A STRATEGIC SAFETY-RISK MANAGEMENT PLAN FOR RECOVERY AFTER DISASTER OPERATIONS

Presented by:

SARMAD

Safety, Risk Management, And Decision-making Research Group

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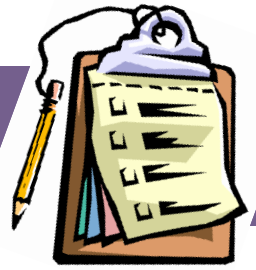
Agenda



- Problem Statement
- Background
- Research Objectives
- Research Methods
- Results and Discussion
- Practical Applications

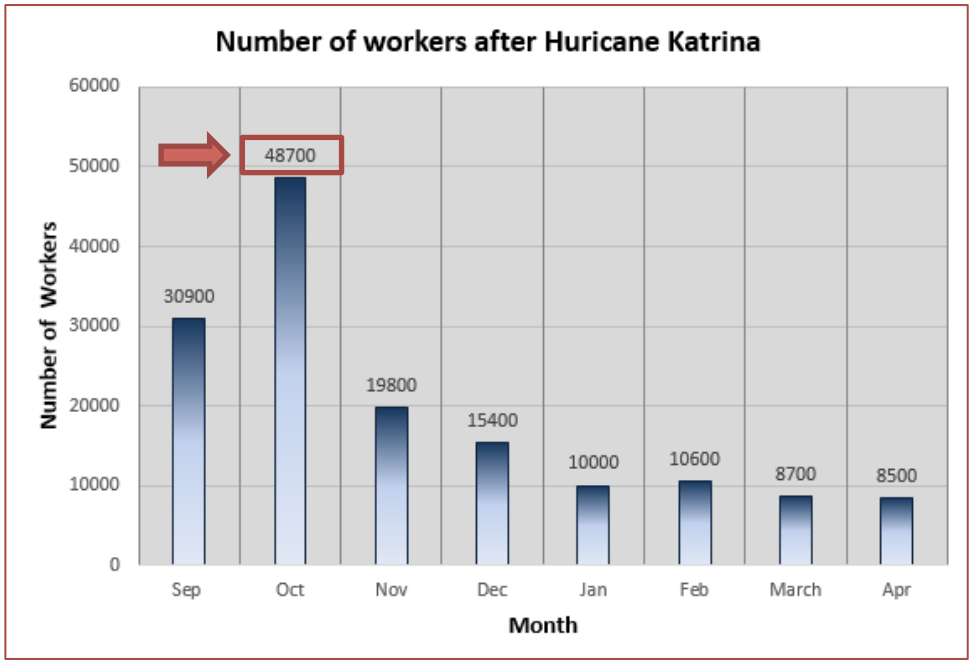
Problem Statement

- The Impacts of disasters in our lives:
  - ✓ Disasters cause approximately $24 billion worth of damage and affect the lives of 60 million people around the world every year
  - ✓ In 2010, an earthquake in Haiti destroyed over 250,000 houses)
  - ✓ In the U.S.A. (1980-1999), 13 hurricanes caused $68 billion in damages and more than 400 deaths.

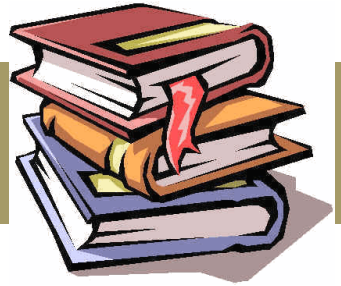
Recovery operations involve
Construction Workers

Problem Statement

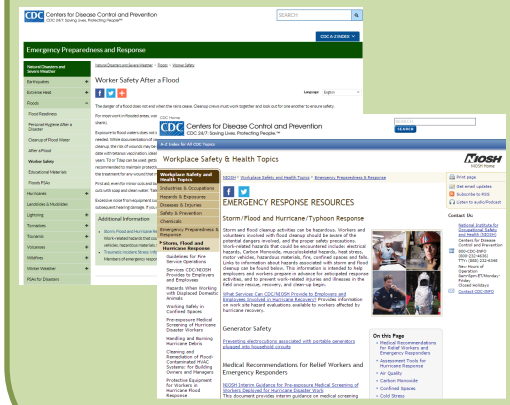
- Available data from different agencies reveals that workers faced over 3000 injuries and illness during recovery operations after hurricane Katrina.
- 11 workers lost their lives during these operations.
- Among 2801 causalities in ground zero, 343 victims were firefighters.



