

Developing the Ontario Provincial Hazard Identification and Risk Assessment

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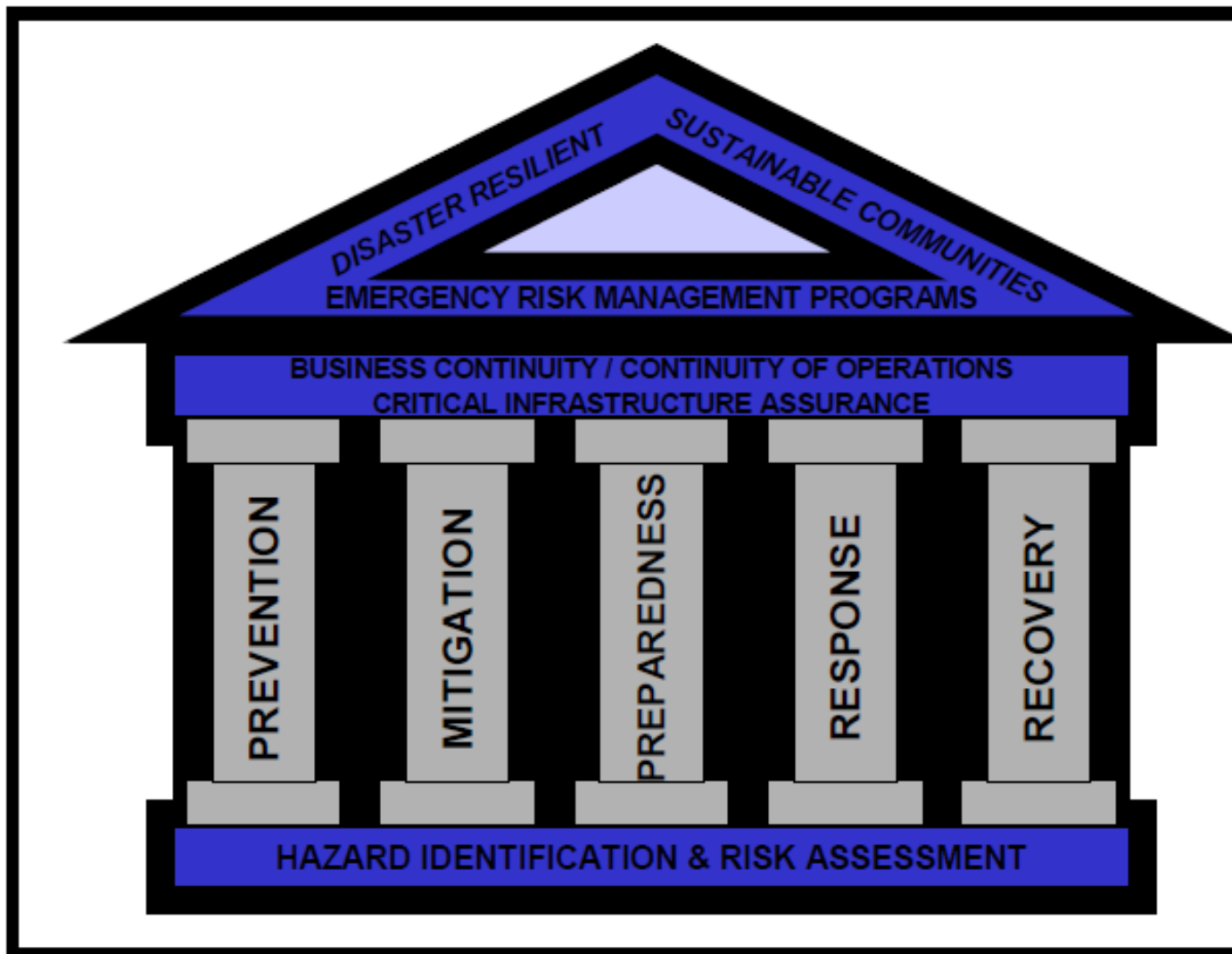
Introduction

- Emergency management programs in Ontario are required by the EMCPA to be risk-based.
- A risk-based approach has many advantages:
 - Helps emergency managers prepare for the worst and/or most likely risks.
 - Allows for the creation of exercises, training programs and plans based on the most likely scenarios.
 - Saves time by isolating hazards that can not occur in the area.

Continued

- Systematic risk assessments (such as HIRA) can shift the focus of emergency management programs away from being reactive to pro-active.
- A pro-active approach to emergency management can result in a more disaster-resilient Province.

Foundation of Emergency Management



Risk Assessment in Ontario (Pre-2012)

Prior to the release of the HIRA in 2012:

- Most current version released in 2005
- No standardized methodology
- Lack of scientific/subject matter expert consultation and review
- No ranking/prioritization of hazards
- Based on historic events
- Lack of data to inform stakeholder HIRAs
- Project approach; not an ongoing process

Approach to Building the HIRA Program

- Identify the purpose, scope and requirements of the HIRA.
- Identify best practices and gaps.
- Identify opportunities for collaboration.
- Establish an internal and external stakeholder review process that included scientists, subject matter experts, and risk assessment professionals.
- Create a review cycle for documents.

