



EMERGENCY PREPAREDNESS CAPACITY BUILDERS

Hazard Identification & Business Impact Analysis

Hazard Identification & Business Impact Analysis Guideline

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Introduction: Business Impact Analysis

How well informed are your emergency plans and business continuity arrangements?
Are you doing as well as can reasonably be expected?

The relevant matters to take into account by courts and coronial enquiries in considering the quality of management exercised center around key performance tests about your state of knowledge and its application.

They focus on considerations around what you ought to know (or be reasonably expected to find out) about risks.

In particular, this test is about: **assessing risk severity or business impact:**

- To what extent can and ought you reasonably be able to foresee the extent of harm likely to be caused.
- How do you ensure that you exercise “sound” judgment around probability & consequence?

Figure: Duty of Care and Best Practice Framework

<p>1. State of Knowledge (This is about the risk and treatment options — What is a reasonable expectation one can hold of the person exercising the risk decision? What ought to have they known?)</p>	<p>Consider acceptability (in terms of both individual and societal tolerance). The scope of “community” participation.</p>
<p>2. Risk Severity (This is about how big / high is the risk — generally as a function of probability and consequence)</p>	<p>Determine significance of estimated risks (in absolute and comparative terms).</p>
<p>3. Cost of Fixes (This is about cost effectiveness and reasonableness — should you use a million dollar fix for a ten cent problem)</p>	<p>Comparing levels of risk found in analysis with previously established criteria Examine costs and benefits of control for most serious risks. Study economic impact and funding options for response and recovery.</p>
<p>4. Availability & Suitability of Fixes (This is a benchmarking issue and is similar to the 'constructive knowledge' principle applied in the state of knowledge criterion.)</p>	<p>Deciding whether risk can be accepted - decide to accept, reduce, or transfer risk. Producing prioritized list for action</p>

This paper introduces a Resource Kit which will enable compliance with the requirement that:

- "the entity shall identify hazards, the likelihood of their occurrence, and the vulnerability of people, property, the environment, and the entity itself to those hazards" (Ref 3-3 of The Standard on Emergency/Disaster Management and Business Continuity Programs - NFPA 1600); and
- "a continuity of operations plan shall identify the critical and time-sensitive applications, processes, and functions to be recovered and continued, as well as the personnel and procedures necessary to do so, such as business impact analysis, and business continuity management" (Ref 3-6 of The Standard on Emergency/Disaster Management and Business Continuity Programs - NFPA 1600)

Table: The alignment of Problem Solving and Risk Management

Management	Emergency Risk Management
Problem Definition	Identify Issues & Establish Management Framework
Research	Identify & Characterize Hazards and Vulnerabilities
	Develop Evaluation Criteria
Analysis	Profile Risks
Decision Making	Evaluate Risks
Implementation	Identify Options (Prevention, Preparedness, Response & Recovery); Evaluate Options; Plan & Implement Capacity Building Strategies

The management priority is how best to reduce major risks.

This Emergency Preparedness Capacity Builders learning resource is about building your capability with regard to these key tests - especially with regard to **Problem Solving & Opportunity Identification**.

Our Problem Definition framework includes:

- Mapping the context - of the entity, hazards and existing capabilities.
- Identifying and researching features of hazards to which the entity may be exposed.
- Generating scenarios by identifying what, why, where, when and how events could effect the entity (household / livelihood / organization / business). Consider and analyze the range of potential consequences and how likely those consequences are to occur in the context of existing capabilities.
- Comparing estimated levels of risk against your predetermined assessment criteria - this enables judgments to be made about management priorities.

Business Impact Analysis considers

- What can affect my business?
- How will it affect my business?

With this knowledge a manager can then determine how best to manage risks posed by the hazards.

Our **Business Impact Analysis** applies the following steps:

1. **Develop an entity profile.**
2. **Identify and profile hazards.**
3. **Establish risk assessment criteria.**
4. **Create and apply impact scenarios.**
5. **Compare and prioritize risks.**

Why five steps? Sound Business Impact Analysis is about successful problem structuring - a crucial first step in developing successful solutions. One is reminded of an important type of incompleteness by the story of the man who was looking for his lost keys under the street-lamp. No, he did not lose the keys there, but it was easier to see! The limitations imposed by the types of readily available data distort the analysis so that it may judge what is readily measured rather than what is important (White 1988) are often compounded when data deficiency is disguised by impressive marketing displays and “gee look at that” software.

