

Rochester Institute of Technology

RIT Digital Institutional Repository

Theses

2004

Designing risk messages in response to human-caused disasters

Michael E. Hellinger

Follow this and additional works at: <https://repository.rit.edu/theses>

Recommended Citation

Hellinger, Michael E., "Designing risk messages in response to human-caused disasters" (2004). Thesis. Rochester Institute of Technology. Accessed from

This Thesis is brought to you for free and open access by the RIT Libraries. For more information, please contact repository@rit.edu.

Graduate Graphic Design Program
School of Design
College of Imaging Arts and Sciences
Rochester Institute of Technology

A Thesis submitted to the Faculty
of the College of Imaging Arts and Sciences
in candidacy for the degree of Master of Fine Arts

DESIGNING RISK MESSAGES IN RESPONSE TO HUMAN-CAUSED DISASTERS

Michael E Hellinger

May 2004

21 May 2004

Bruce Ian Meader

Chief Advisor, Bruce Ian Meader
Associate Professor, School of Design

21 May 2004

M. Ann Howard

Associate Advisor, M. Ann Howard
Associate Professor, College of Liberal Arts

21 May 2004

Deborah Beardslee

Associate Advisor, Deborah Beardslee
Associate Professor, School of Design

5.21.04

Patti J. Lachance

Chairperson, Patti Lachance
Associate Professor, School of Design

*I, Michael E Hellinger, hereby grant permission
to the Wallace Memorial Library of RIT to reproduce my thesis in whole or in part.
Any reproduction will not be for commercial use or profit.*

21 May 2004

Michael E. Hellinger

Michael E Hellinger

1	PROJECT DEFINITION
3	PRECEDENTS
12	RESEARCH
16	SYNTHESIS
20	IDEATION
27	INTERMEDIATE EVALUATION
30	IMPLEMENTATION
32	DISSEMINATION
35	RETROSPECTIVE EVALUATION
37	CONCLUSION
38	GLOSSARY
41	BIBLIOGRAPHY
44	APPENDICES

1.1 *Introduction*

The field of graphic design has contributed to society in specific ways. The author was compelled to focus on a newer area for the field to address – designing in response to human-caused disasters. This has been emphasized in the past two decades due to these kinds of disasters and subsequent legislation. This underlying effort is supported by design philosophies that attempt to direct the discipline to different practical problems of human importance. The purpose of discovering these new problems has been as valuable as the chosen context. Research on the chosen topic led to determining the designers' exact role in the situation and discerning the appropriate background one must have to contribute. Both have been an ongoing challenge. Complexity has been a recurring theme with various contextual considerations of risk management, as well as the ongoing research analysis. The guidebook the author developed in this process attempts to simplify and cross-reference this complexity. It is intended to be a foundation for designers to develop an intellectual perspective on the subject matter. In a risk management situation, the designer should be able to recognize an elaborate context and make connections to findings. For example, on the introduction of a chemical manufacturing plant, the designer should foresee needs and barriers. The benefit is an informed, more responsible, and effective designer solving problems of human significance.

The topic explored was chosen because it has the potential to contribute to humanity in the context of a society that is susceptible to human-caused disasters and the terror they can induce. The holistic mindset leading to this consideration has been the most underlying step for the author. The influence this will have on the author is unknown, but its potential is beneficial.

1.2 *The Problem*

The September 11th attacks have heightened the safety concerns of the American public and government. These concerns are legitimate and relevant considering the industrial hazards that exist in today's society. Among the resulting needs stemming from this situation are various visual communication challenges; such as informing communities of nearby risk, addressing fears of the public, and improving response to human-caused disasters. This presents an opportunity for graphic designers to contribute to a meaningful cause and learn from the many findings about managing and communicating risks. Human-caused disasters are catastrophic events that substantially harm people and are brought about by accidents or acts of terrorism. One source of these kinds of risks can be nuclear energy and various chemicals, which are

already controversial risk issues in society. Communicating clearly about these controversial social concerns is a complex challenge that must overcome a number of barriers, such as uncertainty, strong associations, and ignorance.

Graphic design is the practice and study of visual communication, which solves practical problems that inform or persuade masses of people. It has been developed throughout the 1900's, contributing to advertising, corporate identities, wayfinding, information design, political movements, and public service announcements. Information design is an important direction in the discipline. There is an opportunity to focus information design toward problems of utmost human significance. This thesis attempts to direct the skills of the graphic designer to inform, as well as persuade in communication solutions that aid humanity.

Information design is a segment within graphic design that focuses on solving problems by informing the audience, as opposed to persuading them.

While researching the needs spawned from human-caused disasters, external theories were discovered which can inform designers in their problem-solving processes. These theories come from the study of risk communication, which is the exchange of information about large-scale health risks between the public and experts. It has been studied since the 1980's by numerous fields, including sociology, psychology, anthropology, linguistics, marketing, law, and philosophy.

The main goal of the thesis is to determine the best approach for solving communication problems about human-caused disaster. The author aims to help graphic designers, as well as lay people who are faced with this complex challenge. There is an opportunity to align risk communication research with the methods, process, and practice of graphic design. Another goal is to increase awareness about the potential for graphic designers to contribute to these kinds of problems.

2.1 Projects

2.11 Public Service Advertising Examples

Early research led to an informal analysis of risk messages. Vincent Covello described risk communication with four categories that were addressed in risk messages: nature, significance, magnitude, and control. While browsing risk messages in public service advertising in *The One Show*, examples of risk messages revealed different focuses on these categories.

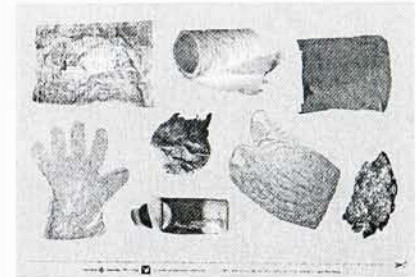
The first example was a gun control ad that references an obituary page to show the number of people that die every year from guns. Thirty obituaries are left blank and sequentially numbered to represent the quantity of deaths in South Africa every day. The primary category in this ad is magnitude. A community beautification ad was the second of these examples. It showed various materials that can be used to dispose of dog feces. The ad simply states, "If your dog soils the street, there are many things you can use to clean it up." It clearly focuses on how this problem can be controlled by dog owners. The third example, an anti-smoking ad, juxtaposed a make-up brush with a used ashtray. This combination of unrelated objects is used to communicate the significance of smoking on a person's skin. The fourth example was a forest protection ad that simply showed an axe substituted for a chopped tree. The axe's stump protrudes from the ground and its remains have fallen next to it, representing the nature of deforestation in an intriguing way.

These precedents revealed to the author how risk messages prioritize a single category of risk. Some of the messages also addressed the other categories in a secondary manner. In the first example, magnitude was the primary focus of deaths by gun shootings, while significance and control are also included in the short ad. A secondary group of messages within some of the obituaries recognizes specific harm that gun fatalities cause to the families of victims, which is an example of significance; "he will always be remembered by Jude and his three loving children." The headline mentions gun control briefly as a way to prevent these deaths. By including these additional categories of the risk, the message has multiple layers of meaning and is more informative to those engaged by the primary message. Conversely, the second ad excludes two of the categories of risk. There is no mention of the effect of the pollution (significance) or how much dog waste is not cleaned up (magnitude). The ad aims to induce action in two ways, at most. It primarily informs dog owners of simple cleaning materials. It also humbles dog owners who are causing the problem. This is done through the tone and by the formal presentation of such an obvious control mechanism that they are ignoring.

Vincent T. Covello. "Credibility is a Risky Business: an Interview with Vincent T. Covello" interview by Keith Sheldon, *Communication World* (April 1996) 16.



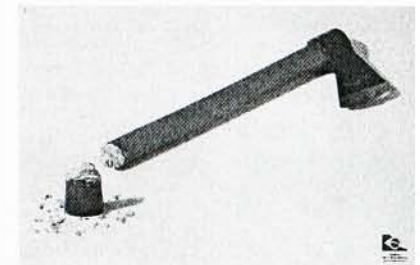
Gun Control Ad
primary: magnitude
secondary: significance
and control



City Beautification Ad
primary: magnitude
secondary: none



Anti-Smoking Ad
primary: significance
secondary: none



Forest Protection Ad
primary: significance
secondary: none

The One Show (New York: One Club for Art & Copy, 1999, 2001), 307 of volume 21, 272 – 279 of volume 22.

While the ad uses something that the dog owners do know, it ignores something they may not: the magnitude of harm this kind of pollution creates in a city.

The third example shows how parts of a category can be exclusively addressed in a risk message. The non-smoking ad addresses the significance category by focusing on a specific harm, which is not commonly known. It excludes the kinds of harm that have been the focus of many other anti-smoking ads, such as lung cancer. This selective choice delivers a powerful message. It counters a perceived benefit of smokers, as an external symbol of social status, with another perceived measure of social status, physical appearance. This intention is clear in the copy, which states that smoking toxins “...starve your skin of oxygen and remove the lingering traces of a healthy complexion.” The fourth example has been determined as another message about significance, which is even more simplified. The chopped axe handle shows the basic problem and suggests the direct reliance humans have on the forests we are destroying. It is more conceptually memorable than informative.

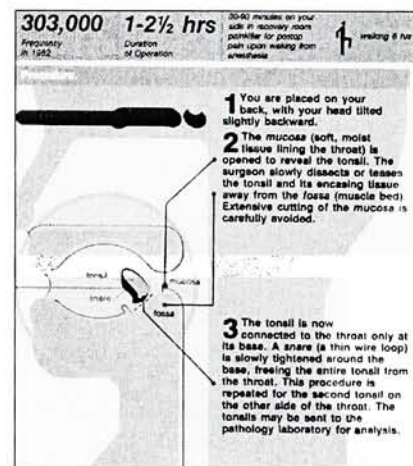
The findings from these risk messages helped analyze the completeness and prioritizing of the three categories of messages about human-caused disasters. Case studies of disasters led to further analysis within each category of specific human-caused disasters. The author found that the three categories are prevalent in all of the risk communication topics researched.

2.12 Medical Access

Medical Access by Richard Saul Wurman explains the procedures and purpose of a multitude of diagnostic tests. It describes common surgical procedures, and provides information on doctors, hospital care, and patient rights. Individuals with concerns about serious health risks can direct themselves to the proper control. This is an excellent example of simplified risk communication for the public. It uses clear visual diagrams and writing with common language to connect familiar symptoms to potential harm and control. The book carefully describes the illnesses and procedures, so they will not intimidate the patient. This precedent shows how risk messages can be complete without being overwhelming.

2.13 California Wildfires

In the 2003 California wildfires, a variety of people used the world wide web to communicate different messages and deal with their problems. News sources reported immediate information on the significance and magnitude of the disaster, and victims recorded first hand experiences through logs on the web. This shows the advantage the web offers by opening communication for all interested parties. Organizations and members of the media can disperse traditional messages about risk more immediately. Victims can communicate with those interested in ways not previously possible. This offers a method



Wurman, Richard Saul. *Medical Access*. Los Angeles: Access Press, 1985.

of releasing emotional stress and informing potential victims about how to prepare for the disaster. The web allows its vast audience to quickly seek out ways to control their problems. Ideally, the user learns only what they want through searching with specific terms or browsing categories. The disadvantage of the web is that it allows for increased inconsistency and building superstitions from uncertainty. The ease of publishing immediate information on the web can be taken advantage of by anyone; therefore, it is likely that information may not be accurate or even true. An organization's hesitation to release information immediately will likely lead to uncontested risk messages with narrow perspectives on the web. An example of this in traditional channels of media is the case of Three Mile Island; delayed press releases allowed unreliable news to be broadcasted. Unreliable information on the web is becoming more commonly filtered by users and web searching technology. However, the immediate nature of the web will always present additional problems for this channel.

Further description of Three Mile Island can be found in section 2.14, page 9.

2.14 Advisory System

Homeland security's *Advisory System* is a controversial example of risk messages. It demonstrates communication barriers that can exist in messages about the risk of human-caused disasters that are acts of terrorism. The primary goal of the system is to warn law enforcement and other authorities about threats found through government intelligence processes. The messages are publicly dispersed, because leaks of the information are considered inevitable and may cause speculation and hysteria. They are also intentionally incomplete, because of the sensitive nature of the information. The Advisory System has been in place for two years in the United States. While advisories have been successfully channeled by the media, they have also been highly criticized. The system of five levels (low, guarded, elevated, high, and severe) has been considered useless. This impression has been increased by vague and inconsistent messages of micro-control, which supplemented the advisories.

In early warnings the public was first told to remain cautious and keep their eyes open, which was soon followed by "go about their daily business." This created a confused and anxious atmosphere. For the seventh advisory, more specific information was provided on likely kinds of attacks and how to prepare for each. Lists of shopping items, fueling automobiles for an evacuation, and sealing homes with plastic and duct tape were suggested by experts.

"Near panic buying of the recommended supplies followed in many cities. Amazingly, the collateral second message was once again sounded—about living our lives as usual... experts said we could suffocate by sealing off ventilation into our homes, and others said some of the 'reliable' sources were hoaxes."

Philip G. Zimbardo,
The Political Psychology of Terrorist Alarms
(APA Divisions: February, 26th, 2003).
www.apa.org/about/division/terrorism.html

All of this inconsistency created confusion in people's everyday lives and contributed to the skepticism surrounding the Advisory System.

There are advantages to the Advisory System, but they may be outweighed by one important disadvantage. The main advantage is an immediate way to heighten security. In addition, it suggests that the government is taking action to prevent terrorism and replaces language that is often vague and can be altered through different channels. The underlying disadvantage is that it keeps the threats of others on the minds of people. Philip G. Zimbardo states, "Terrorism is about making ordinary people feel vulnerable, anxious, confused, uncertain and helpless. Ultimately, when terrorism works, citizens feel hopeless and lose trust in their leaders to guarantee the fundamentals of existence – safety and security." There is a concern that the public will stop taking the Advisory System seriously. This could actually be helpful, as long as security still adapts to the system, and the public trusts that the government has the situation under control. If advisories continue to cause mass confusion and hinder daily activities, the system should be changed. In two 2003 public opinion polls, 8% of US citizens thought advisories were harmful and 13% thought the terrorists were winning "the war on terrorism". See Appendices 2 and 3 on page 26 for full questions, results, and sources.

2.15 Risk Management Planning

Other kinds of communication problems allow for a more complete solution that has the potential to be more clear and informative. The *Risk Management Planning* pamphlet released by Kodak in 1996 was intended to inform the nearby community about the risk of specific disaster scenarios. This pamphlet was released in response to the Emergency Planning and Right to Know Act. It is a summary of the complete report sent to the Government Emergency Planning Committee and was voluntarily distributed by the company. The pamphlet covers a wide range of the categories with a strong emphasis on the controls in place at Kodak. The largest area for improvement would be the inclusion of descriptions of ways individuals can respond in a disaster. Despite this omission, the pamphlet will not likely create any stigmatism. The geographic scope of a potential disaster, shown with two radiuses of separate disaster scenarios, does not cover a large portion of the surrounding community. The content addresses both the benefits of the chemical and the potential harm it could cause in a disaster. Some of the information is repeated too often in the pamphlet without adding substance. Replacing redundancies with more specific information would help. A potential barrier of effective communication for this kind of pamphlet is trust. However, Kodak has dedicated resources to building a trusting relationship with their surrounding community. Without this relationship an external audit or verification from an outside source might have been essential for the pamphlet to be perceived as truthful.



For complete full-sized pamphlet see section 13.20, page 79.

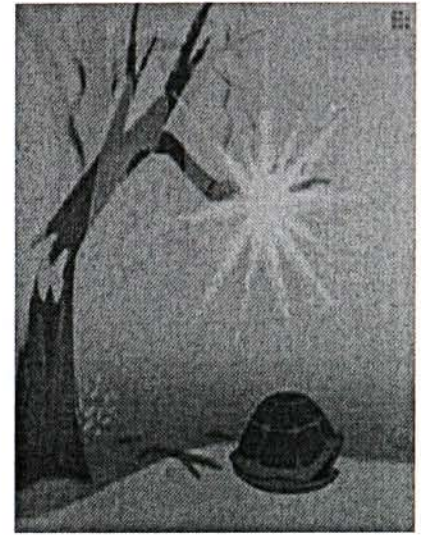
For descriptions of Emergency Planning and the Right to Know Act see section 2.13, page 8.

Stigmatism is a social condition where a hazard has severely hindered interaction or communication, has limited progress, has become visually or emotionally upsetting, or has become a danger within itself.

2.16 *Duck and Cover*

The 1951 *Duck and Cover* video is part of a large government project, which appears to have intentions of creating a false sense of security during the Cold War. Targeting children, the video primarily explains how to protect oneself in the event of a nuclear explosion. The rationale is that huddling into a specific posture will protect one from flying debris, providing the necessary safety. In the beginning, an animated turtle is shown ducking into its shell after a bomb explodes next to its head. The video suggests that people can survive a nuclear explosion with simple protective reactions. This example of micro control is intended to reduce stigmatism, but is widely criticized as propaganda. Secondary messages in *Duck and Cover* are significance and macro control. The video shows how a nuclear bomb creates destruction and explains how the government is ensuring that an attack will not occur.

Exaggerated messages of control, such as those in the *Duck and Cover* video can create distrust. They can misrepresent the potential harm of a disaster and even belittle serious risks, such as nuclear war.



Frame from the *Duck and Cover* video.

2.1 Case Studies

2.11 *Chernobyl*

In 1986 the first known nuclear disaster, known as Chernobyl, carried great uncertainty and received an enormous amount of attention. The disaster occurred at nuclear power plant near the towns of Pripyat and Chernobyl of the former Soviet Union. It was created by an mishap in an experiment that resulted in an explosion. Radioactive material tore through the walls of the plant and was released three miles up into the atmosphere, causing immediate and long term harm. 31 responders died in the following six months and estimates of 5,000 to 50,000 cancer deaths have been linked to the spread of radioactive material from Chernobyl. Coverage of the disaster response showed that the local communities were relatively calm. The citizens of Pripyat and Chernobyl did not panic as they evacuated on the following morning. In contrast, foreign press created hysteria with reports of inaccurate magnitudes and dark clouds of radiation. The local community was influenced by the prior awareness of risk and the influence of the government. Most Chernobyl plant employees lived in Pripyat. Nuclear power was a part of their daily lives and so was the risk that it carried. In addition, most of these citizens learned of the evacuation before any speculation about the accident was spread. They were actually misinformed about the magnitude of the event and dressed in light clothing without packing materials. In contrast, the international community learned of the incident from detections of radiation in Sweden three days after the disaster. The European and American media begin to heavily broadcast stories of dark radioactive clouds covering Europe and panicked citizens of Kiev. A plume of radiation had

spread from Chernobyl and was guided by wind over a large portion of Europe. Images of dark clouds were not of the plume, and the city of Kiev was calm and under the impression that the government controlled the situation.

This example demonstrates the importance of being the first source of messages about a disaster. It also shows the likelihood of irresponsible messages that can develop from partial information. Designers approaching similar risk communication problems can learn from these mistakes of the past. This example can also inform the designer of specific details about the harm of these kinds of human-caused disasters. Their effects can be studied and anticipated in the case of a similar event.

2.12 *Union Carbide*

Arguably, the worst industrial disaster in history was in 1984 at Bhopal, India. An American company, Union Carbide had contracted a chemical plant with the Indian government 15 years earlier in an impoverished community. The plant was American-built and Indian-operated to manufacture pesticides for India. A spread of chemical gas killed thousands of unsuspecting people overnight and led to a panicked stampede; the community was likely ignorant of the risk of the disaster that occurred. The first warning of the accident was not an alarm, but the smell of the gas that was already spreading. The plant was adjacent to the populated, low-income housing that was first affected. The gas spread well beyond this area killing livestock and blackening vegetation. The gas was a reaction formed by the addition of water to a large tank of methyl isocyanate. Union Carbide claims this was an act of sabotage by a demoted employee. An internal safety report shows that prior maintenance of the plant was compromised. These safety issues are not directly associated with the reaction that created the gas, but represent a larger problem of responsible control.

Emergency response at Bhopal was more difficult than evacuations at Chernobyl because of its swift and visible impact. The Union Carbide plant was located in highly populated surroundings and its workers composed a smaller percentage of the Bhopal population. The town of Pripyat was formed around the Chernobyl plant, while the Union Carbide plant was added to the existing city of Bhopal. Vital risk communication should have occurred in Bhopal when the plant was first proposed. This would have likely stimulated pressure from the community to involved organizations to be more responsible about the plant's warning system, maintenance, and location. It is unlikely that citizens of Bhopal ever suspected such a disaster; the risk was forced upon them without their acceptance.

Ten thousand people have died from the disaster in Bhopal, and fifty thousand of the survivors suffer minor to severe disabilities. This disaster shows the devastation that can occur and the importance of informing a community of the risk from a human-induced disaster. Following Bhopal, the Emergency

Planning and Right to Know Act was developed in the United States in response to concerns of industrial disasters. The regulations were made to inform communities about the risks from chemicals at local plants. Companies with specified quantities of certain chemicals were required to conduct specific assessments. Each state is required to “establish a process for developing local chemical emergency preparedness program and to receive and disseminate information on hazardous chemicals at facilities within local communities.” The amount of information and ways to disseminate are left open, but it is clear that this act is intended to prepare and inform.

Craig R. Anderson and others.
Environmental Law Handbook (Rochville, MD:
 Government Institutes, 1995), 278.

This example shows the need for responsible communication between an industrial plant and its surrounding community. It is a historical milestone that brought the thesis topic to the attention of the American public, government and industrial sectors. The severe impact also emphasizes the relevance of the risk of human-caused disasters in today’s society.

2.14 *Three Mile Island*

In 1979 the worst nuclear accident in America took place. A nuclear core of the Three Mile Island power plant, owned privately by Metropolitan Edison (Met Ed), overheated and released radioactive gases into the environment. The overheating was caused by mechanical failure and human error. The activation of one of the control systems averted a complete meltdown that could have harmed nearby populations of Middletown and Harrisburg. While the incident did not cause any known physical harm, it created confusion and speculation throughout the following 48 hours. The overheating created a bubble in the reactor, which posed the uncertain threat of a catastrophic meltdown. This led to delayed and inconsistent communication. From the start Met Ed seemed to deny the severity of the incident. At first, they did not immediately report the release of gases. As the story leaked, the media interviewed community members who witnessed the gas release. A representative of the Nuclear Regulatory Commission entered the scene and became a more trusted source. However the Nuclear Regulatory Commission and Met Ed provided inconsistent reports on the size and severity of the bubble. This inconsistency became evident in the different news coverage. In addition, some members of the media tried to create additional stories to compensate for the ongoing, anticlimactic event. This communication focused on the fear surrounding the incident and sometimes misrepresented the actual situation. For example news broadcasts showed only cute or handicapped children and interviewed frightened farmers. One network crew was requesting that the citizens stay out of the camera shot. The reporter who observed this later wrote about the town being depicted as an abandoned city.

