Problem
As damage from natural disasters has increased over time, more and more importance is attached to the improvement of buildings’ response to these events. Different tools and programs that evaluate the impact of hazards on residential structures have been launched over the last decade. They differ in terms of their scope of analysis and methodology, and are led by different governmental and private institutions. As such, it can be difficult to discern similarities and differences among the methods.

Approach
We are developing a quantitative cost-benefit methodology for hazard resistance of residential structures. A first step in this research is a review of the existing landscape of methodologies that promote the hazard resistance and resilience of residential structures. Whereas resistance implies the ability to prevent damage to a building, resilience is the ability to absorb and limit damage from hazards. We used an assessment framework to evaluate these methods. We also conducted a literature review, a test run of all tools, and interviews with different stakeholders in the insurance, risk modeling, and building industry. The goal was to identify gaps and overlaps between programs to understand how integrating different approaches can result in a more effective, comprehensive methodology that better meets stakeholders’ needs.

Findings
The table below summarizes our results. Programs differ in terms of their managing organizations (public and private), approach (specific building or general study region), scope (integration or separation of different hazards), focus (retrofitting and new buildings), goal (educate or change), and target group (governmental institutions or homeowners). However, a probabilistic, quantitative, region-dependent methodology for assessing the probability of occurrence, the trade-offs between hazard resistance and resilience, other performance metrics, and costs is still missing. Existing methodologies will serve as a foundation for future work.

Impact
The intent of our research is to provide a quantitative methodology for integrating hazard resistance as a metric into cost-benefit analyses of residential structures. Such an approach can support decisions among stakeholders in the residential building community when evaluating alternative designs with different levels of hazard resistance, cost, and other performance metrics.

More
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