All emergency responses differ in details and certain specific aspects. Contaminated soil under an urban housing estate and a high rise fire in the Central Business District require different management. However there are sufficient common aspects across many hazard agents and entities at risk that some general guidance can be of

practical value. Given the constraints of "the fog of disaster" and the "uncertainty of risk" it is reasonable to expect emergency managers to do as well as they can under the circumstances. Questions of how well can they reasonably be expected to perform are easy to ask "in slow time, on a sunny day". Nevertheless, in this guide we outline a broad and generic five step aide memoir of practical value to emergency managers in both the planning and response phases of disasters. Such decision devices, when used as discovery prompts, can provide useful guidance for probing considerations. They may also be dangerous restraints to productive and flexible decision making if they are followed too narrowly. Rather than act as a Procrustean bed, they should prompt the decision maker to look critically and ask thoughtfully.

Steps one and two occur concurrently and are functions of intelligence - the quest for accurate and timely information, on which to make decisions: "Entity data" (Step 1) and "Hazard data"(Step 2). The importance of collecting both sets of data is premised on the recognition that disaster management is fundamentally about the extreme event and vulnerable entities. "Scenario Analysis" (Step 4) involves scoping the interaction between (Step 1) and (Step2) and involves increased degrees of judgement. The preceding stages should inform the final (Step 5) crucial decisions about risk and action. Crucial decisions are defined as "those which have significant consequences" (Janis, 1989) - as such they will benefit from as much consideration as constraints allow.

What is the best decision?

- Base the decision on the best available information.
- Give priority to preventing risks, not just controlling them.
- Choose options that are feasible, with benefits reasonably related to costs.

Solution Implementation

The information from the Impact Analysis should be used in the development of plans. It indicates which hazards merit special attention, what actions might be taken to reduce impact of those hazards, and what resources are likely to be needed.

- For unacceptable risks, avoid the risk by deciding not to proceed with the activity likely to create the risk (where this is practicable).
- Where risk can not be avoided change the consequences, by strengthening your capability. Develop emergency preparedness plans / business continuity plans which identify, evaluate and implement specific cost-effective strategies and actions for strengthening resilience and reducing potential costs.
- Review the performance of the risk management strategies and seek to detect changes that might affect the cost effectiveness of the strategies.

The first step is the designation of the person or persons who will be responsible for development of the plan. To develop and implement a successful plan, management must demonstrate commitment to this project and promote an atmosphere of cooperation by authorizing the planning group to take the steps necessary to develop a plan. The individual selected should be knowledgeable of the business's context, its operations, assets and facilities. Large and more complex businesses should use the team concept in developing a plan. The concept of "**communities**"¹ provides a valuable model for business as it lends itself to collective action. The philosophy behind our approach is one of empowerment. Capacity is about things of "use value" – considerations include issues such as access to information and social networks. Empowered "communities" (households, organizations or businesses) become increasingly able to deal with more and complex issues. Indeed, the "community" that has established capabilities for building relationships, organizing intervention, and achieving results has taken the valuable first steps to becoming more resilient.

¹ "**Community**" is defined as any group with a "shared association". They may be a geographical area or groups with common interests (including business entities and service providers). In terms of "community", a group may be identified by:

Geographically-based groupings of people such as: households, neighborhood, suburbs, towns, local government areas, cities, regions, states and the nation.

Shared-experience groupings of people such as: particular-interest groups, ethnic groups, professional groups, language groups, age groupings, those exposed to a particular hazard.