Philip S. Klein and Ari Hoogenboom. *A History of Pennsylvania*. (Pennsylvania State University, 1980).
http://www.dep.state.pa.us/dep/PA_Env-Her/tmi/tmi.htm

Peter M. Sandman and Mary Paden.
 “At Three Mile Island” *Columbia Journalism Review*.
 (July 1979), 43-58.
<http://www.psandman.com/articles/3-mile.htm>

The confusion of Three Mile Island revealed the importance for immediate and consistent messages. While the media helped distort certain messages, much of the confusion developed from the poor communication of Met Ed. This led to a level of distrust and speculation that could have been avoided. Such instances should be predicted and the appropriate information released about the incident should planned ahead of time.

2.15 EDB Contamination

In 1984, a number of federal agencies worked to address the risk of contaminating groundwater and food throughout most of America. A chemical commonly used for pesticides and in leaded gasoline was found to be harmful; long-term exposure could cause damage to sperm and the chronic exposures was found to cause severe internal damage to animals. Before a public announcement, the actions of state governments released the concern to the media. Intense social concern grew throughout the country. The Environmental Protection Agency wanted to address the quantity of deaths that were expected from contamination and their measures to reduce the harm. Unfortunately, they were ignoring the concerns of the public that wanted to know which foods to avoid. Peter Sandman labels these two kinds of messages as macro- and micro-risks. He also states that “the connections between macro-risk and micro-risk are difficult to explain.” The author found this difficulty to be created by the broad use of the two concepts. The different possible messages can be divided into two of the three categories:

- Quantity of deaths: magnitude
- Government action: control
- Individual action: control

Of the categories above, messages of magnitude always address a broader scope, so labeling this part as macro is unnecessary. The author found that micro- and macro- differentiate two very important kinds of control. Macro-control addresses what is being done about the overall risk, while the micro introduces ways for the individual to respond to a risk. A combination of both micro- and macro-control information can create a more complete message about risk.

2.15 Love Canal

In 1978, citizens of Niagara Falls, NY were informed of a hazard that threatened their neighborhood and created years of controversy. The community’s location was directly next to a chemical landfill, called Love Canal, that had contaminated some of the neighborhood with chemicals. Evacuation and relocation efforts at Love Canal show how uncertainty, inconsistency and political pressure can affect reactions to risk communication. Three separate evacuations had to be issued over time, after a “leaching” of chemicals.

Federal agencies involved in the EDB case:
Environmental Protection Agency (EPA)
Food and Drug Administration
Department of Agriculture
Occupational Safety and Health Administration

Peter Sandman is a notable researcher, speaker, and consultant of risk communication in the United States. More information his contributions can be found at <http://www.psandman.com>

Branden B. Johnson and Vincent T. Covello.
The Social and Cultural Construction of Risk: Essays on Risk Selection and Perception.
(New York: D. Reidel Publishing, 1987).

Macro-Control are methods of prevention or protection that reduce harm on a large scale.

Micro-Control are methods of protection that reduce harm on an individual scale.

The uncertainty surrounding the significance and magnitude of the chemicals led to wide speculation. Love Canal's public health alarm was the first public message. The second was the state's official emergency declaration, which stated probable risk to only a small portion of the community. This magnitude was very different than the suggestion the alarm had made when it warned the whole city. However, a partial evacuation based on the declaration was granted for infants and pregnant women. This outraged the community and increased attention from the press.

The original relocation of six homes was followed by 239 homes in two weeks, and finally 550 more homes two years later. These two evacuations were responses to political pressure, which were partly caused by perceptions of inadequate action from the previous evacuation. The size of the second evacuation was based on a physical boundary – all houses two rows back from the canal. Locations previously not considered to be affected began to be associated with the risk. The new boundary that was formed was not based on evidence of the hazard, but was plausible. The actual geographic scope that was effected at Love Canal will probably never be known. The government had no precise information about the magnitude, so the community and the media speculated from what was released. Part of this information was the scope of the evacuation, which appeared to be received as a message of magnitude. From this speculation came increased political pressure and attention from the media. Years of this pressure lead to the third evacuation, which stood apart from the first two because it was voluntary. Instead of creating another solid boundary for a complete evacuation, the government made relocation optional for the community. This action reflects their acknowledgement of a stigmatized community more than a specific magnitude threatened by a health risk.

The controversial incident of Love Canal shows the reality of uncertainty and the perceptions that can build from incomplete and inconsistent messages. Arbitrary magnitudes created speculation, and associations developed. By focusing on the known categories of the risk, the organization and the community can try to jointly determine solutions, such as a voluntary range for evacuation.

Branden B. Johnson and Vincent T. Covello.
*The Social and Cultural Construction of Risk:
Essays on Risk Selection and Perception.*
(New York: D. Reidel Publishing, 1987.) 55 – 58.

3.1 *Design Philosophies*3.1.1 *User-Centered Design*

Jorge Frascara's user-centered design philosophy proposes graphic design to be an interdisciplinary that affects people's knowledge, attitudes, and behavior. The primary goal should be to aid specified people with needs, and therefore should be the rationale behind all decisions. The context of the pragmatic problem should exclusively lead the designer in his or her problem-solving.

Frascara states that all design problems should have a well-defined audience that is manageably sized. Solutions that target broad audiences fail to affect the attitudes and behavior of people. The audience must also be reachable and sustainable, therefore justifying the allocation of human and economic resources to solving the problem. Lastly, Frascara challenges the designer to make sure the audience is measurable and reactive.

Frascara explains the common practice of segmentation by geographic, demographic, and socioeconomic criteria. He then adds two other criteria: psychocultural and mutual effect. Psychocultural is described as a less "quantitative or objective dimension" that includes temperamental characteristics and social values. This is expanded to personality types such as leaders, followers, and adventures; shared notions of economy, efficiency, and safety; and shared goals and expectations. Frascara states that to affect the attitudes and behavior of people, an audience's personal preferences, cognitive abilities, and value systems should be considered. Frascara also explains that an audience segment can be created by the problem. An example of this is the spread of AIDS, which at least creates two segments; one that has been diagnosed, and the another that is highly susceptible to it. The author refers to this criteria as mutual effect.

Within the focus on user-centered design, Frascara differentiates between the challenges of informing and persuading the audience. The latter has to be both understood and acted upon, which is much more challenging than the former. He uses examples of warning signs that intend to reflect authority to gain response.

Jorge Frascara is a Professor of Art and Design at the University of Alberta, Edmonton, Canada.

3.2.1 *Social Science Background*

Frascara challenges designers to expand their education to the study of social sciences. He describes this as the next step for design and parallels it to the melding of art and production education at the Bauhaus in the 1920s. While the industrial revolution prompted the need for an education in production, today's society calls for a combination of the Bauhaus model and a social science background. This educational background will direct designers in

solving problems in arising areas of need. Frascara states that designers should extend this background to collaborating with other disciplines, developing new tools, initiating projects, generating new information, and sharing this information. Regardless of the designer's method, it is clear that strong input from these areas is recommended to address social problems.

Frascara believes that graphic design is often limited in its social contributions because of limited outside understanding of the profession and the field's traditionally reactive ways. Graphic design is often connected either with the fine arts or the promotion of consumer goods, limiting the role that it can provide for society. Solutions are often measured by immediate benefits that are obvious, such as the physical appearance it presents, instead of the value returned.

Frascara's philosophy also recognizes the reality of incomplete parts in every design problem and the multiple variables within the process. He stresses focus on reliable and explicit information relevant to the problem and building trust with the client. The designer can gain trust from the client by appropriately analyzing the problem and articulating the reasons for recommended action.

Jorge Frascara. *User-centered Graphic Design: Mass Communication and Social Change*. (London: Taylor & Francis, 1997).

3.2 *Risk Communication Findings*

Findings from the National Research Council, psychologists, and sociologists led to a number of considerations. These have been determined necessary for background for one designing risk messages.

3.21 *Ignorance*

A barrier in risk messages that can often be reduced is ignorance. The receiver may not understand the premise of the message. Designers should discern the knowledge base of the audience. The designer can refer to any existing demographics, attend relevant neighborhood meetings, and initiate his or her own surveys and interviews for the community. Ignorance can exist about any category of the risk, or even the risk itself. Ignorance about one category can undermine understanding in a message about a separate category. For example, if the receiver is unaware of the potential harm of a chemical disaster, he or she will likely respond undesirably to a message about controlling a chemical leak. He or she may ignore the message completely or overact to a chemical they know nothing about.

3.22 *Uncertainty*

Some information on certain risks is completely unknown to science; this barrier is referred to as uncertainty and is common throughout all forms of risk communication. When a specific kind of disaster has never occurred, there are a number of unknown factors that make the risk difficult to assess.

The potential harm of many chemicals is currently unknown to science and a repeat of the Love Canal incident is definitely possible. Human-caused disasters can be largely affected by uncertainty. The messages and public response at Love Canal show how uncertainty can lead to increased perceptions of risk. The media's response to the Three Mile Island incident shows how uncertainty can cause the spread of speculation.

Daniel Kahneman and Amos Tversky.
Judgment Under Uncertainty: Heuristics and Biases.
(New York: Cambridge University Press, 1982), 4–14.

3.23 *Associations & Conceivability*

Daniel Kahnemans and Amos Tversky stated that two means of judgment often create biases in the existence of uncertainty. These introduce associations and conceivability as barriers to risk messages. Representativeness is the method of determining probability through associative relationships. An example of excessive representative heuristics is determining the probability of a chemical disaster on the hazard's potential level of harm without considering the control mechanisms. The second method of determining probability is availability, which is the ease of visually recalling or constructing something in the mind. This was found as a common means of judgement that was prone to biases. Availability is affected by imagery from personal experiences, memories, dreams and imagination. Tversky and Kahneman stated that even people's imagination "play an important role in the evaluation of probabilities of real-life situation" and do not always reflect reality. The easier someone can imagine something occurring, the more probable they will perceive it. These two biases were found to overwhelm other possible considerations including measuring the predictability, the affect of the sample size, and the validity of information. Recognizing these biases can help designers overcome potential barriers and prevent the perpetuation of misconceptions.

Daniel Kahneman and Amos Tversky.
Judgment under uncertainty: heuristics and biases.
(New York: Cambridge University Press, 1982), 4–14.

Heuristics is a problem-solving method where the most appropriate information is chosen from a variety of options and used for drawing a conclusion. Used in this context to determine the severity of a risk.

Daniel Kahneman and Amos Tversky.
Judgment Under Uncertainty: Heuristics and Biases.
(New York: Cambridge University Press, 1982), 13.

Generally, risk assessments are largely based on the existence of a hazard. However, people also consider associative benefits in judging the amount of risk. This is an inverse relationship, where the perception of a benefit rising lowers the perceived risk and vice-versa. Alhakami and Slovic found that this relationship was caused by an "affect heuristic," meaning that one's immediate visual associations to the risk will affect the way they judge it. They state that both good and bad visualizations are created in the same place, resulting in the inverse relationship.

Hazards are a potential source of danger to people and their environment.

Paul Slovic. *The Perception of Risk* (Sterling, VA: Earthscan Publications Ltd, 2000), 403–408.

Perspectives on risk that are based on emotion tend to be viewed by scientists as unimportant because they create an incomplete view. Antonio Damasio studied two common methods of judging risks: the process of visualizing associations and an emotional process. He found that they are both connected to rational thought. This connection to reason-based analysis effect the judgements of all individuals, despite their knowledge base. Therefore, both the public and the expert risk assessor are influenced by emotions and associations.

Antonio Damasio was credited with these contributions by Paul Slovic: *The Perception of Risk* (Sterling, VA: Earthscan Publications, 2000), xxxii.

3.24 Risk Perception

Paul Slovic's psychological theory of risk perception introduces important considerations for designers. He states that risk is a subjective, mental construct, often based on personal values. This perspective can reveal the root of many risk communication problems and lead to approaches that can help solve them. Messages are completely ineffective when the sender and receivers subjective values are misaligned. Disagreements often occur between the experts and the public on the most important parts of a risk. Experts tend to focus more on assessing the statistical chance of the disaster occurring, while the public is more concerned with potential harm to their family members and future generations.

3.25 Stigmatism

Slovic also introduces the correlation between risk perception and stigmatism. Stigma is generally something flawed or undesirable. Slovic considers people, products, technologies and environments all susceptible to stigmatism. Six dimensions of stigma determined by Jones et al are:

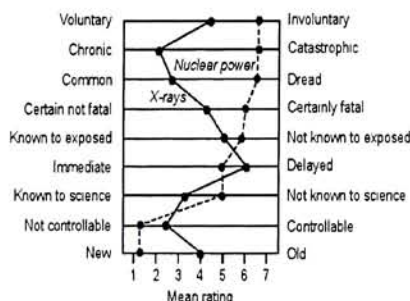
- conceivability (significance and control)
- course over time or to outcome
- disruptiveness (hindrance of interaction)
- aesthetic qualities
- origin (including purpose of creation)
- peril (danger posed)

Slovic categorizes the current stigma of chemical and nuclear waste deposit sites using these dimensions. Describing them as often visible and perceived as being disruptive, ugly, and dangerous; Slovic addresses four of the six dimensions. The other two dimensions, origin and course, could be argued as well, as the creation of these hazards for weapons and their devastating effects are well known. In surveys, Slovic found that the word "chemical" is so stigmatized that it provoked negative word associations and rarely drew any beneficial correlation.

Slovic states that stigma is socially amplified by the media. He cites Mitchell's findings of more than 125,000 print stories about the seven deaths from Tylenol as an example. The study estimated that Johnson & Johnson Company lost one billion dollars from the stigma of the product. Three Mile Island, Union Carbide, and Chernobyl are some of Slovic's other examples; which "illustrate a new form of social vulnerability... we live in a world in which information, acting in concert with the vagaries of human perception and cognition, has reduced our susceptibility to accidents and diseases at the cost of increasing our vulnerability to massive social and economic catastrophes." He then questions if this is inevitable and how it can be reduced without losing the advantages of the information.

Paul Slovic is the President of Decision Research and a Professor of Psychology at the University of Oregon.

In light of risk perception, Slovic selected nine pairs of bi-polar characteristics (shown below) for test groups to rate different risks.



Stigmatism is a social condition where a hazard has severely hinder interaction or communication, limit progress, is visually or emotionally upsetting, and becomes a danger within itself.

Three Mile Island, Union Carbide, and Chernobyl are described in section 2.1, page 7.

Paul Slovic. *The Perception of Risk* (Sterling, VA: Earthscan Publications Ltd, 2000), xxviii.

4.1 Comparative Matrices

A comparative matrix was used to analyze the different categories of messages about human-caused disasters. The different considerations, goals, and sources were determined for each category. Examples of risk messages were also placed in relation to the different categories. These showed the different needs of the messages: to reduce stigmatism, solve problems jointly, provide protective action, and warn. These examples also helped reveal new considerations and goals to the author. One example was a poster that promoted the benefit of the chemical plant for Bhopal, while ignoring the potential risk for an accident. This could have been an opportunity to inform the local community about the risks of such a chemical plant. A complete example was a FEMA (Federal Emergency Management Agency) website that informed children of the harm of disasters and how to act if one were to occur. Many examples appear to exist for the need of reducing stigmatism. Some were intended to relieve post-traumatic stress such as post September 11th ceremonies. Others were based on growing anxiety before any potential disaster, such as the *Duck and Cover* video. This revealed the need for pre- and post-disaster messages and the difference between them. An adaptation of this matrix is used in the guidebook to help establish a background in analyzing the complexity of this kind of risk communication. The comparative matrix can be used to analyze any risk message and determine special goals and considerations. The risk messages in the FEMA web site for children is show was analyzed with the matrix.

For complete comparative matrix with different examples analyzed see section 13.10, page 61.

For full-sized comparative matrix that analyzes the FEMA website see section 13.11, page 63.

		Inform. required		
		Learn problem context	Clarify response	Prepare and plan
Significance	Source of message			
	Impact of hazard		Recognized a harm already sustained without official risk reduction and emergency instructions and resources	
Content	Meaning			
	Media	Describe how to help your parents	Describe how to respond (covered for emotional health) and questions direct us to org	
Message			How, when, where, what, why, how often	

4.2 Developing a Risk Communication Background

Based on Frascara’s user-centered philosophy, the graphic designer who wishes to design effective risk messages should have a background in risk communication. This dynamic is so complex that the designer will likely never be an expert in all areas. However, a holistic approach to risk communication that will give the designer a background will promote an informed process and responsible design decisions. The typical graphic designer is accustomed to having a variety of backgrounds that help him or her collaborate with other experts. Many graphic designers are not experts in photography, but understand important considerations of special lighting techniques. The designer’s background in this area is sufficient for them to collaborate with a photographer to collectively achieve the necessary communication goals. Similarly, the designer does not have to be a risk assessor or psychologist to effectively design messages. The designer should be able to ask pertinent

For a description Frascara’s user-centered philosophy see section 3.11, page 12.

questions that will affect design decisions. Only through this collaboration can the context be chosen and shaped to affect people's knowledge, attitudes, and behaviors.

The designer should be aware of the different aspects of risk message-making in order to develop a risk communication background. These were determined by the author to be different categories of risk, the barriers he or she will approach, common goals of the message, the needs for the problem, and the different sources of risk messages.

4.21 *Three Categories*

Three categories were found to exist in risk messages about human-caused disasters: magnitude, significance, and control. A variation of these categories was originally stated in an interview of Vincent Covello, and each was found by the author to be emphasized in different risk messages.

These categories are introduced in section 2.11, page 3.

A similar set of categories was recorded by Covello and Slovic as significance, levels, and control. Messages about significance are descriptions of the harm and benefit relative to the risk, and the balance between them. The category of levels was determined to be a subcategory of magnitude along with quantity and geographic scope of a risk's effect. Messages about magnitude are measurements or predictions that are often assessed by experts. Control messages are explanations of methods that reduce the amount of risk. As the EPA case showed, they can be focused on macro or micro scale.

4.22 *Complete & Directed Towards the Audience*

Designers should have the integrity to include all known information and emphasize the categories which fit the need of the communication problem. By interviewing or surveying the audience about their understanding of the significance, magnitude, and control of the given risk; the designer can determine important topics that are unknown or misdirected. Comparing findings with the knowledge of the risk assessors should help determine content and guide the rest of the design process. As Damasio found, emotion and associations affect the thought processes of all people despite their level of knowledge. Both experts and the general public have perceptions of risk that are based on these processes and therefore are subjective. This creates an additional role for the designer to clarify the variety of subjective values. As a designer can inform a corporate client of the ignored need of the consumer, he or she can do the same by revealing gaps; these stem from the target audience's different perceptions of risk. The source, experts, and segments within the audience can all have different perspectives on the risk. For example, the experts tend to focus on the magnitude and macro control of a given risk, while the audience tends to be more concerned with the significance and micro control. If the audience's

The effect of emotion and associations are described in section 2.23, page 14.

concerns are being met they are more likely to notice new considerations that affect risk perception. An assessment of a risk is useless if it ignores the receiver's concern.

The target audience's various subjective values should directly impact the decisions in the design process. The selection of content should be based on these values, and its treatment should be sensitive to it as well. Designers can then use their knowledge of organizational and visual skills. They will now be able to design a message that is not only comprehensible, but also effective at changing knowledge, beliefs, and actions for the better.

The subjectivity in risk presents one other challenge for the designer. The designer must not only research the values of the sender and receiver, but also recognize his or her assumptions and values relevant to the risk. Establishing this awareness is the first step in designing risk messages responsibly. The designer can then properly research the values of other stakeholders in the message and focus on remaining as neutral as possible.

4.23 *Barriers & Goals*

Eight barriers were found to exist in human-caused disaster messages and nine goals were identified for designing these kinds of messages. Uncertainty, ignorance, mistrust, inconsistency, politics, potential litigation, associations, and conceivability are barriers that a designer must handle. Goals that were commonly found within risk messages are integrity, persuasion, neutrality, directness, simplicity, non-technical, comprehensible, memorable, and complete. Combinations of these barriers and goals exist for different messages about human-caused disasters.

<i>Barriers</i>	<i>Goals</i>
Uncertainty	Integrity
Ignorance	Persuasion
Mistrust	Neutrality
Inconsistency	Direct
Politics	Simple
Litigation	Non-technical
Associations	Comprehensible
Conceivability	Memorable
	Complete

Research revealed enormous amounts of uncertainty that commonly exists about human-caused disasters. Designers should recognize a strong correlation between uncertainty and completeness. If information is unknown, the designer has the responsibility to represent the uncertainty in a clear and non-technical manner. Being as complete as possible can help reduce unrealistic speculation about a risk. Completeness can be assured by evaluating an existing message with a matrix comparing the categories and needs of the solution.

4.24 *Needs*

In the planning of the thesis the author was driven by connections between risk communication and information design. Risk communication was primarily considered an objective method of providing the audience with unpersuasive, more informative facts about the risk. It became clear that risk messages are unavoidably subjective and can also include a persuasive element at times. Researching risk perception and analyzing different examples of risk messages in a comparative matrix led to a broader understanding of risk communication.

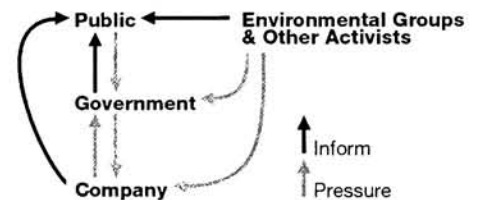
Matrix findings are in section 4.1, page 16.

Persuasion is not always a need in risk messages. It is intended to induce protective action or sometimes to jointly solve problems. In the post-disaster stage, people are directed to safety, as well as physical, psychological, or material aid. In the pre-disaster stage, individuals are encouraged to prepare for the worst or to put pressure on others to accept or reduce the risk. This is one case where awareness of the designer's own personal values is important. Designers need to be attuned about ethical decisions in persuading others about risk.

4.25 *Different Sources of Risk Messages*

In controversial risks, such as human-caused disasters, there are typically a variety of sources that address the same audience. The flow of risk messages is an important part of the communication problem context. The designer should research the flow of existing risk messages to determine their knowledge base and potential barriers created by other sources. This can lead to more complete messages that address ignorance, inconsistencies, and associations.

One possible cycle that represents a network of messages passing between different stakeholders.



5.1 *Basic Directions*

The author explored application possibilities within two conceptual directions: a solution to an existing risk communication problem, and an instructional tool for designers faced with a risk. This led to the implementation of a two-part application: a redesign of the *Risk Management Planning* pamphlet and a guidebook that references the pamphlet. Mind-mapping, forced juxtaposition, and visualizing thoughts were the ideation methods used. Evaluation of precedents also contributed to the development of ideas.

Descriptions about the thesis exhibit can be viewed in section 8.1, page 32.

5.2 *Existing Risk Communication Problems*5.21 *Wayfinding*

Ideation that occurred before the main thesis development focused on solving existing problems of wayfinding for disaster victims. The first application ideas were focused on helping these victims find disaster response services and improve communication between emergency response units. Research on risk communication led to a new set of needs, based on planning for and informing others of the risk of human-caused disasters. The author explored the need of informing communities about local risk management. More details about the potential for improved wayfinding for disaster victims can be found in the planning booklet – see page 46.

5.22 *Worst-Case Scenarios*

A second possibility was to redesign visuals that show worst-case scenarios, which are predictions of the most harmful disasters possible at industrial plants carrying specific chemicals. The Environmental Protection Agency (EPA) required chemical companies to provide these scenarios through computer-generated models. Much of this information has been withheld from the public since September 11th, because of concerns of aiding terrorists with places to cause disasters.

