



Seismotectonic Analysis for the KZN region of South Africa

M. Singh

School of Engineering, University of KwaZulu Natal, Howard College Campus, Durban, 4041, South Africa

Recently, devastating earthquakes and tsunamis have shocked the modern world (Japan [April 7 2011, Mw 9.0, loss of life and destruction of infrastructure, 15,457 deaths 5,389 injured, US\$300 billion loss (Japanese National Police Agency 2011)], New Zealand [21 February 2011, Mw 6.3, 148 killed], Haiti [12 January 2010, Mw 7.0, estimated 316 000 killed and 300 000 injured]). These earthquakes have caused large scale damage to the built environment not to mention the high number of fatalities. The KZN coastal region is also fast developing especially towards the north of Durban CBD (Cornubia [New development near Umhlanga, 25 Billion Rands investment], Gateway/Umhlanga Business District, Moses Mabida Stadium (cost of R3.4 billion), King Shaka International Airport at a cost of R6.8 billion, Dube Tradeport to be developed next to the airport at a cost of R5 billion, as well as the development of the Richards Bay Industrial Development Zone . The KZN is home to 10 million inhabitants with a relatively denser population distribution around the Durban and Pietermaritzburg CBDs. With the increasing amount of investment towards the north coast of Durban, the population distribution will migrate to these areas. These areas now become 'vulnerable' to rare, infrequent and potentially devastating natural disasters like earthquakes. One of the first steps to understand and plan for an earthquake occurrence is through a seismic hazard and risk assessment. The seismic hazard and risk method has well been established since 1968 (see Cornell (1968); Veneziano et al., (1984); Bender and Perkins (1993); McGuire (1993); McGuire and Toro (2008); Kijko and Graham (1998); Kijko and Sellevoll, (1989, 1992)). The components of a seismic risk assessment (SRA) include several building blocks namely: the development of the earthquake catalogue, seismotectonic model, attenuation models, seismic hazard assessment (SHA), vulnerability assessment and seismic risk computations. The seismotectonic model element will be explored in further detail for this research. Preliminary investigations into a seismotectonic investigation for the province have been undertaken by Singh et al. (2011). Under the framework of this research the following tasks are planned for the KZN coastal region: i) Development of a historical earthquake catalogue ii) Development of a GeoDatabase for Seismotectonic Zonation iii) Development of a Seismotectonic Model and iv) Development of an Earthquake Recurrence Model. The author will present progress made to date towards this research.