



# CENTER FOR TERRORISM RISK MANAGEMENT POLICY

THE ARTS  
CHILD POLICY  
CIVIL JUSTICE  
EDUCATION  
ENERGY AND ENVIRONMENT  
HEALTH AND HEALTH CARE  
INTERNATIONAL AFFAIRS  
NATIONAL SECURITY  
POPULATION AND AGING  
PUBLIC SAFETY  
SCIENCE AND TECHNOLOGY  
SUBSTANCE ABUSE  
TERRORISM AND  
HOMELAND SECURITY  
TRANSPORTATION AND  
INFRASTRUCTURE  
WORKFORCE AND WORKPLACE

This PDF document was made available from [www.rand.org](http://www.rand.org) as a public service of the RAND Corporation.

[Jump down to document](#) ▼

The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world.

## Support RAND

[Browse Books & Publications](#)

[Make a charitable contribution](#)

## For More Information

Visit RAND at [www.rand.org](http://www.rand.org)

Explore [RAND Center for Terrorism Risk Management Policy](#)

View [document details](#)

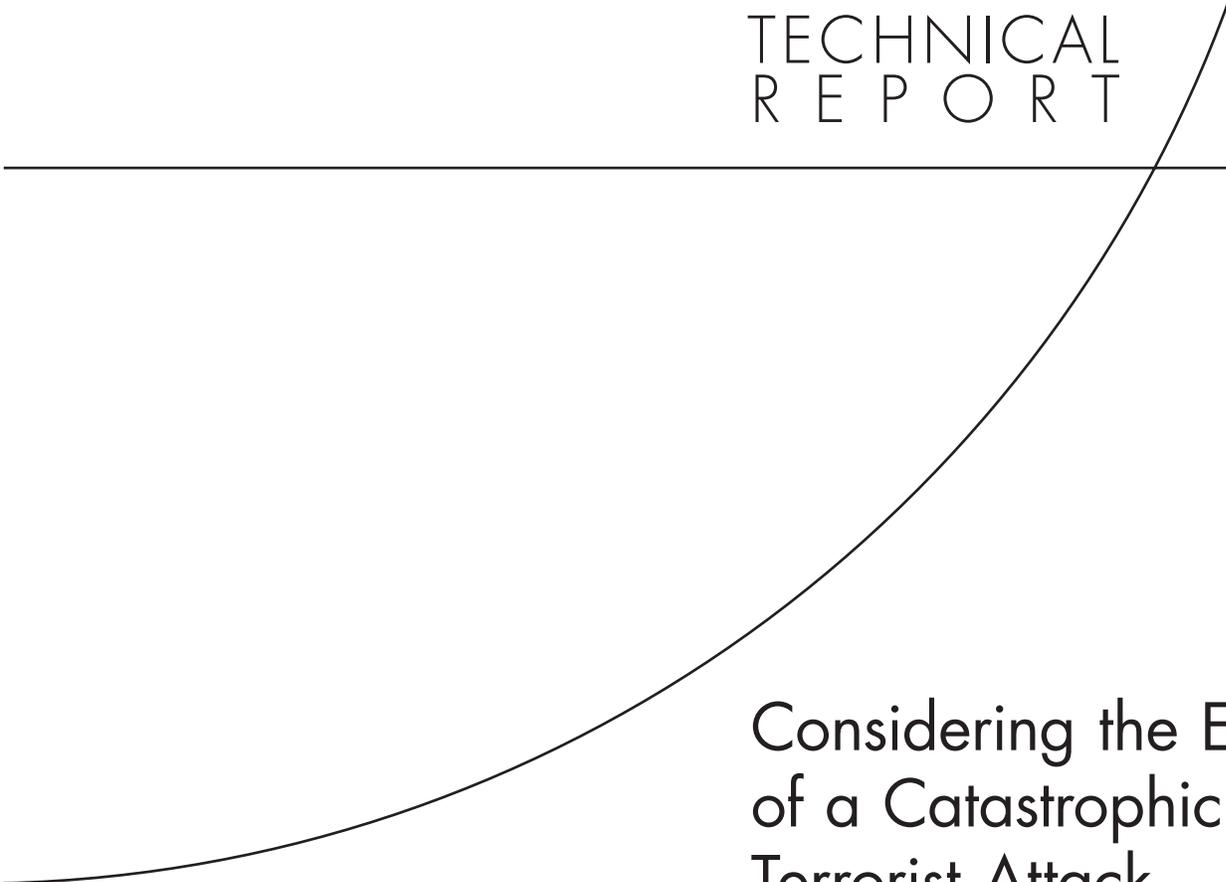
## Limited Electronic Distribution Rights