The chemicals and their thresholds are determined by federal law. For more detail see section 2.12, page 8.

5.23 *Private Risk Publications*

A third idea was to redesign private publications that explain risk management planning for specific chemical plants. This possibility was considered after evaluating the *Risk Management Planning* pamphlet by the Eastman Kodak Company. Some of the other existing risk communication projects were considered as possible redesigns, such as the *Be Informed* section of Ready.gov.

For more background see section 2.15, page 6

For the *Risk Management Planning* pamphlet see section 13.20, page 79.

For the *Be Informed* section of Ready.gov see section 13.9, page 60.

The author selected the *Risk Management Planning* pamphlet by Kodak (1996) for development and prepared for ideation by auditing designs

For the implementation of the *Risk Management Planning* pamphlet into the guidebook see section 7.1, page 30.

with a similar purpose. The author began by exploring variations of the pamphlet's cover, insert, and part of the inside content. Existing strengths were expanded upon and weaknesses were addressed. The redesigned parts were combined into a new pamphlet that was a focus for intermediate evaluation. Some of the revisions were applied to the final guidebook.

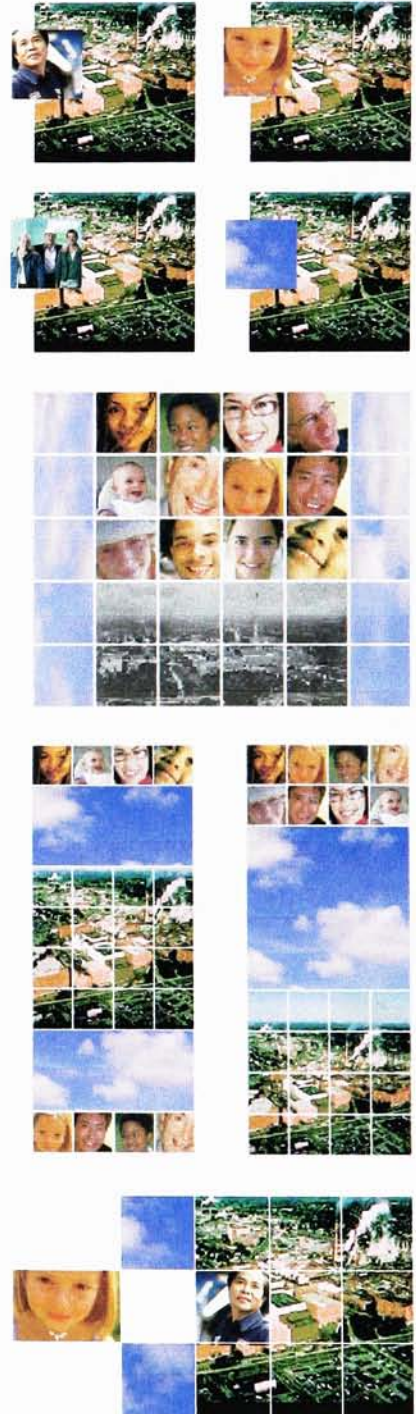
An exploration of the cover examined the potential use of two elements in the original pamphlet: grid lines and photographs. The grid lines, which overlapped a photograph of the industrial park were determined to be a strong way to show control. The author made the device more dominant by increasing its overall proportion and extending its structure throughout the whole page. This created square units of the chosen imagery, which were of the industrial park, faces of people, a body of water, and the sky. These were arranged in various compositions, from stacked blocks to sporadic patterns. New image possibilities were generated from a mind-map based on the benefits of manufacturing film. Pictures of smiling faces were determined to represent the specific benefit provided by Kodak Park. Some variations allowed the photographs of people to extend beyond the grid line. The resulting rectangular shape was made proportionate to a standard four-by-six photograph size. The relative placement of the portraits to the image of the industrial park communicated different messages. When some of the faces were placed next to the industrial park, the staff of the park began to be emphasized. Individuals who were too young to be workers were also placed nearby the plant. They suggested a much different message about a level of susceptibility. These juxtapositions were explored further with the intention of recognizing the risk to people, while suggesting the goal of protecting the community. An irregular arrangement of imagery was selected as the strongest representation of the uncertainty and complexity of this risk management planning.

The second portion of the pamphlet explored was one of the inserts, which introduced a case scenario to the audience. The original consisted of two sides: one with a map showing the geographic scope of a risk scenario and the other with text about the chemical that was rooted in the cause. Objects, color, and scale were examined in this exploration. Most of the adjustments to the map were made to the form of the objects in the map. Subtle alterations in shape and weight revealed information that ranged from relevant to distracting. Roads, properties, and buildings were treated with different levels of emphasis and complexity. Variations led to the introduction of two different kinds of neighborhood properties: residential and commercial. This additional information could help the audience orient themselves on the map and see who would be impacted most by the scenario. Color-coding helped differentiate these properties, as well as prioritize the different objects in the map. In the variation selected for implementation, the buildings within the properties were

Strengths
Grid lines
Mapped scenarios
Abstract images
Direct writing

Weaknesses
Extension of grid lines
Mapped surroundings
Specific benefit images
Redunant writing

Variations of juxtaposed images for the pamphlet.

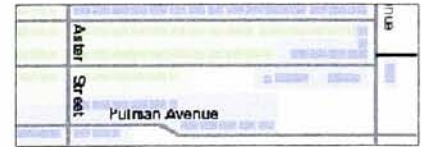


indicated with a darker and more saturated hue. For example, a green square representing a house stood out from the surrounding faded green, which represents the property. This subtle layering allowed additional information to be conveyed about the significance of the scenario and quantity that it affected. Selective color-coding allowed a layering of information, without distracting the viewer from the scope of the scenario.

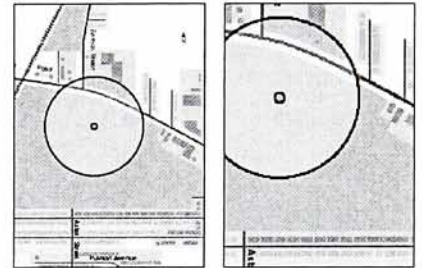
The scale of the map was adjusted to see how it affected the appearance of the disaster's size. Different scales changed the perceived size, as well as the amount of surrounding information that was revealed. When the scale was increased, neighbors nearby the scenario were no longer visible. When scale was decreased, more neighbors were shown, but the property directly impacted became more condensed, which reduced clarity at some sizes. Consistent scaling of multiple maps became another consideration. The *Risk Management Planning* pamphlet that was redesigned consisted of two pairs of scenarios, each requiring a separate map. These used very different scales to show important surroundings of the scenario. Different scale meters in the navigation and grids in each map indicate the differences. When multiple scenarios are to be displayed on separate maps, it would be important to use indicators and stay within one to three different scales to avoid any confusing or misleading interpretations.

The writing that described elements within the maps was also refined. In the original pamphlet this information was on a page separate from the map, and embedded within a list of questions and answers. Rearrangements of this section allowed for the explanations of the scenarios to be adjacent to the map. The list was also divided under four main topics: inform, prevent, predict, and prepare. The topics were found while auditing a separate pamphlet. This sorting was intended to increase comprehension and reflect the goals of the information. It also established a system for multiple scenarios to follow. The final redesign describes scenarios for two chemicals, and the same questions are answered for both. This allows the reader to find all the potential hazards from these emergencies with relative ease. All of these facts were placed on the same spread as the map. The placement of this section in the two pamphlets also impacts the overall function of the pamphlet.

The inside of the pamphlet was the third focus of exploration. This section explained risk management and the general control methods. The author reduced technical information and added visual explanations to increase comprehension. Much of the technical information was not about the risk, but the legal requirements for risk management. The writing was revised to focus on actions that protect the public, while mentioning the requirements. The following page shows two different introductions of risk management from the original and the redesigned pamphlet.



Value and color used to separate information.



Variations of scale altered how much information was shown in the maps as well as the perceived appearance of the geographic scope.

A pamphlet informing chemical companies about the need for Risk Management Programs described the purpose of Risk Management Plans: "protect plant personnel, the public, and the environment; prevent accidental chemical releases from occurring; predict the areas that would be impacted by a worse-case accident release; prepare plans for handling accidental releases; and provide chemical hazard information (inform), potential off site on sequences, and accidental releases prevention to the public". Protect was determined to be a part of prevent and prepare. For the full pamphlet see appendix 13.9, page 78.

For feedback about the physical function of the redesigned pamphlet see section 6.2, page 68.

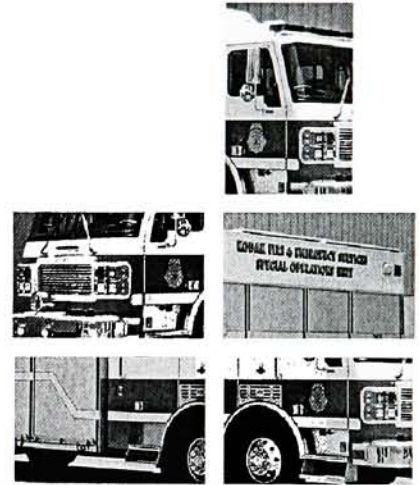
Original:

"In 1996, the U.S. Environmental Protection Agency (EPA) adopted the Risk Management Plan (RPM) regulation, establishing guidelines for identifying, reporting and communicating potential accidental releases of significant quantities of 140 specific hazardous materials. It requires that facilities handling these materials submit their Risk Management Plans to the EPA."

Redesign:

"Risk management planning aims to reduce any chance of harm in the case of an emergency. By informing, preventing, predicting, and preparing, Kodak Park can reduce risk to its neighbors in the event of such an emergency. Emergency case-scenarios, response plans, and accident prevention programs are provided to the government. These actions meet regulations established by the Environmental Protection Agency. A portion of the planning information is included within this brochure to inform Kodak Park neighbors."

The imagery used in the original interior pages were pieces of the cover that were placed at the top of each page. While this tied these pages to the cover, there was an opportunity to make the visuals specific to the content. By making the imagery more specific, it has the potential to introduce the subject and be more informative to the reader. Auditing from other pamphlets revealed the possibilities of using images of safety workers and equipment. Based on these decisions, photographs of safety experts and the plant's fire department were examined. These objects were seen as main focuses in the writing of the existing brochure. Photographs of the new fire truck were found and manipulated in different ways. Crops of the photo were placed within a grid similar to the one used for the cover. Recognizable parts of the vehicle were repeated, juxtaposed, and pointed in multiple directions. This created a highly appropriate sense of urgency and action while displaying specific response equipment. See the guidebook for additional information on design decisions that affect the redesigned parts of the *Risk Management Planning* pamphlet.



5.3 Instructional Device

The author explored ways to explain the integration of graphic design with risk communication. It became clear after completing the thesis research that this second direction for the application would be more appropriate. These potential applications was aided by an exhibit design and different approaches to sorting the content. Two possible forms of applications were a distance-learning lesson plan and a guidebook for designers. They were both intended to instruct designers on how to integrate graphic design with risk communication.

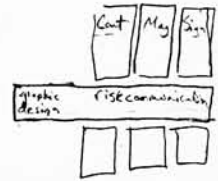
5.31 Exhibit Ideation

The process of exploring application possibilities was aided by the ideation for a thesis exhibit, which helped make the thesis findings public. The progress made in designing the exhibit naturally flowed into the development of the application. One of the goals for the exhibit was to explain the integration of graphic design and risk communication. A summary of the findings from research and synthesis were organized in several ways. Variations were sketched for the following components: formats of the exhibit panels, the introduction of specific needs and barriers, and visual representations of the three categories (significance, magnitude, and control).

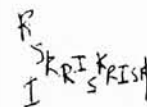
Various arrangements of the four panels aimed to visually integrate the overall need in the thesis with the current findings. The horizontal panel introduces the thesis topic and the needs associated with it. The vertical panels divide the categories, and define the needs and barriers that intertwine within them. For example, the goal of persuasion applies only to the category of control, while other goals apply to all three categories.

Various forms of notation were explored to show where needs and barriers existed within the categories. Horizontal gray and yellow bars were selected because they introduced the idea of a hazard from a distance. They do this by subtly referencing the caution marking that exist in our everyday surroundings, such as railroad crossings and maximum headroom signs.

The author also explored additional visualizations that were intended to provide more specific information from a distance. These were based on the three categories of risk. Sketches ranging from literal imagery to symbolic representations led to an exploration of typographic possibilities. These aimed to communicate each category with different arrangements of the four letters in the word “risk”. For significance the concepts of harm, benefit, and their relationship were explored. The selected arrangement used all capital letters that represented harm and lower-case letters representing benefit. They are then scattered to show a wavering balance. For magnitude, exploration intended to capture the more quantitative aspects of risk. The selected collage has “Risk” spanning the panel with concentric circles expanding from the bowl (circular counter within a letterform) of the “R” to reflect geographic scope. Multiples of the “i” are used to reference ISOTYPE, which is a system of graphic symbols used to reflect specific quantities in information design. For control, the type was arranged to show a human influence of risk. The forms selected for the final exhibit were symmetrical and placed emphasis on a center space surrounded by diagonal letters. This created a planned appearance that is structured, yet active. The selections of content organization, the yellow and gray bands, and the typographic collages influenced the development of the application.



All sketches for exhibit panels in section 13.13, page 66.



Sketches of typographic collages in section 13.14, page 67.
Application to panels in section 13.15, page 71–73.

5.32 Lesson Plan

A lesson plan on the thesis topic was prepared around the exhibit development. This process aided the author in dividing the content into sections to introduce the audience to the thesis topic. The lesson plan was different from the exhibit in that it was a potential application for a specific audience instead of a means of dissemination to a broad audience. The content was divided into specific research findings and compared to existing information that a graphic designer would have acquired from prerequisite courses. The lesson plan was intended to fit within a broader design curriculum and be provided for college students at a senior level. The author developed a diagram of ten lessons and their content; which is intended to explain this new topic and instruct students on designing risk messages about human-caused disasters. This specific outline is intended for a distant learning course. This idea was based on the various kinds of research sources available on the World Wide Web. Organizing these lessons in conjunction with the exhibit panels contributed to the development of the final application. It also revealed a value of providing instructional information on the Web, as resourceful sources can be electronically linked from a Web-based application.

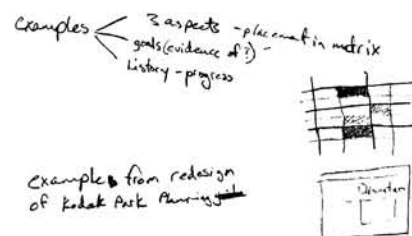
See sketch of diagram for lesson plan in section 13.16, page 75.

5.33 Guidebook

The idea of a guidebook was considered early in the process, but its appropriateness and value was revealed after completing the research and a majority of the ideation. It was ultimately selected as the main part of the final application, because it could reach a larger audience and provided a better means for reference.

Before exploring variations for the booklet the instructional and exhibition content were outlined into possible sections. The final outline was arranged into the following: preface; design considerations; significance, magnitude, and control; needs; goals and barriers; process; summary; examples; and glossary. Different formats of the guidebook were then explored. In these sketches, the opportunity arose to make visual connections between concepts. Different ways of creating an interactive experience were explored. The matrix and the visuals developed for the exhibit were extended into ideas for the guidebook.

The comparative matrix was sketched into the guide as a device to show the designer the complexity of these kinds of communication. The idea was to analyze an example to show the variety and depth of messages. This developed into a group of examples that introduced the project, divided its content, and evaluated it based on the comparative matrix. This section of the guidebook was found to be the most complicated part of the guidebook. Much of the following ideation branched from it. This section developed into the primary focus of the two-part application.



Complete sketches for guide in section 13.23, pages 96-97.

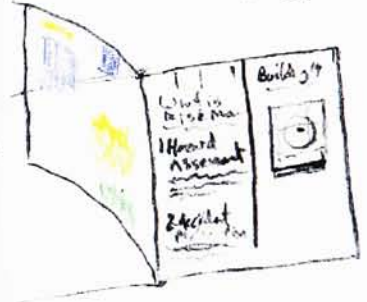
The yellow and gray bars from the exhibit were added as introductions and reference markers. The location and orientation of the bars were explored in relation to the other information. A diagonal orientation was chosen because it provided the strongest concept while maintaining readability for the singular terms. The author first chose multiple bindings to create reference tools that could be used throughout the guidebook. This solution was eventually found to be unnecessarily complicated.

The author selected a simpler method that used the reference tools in the chapter of applied examples. The typographic arrangements were introduced in sketches for the chapters on significance, magnitude, and control. The location and color treatment of each was sketched to establish an important visual system throughout the guidebook. The location of each category on the page aligns with its placement in the matrix. Exploration of location included both vertical and horizontal intervals in the margins of the page, as well as a flap to extend the top of the book. The color used for each category was later used to highlight corresponding content within these same examples. Exploration of color treatment included use of transparent sheets, overlapping color blocks and selective coloration of forms. Cool colors, such as green, blue, and purple were used, because they were on the opposite spectrum of the yellow already used and they did not compete with each other on the page. The applied system selected from these variations can be viewed in the final application, which is included with this document.



For early sketches for guidebook see section 13.23, page 97. For spreads of the multi-bound guidebook see section 13.25, page 99.

transparency
and overlapping labels



For the complete sketches of color-coding ideas for the guidebook see section 13.24, page 98.

6.1 *Internal Evaluation*

The explorations of the different sections of the *Risk Management Planning* pamphlet were brought to thesis committee advisors for feedback. The typographic treatment generally increased readability and allowed the information to be more accessible. The strongest improvement was in the formatting of the facts that accompanied the map. It was recommended to make the capitalized title on the cover consistent with the more appropriate, interior titles; these used bold upper and lowercase. The additions and simplifications made in the map were noted as an improvement. Further simplification was suggested for a few unnecessary details of buildings and navigational tools. Inclusion of tools that measured scale were also suggested. Feedback on the cover cited the scattered imagery as more appropriate for the complex nature of the risk. The stacked images seemed too controlled and were not much different from the original design. The arrangement of the title (in italic below) and subtitle had unintentionally altered the meaning. The two variations read:

Efforts at Kodak Park

Risk Management Planning Prevention & Planning

Risk Management Planning

Prevention & Planning Efforts at Kodak Park

This subtly separates the subtitle, introducing the pamphlet in two different ways. The first arrangement states a vague set of actions at the industrial park and then separately refers to the title and remaining subtitle. The second clarifies that the actions at the park are to prevent and plan for risk.

A final evaluation from the advisors was about the physical form of the pamphlet. At the time the author had redesigned the map and accompanying facts on an insert similar to the original pamphlet. It was presumed that the intention of this was to allow for the main portion of the pamphlet to be distributed alone; this content was not reliant on the inserts and could serve a purpose by itself. The disadvantage to this separation was the possibility that the insert could serve out of the context of the main portion. The importance of considering the life of the pamphlet shortly became obvious; after distribution, the portions could easily be separated and distributed. The insert could fall out on the street, a hurried reader may not reassemble them, or someone could intentionally discard the main portion. If another person found this insert he or she would receive partial information and

could distribute it physically or through word of mouth. With little trouble or intent of deception, an individual could post one side of the insert – the wall of a nearby bus stop could display a map of a disaster prediction without any mention of prevention or preparation. All of these possibilities can be avoided by a simple decision to physically attach the case scenario information with the risk management content.

6.2 External Evaluation

The selected variations of the cover, insert, and interior information of the *Risk Management Planning* pamphlet were combined and formatted in a new physical format. The original and redesigned pamphlets were compared in a survey. A random selection of 22 people with no previous knowledge of the thesis were provided two pamphlets with a survey. They were instructed to read one of the pamphlets as thoroughly as desired and then answer questions about the content and its effectiveness. They were then immediately asked to read the second pamphlet and answer questions that compared the two. The questions covered their reading experience and their response to it. Responses gauged opinions on clarity, the company's control of the situation, how alarming and trustworthy the content is, and the strengths and weaknesses of the pamphlets. Choices were provided for most questions; half of these used measurements on a bipolar scale. For example, the reader was asked to rate the pamphlet between alarming and comforting. The other half of these questions asked the reader to select a percentage of information that was fitting. For example, the reader was asked what percentage of the information was alarming. The bi-polar response measured the reader's perception of the level of risk. The recorded percentage was intended to see how much the reader focused on the potential harm. While all readers received the same questions, the author mixed the order in which the pamphlets were read. This allowed some readers to begin with the original pamphlet and others to start with the redesign.

The author was able to observe some of the readers interacting with the two pamphlets. Surveyors generally took about ten seconds to scan the cover, back, and the first inside spread. All readers observed sat down to read, and some eventually spread the pamphlet out before them. People tended to get to the scenario information within the first minute of interacting with the original pamphlets. Some people read the inserts before the general planning and prevention methods. For the redesigned pamphlet, this information was consistently read towards the end of the process – three to ten minutes. One surveyor never opened the scenario spread in the redesign. While omission of this portion is not desired, it is preferred over other potential incomplete readings. Other omitted information may create fear and perceptions of vulnerability.

Written responses in the survey supported a majority of the goals of the redesign. Improvements in clarity were reflected the most through ratings and general comments. The redesigned pamphlet was identified as being clearer by a majority of surveyors. On average, the redesigned pamphlet was also rated closer to clear on the bi-polar scale. Comments referred to the redesign as easier to follow and more enjoyable to read. The original pamphlet received a broader range of responses, from “clear and straightforward” to “nice, but vague”. On average, surveyors recorded that they read 10% more of the redesigned pamphlet than the original one. This figure was consistent despite the order in which the pamphlets were read. Even when the original packet was read first, people tended to read the redesign more carefully.

Results also differed in the amount of trust people had in the information. Average measurements on the bi-polar scale fell directly between trustworthy and deceiving. When comparing the two pamphlets, seven readers found the redesign to be more trustworthy; most individuals (ten) stated that there was no change in the level of trust between the two pamphlets. No major difference was reflected about the alarming nature of the information. Responses ranged across the bi-polar scale, averaging in the middle.

Most readers stated that the strongest improvement were descriptions of the scenarios and the chemicals associated with them. The prevention or protection methods were mostly chosen as the least effective portion of the redesigned pamphlet. A few of the comments addressed the differences between the physical formats. One reader stated a dislike for the inserts and another wrote that they felt more guided by the single-sheeted pamphlet. In contrast, a third individual preferred the inserts, because the separation of the chemicals from the pamphlet felt more comfortable. Overall results and comments from the survey supported the goals to be as complete as possible and increase comprehension.

For examples of completed surveys see section 13.22, page 88–96.

The surveyed sample did not have the same relationship with the company as the neighbors of the plant. This relationship will have an impact on the level of trust.

Each of these categories was chosen four times. None was chosen twice, scenarios once, and description of scenarios zero times.

	Original	Redesign			
Clarity (low (1) – high (12))	5.6	6.8			
	Original	Redesign	No change		
Comparison of perceived trust	5	7	10		
	Original	Redesign			
Average amount read	44%	57%			
Average amount skimmed	64%	49%			
	Scenarios	Prevention	Preparation	None	Description
Most improved section chosen	5	1	0	1	2
Least improved section chosen	2	2	0	3	2

Measurements of improvements are from half of the surveys, where the original pamphlet was read before the redesigned pamphlet.

