



Abstract

A three-dimensional (3D) model of a six-story building subjected to a surface blast is analyzed using the coupled numerical approach. The simulation incorporates the explosion process, shock wave propagation through air and soil medium, shock wave structure interaction, and structure response in a single model to study the soil–structure-interaction effect on the blast response of the building. The coupled analysis is implemented with the help of the coupled Eulerian–Lagrangian scheme. The study shows that soil type has a significant effect on the surface-blast-induced response of the building. Further, validity of the uncoupled analysis is investigated, as it takes much less computational time than the coupled analysis. The uncoupled analysis is found valid for greater standoff distance, while the fully coupled analysis is to be performed in the near blast situation.

Get full access to this article

View all available purchase options and get full access to this article.



Data Availability Statement

All data, models, and code generated or used during the study appear in the published article.

References

ASCE. 1997. *Design of blast resistant buildings in petrochemical facilities*. Reston, VA: ASCE.

[Google Scholar](#)

BIS (Bureau of Indian Standards). 2002. *Criteria for earthquake resistant design of structures*. IS 1893-Part 1. New Delhi, India: BIS.

[Google Scholar](#)

SHOW ALL REFERENCES

Recommended

Journal of Performance of Constructed Facilities | Article | April 2020

Effect of Surface Blast on Multistory Buildings

Journal of Performance of Constructed Facilities | Article | December 2020

Numerical Modeling of Shallow Buried Tunnel Subject to Surface Blast Loading

Practice Periodical on Structural Design and Construction | Article | May 2022

Dynamic Response of Underground Tunnel in Soft Soil under Surface and Subsurface Explosion

Chapter | April 2012

Modeling of Surface Blast Effects on Underground Structures

Journal of Structural Engineering | Article | July 2019

Blast-Wave Clearing for Detonations of High Explosives

[View full text](#) | [Download PDF](#)