This document and trademark(s) contained herein are protected by law as indicated in a notice appearing later in this work. This electronic representation of RAND intellectual property is provided for non-commercial use only. Permission is required from RAND to reproduce, or reuse in another form, any of our research documents for commercial use.

This product is part of the RAND Corporation technical report series. Reports may include research findings on a specific topic that is limited in scope; present discussions of the methodology employed in research; provide literature reviews, survey instruments, modeling exercises, guidelines for practitioners and research professionals, and supporting documentation; or deliver preliminary findings. All RAND reports undergo rigorous peer review to ensure that they meet high standards for research quality and objectivity.

TECHNICAL  
R E P O R T

---



# Considering the Effects of a Catastrophic Terrorist Attack

Charles Meade, Roger C. Molander



CENTER FOR TERRORISM RISK MANAGEMENT POLICY

The research described in this report was conducted by the RAND Center for Terrorism Risk Management Policy.

The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors.

**RAND**® is a registered trademark.

© Copyright 2006 RAND Corporation

All rights reserved. No part of this book may be reproduced in any form by any electronic or mechanical means (including photocopying, recording, or information storage and retrieval) without permission in writing from RAND.

Published 2006 by the RAND Corporation  
1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138  
1200 South Hayes Street, Arlington, VA 22202-5050  
4570 Fifth Avenue, Suite 600, Pittsburgh, PA 15213  
RAND URL: <http://www.rand.org/>  
To order RAND documents or to obtain additional information, contact  
Distribution Services: Telephone: (310) 451-7002;  
Fax: (310) 451-6915; Email: [order@rand.org](mailto:order@rand.org)

## Summary

---

A quickly growing concern about terrorism is that a devastating attack would send social and economic aftershocks cascading through multiple sectors long after the initial strike was over. While much analysis has been done on the possible short-term effects of an attack of this magnitude, no work has investigated longer-term implications. Exploratory efforts to do so are needed.

With this motivation, the RAND team developed a novel approach that enabled us to investigate two key policy questions:

- *Within the first 72 hours, what would the direct effects of such an attack be? What human casualties, property damage, and destruction of infrastructure would result immediately?*
- *In the weeks and months after the attack, what would the longer-term economic implications be? From a decisionmaking standpoint, what would the particularly challenging policy issues be? What would the high-priority concerns for different stakeholder groups be?*

To answer the first question, we conducted a scenario analysis; strategic gaming provided us with insights into the second. Both tools provide means of exploring highly uncertain policy landscapes. In scenario analysis, researchers posit a “what if” framework and examine how various factors might interact to generate a sequence of events—i.e., “What if such and such happened next?” In strategic gaming, participants are realistically immersed in a stressful event and directed to explore the resulting policy challenges for various stakeholders. By combining these approaches, we were able to link the immediate challenges of a hypothetical attack with its possible consequences at a macro level.

### **A Devastating Attack on a Key Component of the U.S. Economic Infrastructure**

In our scenario, terrorists conceal a 10-kiloton nuclear bomb in a shipping container and ship it to the Port of Long Beach. Unloaded onto a pier, it explodes shortly thereafter. This is referred to as a “ground-burst” as opposed to an “airburst” explosion. We used this scenario because analysts consider it feasible, it is highly likely to have a catastrophic effect, and the target is both a key part of the U.S. economic infrastructure and a critical global shipping center.

This scenario formed the basis for strategic games with leaders from government, business, and the insurance and real estate industries. Participants shared their perspectives on what the attack's longer-term consequences might be and outlined the decisions they would be likely to make in response to the sequence of events our scenario analysis suggested. They also anticipated the decisionmaking challenges that might arise and reflected on strategies that might address these problems.