7.1 Guidebook

The author selected two directions from the ideation stage, developed them separately, and then integrated them in the implementation of a final application. A guidebook was chosen to outline principles and demonstrate important design decisions for messages about human-caused disasters. The goal of the book was to instruct the message maker and encourage the integration of graphic design with risk communication. After describing the principles, the guidebook reveals their relationships in specific examples. This is the final section of the guide, and its development was the focus of the implementation.

The author used the *Risk Management Planning* pamphlet as an example and analyzed it based on fundamentals of the guidebook. The original pamphlet is displayed and its context is described on the left-hand page. The different spreads of the pamphlet are displayed and accompanied by explanatory captions. Yellow and gray tabs on the margin of this page align with a list of goals and barriers that exist in this example. The writing explains the design’s purpose, as well as its strengths and weaknesses, which are based on the findings of the opposite page. On the right-hand page, the content of the pamphlet is analyzed in a comparative matrix. The matrix cross-references the same three categories and pairs of needs that were used in the synthesis stage. Key parts of the pamphlet are addressed in the appropriate areas with a summary of the information. Each of these pages was based on exploration for the redesign of the *Risk Management Planning* pamphlet. Three elements of the pamphlet were expanded: the map, text, and image. Each was introduced in with the original design displayed next to visual pieces of the exploration. Important treatments for the elements were also introduced on this page.

Element	treatment considerations
Map	scale, content, color, and form
Text	grouping, legibility, and formatting
Image	selection and alteration

Treatment considerations were demonstrated with visual examples and written descriptions. The visuals were displayed along the top of the page, and the descriptions were arranged in the bottom section. The only writing that existed on the top of the page was one to three word labels positioned above the visual. This consistent arrangement was found to be most successful, because the reader could compare variations with ease. The visuals were often repeated and then details were carefully added, exchanged, or sorted.

It was a challenge to select the best visuals and present them most effectively. Many of the visuals had to be cropped tightly to eliminate excess elements. For example, the full map did not reveal the variations of content, so a small portion of it was eventually found to be more effective. The author learned that the complete set of elements in the redesign had to be simplified to demonstrate specific points. Methods applied to the visuals were sorting (referred to as *grouping* in the guidebook), forced juxtaposition, and small multiples. The explanations introduced some of these methods for the treatment, making connections to the guidebook's principles. Two to three sentence paragraphs then described the visuals directly above. The resulting demonstrations can be viewed in the Appendix 13.20 on pages 100–108.

8.1 *Gallery Exhibit*

The author exhibited an explanation of the research and synthesis for the thesis topic. It was displayed for two weeks at the Bevier Gallery at Rochester Institute of Technology where various students, instructors, and the general public attended. The display contained four panels that covered an eight by fourteen-foot area. The thesis topic was introduced from a distance in an intriguing way and revealed more information as the viewer moved closer.

A horizontal panel that stretched across the exhibit was placed at eye level. It described risk communication, graphic design, and human-caused disasters and was intended to be the detailed information read first. Three sets of vertical panels ran perpendicular to the first panel; each represented one of the three categories. They also included descriptions of the goals and the barriers from the synthesis.

The visuals were typographic collages of the word risk and interchanging bars of yellow and gray. One collage covered the bottom of each vertical panel and visually described the category that was titled and defined above. The yellow and gray bars that ran across the center of the panels were intended to first hint at the topic. The gray bars contained a list of the goals and their definitions, while the yellow bars listed and defined the barriers. Most bars overlapped all three panels, while others went over just a few. This indicated the categories where each goal and barrier existed. This was intended to be the last layer of information for the viewer and required the most amount of attention. It begins to reflect the complex intertwining that exists within the various kinds of risk messages about human-caused disasters. The visuals developed in the exhibit were carried through into the final guidebook. Feedback about the exhibit revealed that the author's intentions for interaction were met. Suggestions led to adjustments to spacing between letters and lines of text to improve legibility and changing "man-made disasters" to "human-caused disasters". These refinements were carried through the appropriate parts of the remaining thesis.

For ideation on exhibit panels see section 5.31, page 24.

8.2 *Presentations*

The author presented the thesis at three different times during the thesis process; each was addressed to different classes with different focuses. All presentations were supplemented by a series of slides. The typographic treatments within the slides were chosen for digital projection, and a red or orange color was selectively used because of their association with risk.

All three presentations preceded the ideation of visual concepts and are visually different from the exhibit and the application.

8.21 Preliminary Presentation

The first presentation was given at the end of the thesis planning in a course called *Design Issues*. The presentation was geared toward design's contribution to the government. It focused on human-caused disasters in today's society and the categories of risk messages discovered in early precedents. Bhopal and a leak of chemicals at Kodak were introduced as examples of the risk associated with human-caused disasters. Handouts were distributed with a summary of the two incidents from an outside source. Sections of the writing were emphasized with bold text. The author explained that the designer influenced the viewer's experience; the choice of placing these two summaries next to each other and selecting parts of the text to emphasize affects the message. This was followed by slides of the right-to-know laws and the concern following September 11th. The end of the presentation focused on the categories of risk messages. The four precedents from the public service advertisements were displayed and their focus on one of the categories was explained. One of the students voluntarily provided positive feedback about the clarity of the visual examples and their verbal descriptions.

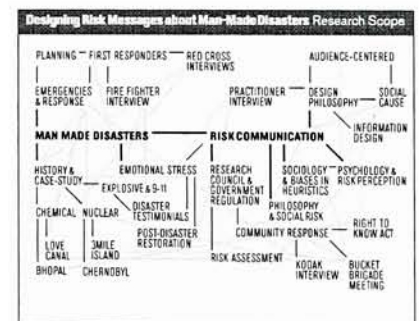
For a copy of the presentation handout see section 13.15, page 58.

In the presentations slides (13.8, page 59) nature is included. This additional category was deciphered to be a part of significance.

8.22 Post-research Presentation

At the end of the research phase and the start of ideation, the author presented to first-year graduate students of the graphic design program and faculty members. One of the goals was to explain the process for the students who would be developing their thesis in the following year. The topic was introduced with a background of the path that led the author to it. A branching diagram of the research areas and the connections that existed between them was shown. The categories and risk perception were focused on in the presentation. The comparative matrix was shown, and the findings from the different examples were summarized. An example of a FEMA web site that described disaster response to kids was analyzed within the same matrix. Shading in the different blocks of the matrix showed the level of completeness, and descriptions within the boxes clarified the correlation. This technique was later adopted in the implementation of the guidebook. The end of the presentation introduced a possible cycle of risk communication and the designer's potential role in this context.

The Graduate Graphic Design program at RIT is a two-year program. The students are divided into first-year and second-year levels. The author was a second-year student during this presentation.



Scope of research and connections are shown above. This presentation was given before "Man-Made Disasters" was changed to "Human-Caused Disasters". For the complete slides see section 13.12, page 64–65.

8.23 Ideation for Lesson Plan Presentation

The third presentation described one of the explored ideas for the application. The author presented a lesson plan for an education course: *Instructional Planning for Distance Learning*. The presentation explained the objectives

The goals and exploration of the lesson plan are explained in section 5.3, page 23.

and prerequisites of the course. Different methods of engaging students were discussed, including examples of interactive guides (FEMA kid's web site about disasters) and film (Duck and Cover). Sources were listed and three were expanded upon: a basic introduction to risk communication, Peter Sandman's online essays, and the National Academic Press' copy of Improving Risk Communication. These parts were organized into ten lessons that started with an introduction to the topic and ended with a design project in response to the risk of a human-caused disaster.

Peter Sandman is a notable researcher, speaker, and consultant of risk communication in the United States. More information his contributions can be found at <http://www.psandman.com>

Design for Risk Communication

Objectives	State when and why risk communication originated.
	Define the risk in relation to communication, messages, and perception.
	Compare aspects of risk communication and graphic design.
	Identify contributions from psychology, sociology, and philosophy.
	Explain the difference between quantitative and social perspectives of risk.

Course objectives of potential application are displayed in the slide below. For complete slides see section 13.16, page 74.

8.3 Plans for Dissemination

The author intends to further disseminate the thesis findings through trying to publish articles and releasing a summary of the thesis and application to relevant individuals and organizations. The author has compiled a list of potential journals, individuals, and organizations. Some of these organizations have recognized a need for the research of risk communication to be better integrated into the message makers' background.

The thesis findings could also be disseminated in an educational environment. This could be accomplished by passing the information to design and communication professors. The goals, barriers, needs, and categories of these kinds of messages could be incorporated into classes that include risk management or even risk assessment. It is important for risk assessors to recognize the importance of risk communication and how a graphic designer can contribute to the process. Graphic design classes could introduce upper-level students to the topic as a potential application of their design skills. This focus could appeal to students interested in philanthropy and new challenges for today's society. It should be directed to those who have or could develop an appreciation for the sensitivity of the topic.

Journals:

How
Information Design Journal
Step-by-Step
AIGA Journal

Organizations:

Defense Threat Reduction Agency
National Research Council
Homeland Security Department
Kodak Neighborhood Relations Department
Federal Emergency Management Agency
American Chemistry Council
Center for Biosecurity

Individuals:

Jorge Frascara
Michael Beirut
Vincent Covello
Paul Slovic

9.1 *Self Evaluation*

In exploring a new, unfamiliar area the author adapted well to exploring new ways for designers to contribute to the broad problem. A vast amount of research was found, which was applicable and integrated well with graphic design. The author was surprised that little areas of this research specifically addressed visual considerations for solving these kinds of communication problems. Throughout the thesis planning and development the author was encouraged to focus on social issues that can be overlooked easily in today's fast-paced society. The planning for the thesis directed the author and introduced ideas early on that were explored more thoroughly later. The application considered in the planning was changed from a wayfinding problem to an instructional guide. This change reflects the more holistic perspective on the topic that was developed through the research. Methods specific to the application were altered:

Testing the emotions of victims *was adapted to* a focus on risk perception.

Considering common aspects of the physical surroundings of a disaster *was adapted to* considering the contexts that influenced people's knowledge, beliefs, and response to the risk of human-caused disasters.

While the development of the thesis altered a few of the original plans, the changes maintained the overall direction and were revealing to the author. Original pre-conceptions were focused on the event of a human-caused disaster, instead of the risk that such a disaster poses to society.

The author faced a number of challenges in the thesis development. A large portion of the research was based on findings from verbal communication. The appropriate principles of these findings were applied to visual communication specific to the topic. The author also had to recognize the difference between specific communication problems and the broader need for guiding the designer who will address these problems. A more task-oriented challenge was organizing the lengthy development while meeting intermediate deadlines. Multiple tasks were handled well; more immediate recording of findings throughout the process could have been advantageous to the author.

Most importantly, the thesis was continuously invigorating. It offered a variety of considerations to maintain interest over a long period of focus. The outline that was provided by the author's academic program helped separate the development into stages. Each helped the author think about the topic

in a different way. For example, the precedents encouraged critical thinking about a variety of examples, and dissemination challenged the author to begin explaining findings in a comprehensive way. The most enjoyable part of the process was applying all the gained knowledge to the design of the two-part application. This step allowed the author to combine the new knowledge gained from the thesis with graphic design skills.

9.2 *Outside Evaluation*

At the end of the development, the thesis process was discussed with Cindy Ames, who manages risk communication between Kodak Park and their surrounding neighbors. The redesigned pamphlet and the guidebook were shown and described in relation to the thesis process. Ames supported the need to be proactive and elaborated on the challenges in maintaining trust. She noted that in her experience neighbors expect the industry to openly communicate only about the benefits of the plant. When the communication efforts were proactive, information about harm was often accepted in a more positive light than expected. When the risk was communicated after a disaster, the message became a large concern. Therefore, the proactive approach managed a “potentially antagonistic relationship.” This supported the need for designing solutions prior to a human-caused disaster.

Ames emphasized the importance of recognizing perceptions of risk and being the first source of information on a subject, which supported the thesis. She also spoke of her experience with the delicate perceptions of neighbors. The aspects of risk (barriers, goals, categories, needs) represented in the guidebook were noted as appropriate, and the redesigned pamphlet was recognized as an improvement. Ames pointed out an improvement that the author had overlooked – the distribution of information throughout the pages of the pamphlet. The back page of the original pamphlet contained a photo of Kodak Park with no text. This was discussed as a portion that a person would likely view; the unused space missed a simple opportunity for messages. Ames also pointed out a negative association created in the cover of the original pamphlet. The fading between images created a foggy horizon that reminded her of a hazardous haze. She appreciated that the color red was not used throughout the redesigned pamphlet, because of its strong connotations to danger. The author agrees that this color should be avoided, unless there are meaningful ways to use it selectively without sensationalizing the message. Ames stated a concern that the grid lines on the map created a tone that was too technical. She explained that Kodak attempts to keep their communication with neighbors somewhat friendly. This revealed an interesting challenge to balance between being serious and relatively friendly. The author believes that in such a balance, it is better to err on the side of being serious, because of the subject matter.

Cynthia M Ames is the Environmental Issues Coordinator at Eastman Kodak's department of Neighborhood Relations.

Eastman Kodak refers to the community surrounding their industrial park as their “neighbors”.

The original pamphlet was designed in part by the Neighborhood Relations Department.

The thesis was successful in finding specific contributions that designers can make in response to human-caused disasters. This progress was largely based on the study of risk communication. There is an opportunity to extend the research in this area and further integrate it into graphic design.

There is also the potential to address risks other than human-caused disasters. For example, the three categories (significance, magnitude, and control) can be used to analyze messages about very different kinds of risks, such as obesity, smoking, or speeding.

The integrity of the person who designs these kinds of messages was found to be most important. The designers' basic duty is to transmit the message from the client to the audience. It is also his or her responsibility to make sure the information is complete and accurately portrayed. In order to do this, the designer should have an understanding of the principles that were addressed in this thesis.

The author believes that the treatments of messages about the risk of human-caused disasters can affect an important part of people's worldview. This belief is based on problems found in the case studies and the research on the perception of risk. There is an opportunity to test how much impact the graphic designer's treatments have on risk perception. The author began doing this in the intermediate feedback stage. A broader, more scientific test would be another possible extension of the thesis.

The threat of human-caused disasters is imminent in our society. Chemicals and nuclear power have become a controversial part of our civilization, and terrorism complicates these issues even more. Meanwhile, advances in technology, such as the world wide web, are allowing for these messages to spread globally in very little time. The integrity and treatment of these kinds of messages can influence responses to these risks. Human-caused disasters are complicated issues; they are not as statistically probable as most risks, but are one of the most severe kinds of risk. The public should be aware of their existence, the potential impact on their lives, and the ways that they are protected from them.

It is a demanding challenge to effectively communicate this kind of message. The context is complex and emotional. It requires integrity and a broad set of skills for the designer, from informing to persuading. This provides a challenging opportunity for designers to contribute to society. The author hopes that designers will respond responsibly to these kinds of communication needs to help overcome new problems that threaten our society.

Comparative matrix

A cross-referencing tool that separates parts of a design solution while revealing connections between the different parts.

Control

Explanations on methods that reduce harm on an individual scale (micro) or a large scale through an organization's actions (macro).

Conceivability

1 The ease with which occurrences can be brought to mind.

2 The ease of visualizing a situation through recall or imagination.

Referred to as availability in research by Kahneman, Slovic, and Tversky.

Crisis

A traumatic experience where stress is caused by harm inflicted on individuals.

Disaster

A catastrophic event created by nature or man that causes vital immediate and long term harm to humans.

Ideation

The exploration of ideas used for solving a visual communication problem.

Information design

A segment within graphic design that focuses on solving problems by informing the audience, as opposed to persuading them.

Juxtaposition

A method used to combine two visuals to create a new level of meaning – often used with images and can be randomly or forcefully combined.

Hazard

A potential source of danger to people and their environment.

Heuristics

Problem-solving methods where the most appropriate information is chosen from a variety of options and used for drawing a conclusion. Used in this context to determine the severity of a risk.

Macro-Control

Methods of prevention or protection that reduce harm on a large scale.

Magnitude

Measurements or predictions of the quantity, level, or geographic range of a risk's effect.

Mind-Mapping

- 1 A documentation of associative thought process used in ideation.
- 2 A written form of brain storming.

Risk

Adds to the hazard and its magnitude the probability that the potential harm or undesirable consequence will be realized.

Micro-Control

Methods of protection that reduce harm on an individual scale.

Risk Assessment

Determining the significance and magnitude of a threat to public health based on the hazard and the kinds of macro-control.

Risk Communication

- 1 The exchange of information between experts and audiences regarding risk.
- 2 The interactive process of the exchange of information and opinions among individuals, groups, and institutions; often involves multiple messages about the nature of risks or expressing concerns, opinions, or reactions to risk messages or to legal and institutional arrangements of risk management.
- 3 An exchange of information among interested parties about the nature, magnitude, significance, or control of a risk.

Second definition is from:
National Research Council. *Improving Risk Communication* (Washington, DC: National Academy Press, 1989), 322.

Risk Management

The evaluation of alternative risk control actions, selections among them and their implementation. Often a risk manager oversees this process.

Risk Message

A written, verbal, or visual statement containing information about risk.

Risk Perception

The idea that risk is in inherently subjective.

Representativeness

Associations that dominate judgments of probability, including stereotypes and connotations.

Significance

Descriptions of the risk that address the harm and benefit relative to it. Answers questions about what the risk is and how it affects people.

Stigmatism

1 A severely reduced quality of life.

2 A social condition where a hazard has severely hindered interaction or communication, has limited progress, has become visually or emotionally upsetting, or has become a danger within itself.

American National Red Cross. Video Guide to Home Chemical Safety and Emergency Procedures. 15 minutes, 1992.

Anderson, Craig R. and others. *Environmental Law Handbook: 13th Edition*. Rockville, MD: Government Institutes, Inc, 1995.

Baram, Michael, and Daniel Partan. *Corporate Disclosure of Environmental Risks: U.S. and European Law*. Stoneham, MA: Butterworth Legal Publishers, 1990.

Bierut, Michael, Principle Partner at Pentagram. Interview by author, 23 November 2004, New York, NY. Corresponding emails.

Clarke, Lee Ben. *Mission Improbable: Using Fantasy Documents to Tame Disaster*. Chicago: University of Chicago Press, 1999.

Defense Threat Reduction Agency. *Human Behavior and WMD Crisis/Risk Communication Workshop – Final Report*. March 2001. Accessed May 2003. www.dtra.mil/about/organization/finalreport.pdf

Frascara, Jorge. *User-Centered Graphic Design: Mass Communication and Social Change*. London: Taylor & Francis, 1997.

Covello, Vincent T. "Credibility is a Risky Business: an Interview with Vincent T. Covello." Interview by Keith Sheldon, *Communication World* (April 1996) 16 – 20.

Gray, Jeffery A, *The Neuropsychology of Anxiety : an Enquiry into the Functions of the Septo-Hippocampal System*. Oxford: Oxford University Press, 2000.

Johnson, Branden B. and Vincent T. Covello. *The Social and Cultural Construction of Risk: Essays on Risk Selection and Perception*. New York: D. Reidel Publishing, 1987.

Kahneman, Daniel, Paul Slovic and Amos Tversky. *Judgment Under Uncertainty: Heuristics and Biases*. New York, NY: Cambridge University Press, 1982.

- Klein, Philip S. and Ari Hoogenboom. *A History of Pennsylvania*. Pennsylvania State University, 1980. Accessed May 2003.
http://www.dep.state.pa.us/dep/PA_Env-Her/tmi/tmi.htm
- Koven, Edward L. *Smoking : The Story Behind the Haze*. New York: Nova Science Publishers, 1996.
- Krippendorff, Klaus. *Content Analysis: An Introduction to its Methodology*. Beverly Hills: Sage Publications, 1980.
- Herrmann, Jack, State Lead at Disaster Mental Health of the Red Cross. Interview by author, 11 December 2004, Rochester, NY. Notes from interview.
- Lundgren, Regina. *Risk Communication: A Handbook for Communicating Environmental, Safety, and Health Risks*. Columbus: Battelle Press, 1998.
- Manning, Anita. "Americans Fear More Terrorism Despite Preparedness." *USA Today*. 8 September 2003. Accessed May 2003.
- National Research Council. *Alerting America: Effective Risk Communication – Summary of a Forum*. Washington, DC: National Academy Press, 2003.
<http://books.nap.edu/books/N1000497/html/index.html>
- National Research Council. *Improving Risk Communication*. Washington, DC: National Academy Press, 1989. Accessed May 2003.
<http://www.nap.edu/books/POD289/html/index.html>
- National Research Council. *Risk Assessment in the Federal Government: Managing the Process Working Papers*. Washington, DC: National Academy Press, 1983. Accessed May 2003. <http://books.nap.edu/books/POD115/html/index.html>
- Newton, Lisa H. *Watersheds: Classic Cases in Environmental Ethics*. Belmont, CA: Wadsworth Pub. Co, 1997.
- Olgyay, Nora. *Safety Symbols Art*. New York: Van Nostrand Reinhold, 1995.
- The One Show – Volumes 21 & 22*. New York, NY: One Club for Art & Copy, 1999, 2001.

Pivertier, Ralph, Executive Deputy Cheif of Rochester Fire Department.
Phone interview by author, 23 November 2004, Rochester, NY.

O'Connell, Kim. "Pounds of Cure" *The American City and Country*. 01 June 2003.
Accessed May 2003. <http://www.keepmedia.com/pubs/AmericanCityCounty/2003/06/01/181849?from=search>

Sandman, Peter M. and Mary Paden. "At Three Mile Island" *Columbia Journalism Review*. July 1979, 43-58. Accessed May 2003.
<http://www.psandman.com/articles/3-mile.htm>

Slovic, Paul. *The Perception of Risk*. Sterling, VA:
Earthscan Publications Ltd, 2000.

Smith, Denis. *Report from ground zero*. new York: Viking, 2002.

Suketu, Mehta. "After Bhopal" *The Village Voice*. New York:
10 December 1996. 54-58.

Trost, Cathy. *Running Toward Danger: Stories Behind the Breaking News of 9/11*.
Lanham, MD: Rowman & Littlefield, 2002

Wurman, Richard Saul. *Medical Access*. Los Angeles: Access Press, 1985.

Winner, Langdon. *The Whale and the Reactor: A Search for Limits in an Age of High Technology*. Chicago: University of Chicago Press, 1986.

Zimbardo, Philip G. *The Political Psychology of Terrorist Alarms*.
APA Divisions: February, 26th, 2003. Accessed May 2003.
www.apa.org/about/division/terrorism.htm

13.1 *Ready.gov*

The first project observed about human-caused disasters was the Visual Guide at ready.gov. Despite the serious subject and the well-financed source, the communication is vague and almost nonsensical at parts. The graphic appearance reflects the safety directions found on an airplane, but the choice of imagery and visual treatments create unclear messages. This example demonstrates the need for skills of a graphic designer to develop meaningful and appropriate visuals in risk communication. More could be communicated from better choices of visuals and selective treatment simplicity, consistency, and clarity. The state of this precedent requires more of a complete redesign than minor adjustments.

