Abstract

There are two specific objectives in this research. The first one is developing probabilistic models for buried pipes in prevalent seismic loading. In fact such models make suitable tools to estimate losses in lifelines. Parameters like corrosion, size of pipe & ground settlement are directly involved in suggested procedure. From this view point developed models have advantages over previous models. The second objective is suggesting different procedure for prediction of the loss in a city gas network associated with a certain earthquake. In a gas network poles are vulnerable too. Damages in these members depend mostly on the extent of collapse of adjacent buildings; so a method is suggested to estimate the collapse probability of building as an appendix to this thesis. Initiation & spreading of fire following earthquake are assessed by studying physical models. Stop in gas delivery is considered as another source of loss in a gas network. To calculate this kind of loss, the network is modeled as a combination of feeding nodes and consumption regions. Finally the mean of total loss is suggested as a function of elapsed time after earthquake. Describing loss function in this way makes it possible to compare the city regions taking in to account various loss sources. As an another application, the time dependent loss function con also be used to calculate the effective time for preventive measures. For driving economical loss estimation, it will be necessary to have realistic values for the parameters involved.