SMCE, Kelud Volcano*