13.2 *War on Terrorism Poll*

The following are results from a 2003 *CNN/USA* Gallup Poll. 1,004 adults in the United States were asked between October 10th – 12th, “Who do you think is currently winning the war on terrorism: the U.S. and its allies, neither side or the terrorists?” (options rotated)

42%	U.S. and Allies
42%	Neither Side
13%	Terrorists
3%	No opinion

13.3 *Terrorism Warning Poll*

The following are results from two 2003 *CBS News/New York Times* Poll. 747 adults in the United States were asked between February 10th – 12th, “Since the terrorist attacks on the World Trade Center and the Pentagon, the government has issued warnings about possible attacks on Americans abroad and in the United States. Do you think the warnings have been useful, or harmful or neither?”

62%	Useful
6%	Harmful
29%	Neither
3%	Don't Know

13.4 *Homeland Security Perception Poll*

Results from public opinion poll by USA Today about terrorism and homeland security (limited to New York City Residents):

- 81% concerned about terrorist attacks
- 35% think their communities are prepared for terrorist attacks

13.5 *Ignorance of Assessing Probability*

If a person is asked about the chances of a chemical disaster harming them, there are different kinds of ignorance that could affect their response. A common one may be a lack of knowledge about the kind of chemical at a nearby plant, the potential magnitude of a potential chemical disaster, or the types of control mechanisms already in place. It is possible that this type of information could be provided to raise awareness on these issues. A more complicated form of ignorance deals with probability. Tversky and Kahneman state that most people do not consider statistical factors. They found that in simple queries, people base their judgements on combining limited samples of information. Typical judgement only considers one forth of the relevant variables in their probability. An average individual would likely base the probability of a chemical disaster on the number of similar events that have occurred. They would ignore other samples, such as the frequency of time without a disaster occurring and other types of disasters that could occur instead. This theory is difficult to apply to disasters, because most people would consider the chance of a disaster in the United States fairly low.

13.6 *Numbing from Large Quantities*

David Fetherstonhaugh discovered a common mindset that can hinder action to decrease risks, which are similar to disasters. People were numbed by risks of large magnitudes where little could be done to reduce a majority of fatalities. They were less willing to help save a small portion in a large disaster, than a large portion of a small disaster. He concluded that they are numbed by large quantities of deaths, when it is clear that nothing can be done to save the lives of the many people effected.

**Thesis Planning Document
for the Masters of Fine Arts Degree**
Graduate Graphic Design Program
School of Design,
College of Imaging Arts and Sciences
Rochester Institute of Technology

**Designing
Visual Communication
for a Crisis**
Michael E. Hellinger
Fall 2003

Contents

Thesis Committee Members 1

Thesis proposal 3

Mission, Objectives, Goals, and Plans 4

Precedents 6

Explanatory Diagram 10

Evaluation 12

Timetable 14

Glossary 16

Bibliography 17

Thesis Document Structure 19

Thesis Committee Members

Hellinger 1

Professor Bruce Ian Meader
Chief Advisor Approval

Professor Deborah Beardslee
Associate Advisor Approval

Professor M. Ann Howard
Associate Advisor Approval

Michael E Hellinger
MFA Candidate

Problem Statement

The 2001 September 11th attacks call for various contributions to address realized problems vital to public health. In seeking callings for the field of graphic design, external theories were discovered, which can inform designers in their problem-solving processes. A disaster victim's wayfinding will be addressed using this altered process.

Documentation of Need

Various kinds of aid serve numerous needs of disaster victims within emotional and physical extremities. Each victim is provided the opportunity for appropriate aid; finding this aid is often difficult for the stressed victim.

There is also a need for the field of graphic design. While the discipline is directing itself to more informative solutions, there is an opportunity to also focus on problems that are of utmost human significance. This thesis attempts to direct the skills of the graphic designer towards communication that is both informative and essential to aiding humanity.

Situation Analysis

The September 11th attacks have heightened concerns of the American public and government. Among responses are increasing preparations for the future that consist of various communication challenges. This presents an opportunity for the field of graphic design to contribute to a meaningful cause and learn from risk communication (the discipline of exchanging of information between experts and audiences regarding potential harm or undesirable consequence to masses of people).

Goals

To meet the wayfinding needs of disaster victims through aligning graphic design methods with risk communication theory. The term "wayfinding" is used broadly as seeking a specific destination among options and obstacles that create a problem.

Process and Strategies

The designer will research the disaster environment, needs of victims, and aid services. The findings will be mapped in varied associative relationships, including the separation of four aspects (nature, magnitude, significance, and control). After ideation and preliminary evaluation (based on emotional context), the proper inclusion of the above four factors will be determined. This will be the foundation for the implementation of a wayfinding application.

Possible Applications

The application will be a resource to improve wayfinding that sensitively addresses potential risks of victims. Possibilities include aid service awareness promotions, an on-site bulletin series, signage redesign, identity redesign, and an extension of existing aid signage.

Mission, Goals, Objectives, and Plans
Designing Visual Communication for a Crisis

Table 6

Mission Statement

To improve the role of visual communication in rescue efforts during concentrated disasters.

Organizational Goals	Objectives	Plans: processes, strategies
To determine the main factors of disaster rescue efforts.	To identify all contextual properties of a concentrated disaster.	To experiment with fast looking (C. Kent, J. Stewart) with the imagery from September 11th to replicate chaotic environment for the designer. To identify which of Howard Gardner's multiple intelligences are likely to sustain and be helpful in a concentrated disaster. To organize common aspects of cities using Warman's Hierarchy.
	To identify and categorize all probable needs of disaster victims.	To research direct accounts from ground zero and determine the expected needs and barriers of the disaster victims. To interview volunteers about the needs of disaster victims.
To align principles of graphic design and risk communication	To analyze the significant findings in relation to each other.	To juxtapose found contextual properties.
	To integrate the four aspects of a risk into the analysis.	To build generative matrices with contextual findings, victim needs, and aspects of a risk (nature, magnitude, significance, control). To determine which of the four aspects to address.
To meet the way finding needs of disaster victims	To design a wayfinding prototype that will serve as a precedent for the visual design of risk communication for disaster victims.	To brainstorm possible modes of temporary hierarchy in the confusion of a concentrated disaster for each selected problem.
		To select from solutions, implement and refine prototypical solutions to problems based on collective assessments.

Applied Methods

To determine which of the four aspects of the possible victims risks will be addressed for the solution, the designer will rate the importance of these aspects for each potential level based on research findings. Below example represents the designer's early assumptions, which will have to be tested in the design process.

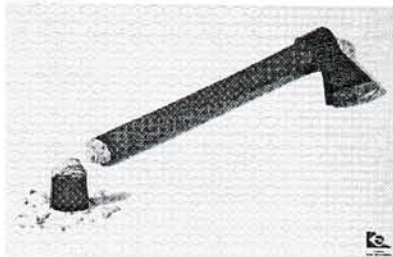
	Victims at Crisis	Potential Victims
Name	1	4
Significance	3	4
Magnitude	0	4
Control	6	4

Precedents

Each design solution on this spread focuses on one of the specific four aspects of a risk: **nature, significance, magnitude, and control**

This example immediately and richly suggests the **nature** of the risk caused by deforestation.

The environmental effects (significance), number of trees lost (magnitude), or how to help stop deforestation (control) are not addressed.



A combination of a pair of unrelated objects is used to communicate the **significance** of smoking on a person's skin.

How many people harmed (magnitude) or how to stop smoking (control) is ignored. Copy: "every cigarette contains...toxin" that constrict blood vessels, starve your skin of oxygen and remove the lingering traces of a healthy complexion"



Thirty obituaries are left blank and sequentially numbered to represent the **magnitude** of deaths in South Africa every day.

A secondary group of messages within the obituaries suggest the harm this is causing to families (significance), while how the number of deaths can be decreased (control) is not addressed. Obituary copy: "He will always be remembered by Iode and his three loving children"

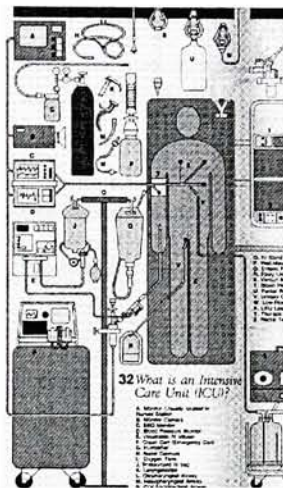
Options for the **control** of dog waste pollution are shown with imagery of "scooping" tools.

There is no mention of the effect of the pollution (significance) or how much dog waste is not cleaned up (magnitude). Copy: "If your dog soils the street, there are many things you can use to clean it up."

Precedents

Medical Access by Richard Saul Wurman explains the procedures and purpose of a multitude of diagnostic tests, describes common surgical procedures, and provides information on doctors, hospital care, and patient rights. Individuals with concerns about serious health risks can direct themselves to the proper control, which is established. This is an example of simplified risk communication for the public. *Medical Access* serves a broader set of needs than the author's problem. The solution is not solely devoted to helping patients find their way to the correct medical procedure. For this reason the amount of information may be overwhelming to someone in a crisis.

A diagram of an intensive care unit helps prepare patients by familiarizing them with the equipment that will surround them during a surgery.

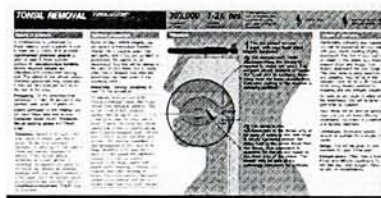


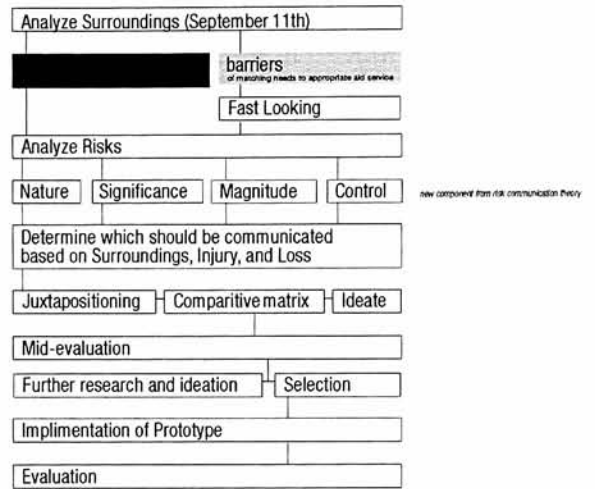
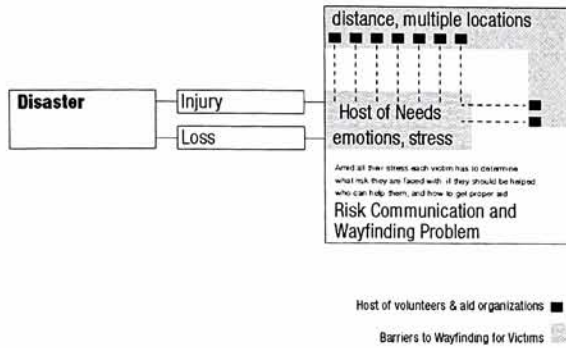
On a broader scale the **World Wide Web** allows its vast audience to quickly seek out ways to control their problems. Ideally the user learns only what they want to through searching with specific terms or browsing categories.

In the 2003 California wildfires, residents used the Web to stay informed about the fires, as well as post first-hand experience through logs and published news.

Hellinger 9

Tons removed is described in the following categories: Nature of problem, surgical preparation, stages of recovery and the procedure (visualized).





Evaluation	<p>A majority of the methods of evaluations in the three stages below will address the four aspect of risk communication and the emotional surroundings of a crisis. Duplicating these emotions in a test audience would be ideal. No such method is currently known or has been conceived by the designer.</p>
Preliminary	<p>Designers involved in post September 11th contributions and experts in disaster relief have been interviewed. These experts include Jack Hermann from the American Red Cross and Chief Ralph Provender from the Rochester Fire Department.</p> <p>Continue interviews with practitioners in disaster relief and past victims/witnesses of disasters. These include staff from the Monroe County's Local Emergency Planning Council and a water treatment plant in Rochester.</p>
Intermediate	<p>Committee meetings with advisors to evaluate progress and direction of studies.</p> <p>Survey a random sample of the general public (eighteen and older) to determine awareness of disaster relief organizations and their services.</p> <p>Survey experts in the fields of risk communication and disaster relief.</p> <p>Bi-polar scales given to general public measuring levels of emotional response to the tested visual. This test assumes that any amount of emotional response from a person in normal conditions will be magnified greatly in an highly emotional situation.</p> <p>A work in progress exhibit will intermittently disseminate my progress to RIT and the surrounding Rochester area.</p>
Retrospective	<p>Self-evaluation of how the focus on the four aspects of risk communication affected the development of the thesis and designer's process in designing the application.</p> <p>Presentation to the first year graduate graphic designers at RIT.</p> <p>Potential publishing of findings in the following areas: Graphic Design, Risk Communication, Disaster Relief, and the United States Government (local and federal).</p> <p>Consider how it could be implemented into various lesson plans of courses and distribute summary of findings to instructors who teach related courses.</p>

Timeline	Fall Quarter	Winter Quarter	Spring Quarter	Hilinger 16			
	November 2003	December 2003	January 2004	February 2004	March 2004	April 2004	May 2003
Thesis	14 Proposal signed 19 Planning report due	1 Research 11 Outline 16 Analysis 18 Committee meeting	8 Analysis 12 Synthesis 22 Begin preliminary writing 26 Committee meeting	5 Synthesis Preliminary writing 10 Implementation 26 Committee meeting	8 Installation of thesis show 12 Gallery opening 22 Revision of application 26 Thesis show comes down	9 Presentation to first year students 16 Final Implementation	12 Final Writing Thesis signed
Academic	21 Fall quarter ends Fall/winter break begins	1 Winter classes begin 8 Last drop/add date 21 Holiday break begins	5 Holiday break ends, classes resume 23 Last date to withdraw with w grade	20 Last daytime class 27 Last winter final exam 28 Spring break begins	8 Spring break ends, classes begin 16 Last Date to Drop/Add Courses	16 Last date to withdraw with "w" grade 24 End of exam week Academic convocation (7:30 pm) 27 Commencement	14 Last class
Var	28 Thanksgiving	25 Last night of Chanukkah Christmas Day	1 New Year's Day	14 Valentine's Day	17 St Patrick's Day	11 Easter Sunday	

Glossary

Crisis A traumatic experience where stress is caused by harm inflicted on individuals—used by the author in specific reference to a disaster.

Disaster A catastrophic event created by nature or man that causes vital immediate and long term harm to humans.

Risk Adds to the hazard and its magnitude the probability that the potential harm or undesirable consequence will be realized. (Risk Council 1972)

Risk Assessment determining the significance of a threat to public health.

Risk Communication 1. the exchange of information between experts and audiences regarding risk; 2. the interactive process of the exchange of information and opinions among individuals, groups, and institutions; often involves multiple messages about the nature of risks or expressing concerns, opinions, or reactions to risk messages; or to legal and institutional arrangements of risk management (risk council 1972); 3. An exchange of information among interested parties about the nature, magnitude, significance, or control of a risk.

Risk Management the evaluation of alternative risk control actions, selection among them and their implementation. (risk council 1972) Often a risk manager oversees this process.

Risk Message a written, verbal, or visual statement containing information about risk.

Wayfinding 1. seeking a specific destination among options and obstacles that create a problem; 2. the practice of aiding people to their desired destinations considering visual, verbal, and physical surroundings.

Bibliography

Direct sources

Interview with Ralph Prenter

How training is done for a disaster.
Executive Deputy Chief of Rochester Fire Department.

Interview with Michael Bierut

How designers are contributing to reconstruction of September 11th and first hand experience with the ground zero environment.
Principal at Pentagram, NYC, and past president of AIAA.

Interview with Jack Hermann

The role of the disaster relief organizations and the complexity of the September 11th disaster.
New York State Disaster Mental Health Leader for the American Red Cross.

Enslin, Regina

Risk Communication
Provides theories, aspects, and role of risk communication.
T to aJL 50 1998

Manning, Anna

Americans fear more terrorism despite preparedness
from USA Today September 8th, 2003
Public opinion about terrorism and homeland security:
81% of New Yorkers are concerned about attacks and
35% think their communities are prepared for them.

National Research Council

Improving Risk Communication

File # 247 1989
Includes explanation of managing risk communication processes.

National research council

"An Anatomy of Risk Assessment" a chapter of
**Risk Assessment in the Federal Government:
Managing the Process**

pages 83-142
<https://nrc.nap.edu/books/PDF411/html/>
Early governmental report on risk assessment, 1983

O'Connell, Kim

"Ponds of Care"
from **The American City and Country**
Describes America's preparation for various types of terrorist attacks, including risk communication.

Hellinger 17

Bibliography (direct sources contained)

Sheldon, Keith
"Credibility is a Risky Business"
from *Communication World*
An interview with expert Vincent T. Corvellec
Defines risk communication in the four aspects directly
used in this thesis.

Smith, Denis
Report from Ground Zero
HV6432, 564, 1002
Fire Fighters' account of September 11th, provides
emotional challenge, detailed surroundings, and rescue
considerations.

Trost, Cathy
Running Toward danger: stories behind
the breaking news of 9/11
Lanham, MD: Rowman & Littlefield
Media's account of September 11th, provides true line
and some context.

Indirect sources

Olgem, Nora
Safety Symbols Art
Visual collection of existing safety symbols

Wigner, Langdon
The Whale and the Reactor
Philosophical perspective on the ignored effects of
technology on humanity.

One club for art & Copy
The One Show
NCJ10015, 053, Volume 72 (2003) and 71 (1999)
Referenced for examples of risk communication handled
by graphic designers

Klipp, Jonathan D.
**Emergency Incident Risk Management:
A Safety & Health Perspective**
HV5512 J56 1996

Edited by Kahneman, Slovic, and Tversky
Judgment Under Uncertainty

Thesis Document Structure

Hellinger 10

- 1 Thesis Project Definition** Introducing, identifying and understanding the nature of the problem, including history, situation and goals.
- 2 Precedents** Describing other existing projects, case studies, models that have meaningful relationships to your study.
- 3 Research** Describing facts, principles, theories or relationships that have been discovered to help to solve the problem.
- 4 Synthesis** Describing interrelationships and patterns; sorting, sequencing, ordering information or parts of the problem.
- 5 Ideation** Describing the generation of conceptual solutions and preparation of a range of preliminary design approaches.
- 6 Intermediate Evaluation** Describing testing strategies that were used to judge ideation and the resulting selection of possible design solutions.
- 7 Implementation** Describing how the project was refined, developed and produced to its final form or application.
- 8 Dissemination** Describing plans for future audience interaction, how could the product or information be distributed/used in the future?
- 9 Retrospective Evaluation** Assessing the final product to determine strengths and weaknesses, how could future versions be improved?
- 10 Conclusion** Summarizing overall experience and outcome, what was gained?
- 11 Glossary of Terms** Defining particular terms that were used within the written documentation to aid in reader understanding.
- 12 Bibliography** Listing all sources used for the study by category: books, journals, magazines, web sites, etc.
- 13 Appendices** Labeling each tool, instrument or activity separately enabling a reader to refer to more in-depth detail at the end of the thesis documentation.
Example: One-hundred can be described within the text of the thesis documentation and a blank questionnaire can even be shown there. The entire collection of actual handwritten responses, etc. should be located in the back labeled as Appendix A.

In the early hours of Dec. 3, 1984, gas leaked from a tank of methyl isocyanate (MIC) **at a plant in Bhopal, India**, owned and operated by Union Carbide India Limited.

The state government of Madhya Pradesh reported that **approximately 3,800 persons died, 40 persons experienced permanent total disability, and 2,680 persons experienced permanent partial disability.** Studies by India's Council of Medical Research indicate that severe injury to the lung is limited to a small percentage of the population and there is no serious residual eye disease. Medical studies have shown that massive, one-time exposure to MIC has not caused cancer, birth defects, or other delayed manifestations of medical effects.

– bhopal.com/

Industry discharged **1 billion pounds of toxic chemicals into U.S. waterways** from 1992 to 1996. The **Genesee River gets the distinction of being #2 in this criteria:**

Top polluters directly discharging cancer-causing chemicals to U.S. waters (1992-1996)

– Frank J. Regan. © 1998

RochesterEnvironment.com

Kodak Park has a 22 mile border. The(re are) 13,000 neighbors that run along that border..

In March of **1988, contaminates found in the groundwater under Kodak Park** raised public concern about the potential impact on the safety of the Rand St. neighborhood. The homes in the Rand Street area did not use groundwater - drinking water was supplied exclusively by the public water system...

In 1988 a spill, **estimated at over 30,000 gallons of Methylene Chloride, occurred within 1000 yards of P.S. #41.** A 1991 press release showed Kodak at the top of the states list of industrial polluters. Kodak was inundated with public inquiries. Kodak adopted an environmental policy. A 1992 Kodak press release showed a 50% reduction in the company's release of toxic materials since 1987.

– Robert G. Pattridge, RIT

rit.edu/~rgp5877/kodak.htm

YOU ARE ALL AT RISK

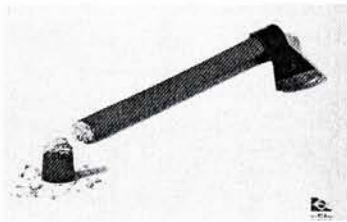
Government realization of threats

- Air Contamination
- Water Contamination
- Explosions
- Accidents
- Natural Disasters
- Terrorism

Risk (adds to hazard of potential harm or undesirable consequence)

Communication

Exchanging information
between experts and audiences
regarding risk



Nature

Significance

"Clinically proven to give
you grosser looking skin...
every cigarette contains
special active ingredients
called 'toxins'
that constrict blood
vessels, starve your skin
of oxygen and remove
the lingering traces of a
healthy complexion."

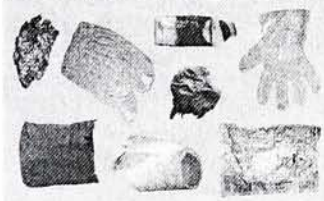


secondary significance
the well known
the unknown
the hidden
the hidden children

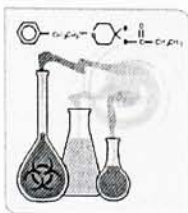
Magnitude

Control

"If your dog soils the street, there are many things you can use to clean it up."



BE INFORMED CHEMICAL THREAT

[back](#)
[next >](#)
[Download PDF](#)


1. A chemical attack is the deliberate release of a toxic gas, liquid or solid that can poison people and the environment.



2. Watch for signs such as many people suffering from watery eyes, twitching, choking, having trouble breathing or losing coordination.



3. Many sick or dead birds, fish or small animals are also cause for suspicion.



4. If you see signs of a chemical attack, quickly try to define the impacted area or where the chemical is coming from, if possible.



5. Take immediate action to get away from any sign of a chemical attack.



6. If the chemical is inside a building where you are, try to get out of the building without passing through the contaminated area, if possible.



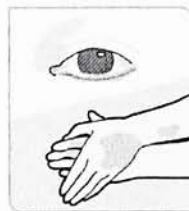
7. Otherwise, it may be better to move as far away from where you suspect the chemical release is and "shelter-in-place."