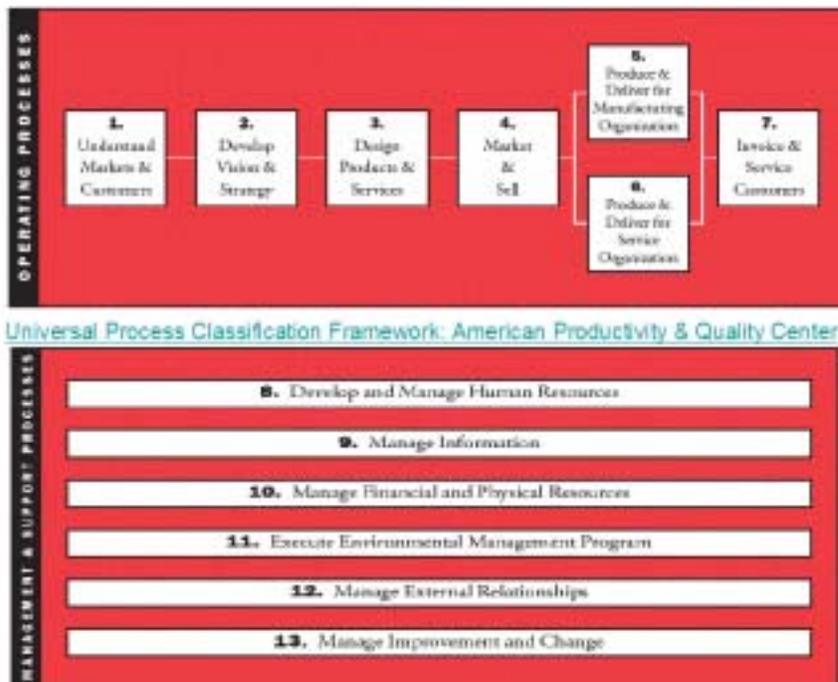
Sector-based groupings such as: agricultural, manufacturing, commercial, mining, education sectors. It may be necessary to consider groups within these sectors (e.g., the food processing group within the manufacturing sector).

Functionally-based groupings such as: service providers responsible for systems or networks which provide for the movement of people, goods, services and information on which health, safety, comfort and economic activity depends (lifelines).

Step 1: Develop an entity profile

- This step is focused on “MAPPING” features of the vulnerable entity – in geographic and social space.
- Critical elements of the entity and its business (people, facilities, equipment and processes)

This systems analysis begins by studying and mapping, in flow diagrams, the entire operational system(s). The systems analysis is best done through workshop and interview processes where detailed information on each part of the system and its separate vulnerabilities can be established.

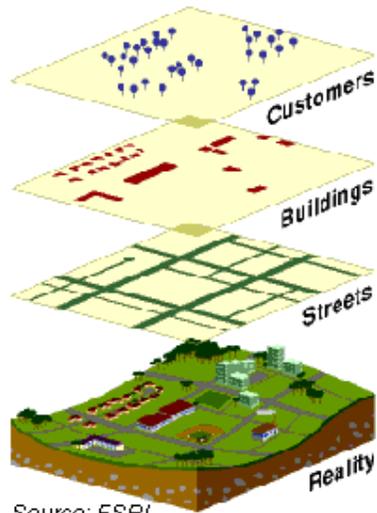


Identifying Elements at Risk.

- ✓ Company products, services, facilities, and equipment needed to produce them.
- ✓ Products and services provided by suppliers, especially sole-source vendors. (If a sole-source vendor has an emergency, it will impact your company.)
- ✓ Lifeline services such as electrical power, water, sewer, gas, telecommunications and transportation. What backup systems or alternatives are in place?

- ✓ Identify operations, equipment and personnel vital to the continued functioning of the business.
- ✓ Investigate alternatives for computer data backup and storage, such as CDs, zip drives, offsite data storage, and laptop computers.
- ✓ Consider all functions performed and the communications (both voice and data) used to support them. How would the loss of these functions impact the facility, both in normal operations and in an emergency?
- ✓ Talk with your communication vendors (both voice and data) about their emergency response capabilities.
- ✓ Prioritize all facility communications. Determine which should be restored first. Determine the need for backup communications for each business function. Options can include messengers, portable phones, amateur radios, satellite communications, and high-frequency radio.
- ✓ Work with your Internet provider. Speak with them about their plans and how they may be able to assist you.

Geographic Features and Relative Location



The importance of geographic space in risk management has been well known since the value of hill settlement fortifications and analyses of Cholera correlations by John Snow.

A sophisticated Geographic information system may not be available to you but it also may not be necessary. Indeed, great value is often derived by people working together over a suitably scaled map covered with heavy duty plastic, with some colored felt pens and Post-It pads.

Layering information in a way that makes it meaningful at a glance is very useful. Where flow charts show operational process vulnerabilities this too can be drawn on the base map.

Identify risk-related information in a *visible way*. A simple and resource-effective way to do so is to focus all key details on a large scale map of the entity and its environs, which will become the foundation for additional layers of information.

Ensure the map is:

- The latest and most accurate reflection of the community
- Large in size yet able to be moved
- Marked with:
 - Relevant natural or geographical barriers (e.g., lakes, rivers)
 - Key human-constructed structures
 - Political or jurisdictional boundaries
- Located in a place safe from defacing, or damage

Only data that is not likely to change easily should be marked directly on the map.

