

Issues connected with indirect cost quantification: a focus on the transportation system

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Transportation and communication networks in general are vital parts of modern society. The economy relies heavily on transportation system performance. A number of people commutes to work regularly. Stockpiles in many companies are being reduced as the just-in-time production process is able to supply resources via the transportation network on time.

Natural hazards have the potential to disturb transportation systems. Earthquakes, flooding or landsliding are examples of high-energetic processes which are capable of causing direct losses (i.e. physical damage to the infrastructure). We have focused on quantification of the indirect cost of natural hazards which are not easy to estimate. Indirect losses can also emerge as a result of meteorological hazards with low energy which only seldom cause direct losses, e.g. glaze, snowfall. Whereas evidence of repair work and general direct costs usually exist or can be estimated, indirect costs are much more difficult to identify particularly when they are not covered by insurance agencies.

Delimitations of alternative routes (detours) are the most frequent responses to blocked road links. Indirect costs can then be related to increased fuel consumption and additional operating costs. Detours usually result in prolonged travel times. Indirect costs quantification has to therefore cover the value of the time. The costs from the delay are a nonlinear function of travel time, however. The existence of an alternative transportation pattern may also result in an increased number of traffic crashes. This topic has not been studied in depth but an increase in traffic crashes has been reported when people suddenly changed their traffic modes, e.g. when air traffic was not possible.

The lost user benefit from those trips that were cancelled or suppressed is also difficult to quantify. Several approaches, based on post-event questioner surveys, have been applied to communities and companies affected by transportation accessibility cut-off. No widely accepted methodology is available, however. In this presentation we will discuss current approaches, and their limitations related to indirect cost estimation which can be applied to estimation of natural hazard impacts.