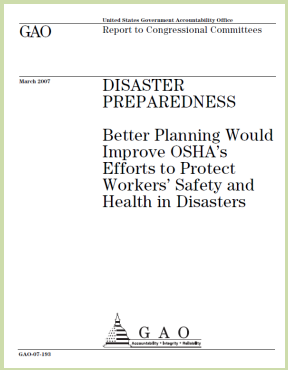
Background

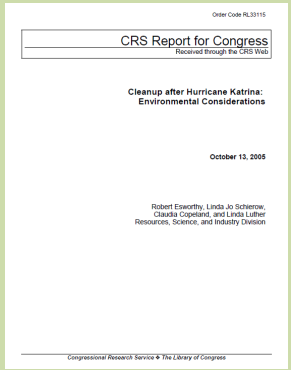


CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION



Studies & Reports





OSHA® FactSheet

There is no study to analyze safety risk of different hazards!

Research Objectives

1. Identifying common hazards in post-disaster recovery and reconstruction
2. Quantifying the safety risk of common hazards
3. Developing a safety guideline for workers involved in post-disaster recovery
4. Developing a mobile application to disseminate results of the study.

Research Method Overview

Literature Review

Google Scholar · FEMA · ASCE American Society of Civil Engineers · National Institute for Occupational Safety and Health NIOSH · OSHA

Hazards in Post-disaster

Data Collection

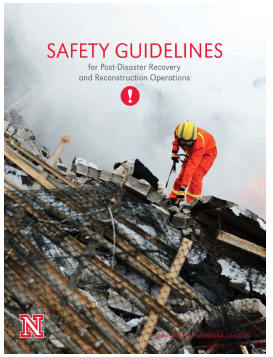
#	Hazards	Frequency	Severity	Risk
35	Working in cold or windy weather (Weather)	4.5	4	18
33	Working in a hot and humid outdoor condition for a long time (Weather)	4	3.5	14
40	Performing an activity frequently (Ergonomic)	4	3	12

- ❑ Developing a survey to collect severity and frequency of injuries associated with each hazard.

Results

Dissemination

Safety Guidelines



Mobile Application

Scenarios in Recovery after disasters

De- Watering

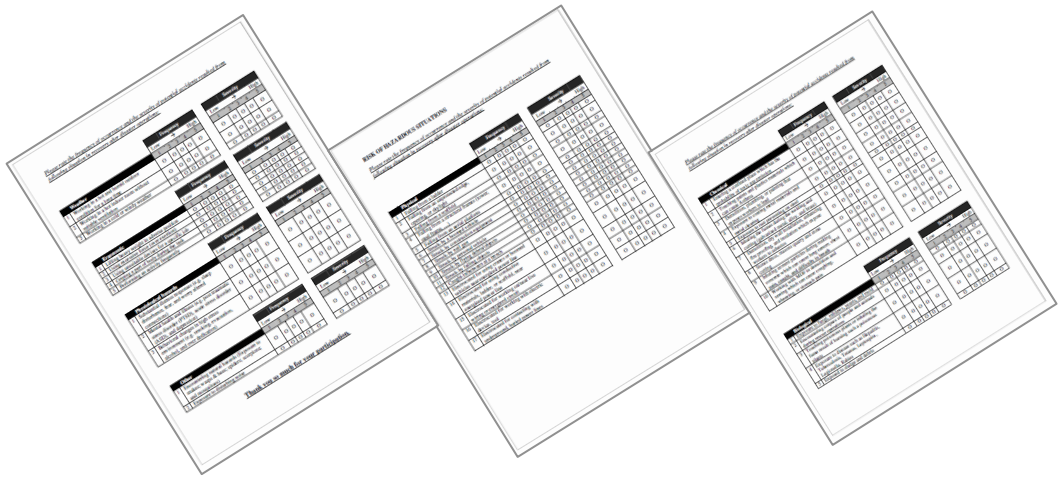
Cleaning up and Debris Removal

Using Portable Generator

Demolition and Rehabilitation

Risk Assessment

List of Hazards



14
Safety Managers

NDOR Nebraska Department of Roads

The Associated General Contractors of America

ABC Associated Builders and Contractors, Inc. Empire State Chapter

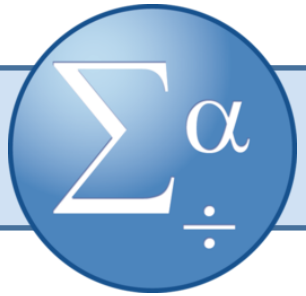
Risk = Severity × Frequency
(Median) (Median)

Cronbach's Alpha

Cronbach's alpha is a measure of **internal consistency**, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability.

- A high value (> 0.90) of Cronbach alpha does not show that the measure is **unidimensional**.
- A high value (>0.90) shows **redundancies** and suggests that the test length should be shortened.