8. If you are outside when you see signs of a chemical attack, you must quickly decide the fastest way to get away from the chemical threat.



9. Consider if you can get out of the area or if it would be better to go inside a building and follow your plan to "shelter-in-place."



10. If your eyes are watering, your skin is stinging, you are having trouble breathing or you simply think you may have been exposed to a chemical, immediately strip and wash. Look for a hose, fountain, or any source of water.





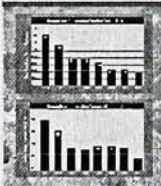
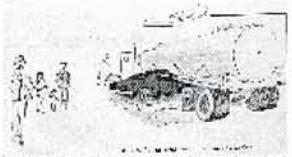


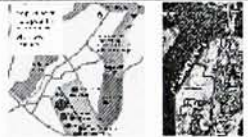
11. Wash with soap and water, if possible, but do not scrub the chemical into your skin.



12. Seek emergency medical attention.

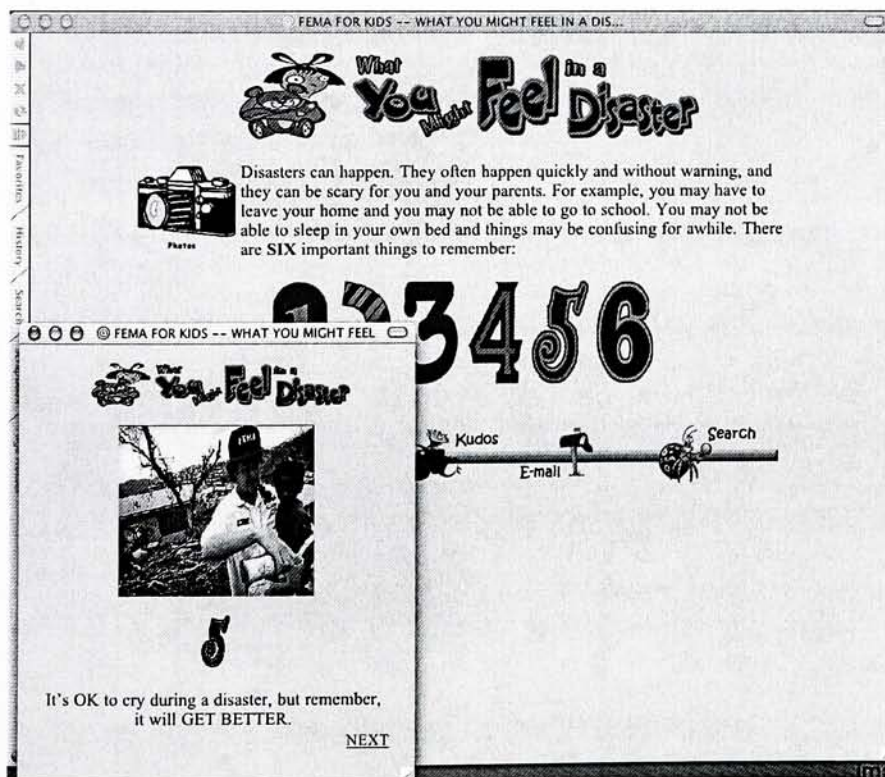
13.10 Comparative Matrix Used in Synthesis

Category	Subcategory	Considerations	Goals	Sources
Components of Risk in a man-made disaster		Inform decisions about mentally or physically dealing with a risk	Integrity Neutral Simple Reliable Direct Non-technical Comprehensible Persuasive Completeness Immediate Memorable	Government Industry Corporations Environmental groups Media Publics
	Significance	Benefit of hazard's by-product	Integrity Reliable Complete	Government Corporations Media
		Harm of hazard		
	Control	Macro	Should be aligned with existing perceptions of the risk Repetition of strong imagery can cause stigmatism (especially when magnitude is uncertain) Redundancy can cause numbing.	Integrity Neutral Non-technical Complete Direct Environmental groups Government Industry Media Publics
		Micro	Should be externally assessed and/or supported if source is distrusted	Integrity Reliable Clear Complete Comprehensible Direct Government Corporations Media
	Magnitude	Could contribute to stigmatization Often for reference in an emergency	Persuasive Credible Immediate Completeness Simplified Non-technical Direct	Government Corporations Environmental groups Media
		Often overwhelmed by associations from significance (representativeness) and recall (availability).	Integrity Reliable Completeness Comprehensible Direct	Government Industry Corporations Environmental groups Media

		To inform or educate	Reduce stigmatism
Significance	Benefit of hazard's by-product		 <p>New Union Carbide plant promotion in Bhopal, India; which ignores the harm of the hazard and blindly boasts of "A hand in things to come." 5,000 civilians die from leak at the plant. Survivors evacuated after three days. 15,000 more die over the next decade.</p>
	Harm of hazard	<p>At Love Canal families with children or pregnant women were evacuated by the government after a chemical leak. Uncertainty of harm and magnitude caused continued protests until the evacuation was expanded on two separate occasions.</p>	 <p>Part of FEMA web site for kids that introduces children to disasters and gives 6 suggestions for handling a disaster.</p>
Control	Macro		
	Micro	<p>Conflicting messages from Met Ed and Nuclear Regulatory Commission led to uncertainty about control of leak and an "explosive bubble" at Three Mile Island. Lack of integrity by Met Ed and preparation by NRC made the accident into a crisis for man. Some of the dramatize stories.</p>	 <p>Annual Environmental Report released by Kodak. Assessed internally with limited external support.</p>
Magnitude		 <p>Directions for people during a chemical leak. Unclear information, overlooks danger of explosion from accident.</p>	 <p>Control is used by the government as a guise to reduce stigmatism in "duck and cover" Highly criticized as propaganda.</p>
		 <p>Government uses to inform law enforcement and susceptible corporations. Heavily criticized for sharing information with the public (supporters assume that the media will do so anyway).</p> <p>Vague about significance and control. Potentially stigmatizing.</p>	 <p>Australian Government maps used show proximity of chemical hazard to the Olympic grounds, showing potential risk.</p>

13.11 Comparative Matrix for Content on FEMA Website

		Inform/Educate			Induce Response	
		Joint problem solving	Reduce stigma	Prepare and plan	Protective action	Warn
Significance	Benefit of resource					
	Harm of hazard		Describes how they happen direct effect no school replication confusion			
Control	Minor					
	Major	Describes how to help your parents	Describes how to respond (geared for emotional benefit) ask questions draw ok to cry			
Magnitude			Describes how to respond (geared for emotional benefit) ask questions draw ok to cry			
			Describes how to respond (geared for emotional benefit) ask questions draw ok to cry			



Designing Risk Messages about Man-Made Disasters Topic & Problem

Problem

The 2001 September 11th attacks call for various contributions to address realized problems vital to public health.

In seeking callings for the field of graphic design, external theories were discovered, which can inform designers in their problem-solving processes.

Designing Risk Messages about Man-Made Disasters Topic & Problem

Needs

Disaster victims (emotional and physical)
Society
The field of graphic design

Designing Risk Messages about Man-Made Disasters Topic & Problem

Needs for Society

Awareness
Proper response
Recovery

"... we live in a world in which information... has reduced our susceptibility to accidents and diseases at the cost of increasing our vulnerability to massive social and economic catastrophes (due to social amplification)"
Paul Slovic

Designing Risk Messages about Man-Made Disasters Topic & Problem

Needs for Graphic Design

Contribute to a meaningful cause
Direct the skills of the graphic designer towards communication that is both informative and essential to aiding humanity.
Addressing risk latent social problems
Learn from the study of risk communication

Designing Risk Messages about Man-Made Disasters Topic & Problem

Needs for Graphic Design

Contribute to a meaningful cause
Direct the skills of the graphic designer towards communication that is both informative and essential to aiding humanity.
Addressing risk latent social problems
Learn from the study of risk communication
Risk communication - the exchanging of information between experts and audiences regarding potential harm or undesirable consequence to masses of people

Designing Risk Messages about Man-Made Disasters Research Scope

PLANNING — FIRST RESPONDERS — RED CROSS INTERVIEWS — AUDIENCE-CENTERED
EMERGENCIES & RESPONSE — FIRE FIGHTER INTERVIEW — PRACTITIONER INTERVIEW — DESIGN PHILOSOPHY — SOCIAL CAUSE
MAN MADE DISASTERS — RISK COMMUNICATION — INFORMATION DESIGN
HISTORY & CASE-STUDY — EMOTIONAL STRESS — RESEARCH COUNCIL & GOVERNMENT REGULATION — SOCIOLOGY & BIASES IN HEURISTICS — PSYCHOLOGY & RISK PERCEPTION
CHEMICAL — NUCLEAR — DISASTER TESTIMONIALS — PHILOSOPHY & SOCIAL RISK — RIGHT TO KNOW ACT
LOVE CANAL — SMILE ISLAND — POST-DISASTER RESTORATION — COMMUNITY RESPONSE — RISK ASSESSMENT — KODAK INTERVIEW — BUCKET BRIGADE MEETING
BHOPAL — CHERNOBYL

Designing Risk Messages about Man-Made Disasters Research Scope

PLANNING — FIRST RESPONDERS — RED CROSS INTERVIEWS — AUDIENCE-CENTERED
EMERGENCIES & RESPONSE — FIRE FIGHTER INTERVIEW — PRACTITIONER INTERVIEW — DESIGN PHILOSOPHY — SOCIAL CAUSE
MAN MADE DISASTERS — RISK COMMUNICATION — INFORMATION DESIGN
HISTORY & CASE-STUDY — EMOTIONAL STRESS — RESEARCH COUNCIL & GOVERNMENT REGULATION — SOCIOLOGY & BIASES IN HEURISTICS — PSYCHOLOGY & RISK PERCEPTION
CHEMICAL — NUCLEAR — DISASTER TESTIMONIALS — PHILOSOPHY & SOCIAL RISK — RIGHT TO KNOW ACT
LOVE CANAL — SMILE ISLAND — POST-DISASTER RESTORATION — COMMUNITY RESPONSE — RISK ASSESSMENT — KODAK INTERVIEW — BUCKET BRIGADE MEETING
BHOPAL — CHERNOBYL

Designing Risk Messages about Man-Made Disasters Analysis

Significance



"every cigarette contains... 'toxins' that constrict blood vessels, narrow your sin of arteries and remove the lingering traces of a healthy complexion"

Designing Risk Messages about Man-Made Disasters Analysis

Magnitude

Thirty disasters are left blank and sequentially numbered to represent the magnitude of deaths in South Africa every day



Designing Risk Messages about Man-Made Disasters Analysis

Control




"If your dog soils the street, there are many things you can use to clean it up"

Designing Risk Messages about Man-Made Disasters Analysis

Category	Item	Value	Unit
Air Pollution	PM10	1.2	µg/m³
	PM2.5	0.8	µg/m³
	Ozone	0.05	ppm
	Carbon Monoxide	0.01	ppm
Water Pollution	BOD	150	mg/l
	COD	200	mg/l
	Ammonia Nitrogen	0.5	mg/l
	Nitrate Nitrogen	1.0	mg/l
Soil Pollution	Lead	100	mg/kg
	Cadmium	50	mg/kg
	Chromium	100	mg/kg
	Mercury	10	mg/kg
Noise Pollution	Daytime	70	dB
	Nighttime	55	dB
	Evening	65	dB
	Morning	60	dB

Designing Risk Messages about Man-Made Disasters Analysis



[illegible]

The diagram illustrates the Shannon-Weaver Model of communication. It shows a linear flow from left to right. On the far left is a box labeled 'Source'. Below it is the word 'Message'. An arrow points from the Source box to a box labeled 'Transmitter'. Below this box is the word 'Message'. Another arrow points from the Transmitter box to a thick vertical black bar labeled 'Noise' above it. Below this bar is the text '2000 4211000'. An arrow points from the Noise bar to a box labeled 'Receiver'. Below this box is the word 'Message'. A final arrow points from the Receiver box to a box labeled 'Destination'.

The diagram illustrates a communication system. On the left, a box labeled 'Source' is connected to a box labeled 'Transmitter'. Below the 'Transmitter' box is the label 'Message'. A line connects the 'Transmitter' to a thick vertical black bar labeled 'Noise' at the top. Below this bar are the labels '1/2, 1/2' and '1/2, 1/2'. To the right of the noise barrier is a box labeled 'Receiver', which is connected to a box labeled 'Destination'. Below the 'Receiver' box is the label 'Message'.

Noise & Uncertainty

- Incomplete knowledge of Disasters
- Biases in Judgement
 - 1 Representativeness, stereotypes & other associations will distort judgement.
 - 2 Availability: conceivability from memory or imagination will make a situation seem more likely and/or more numerous.

[illegible]

The diagram consists of two horizontal rows. The top row is labeled 'General' on the left. It shows a solid arrow pointing from 'Client' to 'Audience', with the word 'Designer' centered above the arrow and three dots '...' on the arrow itself. The bottom row is labeled 'Corporate' on the left. It shows a solid arrow pointing from 'Company' to a group of three terms: 'Consumers', 'Employees', and 'Stakeholders' stacked vertically. The word 'Designer' is centered above this arrow, and three dots '...' are on the arrow itself.

The diagram shows a cyclical relationship between five entities. At the top left is 'Social & Risk Inherent'. At the top right is 'Environmental Groups & Other Activists'. In the center is 'Public'. Below 'Public' is 'Government'. At the bottom is 'Company'. Arrows indicate the following flow: from 'Social & Risk Inherent' to 'Public'; from 'Environmental Groups & Other Activists' to 'Public'; from 'Public' to 'Government'; from 'Government' to 'Company'; from 'Company' to 'Public'; and from 'Public' back to 'Social & Risk Inherent'.

The diagram illustrates the relationship between five entities: Social & Risk Inherent, Environmental Groups & Other Activists, Public, Government, and Company. The entities are arranged in a circle, with arrows indicating the flow of influence and pressure. A legend on the right defines the arrow types: a solid arrow for 'Inform & Persuade', a dashed arrow for 'Pressure', and a dotted arrow for 'Designer's Influence'.

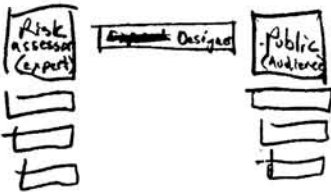
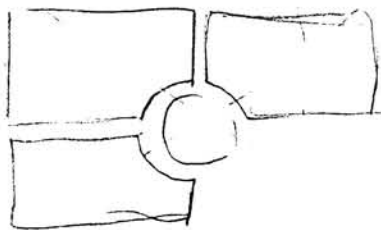
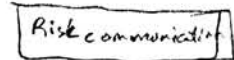
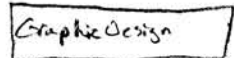
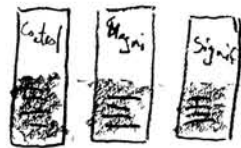
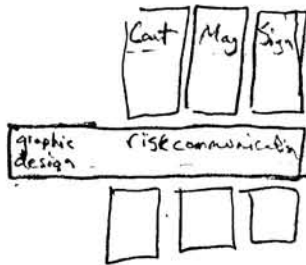
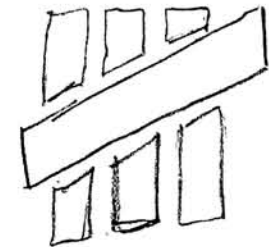
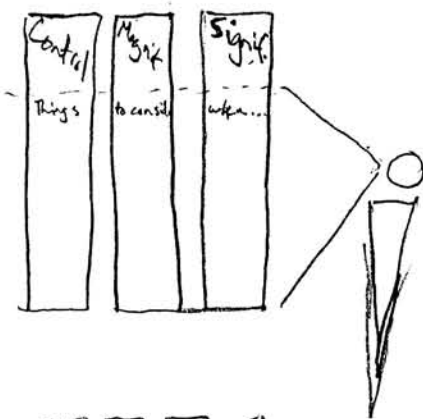
```

graph TD
    A[Social & Risk Inherent] -- "Inform & Persuade" --> B[Environmental Groups & Other Activists]
    B -- "Inform & Persuade" --> C[Public]
    C -- "Inform & Persuade" --> D[Government]
    D -- "Inform & Persuade" --> E[Company]
    E -- "Inform & Persuade" --> A
    
    A -.-> B
    B -.-> C
    C -.-> D
    D -.-> E
    E -.-> A
    
    A -.-> B
    B -.-> C
    C -.-> D
    D -.-> E
    E -.-> A
  
```

Legend:

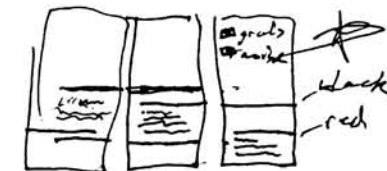
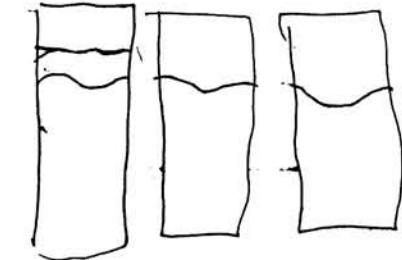
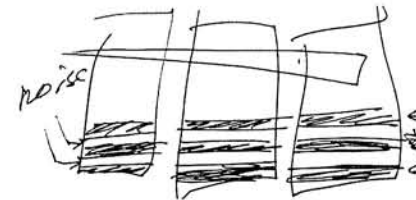
- Inform & Persuade (solid arrow)
- Pressure (dashed arrow)
- Designer's Influence (dotted arrow)

Application Guidebook for Graphic Designer
Toxic Release Data (EPA)
Emergency Response Plan
Communications Piece (Kodak)



Sketches to the left experiment with the physical format of the exhibit panels.

The four sketches below focus on intertwining the goals and barriers across the three horizontal panels.

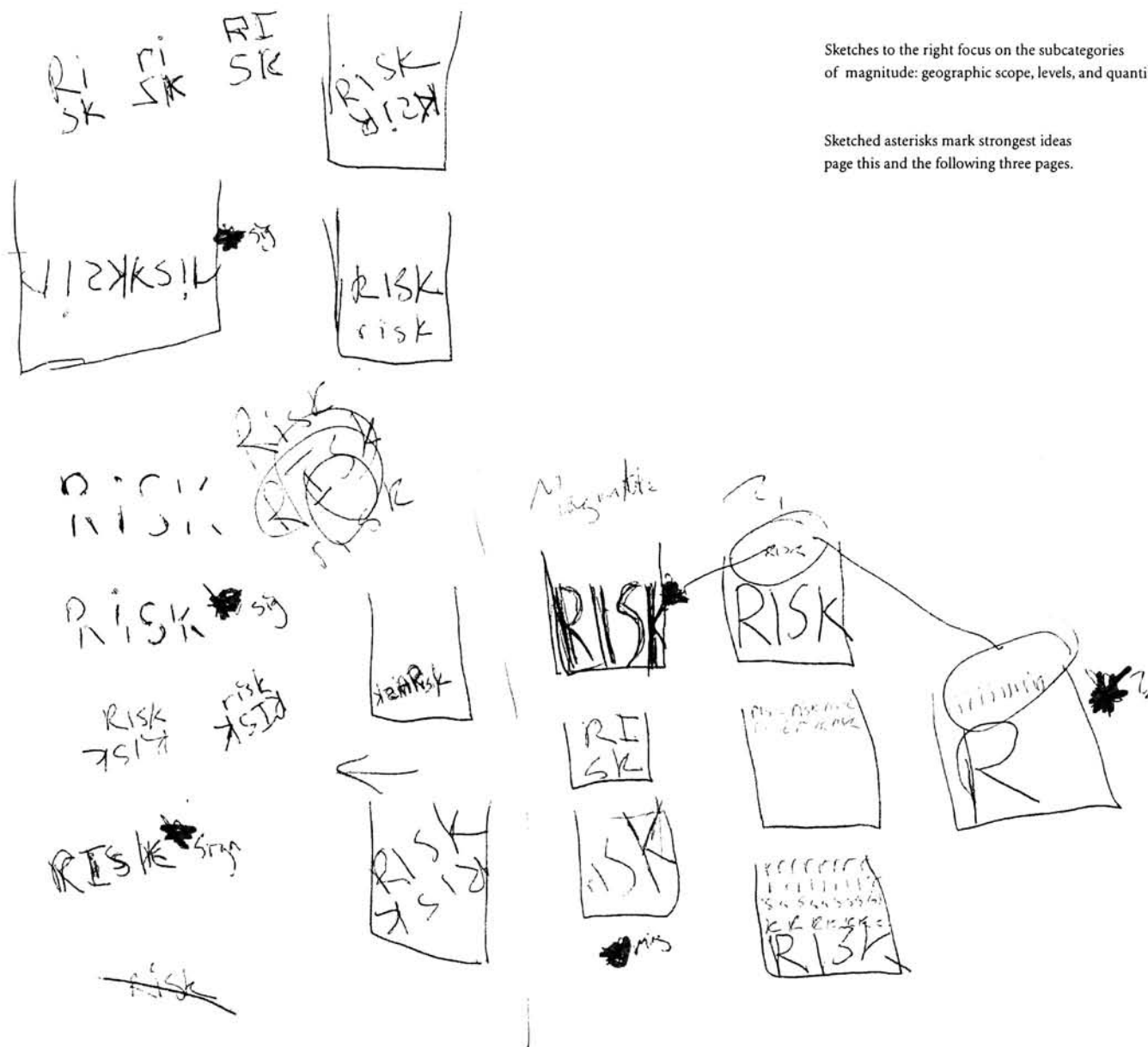


13.14 Sketches of Typographic Collages for Exhibit Panels

Sketches for significance intend to reflect an inverse relationship between benefit and harm.

Sketches to the right focus on the subcategories of magnitude: geographic scope, levels, and quantity.

Sketched asterisks mark strongest ideas page this and the following three pages.







Page of sketches of ideas for reflecting control of risk.



Sketches for significance, magnitude, and control.

Risk Communication is the exchange of information between the public and experts about the significance, magnitude, or control of health risks. It has been studied since the 1960s by numerous fields, including sociology, psychology, anthropology, linguistics, marketing, law, and philosophy.

Graphic Design is the practice and study of visual communication, which solves practical problems that inform or persuade masses of people. It has developed through out the 1900s, contributing to advertising, corporate identities, wayfinding, education, political movements, and public service announcements.

Man-made Disasters are catastrophic events that cause extensive harm to people and are created by accidents or acts of terrorism. They often include hazards, such as nuclear energy and various chemicals, whose exposures are controversial risks of society. Communicating these risks is a complex challenge. The September 11th attacks have heightened concerns of the American public and government. Among needs for these many problems are communication strategies. This presents an opportunity for graphic designers to contribute to a meaningful cause and learn from the many findings of risk communication.

Significance

Descriptions of the risk that address both the harm and benefit relative to it. A chemical plant creates a hazard that has potential harm, including an accidental leak that could cause specific health problems. While the chemical also offers benefits including daily cleaners.

Magnitude


Measurements or predictions of the quantity, level, or geographic range of a risk's affect. The harm of a chemical disaster and the benefit of the chemical as a cleaning product can have drastically different amounts of distributions.

Control


Explanations on methods that reduce harm on an individual scale (micro) or a large scale through an organization's actions (macro). People can prepare for a chemical leak by storing an emergency water supply. A plant can explain security methods and response plans.