All other information should be illustrated using other tools. These tools may include small pins (i.e. colour-coded or ones with small paper “flags”), stickers (i.e., in colour, or white with significant markings), or plastic overlays. Another option is the use of thin strings or threads. These can be attached at one end by a pin to a key point on the map, and on the other to a space off the map area where there is more space to expand on the desired information.

Plastic overlays are an inexpensive and simple way to portray information.

This technique could be used in many ways. It can be used to display broad or general information prior to the use of other tools (e.g. pins). Consider using overlays to identify different aspects of the entity and environs. In that case:

- Get a sufficiently large sheet of clear and sturdy plastic
- Lay it on the map so that it covers a little more than the area desired
- Use clear tape or pins to secure the overlay into place
- Mark on the overlay the boundaries of the area that you want to illustrate
- Use light shading or different colors to define the information you wish to highlight
- Encourage people to be flexible and creative!

You may mark onto the overlays the location of specific sites or other key data. When doing so, ensure that the overlay is on the main map and that sites marked on the overlay are also aligned correctly with the map coordinates. Identify the map coordinates or reference points at two opposite corners of the overlay, when it is secured on top of the map. In this way, the overlay could be taken off the map but quickly and accurately realigned back onto the map.

This data will be specific to the environment under consideration be that a high rise building or a flood plain. Impact area data incorporates a broad set of information about the "total environment": e.g. topography, infrastructure, business networks and people. Some of the things to be noted include:

- Infrastructure lifelines including utilities, communication, and transportation systems.
- Topography and soil composition.
- Essential facilities such as fire departments.
- Special facilities such as health care facilities, schools, and nursing homes.
- Unique, historic or other cultural resources.
- Hazardous materials production/storage/transport.
- Property characteristics such as land use and type of construction.
- The availability of emergency response resources.
- The capability of emergency response resources.
- Hot spots —features such as sites where significant amounts of dangerous goods are stored or transported, fault lines, bush / urban fire interface, mountains, rivers, canyons, coastal areas, etc. In short, places that relate to risk sources or potential disaster occurrences.
- Vulnerable Infrastructure—utilities, communication system, major highway transportation routes including bridges, and mass transit systems.
- Property - numbers and general characteristics such as land use, types of construction, manufactured homes, building codes, essential facilities and potential
- Demographics—population size, distribution and concentrations, special populations (e.g. childcare facilities, nursing homes, prisons) and animal populations.
- Potential Response Agency Capability—information about locations, facilities, services and resources that are available for response capability.
- Availability of warnings—how much warning time there is, and whether there is a warning system. Warning comprises several processes including monitoring conditions, forecasting levels, disseminating warnings, and influencing those at risk to take effective action to prepare for and respond to warnings. People who live and work in areas at risk can benefit from accurate, reliable and timely warnings. They can take action to protect life and reduce damage to their property. The opposite also applies. When premising the behaviour of people across the area at risk, “warning” is an important indicator of capability. Warnings have to be received, not merely issued. You may say what you like, how you like, where you like and when you like but if it does not evoke appropriate protective behaviour from the people at risk then you have not warned. These considerations could be premised by a data set that goes beyond the necessary but not sufficient question "how many". There is a need to encompass (whenever possible) the other aspects of the populations at risk such as age, mobility, gender, socio-economic status, ethnicity etc. These aspects have significant influence on the success (or otherwise) of protection measures such as evacuation.

Step 1: CHECKLIST - Develop an entity profile.

The strategic, organizational and risk management context is established.

1. Achieve top level endorsement.

Top level commitment and sign off endorsing the (emergency risk management) approach is achieved from the entity. This commitment should be maintained by providing feedback as appropriate.

2. Map structure.

The structure (functions and processes) of the entity are mapped and understood. Mapping should be aligned with an accepted best practice framework such as the Universal Process Classification Framework for the private sector developed by the American Productivity and Quality Centre in conjunction with Arthur Andersen, IBM, DEC and Xerox. This framework provides a sound generic basis for the identification of critical functions re Business Continuity Planning. Ref [Universal Process Classification Framework: American Productivity & Quality Center](#). Mapping should be to an appropriate level of detail depending on context entity. It should define the relationship between the organization and its environment - it may identify the organization's strengths, weaknesses, opportunities and threats.

3. Identify critical functions.

Critical functions and processes (for business continuity) are identified. There should be a ranked hierarchy of functions grouped and filtered on the basis of those needed first, if not immediately, through to those which add value normally, but are discretionary in a crisis.

