

Fire resistance of the Mt. Epomeo Green Tuff, a widely-used building stone on Ischia Island (Italy)

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NON-TECHNICAL SUMMARY

The buildings on Ischia, an island just off the coast of Italy near Naples, are built from a green volcanic rock called tuff that formed following a volcanic eruption 55,000 years ago. Because of the risk of fires during the hot and dry summer months, we investigated the fire resistance of this widely used building stone. Rock samples were heated in an oven to replicate the high temperature of fire and, once the samples were cooled, we measured their strength in our laboratory. We found that the rock becomes weaker following exposure to high temperature, a consequence of cracks that form within the rock due to the breakdown of certain rock minerals at high temperature. Finally, we show that it takes the rock a long time to heat up during a fire, meaning that a fire would have to burn for many hours to compromise the structural stability of a building. We conclude that tuffs are tough in the event of fire.

Keywords Zeolite; Porosity; Uniaxial compressive strength; Acoustic emissions; Microcracks; X-ray powder diffraction

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