Cronbach alpha of Frequency = 0.984



Cronbach alpha of Severity = 0.992

Results and Discussion

#	Hazards	Frequency	Severity	Risk
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#	Hazards	Frequency	Severity	Risk
12	Caught-in/between a trench (Physical)	1	4.5	4.5
13	Electrocuted while using cranes or boomed vehicles near energized power line (Physical)	1	4.5	4.5
14	Electrocuted while using conductive materials, ladder, or scaffold, near energized power line (Physical)	1	4.5	4.5
15	Electrocuted while working on/near live wiring or energized circuit (Physical)	1	5	5

#	Hazards	Frequency	Severity	Risk
10	Struck-by flying debris/objects (Physical)	2.5	3	7.5
18	Entering a confined place that has the probability of toxic gas emission (Chemical)	1	3.5	3.5
28-32	Biological Hazards	2	3	6
41-43	Psychological Hazards	2	3	6

Results and Discussion

Risk Assessment			Frequency				
			highly unlikely	unlikely	likely	highly likely	Near certainly
			1	2	3	4	5
Severity	Fatality	5	PHY (12, 13,14,15) 5	10	15	20	25
	Major injuries	4	Phy(2,5,6,16), Chem (18) 4	Phy (3,4,7,9,17) 8	12	Weather (33) 16	Weather (35) 20
	Moderate injeries	3	Phy (8), Chem (20,21,24) 3	Phy (1,11), Cehm (19,22,26,27), Bio (28,29,31), Erg (37,38), Weather (34) Psy(41,42,43) 6	Phy (10), Chem (23), Erg (36) 9	Other (44,45), Erg (40) 12	15
	Minor injuries	2	Chem (25) 2	Bio (30,32) Erg(39) 4	6	8	10
	Trivial injuries	1	1	2	3	4	5

RED

Extremly risky. Emergency attention is required

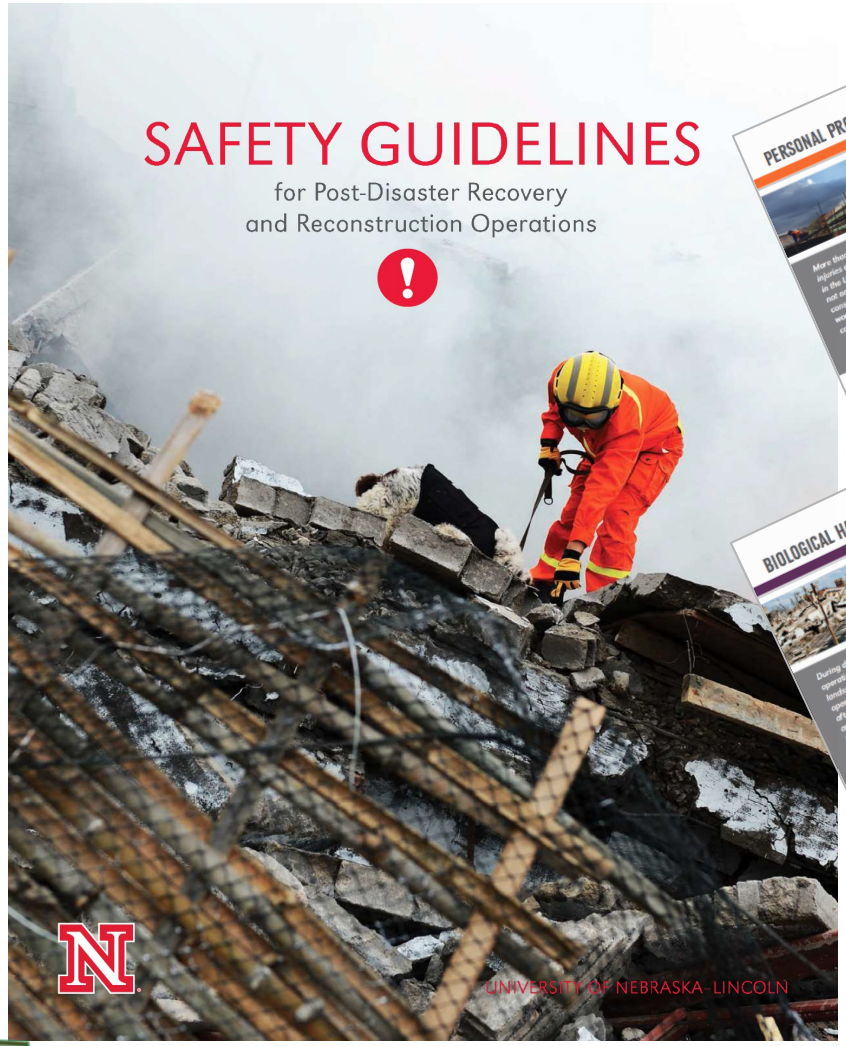
Yellow

Hazardous. This risks should be taken into the consideration

Green

Negligence risks. Minimum action is needed for prevention

Practical Applications



Practical Applications

Questions

Thank you for your time.

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