COST-BENEFIT ANALYSIS FOR SEISMIC REABILITATION OF BUILDINGS

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ABSTRACT
This paper presents a methodology for socio-economic evaluation of seismic rehabilitation projects of existing buildings based on Cost-Benefit Analysis, which integrates the development of Community policies and financial instruments. It aims to provide technical support and contribute to the reflection about co-financing rates modulation.

Keywords: Seismic rehabilitation, Cost-Benefit analyses.

INTRODUCTION
The decision to rehabilitate existing buildings is complex, since the associated costs require assessment at different levels, given their relevance to all stakeholders in decision-making, and are not always easily quantifiable. In addition, following recent decisions of the European Union (EC, 2008), it is essential and urgent to carry out economic baseline studies to support the adoption of seismic rehabilitation strategies. In this context, the use of methodologies based on Cost-Benefit Analysis (CBA) can contribute positively to base decisions on investment projects in building seismic rehabilitation (Serkan, 2005; FEMA 227, 1992; FEMA 228, 1992). CBA allows studying the feasibility of projects and assessing the impacts based on the comparison of costs and benefits in a given time frame.

COST-BENEFIT ANALYSES
Cost-Benefit Analysis (CBA) is a method to assess the net economic impact of a public investment project and can be used for a variety of interventions (EVALSED, 2013). It will be considered for incorporation in investment projects for seismic rehabilitation of existing buildings, Fig.1. The purpose of a CBA is to evaluate if a building seismic rehabilitation project is feasible from the point of view of social welfare through the algebraic sum of their costs and benefits discounted over time.

The decision on this kind of project investment taken would be supported by a CBA, based on economic models of Cost-Benefit (EMCB), covering various areas, which are particularly relevant: i) technical, ii) financial, iii) environmental, iv) planning, v) competitiveness and vi) economic and social development.

The proposed methodology for CBA for seismic rehabilitation projects (Fig. 2) presents an added value, technical and scientific, as it allows: i) express a judgment about the economic and social desirability of these projects; ii) establish a comparison between different design alternatives; and iii) to encourage the practice of identifying and accounting costs and economic benefits, even if they are not immediately converted into monetary units.
FINAL REMARKS

The application of CBA to building seismic rehabilitation projects requires rigor and methodological consistency. After the implementation of required parameters under a seismic rehabilitation project and the corresponding investment shares (public or private), a final assessment to a comparison between the results obtained and the initial forecasts must be made. Thus, it becomes possible to introduce in future similar investment projects and decision-making, the experience and information acquired during this evaluation process. The final evaluation of a project shall be conducted in the same way that the assessment of the options, with identical procedures, including conducting a CBA based on real data rather than forecasts. A complementary research study is being developed in LNEC concerning the implementation of this methodology for seismic rehabilitation of reinforced concrete buildings without seismic design to support all process related stakeholders decision. The obtained results will be object of future publications.

REFERENCES


