

# FEMA'S BENEFIT COST-ANALYSIS TOOL FOR SAFE ROOM PROJECTS

## General Guidance

The purpose of this document is to provide potential subapplicants with general guidance on FEMA's Hazard Mitigation Assistance (HMA) benefit-cost analysis (BCA) tool. The BCA is a required subapplication component. This guidance is not intended to provide complete information, but rather to outline basic requirements and considerations as subapplicants begin the analysis process. Cal OES is available to answer technical questions about BCAs and can be contacted by e-mailing [HMA@caloes.ca.gov](mailto:HMA@caloes.ca.gov).

## Flood Benefit-Cost Analysis for Safe Room Projects

Safe room construction projects are designed to provide immediate life-safety protection for people in public and private structures from tornado and severe wind events, including hurricanes.

## BCA Software and Methodology

FEMA requires the use of its BCA software (version 6 for all BCAs). Subapplicants can get the software by visiting [FEMA's Benefit-Cost Analysis Guidance and Tools website](https://www.fema.gov/media-library/assets/documents/179903): <https://www.fema.gov/media-library/assets/documents/179903>.

Select *Tornado Safe Room* from the *Hazard Type* drop list. For this project type, the software offers three methodologies: *modeled damages* (which incorporates data about wind probabilities for the project site, along with building-specific information entered by the analyst), *expected damages*, and *historical damages*. Data inputs are listed below. Note that if either the *expected damages* or *historical damages* approaches are used, the analyst must have a range of information about the facility itself, and wind probabilities at the site. This type of analysis requires the user to establish a series of at least two points where there are known relationships between the frequencies of events and the damages they cause. All such information must be based on valid, documented sources and methodologies.

## Safe Room Projects

## Data used in the Analysis

This subsection is intended as a general summary of data requirements for the different types of BCAs, not a comprehensive explanation of how to complete an analysis.

1. Address or latitude and longitude of project site.
2. Structure type (drop list)
3. Hazard type (safe room; drop list)
4. Mitigation action type (residential or community; drop list)
5. Project useful life (see below)
6. Project cost and annual maintenance cost.
7. Safe room occupancy (for modelled damages approach; must use FEMA standards)
8. Design wind speed of safe room (for modelled damages approach; must use FEMA standard)
9. Building occupancy (for modelled damages approach; by time of day)
10. Wind speed/frequency relationships (for expected/historical damages approach, for at least two events)
11. Expected numbers and values of injuries and deaths (for expected/historical damages approach, for at least two events)
12. Design performance of the safe room (for expected/historical damages approach, for at least two events, by probability)

## Benefits

Benefits of safe room projects are based entirely on avoided injuries and loss of life. See the help functions in the software and FEMA guidance.

## Project Useful Life and Project Effectiveness

Project useful life is simply the period over which a project is effective. FEMA's 2009 BCA guidance (Appendix D) provides specific values for useful life, and can be found by visiting [FEMA's Benefit-Cost Analysis Guidance and Tools website](https://www.fema.gov/media-library/assets/documents/179903): <https://www.fema.gov/media-library/assets/documents/179903>.

## Safe Room Projects

## **Documentation**

Cal OES and FEMA require subapplicants to provide documentation for all data that is used in a BCA. This must be included with the materials that are submitted as part of the application package.

## **Best Practices**

Cal OES strongly recommends that each subapplicant BCA be supplemented by a brief technical report that summarizes the approach to the analysis, the data that was used, the sources of the data, and the results of the analysis.

Subapplicants should provide electronic copies of any data sources that are used in a BCA.

## **Safe Room Projects**