## **Both Short- and Long-Term Repercussions of the Attack Could Be Overwhelming**

Within the first 72 hours, the attack would devastate a vast portion of the Los Angeles metropolitan area. Because ground-burst explosions generate particularly large amounts of highly radioactive debris, fallout from the blast would cause much of the destruction. In some of the most dramatic possible outcomes:

- Sixty thousand people might die instantly from the blast itself or quickly thereafter from radiation poisoning.
- One-hundred-fifty thousand more might be exposed to hazardous levels of radioactive water and sediment from the port, requiring emergency medical treatment.
- The blast and subsequent fires might completely destroy the entire infrastructure and all ships in the Port of Long Beach and the adjoining Port of Los Angeles.
- Six million people might try to evacuate the Los Angeles region.
- Two to three million people might need relocation because fallout will have contaminated a 500-km<sup>2</sup> area.
- Gasoline supplies might run critically short across the entire region because of the loss of Long Beach's refineries—responsible for one-third of the gas west of the Rockies.

## **Economic Implications in the Weeks and Months After the Attack**

The early costs of the Long Beach scenario could exceed \$1 trillion, driven by outlay for medical care, insurance claims, workers' compensation, evacuation, and construction. The \$50 billion to \$100 billion for 9/11 puts this figure into perspective. In general, consequences would far outstrip the resources available to cope with them.

In addition, over time, the economic effects of the catastrophe are likely to spread far beyond the initial attack, reaching a national and even international scale. Decisionmakers would face two particularly difficult challenges: keeping the global shipping supply chain operating and restoring orderly economic relationships.

### **Keeping the Global Shipping Supply Chain Operating**

In the aftermath of the attack, different stakeholder groups affected might have differing interests. Consequently, their decisions might often be at odds. How to contend with such conflicting interests is the key challenge for policymakers. In terms of global shipping, the main tension might be between the political aim of preventing a future attack and the business interest in seeing that U.S. ports and the global shipping supply chain continue to operate. The only way to completely mitigate the risk of a second strike would be to close all U.S. ports and suspend all imports indefinitely. This would be the national security community's likely position. Yet in business terms, this position would be untenable. The loss of the ports of Long Beach and Los Angeles alone, which handle 30 percent of U.S. shipping imports, would already be substantial. All U.S. ports combined carry out 7.5 percent of world trade activity. Accordingly, the business community would likely call for ports to stay open, or to reopen as early as possible.

But harsh realities facing the financial and real estate communities might prove a barrier. The Long Beach attack might cripple an insurance industry struggling to absorb massive losses from claims. Insurance would be in tremendously short supply—particularly for terrorist and nuclear risks. Without it, ports and related infrastructure could not operate. Further complicating the issue is the high probability that people would flee port cities, severely depleting local labor supplies. Given these conditions, all U.S. ports would likely close indefinitely or operate at a substantially reduced level following the attack. This would severely disrupt the availability of basic goods and petroleum throughout the country.

### **Restoring Orderly Economic Relationships**

The attack is likely to have dramatic economic consequences well beyond the Los Angeles area:

- Many loans and mortgages in Southern California might default.
- Some of the nation's largest insurance companies might go bankrupt.
- Investors in some of the largest financial markets might be unable to meet contract obligations for futures and derivatives.

While exact outcomes are difficult to predict, these hypothetical consequences suggest alarming vulnerabilities. Restoring normalcy to economic relations would be daunting, as would meeting the sweeping demands to compensate all of the losses.

### **Next Steps Would Involve Further Modeling and Gaming**

The analysis tools we developed for this study lay the groundwork for research exploring both the short- and long-term effects of catastrophic events. The need is pressing to continue such investigations, particularly of longer-term economic repercussions. This work would entail developing scenarios for a new generation of strategic games. The overarching goals would be to gain further insights into the policy and economic decisions likely to be made in the months

following attacks of this magnitude and characterize the decision landscape. For example, we could illuminate any potentially unprecedented behavior that might occur in the global economy in times of extreme duress, identify where existing systems are likely to fail, and evaluate the benefits of a range of potential economic policies. In this way, policymakers could start to anticipate the types of decisions they might be called upon to make, reflect in times of relative calm on their options, and plan well in advance for contingencies.