4. Identify key stakeholders.

Groups are defined as "those which have a number of things in common" - they include any shared association relevant to the risk management context. These include the people in the area of impact, employees and their families, suppliers, vendors, and other parties with a stake in the entity and continuity of its operations, providers of social protection (such as planning authorities and emergency service organizations).

5. Differentiate stakeholders.

This process should be conducted in a discrete and respectful way with a view to identifying those with different responsibilities, rights and needs. Consideration may be given to those with whom close, confidential work needs to be done; those who have needs to be supported and informed; and those who (only) need to be made aware in the planning process.

Glossary

Terms and their meanings as used by Emergency Preparedness Capacity Builders

Community	A social group which has a number of things in common generally defined by location, but which may include such things as shared experience, culture, heritage, language and ethnicity. A business is a community.
Consequence	An impact such as economic, social or environmental damage/improvement. ay be expressed quantitatively (e.g. monetary value), by category (e.g. High, Medium, Low) or descriptively.
Disaster	A condition or situation of significant destruction, disruption and/or distress.
Education	The imparting or acquisition of knowledge and the development of intellectual capacity.
Emergency	A condition or situation requiring urgent action or assistance.
Emergency Risk Management	The systematic application of management policies, procedures and practices to the tasks of identifying, analyzing, evaluating, treating and monitoring risks to communities and organizations from extreme events. It involves the development and maintenance of arrangements to prevent or mitigate, prepare for, respond to and recover from emergencies.
Environment	Conditions or influences which surround or interact with a community or organization. Concepts of environment include: <ul style="list-style-type: none">Built environmentPhysical environmentSocial environment
Event	A situation or hazardous occurrence which may require emergency management
Elements at risk	Anything valued may be exposed to risk.
Hazard	A situation or condition with potential for loss or harm
Information	Knowledge communicated or received. That which informs – i.e. reduces uncertainty.
Likelihood	A qualitative description of probability.
Plan (noun)	A detailed scheme of action.
Policy	Agreed principles and practices
Probability	The chance of a specific outcome, measured by the ratio of particular outcomes to the total number of possible outcomes. A measure of the chance that an event will occur. The probability of an event is typically defined as the relative frequency of occurrence of that event, out of all possible events. probability can be expressed as a fraction, % or a decimal. For example, the probability of obtaining a six with a shake of a fair dice is 1/6, 16% or 0.166. Probability is often expressed with reference to a time period, for example, annual exceedance probability.
Residual risk	The risk that remains after risk management and mitigation may include, for example, damage predicted to continue to occur during storm events of greater severity than the 100 to 1 annual chance event.
Resources	People, equipment, finances or any other assets that may be used.
Return period	The expected (mean) time (usually in years) between the exceedance of a particular extreme threshold. Return period is traditionally used to express the frequency of occurrence of an event, although it is often misunderstood as being a probability of occurrence.
Risk	A concept used to give meaning to things, forces or circumstances that pose danger to people or to what they value. Descriptions of risk are typically stated in terms of the likelihood of harm or loss from a hazard. Risk is a combination of the chance of a particular event, with the impact that the event would cause if it occurred. Risk therefore has two components – the chance (or <i>probability</i>) of an event occurring and the impact (or <i>consequence</i>) associated with that event. The consequence of an event may be either desirable or undesirable
Risk analysis	The systematic use of available information to characterize risk.
Risk communication	Interactive processes involving the exchange of information and opinion about risk and its management among individuals, groups and institutions.
Risk evaluation	The process of identifying hazards and consequences, estimating the magnitude and probability of consequences and assessing the significance of the risk(s). The process used to determine risk management treatment priorities.
Risk identification	The systematic process of identifying risks involving an appreciation of the environment, credible sources of and credible elements at risk.

Risk management	The systematic application of management policies, procedures and practices to the tasks of identifying, analyzing, evaluating, treating and monitoring risk.
Risk treatment	Selection and implementation of appropriate intervention strategies for dealing with risk.
Strategy	A possible course of action.
System	In the broadest terms, a <i>system</i> may be described as the social and physical domain within which risks arise and are managed. An understanding of the way a system behaves and, in particular, the mechanisms by which it may fail, is an essential aspect of understanding risk.
Training	The intentional development of certain skills, habits and attitudes through a structured program.
Vulnerability	The degree of susceptibility and resilience of the community and environment to hazards. Assessment involves appreciating the characteristics of a community or system in terms of its capacity to anticipate, cope with and recover from events.