

1.2. SEISMIC GROUND MOTION

1.2.1. Earthquake levels

The earthquake levels to be considered in this Code are defined in the following:

1.2.1.1 – (E1) Earthquake Level: This earthquake level represents relatively frequent but low-intensity earthquake ground motions with a high probability to occur during the service life of buildings within the scope of this Code. The probability of exceedance of (E1) level earthquake in 50 years is 50%, which corresponds to a return period of 72 years.

1.2.1.2 – (E2) Earthquake Level: This earthquake level represents the infrequent and higher intensity earthquake ground motions with a low probability to occur during the service life of buildings within the scope of this Code. The probability of exceedance of (E2) level earthquake in 50 years is 10%, which corresponds to a return period of 475 years.

1.2.1.3 – (E3) Earthquake Level: This earthquake level represents the highest intensity, very infrequent earthquake ground motions that the buildings within the scope of this Code may be subjected to. The probability of exceedance of (E3) level earthquake in 50 years is 2%, which corresponds to a return period of 2475 years.

1.2.2. Representation of ground motion: Elastic Response Spectrum

1.2.2.1 – Within the boundaries of Emirate of Dubai, 5% damped horizontal elastic spectral accelerations corresponding to short period (0.2 second), S_{SD} , and 1.0 second natural vibration period, S_{ID} , are given for (E1), (E2) and (E3) earthquake levels in **Table 1.1** for local soil classes defined in **Annex A**.

1.2.2.2 – Elastic response spectrum representing the horizontal component of earthquake ground motion is defined as follows (**Fig.1.1**):

$$\begin{aligned} S_{AE}(T) &= 0.4 S_{SD} + 0.6 \frac{S_{SD}}{T_0} T & (T_0 \leq T) \\ S_{AE}(T) &= S_{SD} & (T_0 \leq T \leq T_S) \\ S_{AE}(T) &= \frac{S_{ID}}{T} & (T_S \leq T \leq T_L) \\ S_{AE}(T) &= \frac{S_{ID} T_L}{T^2} & (T_L \leq T) \end{aligned} \tag{1.1}$$

Spectrum corner periods T_0 and T_S are defined as:

$$T_S = \frac{S_{ID}}{S_{SD}} \quad ; \quad T_0 = 0.2 T_S \tag{1.2}$$

Transition period to long-period range shall be taken for Emirate of Dubai as $T_L = 8$ s.