ESTIMATION OF ECONOMIC LOSSES DUE TO EARTHQUAKE IN LIFELINE SYSTEMS

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ABSTRACT

In this research, we develop a linear relationship between seismic time-history parameters and earthquake losses to obtain a model that is able to estimate economic losses of lifeline systems including transportation, communication, potable water and waste water, natural gas systems and electric power networks.

We considered economic losses of lifeline systems as a dependent variable and seismic parameters as independent variables. Stepwise multiple linear regressions were used to create a linear equation between the monetary value of losses and the seismic parameters of Peak Ground Acceleration (PGA), Peak Ground Velocity (PGV) and Peak Ground Displacement (PGD) at various earthquakes.

Usually earthquake losses are not limited to physical losses but possible contain very widespread dimensions, example loss of output because of generate abeyance, reduction of consumption because of diminish social activities, etc. Losses linked with effects would be very huge and vaster than those counted just through physical damages.

The method is used in current research is Input-Output (I-O) effect analysis. I-O table is a compendium accounting of all purchases and sales across components in a given zone. In this analysis, Iran is considered as a region. Thus, we use Iran's input-output table, the indirect losses due to damage of lifeline systems in past earthquakes of Iran evaluated by the inter-industry relation.

INTRODUCTION

Losses from earthquakes are usually associated with building and other property damage. However, many businesses are forced to shut down, even if physically unscathed, when suppliers of lifeline services or other inputs are disrupted, or if their employees are unable to reach the workplace. Likewise, businesses may be forced to curtail operations if orders for their products are canceled by their customers, or if they are unable to deliver their products to market. Moreover, these impacts pertain not only to immediate suppliers and customers, but to successive rounds of upstream or downstream links (Okayama and Chang, 2004).

While significant progress has been made in recent years for the economic analysis of disasters, especially in the field of economic modeling for disaster impact the recent advancements have been more toward short-run impact analysis with the strategies for modeling extensions and modifications to fit them to disaster situations rather than toward evaluation of long-run effect of such events (Okayama, 2014).

Natural hazards, such as earthquakes, reason misadventure when they impacts huge residence example urban zones.