A Holistic Approach to Risk can be guided by recognizing the three aspects of risk: significance, magnitude, and control, each of their noise factors and appropriate goals.


Risk Communication Cycle (shown to the right) shows one possible network of messages passing between sources.



Uncertainty	Complete
Stigmatism	Integrity
Politics	Neutral
Mistrust	Persuasive
Inconsistency	Direct
Utilization	Non-technical
Associations	Simple
Ignorance	Comprehensible
Concealability	Memorable







The majority of the display attempts to show connections and an overlapping of principles.

Significance

Descriptions of the risk that address both the harm and benefit relative to it. A chemical plant creates a hazard that has potential harm, including an accidental leak that could cause specific health problems. While the chemical also offer benefits including daily cleaners.

Magnitude

Measurements or predictions of the quantity, level, or geographic range of a risk's affect. The harm of a chemical disaster and the benefit of the chemical as a cleaning product can have drastically different amounts of distributions.

Control

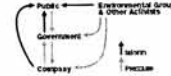
Explanations on methods that reduce harm on an individual scale (micro) or a large scale through an organization's actions (macro). People can prepare for a chemical leak, by storing an emergency water supply. A plant can explain security methods and response plans.

Man-made Disasters are catastrophic events that cause extensive harm to people and are created by accidents or acts of terrorism. They often include hazards, such as nuclear energy and various chemicals, whose existences are controversial risks of society. Communicating these risks is a complex challenge.

The September 11th attacks have heightened concerns of the American public and government. Among needs for these rising problems are communication challenges. This presents an opportunity for graphic designers to contribute to a meaningful cause and learn from the many findings of risk communication.

A Holistic Approach to Risk can be guided by recognizing the three aspects of risk (significance, magnitude, and control); each of their noise factors and appropriate goals; and the variety of sources who address the audience.

Risk Communication Cycle (shown to the right) shows one possible network of messages passing between sources.



Noise	Goals
Uncertainty	Complete
Stigmatism	Integrity
Politics	Neutral
Mistrust	Persuasive
Inconsistency	Direct
Litigation	Non-technical
Associations	Simple
Ignorance	Comprehensible
Conceivability	Memorable

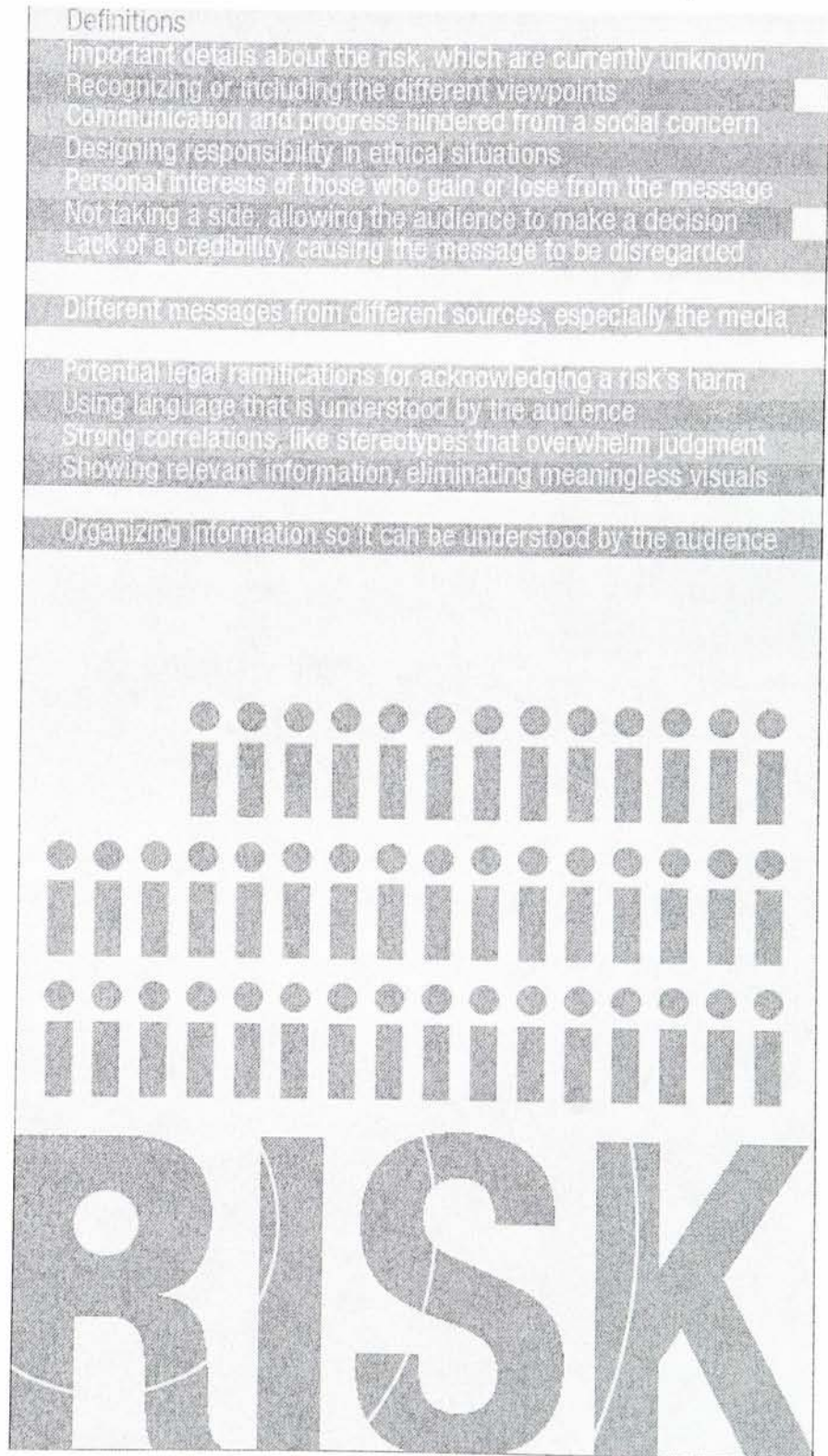
- Information details about the risk, which are currently unknown to the public or industry in the different viewpoints.
- Communication and process, hindered from a social context.
- Designing responsibility in ethical situations.
- Personal interests of those who want to lose from the message.
- Not having a clear, allowing the audience to make a decision.
- Lack of a credibility, causing the message to be discounted.
- Different messages from different sources, especially the media.
- Exaggerated legal ramifications for acknowledging a risk's harm.
- Using language that is understood by the audience.
- Showing correlations like stereotypes that we want to avoid.
- Showing relevant information, eliminating irrelevant details.
- Organizing information so it can be understood by the audience.

- Encouraging a change in behavior.
- Being straightforward and concise about the risk.
- Complete lack of fearfulness at the risk.
- Extreme ability to imagine harm, overwhelming judgment.
- Leaving an easy-to-recall impression without stigmatizing.

RISK

RISK

RISK




Objectives	<p>State when and why risk communication originated.</p> <p>Define the risk in relation to communication, messages, and perception.</p> <p>Compare aspects of risk communication and graphic design.</p> <p>Identify contributions from psychology, sociology, and philosophy.</p> <p>Explain the difference between quantitative and social perspectives of risk.</p>
------------	--

Objectives continued	<p>Identify focal characteristics in a given risk message to recognizing the various ways of representing a risk.</p> <p>Survey a sample about social values pertinent to a chosen risk.</p> <p>Segment this audience and justify a chosen target within the audience.</p> <p>Design a set of risk messages focusing on the social values of a target audience.</p>
----------------------	---

[illegible][illegible]

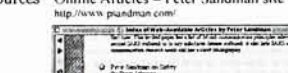
Resources

Improving Risk Communication
<http://www.nap.edu/catalog/1189.html>



The screenshot shows the National Academies Press website. The main content area displays the title page of the report "Improving Risk Communication" by the Committee on the Management of Science and Technology Risks. The page includes the report number "NAP REPORT 1189" and the date "2002". The right sidebar contains a list of other reports and a search bar.

Resources Online Articles – Peter Sandman site
<http://www.psandman.com/>



The screenshot shows a web browser window with the address bar displaying <http://www.psandman.com/>. The page title is "Online Articles by Peter Sandman". The main content area lists several articles, each with a title, author, and a brief description. The articles are:

 - 1. **Values of the American Airlines by Peter Sandman**
by Peter Sandman
This article discusses the values of the American Airlines and the impact of the 9/11 attacks on the airline industry.
 - 2. **First Lecture on Safety**
by Peter Sandman
This lecture discusses the importance of safety in the context of risk management and decision-making.
 - 3. **The Value of the American Airlines by Peter Sandman**
This article discusses the values of the American Airlines and the impact of the 9/11 attacks on the airline industry.
 - 4. **The Value of the American Airlines by Peter Sandman**
This article discusses the values of the American Airlines and the impact of the 9/11 attacks on the airline industry.
 - 5. **The Value of the American Airlines by Peter Sandman**
This article discusses the values of the American Airlines and the impact of the 9/11 attacks on the airline industry.
 - 6. **The Value of the American Airlines by Peter Sandman**
This article discusses the values of the American Airlines and the impact of the 9/11 attacks on the airline industry.
 - 7. **The Value of the American Airlines by Peter Sandman**
This article discusses the values of the American Airlines and the impact of the 9/11 attacks on the airline industry.
 - 8. **The Value of the American Airlines by Peter Sandman**
This article discusses the values of the American Airlines and the impact of the 9/11 attacks on the airline industry.
 - 9. **The Value of the American Airlines by Peter Sandman**
This article discusses the values of the American Airlines and the impact of the 9/11 attacks on the airline industry.
 - 10. **The Value of the American Airlines by Peter Sandman**
This article discusses the values of the American Airlines and the impact of the 9/11 attacks on the airline industry.

A screenshot of a web browser window showing a document titled "Human Behavior & WMD Crisis Report". The address bar displays the URL "www.dtra.mil/about/organs/rational.html/report.pdf". The document content includes a header section with the title and a list of authors: "Authors: J. Allen et al., DTRA, Defense Threat Reduction Agency, DTRA-06-078, DTRA-06-079, DTRA-06-080, DTRA-06-081, DTRA-06-082, DTRA-06-083, DTRA-06-084, DTRA-06-085, DTRA-06-086, DTRA-06-087, DTRA-06-088, DTRA-06-089, DTRA-06-090, DTRA-06-091, DTRA-06-092, DTRA-06-093, DTRA-06-094, DTRA-06-095, DTRA-06-096, DTRA-06-097, DTRA-06-098, DTRA-06-099, DTRA-06-100, DTRA-06-101, DTRA-06-102, DTRA-06-103, DTRA-06-104, DTRA-06-105, DTRA-06-106, DTRA-06-107, DTRA-06-108, DTRA-06-109, DTRA-06-110, DTRA-06-111, DTRA-06-112, DTRA-06-113, DTRA-06-114, DTRA-06-115, DTRA-06-116, DTRA-06-117, DTRA-06-118, DTRA-06-119, DTRA-06-120, DTRA-06-121, DTRA-06-122, DTRA-06-123, DTRA-06-124, DTRA-06-125, DTRA-06-126, DTRA-06-127, DTRA-06-128, DTRA-06-129, DTRA-06-130, DTRA-06-131, DTRA-06-132, DTRA-06-133, DTRA-06-134, DTRA-06-135, DTRA-06-136, DTRA-06-137, DTRA-06-138, DTRA-06-139, DTRA-06-140, DTRA-06-141, DTRA-06-142, DTRA-06-143, DTRA-06-144, DTRA-06-145, DTRA-06-146, DTRA-06-147, DTRA-06-148, DTRA-06-149, DTRA-06-150, DTRA-06-151, DTRA-06-152, DTRA-06-153, DTRA-06-154, DTRA-06-155, DTRA-06-156, DTRA-06-157, DTRA-06-158, DTRA-06-159, DTRA-06-160, DTRA-06-161, DTRA-06-162, DTRA-06-163, DTRA-06-164, DTRA-06-165, DTRA-06-166, DTRA-06-167, DTRA-06-168, DTRA-06-169, DTRA-06-170, DTRA-06-171, DTRA-06-172, DTRA-06-173, DTRA-06-174, DTRA-06-175, DTRA-06-176, DTRA-06-177, DTRA-06-178, DTRA-06-179, DTRA-06-180, DTRA-06-181, DTRA-06-182, DTRA-06-183, DTRA-06-184, DTRA-06-185, DTRA-06-186, DTRA-06-187, DTRA-06-188, DTRA-06-189, DTRA-06-190, DTRA-06-191, DTRA-06-192, DTRA-06-193, DTRA-06-194, DTRA-06-195, DTRA-06-196, DTRA-06-197, DTRA-06-198, DTRA-06-199, DTRA-06-200, DTRA-06-201, DTRA-06-202, DTRA-06-203, DTRA-06-204, DTRA-06-205, DTRA-06-206, DTRA-06-207, DTRA-06-208, DTRA-06-209, DTRA-06-210, DTRA-06-211, DTRA-06-212, DTRA-06-213, DTRA-06-214, DTRA-06-215, DTRA-06-216, DTRA-06-217, DTRA-06-218, DTRA-06-219, DTRA-06-220, DTRA-06-221, DTRA-06-222, DTRA-06-223, DTRA-06-224, DTRA-06-225, DTRA-06-226, DTRA-06-227, DTRA-06-228, DTRA-06-229, DTRA-06-230, DTRA-06-231, DTRA-06-232, DTRA-06-233, DTRA-06-234, DTRA-06-235, DTRA-06-236, DTRA-06-237, DTRA-06-238, DTRA-06-239, DTRA-06-240, DTRA-06-241, DTRA-06-242, DTRA-06-243, DTRA-06-244, DTRA-06-245, DTRA-06-246, DTRA-06-247, DTRA-06-248, DTRA-06-249, DTRA-06-250, DTRA-06-251, DTRA-06-252, DTRA-06-253, DTRA-06-254, DTRA-06-255, DTRA-06-256, DTRA-06-257, DTRA-06-258, DTRA-06-259, DTRA-06-260, DTRA-06-261, DTRA-06-262, DTRA-06-263, DTRA-06-264, DTRA-06-265, DTRA-06-266, DTRA-06-267, DTRA-06-268, DTRA-06-269, DTRA-06-270, DTRA-06-271, DTRA-06-272, DTRA-06-273, DTRA-06-274, DTRA-06-275, DTRA-06-276, DTRA-06-277, DTRA-06-278, DTRA-06-279, DTRA-06-280, DTRA-06-281, DTRA-06-282, DTRA-06-283, DTRA-06-284, DTRA-06-285, DTRA-06-286, DTRA-06-287, DTRA-06-288, DTRA-06-289, DTRA-06-290, DTRA-06-291, DTRA-06-292, DTRA-06-293, DTRA-06-294, DTRA-06-295, DTRA-06-296, DTRA-06-297, DTRA-06-298, DTRA-06-299, DTRA-06-300, DTRA-06-301, DTRA-06-302, DTRA-06-303, DTRA-06-304, DTRA-06-305, DTRA-06-306, DTRA-06-307, DTRA-06-308, DTRA-06-309, DTRA-06-310, DTRA-06-311, DTRA-06-312, DTRA-06-313, DTRA-06-314, DTRA-06-315, DTRA-06-316, DTRA-06-317, DTRA-06-318, DTRA-06-319, DTRA-06-320, DTRA-06-321, DTRA-06-322, DTRA-06-323, DTRA-06-324, DTRA-06-325, DTRA-06-326, DTRA-06-327, DTRA-06-328, DTRA-06-329, DTRA-06-330, DTRA-06-331, DTRA-06-332, DTRA-06-333, DTRA-06-334, DTRA-06-335, DTRA-06-336, DTRA-06-337, DTRA-06-338, DTRA-06-339, DTRA-06-340, DTRA-06-341, DTRA-06-342, DTRA-06-343, DTRA-06-344, DTRA-06-345, DTRA-06-346, DTRA-06-347, DTRA-06-348, DTRA-06-349, DTRA-06-350, DTRA-06-351, DTRA-06-352, DTRA-06-353, DTRA-06-354, DTRA-06-355, DTRA-06-356, DTRA-06-357, DTRA-06-358, DTRA-06-359, DTRA-06-360, DTRA-06-361, DTRA-06-362, DTRA-06-363, DTRA-06-364, DTRA-06-365, DTRA-06-366, DTRA-06-367, DTRA-06-368, DTRA-06-369, DTRA-06-370, DTRA-06-371, DTRA-06-372, DTRA-06-373, DTRA-06-374, DTRA-06-375, DTRA-06-376, DTRA-06-377, DTRA-06-378, DTRA-06-379, DTRA-06-380, DTRA-06-381, DTRA-06-382, DTRA-06-383, DTRA-06-384, DTRA-06-385, DTRA-06-386, DTRA-06-387, DTRA-06-388, DTRA-06-389, DTRA-06-390, DTRA-06-391, DTRA-06-392, DTRA-06-393, DTRA-06-394, DTRA-06-395, DTRA-06-396, DTRA-06-397, DTRA-06-398, DTRA-06-399, DTRA-06-400, DTRA-06-401, DTRA-06-402, DTRA-06-403, DTRA-06-404, DTRA-06-405, DTRA-06-406, DTRA-06-407, DTRA-06-408, DTRA-06-409, DTRA-06-410, DTRA-06-411, DTRA-06-412, DTRA-06-413, DTRA-06-414, DTRA-06-415, DTRA-06-416, DTRA-06-417, DTRA-06-418, DTRA-06-419, DTRA-06-420, DTRA-06-421, DTRA-06-422, DTRA-06-423, DTRA-06-424, DTRA-06-425, DTRA-06-426, DTRA-06-427, DTRA-06-428, DTRA-06-429, DTRA-06-430, DTRA-06-431, DTRA-06-432, DTRA-06-433, DTRA-06-434, DTRA-06-435, DTRA-06-436, DTRA-06-437, DTRA-06-438, DTRA-06-439, DTRA-06-440, DTRA-06-441, DTRA-06-442, DTRA-06-443, DTRA-06-444, DTRA-06-445, DTRA-06-446, DTRA-06-447, DTRA-06-448, DTRA-06-449, DTRA-06-450, DTRA-06-451, DTRA-06-452, DTRA-06-453, DTRA-06-454, DTRA-06-455, DTRA-06-456, DTRA-06-457, DTRA-06-458, DTRA-06-459, DTRA-06-460, DTRA-06-461, DTRA-06-462, DTRA-06-463, DTRA-06-464, DTRA-06-465, DTRA-06-466, DTRA-06-467, DTRA-06-468, DTRA-06-469, DTRA-06-470, DTRA-06-471, DTRA-06-472, DTRA-06-473, DTRA-06-474, DTRA-06-475, DTRA-06-476, DTRA-06-477

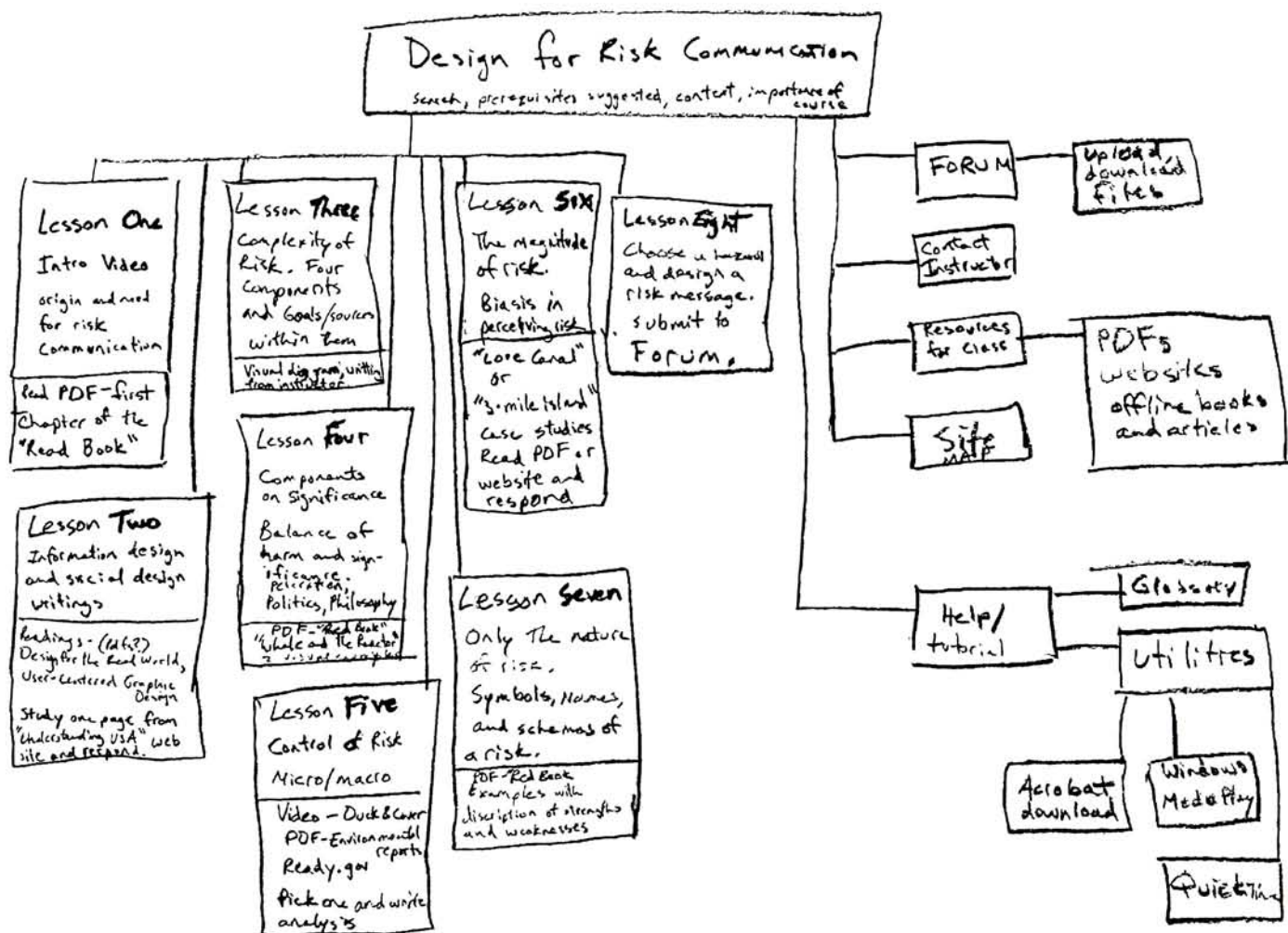
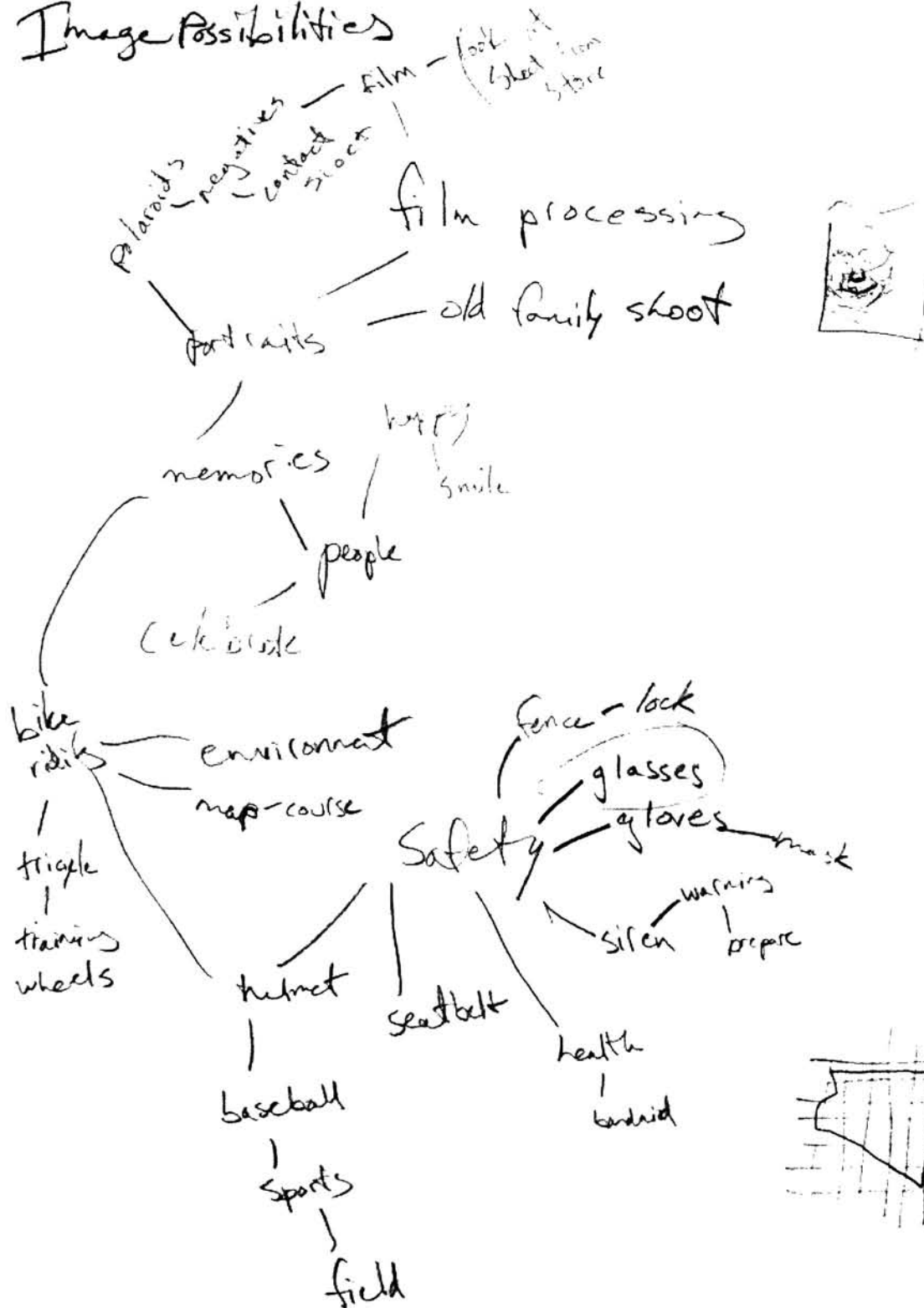


