ANTICIPATED EARTHQUAKE EFFECTS AND RELATED PERILS FOR THE MALTESE ISLANDS

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This report commissioned by the Association of Insurance Companies is mostly based on data obtained from publications, "Earthquakes and Volcanic Eruptions" - a handbook on risk assessment by Swiss Re together with "EU - European Macroseismic Scale 1992 (up-dated MSk - scale)". Further information on the above has been obtained from various other publications. The return periods quoted are from indications given for our region, from various sources, no study has been carried out for the specific Maltese region.

SYNOPSIS

This report starts by demonstrating **HUMAN RESPONSE TO EARTHQUAKES**. Section II **Current Earthquake Design** clarifies what is actually covered in Design Codes and defining how safe is safe. Section III **Engineering Earthquake Parameters** outlines the basic of engineering principles, which need not be fully comprehended, but this section is necessary as definitions given to different properties of materials, together with parameters derived therefrom which will influence the way in which a particular building behaves, when subjected to an earthquake shock.

Section IV **EVALUATION OF DAMAGE & LOSS to Earthquake Exposure** discusses he various effects due to subsoil conditions, different materials, standard of workmanship, and the damage according to the regularity and symmetry of building. This section then defines the effects of non-structural damage, sensitivity of machinery and contents of varying sensitivity is then explained, ending up by explaining fire exposure.

Section V on **Anticipated Damage level under various Earthquake Intensity** defines the level of damage expected under the various 12-MSK intensities on different types of building constructions. These intensity grades have been adjusted for the damage due for buildings founded on bedrock.

Setion VI **Anticipated Damage & Cost Matrixes for Maltese Property types founded on rock.** Table 1 gives the **Mean Damage Ratio (MDR)** for varying moderately asymmetrical and irregular building types

and earthquake intensity. Table 2 gives the MDRs for high asymmetries and irregularities, with the help of tables from **Appendix 'B'**. Tables 3/4 allow a risk analysis of these MDRs to be performed. Table 5 gives the **% death rate expected**. Tables 6/7 convert the MDRs of table 1 into **Mean Damage repair cost ratio,** whilst table 8 does the same for table 2. Table 9 gives **repair times** to the various MDRs. This section is concluded with a **Rating Assessment** example for Earthquake exposure.

The related perils are treated in the last 2 ssections on **Volcanism - VII** and **Tsunamis -VIII.** Examples are given of various effects according to various intensity levels. At the end of each section again is given a related **Rating Assessment** example.

'Appendix A' is a specimen earthquake structural calculation according to the American Unified Building Code (UBC) for a 2 storey premises founded on an underlying basement with prestressed spanning planks.

I HUMAN RESPONSE TO EARTHQUAKES:

In the instant of a major earthquake, panic prevails.

In the aftershocks, from the next minute to within a week, rescue and survival begins with fear still instilled.

With the diminishing aftershocks following the first week up to the first month, short term repairs commenced, whilst litigation commences, shifting the blame on to contractors, designers, officials etc.

Up to within one year of quake, long term repairs commence, whilst call for action regarding higher standards.

From the first year to the tenth, diminishing interest predominates.

Beyond the 10 years from quake, reluctance to meet costs of seismic provisions, research etc. together with non-compliance of regulations creeps in.