Purpose and Scope

Purpose:

- To identify and assess the risks posed by perceived natural, technological, and human-caused hazards.
- To identify which hazards should be the focus of the Provincial emergency management organization at a particular point in time based on their level of risk.

Scope:

- To identify and assess hazards that could result in an emergency situation within Ontario.

Requirements

- risk-based;
- assess different types of hazards.
- allow for the addition of currently unknown and evolving hazards;
- incorporate both qualitative and quantitative information;
- incorporate as much scientific information as possible;
- applicable to a range of event consequences and frequencies;
- scalable;
- consider a variety of consequences;
- simple enough to be easily understood by a diverse group of people with different professional backgrounds.

Scientific Literature Review

A comprehensive review of the scientific literature on risk assessment and hazards was undertaken. The results indicated:

- Emergencies = Hazard + Vulnerability
- The past is not always the key to the future.
- Emergencies can result in a myriad of impacts, including psychosocial.
- Risk assessment is an ongoing process.
- Need to integrate the practitioner and academic communities.
- Awareness of black swan events
- Importance of cascading impacts
- Need to be proactive.

Jurisdictional Scan and Gap Analysis

Risk assessments were assessed based on the findings of the literature review to identify any gaps in emergency management risk assessment practice.

The findings include:

- Lack of standardization (methodology, terminology).
- Inaccurate information.
- Heavy reliance on past events to assess future risk.
- Unidentified hazards.
- Risk assessment as a project, rather than a program.

Emergencies = Hazard + Vulnerability

- A hazard that occurs and does not intersect with vulnerability will not result in an emergency.
- To be fully effective, risk assessment must be part of a comprehensive risk management approach that includes vulnerability assessment.
- Risk assessment in layers can be used in scenario development.
- Vulnerability is not static.



Moving to a Proactive Approach

Hazards and risk are **not** static. Some of the primary influencing factors include:

- Emerging hazards
- Climate change
- Population density/demographic changes
- Technological advancements
- Critical infrastructure dependency
- Mitigation measures



Becoming Proactive

Risk assessments can become more proactive through methodology and through process.

Traditional risk assessments tend to be based on:

$$\text{Risk} = \text{Consequence} \times \text{Frequency}$$

Given that the past is no longer the key to the future, how can we be proactive?

$$\text{Risk} = \text{Consequence} \times \text{Frequency} \times \text{Changing Risk}$$

Process changes include a cultural shift towards the understanding of risk assessment as an ongoing program rather than a project.

Changing Risk

- HIRA is possibly the only EM risk assessment currently in practice to include changes that influence risk levels.
- Includes changes in frequency and vulnerability.
- Weighted less than consequence or frequency due to uncertainty/prediction.
- Information comes from scientific predictions, forecasts, modeling, usually grounded in statistics.



Review of Impact Variables

There are a diverse set of impacts that can arise during a potential emergency situation.

Traditional risk assessments tend to include:

- Social impacts
- Property damage
- Environmental damage
- Economic impact
- Other



HIRA Impact Categories

Based on the results of the literature review and jurisdictional scan the following variables were identified for inclusion in the Provincial HIRA:

- Social impacts (fatalities, injuries, and evacuation/shelter in place)
- Property damage
- Environmental damage
- Business/financial impact
- Critical infrastructure disruptions
- Psychosocial impacts



HIRA as an Ongoing Process

- Continued collaboration between academics, researchers, and practitioners to identify opportunities.
- Encourages the development of related HIRA tools including tree diagrams of cascading hazards.
- Identification of evolving risks and emerging hazards.
- Ensures that information and data is accurate and current.
- Allows for the continuous improvement of HIRA and the development of effective and efficient risk management practices.



Identifying Hazards

- Hazards and risk change over time due to many different factors.
- Effective risk assessments must be flexible to include emerging hazards.
- Three hazards were added to the HIRA in 2012:
 - Geomagnetic/Solar Storm
 - Cyber Attack
 - Natural Space Object Crash



Moving Towards Standardization

- Prior to 2012, there was no clear guidance in terms of risk assessment in Ontario.
 - Communities, ministries, and other organizations used many different risk assessment methods that varied greatly in terms of quality and defensibility.
- The HIRA method has been well received and held up as an international best practice.
 - It has been undergoing rapid adoption in Ontario with communities of all sizes.
 - Communities that have already adopted it include: Ottawa, Burlington, Hamilton, Cobourg and many others.

Moving Towards Standardization Continued

Information regarding the HIRA has greatly assisted in the rate of adoption:

- Online versions
- Direct distribution to MEMCs and CEMCs
- Direct correspondence with HIRA Officer for subject matter expertise encouraged.
- Delivery and advice from Field Officers
- Community run workshops
- Conference presentations
- Advocates

Challenges

- Data access and availability
- Silos and terminology
- Cultural shift



Thank You!

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