_SH3/P2/ID148_ – EUROCODE 8 ALIGNED
PGA, PGV AND PERCEPTIBILITY HAZARD
FOR BULGARIA AND SITE-SPECIFIC SOFIA

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The EUROCODE 8 building code is progres
sively being adopted across Europe as the standard against which to construct both critical and non-critical anti-seismic structures. It aims to increase homogeneity between countries by requiring countries to estimate one basic seismic hazard parameter. The frequently used - but still debated - benchmark adopted by EUROCODE 8 is the 475-year return period peak ground acceleration (PGA). This is equivalent to the maximum ground motion forecast in a 50-year time interval at 90% probability of non-exceedance. However, ground velocity is now often considered to be more representative of a location' s ground motion hazard, as velocity is directly related to the energy flux between ground and structure. Engineering seismologists and researchers are now starting to promote peak ground velocity (PGV) as one of a number of alternative and more appropriate measures against which to benchmark EUROCODE 8, either alongside or in place of standard PGA metrics.The border region shared by Bulgaria, Greece and the FYR of Macedonia has not yet been subject to a comprehensive probabilistic seismic hazard assessment, although geological, tectonic and seismotectonic reviews do currently exist. There have been past major earthquakes in this region that created a ground-shaking hazard that encroached on all three territories. For example, Kresna (1904) and Thessaloniki (2000) have all contributed to this trans-frontier seismic hazard in the past. The need for a uniform assessment is enhanced due to the close proximity of key urban centres and consequences of such large magnitude earthquake occurrences. Results are presented here from a recent study across Bulgaria - with emphasis on southwest Bulgaria - that adopted a new earthquake catalogue and carefully selected geographically relevant ground motion models to forecast peak ground motion. Hazard is presented as contoured maps for both the 475-year PGA and PGV metric at regional and localized (southwest Bulgaria) levels. A site-specific example is also provided for Sofia, whose 475-year return period estimates for PGA and PGV are found to be 177 cm s^{-2} and 27 cm s^{-1} respectively.These same ground motion models are then applied to estimate earthquake perceptibility hazard with respect to PGA and PGV to achieve a second useable design earthquake, the most perceptible magnitude, $M_{P(max)}$. Finally, specimen site-specific ground motion hazard curves

are created for Sofia by integrating this city’s earthquake perceptibility curves to estimate annual probabilities of exceedance for PGA and PGV within a 2° half-width cell centered on the city.