Image Possibilities



VINYLDENE CHLORIDE**ICSC: 0083**

TYPES OF HAZARD / EXPOSURE	ACUTE HAZARDS / SYMPTOMS	PREVENTION	FIRST AID / FIRE FIGHTING
FIRE	Extremely flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Use non-sparking handtools.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT GENERATION OF MISTS!	
Inhalation	Dizziness. Drowsiness. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
Skin	Redness. Pain.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness. Pain.	Safety goggles, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion	Abdominal pain. Sore throat (further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Give plenty of water to drink. Rest.

IMPORTANT DATA**PHYSICAL STATE; APPEARANCE:**

VOLATILE COLOURLESS LIQUID, WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:

The vapour is heavier than air and may travel along the ground; distant ignition possible. Vinylidene chloride monomer vapours are uninhibited and may form polymers in vents or flame arresters of storage tanks, resulting in blockage of vents.

CHEMICAL DANGERS:

The substance can readily form explosive peroxides. The substance will polymerize readily due to heating or under the influence of oxygen, sunlight, copper or aluminium, with fire or explosion hazard. May explode on heating or on contact with flames. The substance decomposes on burning producing toxic and corrosive fumes (hydrogen chloride, phosgene). Reacts violently with oxidants.

OCCUPATIONAL EXPOSURE LIMITS:

TLV: 5 ppm; A4 (ACGIH 1999).

ROUTES OF EXPOSURE:

The substance can be absorbed into the body by inhalation and by ingestion.

INHALATION RISK:

A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.

EFFECTS OF SHORT-TERM EXPOSURE:

The substance irritates the eyes, the skin and the respiratory tract. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. Exposure at high levels could cause lowering of consciousness.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the kidneys and liver.

Do you need a RMP?

Chemical Accidental Release Prevention Program

in North Carolina

Section 112(r)
of the Clean Air Act

Risk Management Program Requirements

Facilities that use, make, or store more than threshold quantities of listed chemicals must develop a Risk Management Program and file a summary Risk Management Plan (RMP) by June 21, 1999. The purpose of the 112(r) rule is to:

- Protect plant personnel, the public, and the environment.
- Prevent accidental chemical releases from occurring.
- Predict the areas that would be impacted by a worst-case accidental release.
- Prepare plans for handling accidental releases.
- Provide chemical hazard information, potential off-site consequences, and accidental release prevention information to the public.

There are 77 acutely toxic substances and 63 flammable gases and volatile liquids that are identified in the new rule. Threshold quantities range from 500 to 20,000 pounds. Please refer to the list of chemicals in this brochure and use the following charts to determine if your facility is subject to these new requirements. Stationary sources (public and private) with process(es) that contain more than a threshold quantity (TQ) of a regulated substance must conduct a hazard assessment, compile a 5-year accident history, develop an accident prevention program, develop an emergency response program, and submit risk management information to the EPA by June 21, 1999.



North Carolina - Dept. of Environment and Natural Resources
Division of Air Quality
P.O. Box 29580
Raleigh, NC 27626-0580

The author applied a modified version of the above categories (protect, prevent, predict, prepare, provide information) to the redesigned pamphlet.



Risk Management Planning

Prevention &
Preparedness
Efforts at
Kodak Park



About Kodak Park

Kodak Park (KP) is the largest photographic manufacturing facility in the world and the largest industrial complex in the northeast United States. The KP plant site is located on more than 1,000 acres and 200 feet of nearly four miles through the City of Rochester and the Town of Tonawanda.

About 13,000 people are employed in a wide variety of manufacturing operations and research positions at Kodak Park, which also serves as an industrial park for business affiliated with Kodak. Approximately 13,000 Tonawanda and Votaw residents are located close enough to KP to be considered plant neighbors.

Responding to Community Concerns

Kodak Park is committed to addressing the concerns of plant neighbors and to a regular exchange of information with the community. Information is shared with KP employees and the community through the 24-hour hotline. Kodak Park management also meets regularly with representatives from local governments, school districts, environmental groups, and plant neighbors.

The Neighborhood Information Center, located near the west end of the Big, 28 miles at 200 West Ridge Road, is open to provide information about Kodak Park issues. Staff members are available to answer questions between 7:30 a.m. and 6:00 p.m., Monday through Friday.

For additional information about Risk Management Planning or other issues related to KP, residents please contact the KP Neighborhood Information Center by calling 716-732-1770.

To report an environmental concern 24 hours a day, every day or the time, call the KP Emergency Response Line at 716-477-4300.

About Kodak Park

Kodak Park (KP) is the largest photographic manufacturing facility in the world and the largest industrial complex in the northeast United States. The KP plant site is located on more than 1,000 acres and 200 feet of nearly four miles through the City of Rochester and the Town of Tonawanda.

About 13,000 people are employed in a wide variety of manufacturing operations and research positions at Kodak Park, which also serves as an industrial park for business affiliated with Kodak. Approximately 13,000 Tonawanda and Votaw residents are located close enough to KP to be considered plant neighbors.

Responding to Community Concerns

Kodak Park is committed to addressing the concerns of plant neighbors and to a regular exchange of information with the community. Information is shared with KP employees and the community through the 24-hour hotline. Kodak Park management also meets regularly with representatives from local governments, school districts, environmental groups, and plant neighbors.

The Neighborhood Information Center, located near the west end of the Big, 28 miles at 200 West Ridge Road, is open to provide information about Kodak Park issues. Staff members are available to answer questions between 7:30 a.m. and 6:00 p.m., Monday through Friday.

For additional information about Risk Management Planning or other issues related to KP, residents please contact the KP Neighborhood Information Center by calling 716-732-1770.

To report an environmental concern 24 hours a day, every day or the time, call the KP Emergency Response Line at 716-477-4300.

Building 119 Vinylidene Chloride Storage Tank



www.kodak.com/go/usa



Environmental Protection Agency

13-18



What is Risk Management Planning?

In 1996, the U.S. Environmental Protection Agency (EPA) adopted the Risk Management Plan (RMP) regulation, establishing guidelines for identifying, preventing, and responding to potential releases of significant quantities of hazardous materials.

It requires that facilities handling these materials submit their Risk Management Plans to the EPA. Risk Management Plans must contain the following three components:

1. Hazard Assessment Process

Each chemical-specific RMP requires that a "worst case" release scenario be outlined for each process covered under the regulation. This scenario is very broadly defined to include a total and rapid release of a stored material with the simultaneous failure of all backup systems designed to prevent a release or release to avert it. In addition, it allows for other risks, other scenarios included in the RMP.

Each of these scenarios includes the danger that a release might cause and the potential effects on people and the environment. The facility's fire and/or accident history concerning the covered process must also be reported in the plan.

2. Accident Prevention Program

An accident prevention program must include inspection, testing, and maintenance of control processes, as well as compliance audits and detailed record keeping.

3. Emergency Response Plan

The RMP regulation requires that an emergency response plan be in place and started with local agencies.

How Does Kodak Prevent Accidents?

Prevention and Preparedness—these are the "two P's" by which KP works to prevent accidents and prepare for any that do occur. Several more specifically, the following seven factors ensure the highest level of preparedness and safety for our employees and plant neighbors:

1. Employment

Highly trained and skilled employees are our most important resource in safely operating our facilities and protecting the community.

2. Mechanical Integrity

We regularly inspect and test operating equipment and perform preventive and remedial maintenance.

3. Process Control Systems

Sophisticated computer process control systems monitor a variety of process parameters and alert operators should a potential problem develop.

4. Process Hazard Analysis

History reviews are conducted for processes that could present a significant hazard.

5. Assessment Process

Review assessments and periodic formal audits are conducted to ensure that safe operating practices are developed and followed.

6. Incident Review and Investigation

Incidents involving hazardous materials are investigated. Corrective actions to prevent a recurrence are implemented and expectations are shared across the site.

7. Emergency Response

Accidental releases are minimized through rapid and efficient emergency response by the specially trained Kodak Fire Department (KFD), which has agreements with community emergency response agencies.

How We Prepared?

The Kodak Fire Department (KFD), with a tradition dating back more than 100 years, today maintains two fire stations at KP and employs about 60 professional firefighters, technicians, and support staff.

These highly trained personnel are prepared to handle a wide variety of emergency incidents, including chemical hazards, and are equipped with a modern hazardous materials (Hazmat) response vehicle.

Kodak firefighters are also a community resource. Kodak's Hazmat vehicle is one of five in Monroe County. Because of their expertise, KFD firefighters are often called to community agencies to provide assistance. The KFD also conducts regular drills with community agencies personnel to enhance their ability to work together during an emergency.

On-Site Resources

In addition to the expertise of the Kodak Fire Department, health, safety, and environmental (HSE) professionals are assigned to every area of Kodak Park to assist in the safe operation and design of facilities, processes and equipment.

All Kodak Park buildings have written plans describing activities to be taken in the event of an emergency. Building personnel are trained to know their role in an emergency.

Preparedness

Over the last 10 years Kodak has invested an average of \$100 million annually in support of its commitment to protect the environment as well as the health and safety of our employees, neighbors and the community.

One example of how these investments have made KP safer is the new \$100-million-plus program to replace, upgrade or automate every bulk chemical hazardous waste or petroleum storage tank at Kodak Park. This project, which involved upgrading tanks and transfer stations to include secondary containment and leak detection devices, was completed in 1999.

Chemical: Vinylidene Chloride

What is it?
A colorless liquid with a sweet odor, evaporates readily, flammable.

What are the common uses?
Used to make certain types of plastics such as clear film plastics, safety film, and so on.

How is it stored/transported?
Stored in a 4,000-gallon tank truck up to four times per year.

How is it stored?
In an underground, 4,000-gallon, double-walled stainless steel tank.

How is it used at Building 119?
In manufacturing polymers for photographic films and papers.

Scenario: release for flammables. The calculated distance at which a fire or explosion, due to a hypothetical release, no longer has the potential to cause damage.

Health hazards based on scenario exposure: Irritation due to fumes, dizziness or burns.

Worst case scenario description: Tank major leak during unloading and the entire tank's contents released simultaneously.

Distance to worst case exposure: Approximately 625 feet—straight off site, east north on Ridge Road.

Alternate case scenario description: How fast to transfer complete release from the tank truck to the storage tank, vapors and approximately 100 gallons is released before the flow is to the tank is shut off.

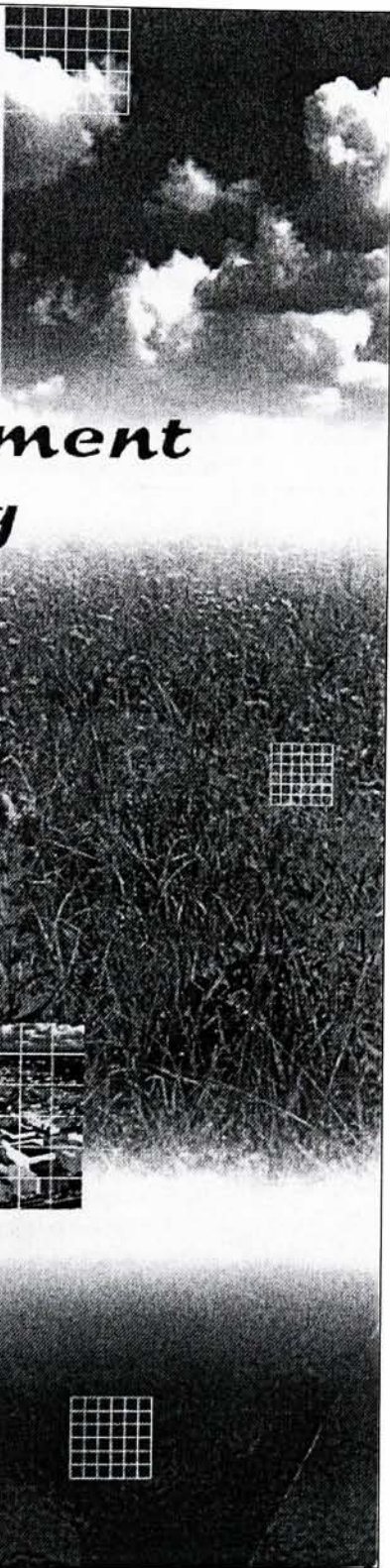
Distance to alternate case exposure: Less than 25 feet—contained within the boundaries of KP.

Accident history: No reportable vinylidene chloride releases from this storage tank and delivery system since it was installed in 1994.



Risk Management Planning

Prevention &
Preparedness
Efforts at
Kodak Park



Cover of original pamphlet.



What is Risk Management Planning?

In 1996, the U.S Environmental Protection Agency (EPA) adopted the Risk Management Plan (RMP) regulation, establishing guidelines for identifying, reporting and communicating potential accidental releases of significant quantities of 140 specific hazardous materials.

It requires that facilities handling these materials submit their Risk Management Plans to the EPA. Risk Management Plans must contain the following three components:

1. Hazard Assessment Process

Each chemical-specific RMP requires that a "worst-case" release scenario be outlined for each process covered under the regulation. This scenario is very broadly defined to mean a total and rapid release of a stored material with the simultaneous failure of all backup systems designed to prevent a release or lessen its severity. In addition, an alternate or more likely release scenario is included in the RMP.

Each of these scenarios includes the distance that a release might travel and the potential effects on people and the environment. The facility's five-year accident history concerning the covered process must also be reported in the plan.

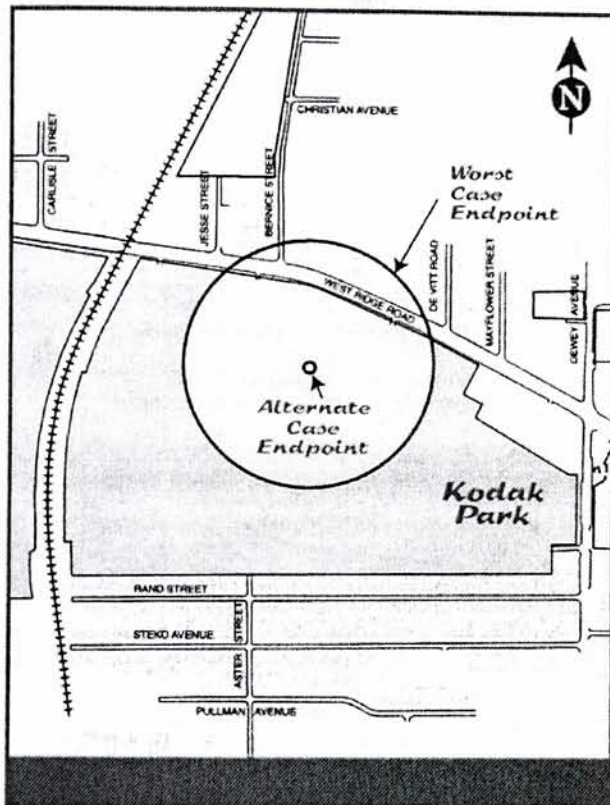
2. Accident Prevention Program

An accident prevention program must include inspection, testing and maintenance of covered processes, as well as compliance audits and detailed record keeping.

3. Emergency Response Plan

The RMP regulation requires that an emergency response plan be in place and shared with local agencies.

Building 119 Vinylidene Chloride Storage Tank



www.kodak.com/go/hse



Printed On Recycled Paper
Contains 15% postconsumer fiber

6/99



Chemical: Vinylidene Chloride

What is it?

A colorless liquid with a sweet odor, evaporates readily, flammable.

What are the common uses?

Used to make certain types of plastic such as a clear, thin plastic wrap for storing food.

How is it transported to Building 119?

Delivered in a 4,000-gallon tank truck up to four times per year.

How is it stored? In an underground 6,700-gallon, double-walled stainless steel tank.

How is it used at Building 119?

To manufacture polymers for photographic films and papers.

Scenario endpoint for flammables: The calculated distance at which a fire or explosion, due to a hypothetical release, no longer has the potential to cause damage.

Health hazards based on scenario endpoint: Injuries due to flying debris or burns.

Worst case scenario description: Tank trailer fails during unloading and the entire 4000 gallons is released instantaneously.

Distance to worst case endpoint: Approximately 625 feet —slightly off-site, just north of Ridge Road.

Alternate case scenario description: Hose used to transfer vinylidene chloride from the tank truck to the storage tank ruptures and approximately 50 gallons is released before the flow to the hose is shut off.

Distance to alternate case endpoint: Less than 25 feet — contained within the boundaries of KP.

Accident history: No reportable vinylidene chloride releases from this storage tank and delivery system since it was installed in 1994.

Prevention

Health, safety, and environmental (HSE) professionals are assigned to every area of Kodak Park. They ensure the safe operation and design of facilities, processes, and equipment. The HSE professionals oversee the following practices that prevent accidents:



Hong Lee, a Kodak Park HSE professional

Employees

Highly trained and skilled employees are our most important resource in safely operating our facilities and protecting the community.

Mechanical Integrity

We rigorously inspect and test our operating equipment and perform preventive and scheduled maintenance.

Process Control Systems

Sophisticated computer process control systems monitor a variety of process parameters and alert operators should a potential problem develop.

Process Hazard Analysis

Safety reviews are conducted for processes that could present a significant hazard.

Assessment Process

Routine assessments and periodic formal audits are conducted to ensure that safe operating practices are developed and followed.

Incident Reviews and Investigations

Incidents involving hazardous materials are investigated. Corrective actions to prevent recurrence are implemented and experiences are shared across the site.

Preparation

Kodak Park is prepared for accidents with on-site firefighting resources and external response plans.



The Kodak Park Hazmat response vehicle

The Kodak Fire Department (KFD), with a tradition dating back more than 100 years, today maintains two fire stations at Kodak Park and employs about 80 professional firefighters, technicians and support staff. These highly trained personnel are prepared to handle a wide variety of emergencies, including chemical hazards, and are equipped with a modern hazardous materials (Hazmat) response vehicle.

Kodak firefighters are also a community resource. Kodak's Hazmat vehicle is one of five in Monroe County. Because of their expertise, city firefighters are often called by community agencies to provide assistance. The KFD also conducts regular drills with community agency personnel to enhance their ability to work together during an emergency.

Kodak building personnel also know their role in an emergency. All buildings at Kodak Park have written plans describing actions in the case of an emergency.



Risk management planning aims to reduce the chance of harm in the case of an emergency. By anticipating, preventing, protecting, and preparing Kodak Park can reduce risk to its neighbors in the event of such an emergency. Emergency case scenarios, response plans, and accident prevention programs are provided to the government. These actions meet regulations established by the Environmental Protection Agency (EPA). A portion of the planning information is included within this brochure to inform Kodak Park's neighbors.

Emergency Case Scenarios

Each chemical-specific Risk Management Plan assumes that a "worst case" scenario is assumed and explained for chemicals determined hazardous by the EPA. This scenario is very broadly defined to assess a total and rapid release of a material with the same/unknown failure of all systems (including backup) that are designed to prevent a release or lessen its severity. A second scenario in the Risk Management Plan is based on a "most likely" case with partial system failure. Each scenario includes the distance that a release might travel and the potential effects on people and the environment.

Accident Prevention Program

This includes inspection, testing, and maintenance of such scenario assessments, as well as compliance audits and record keeping.

Emergency Response Plan

Risk Management Plan ensures that an emergency response plan is in place and shared with important local agencies.

Other Initiatives

Kodak has invested an average of \$150 million annually over the last ten years to protect the environment, as well as the health and safety of all our employees, neighbors, and community.

One example of these investments is the ten-year program to replace, upgrade or eliminate bulk chemicals, hazardous waste, and storage tanks at Kodak Park. The latest program also added backup testing and coverage to better prevent accidents. Completed in 1998, this is one of many projects making Kodak Park safer.

Risk Management Planning

Prevention & Preparedness Efforts

at **Kodak Park**

Vinylidene Chloride

What is it?

Vinylidene chloride is a colorless gas with a sweet odor. It can evaporate into vapor and is flammable.

How is it used?

Polymers are manufactured from it for photographic films and papers or building (VCM-type) plastics are also made of vinylidene chloride, including plastic wrap for storing food.

How is it stored?

An underground 6,000 gallon, double-walled carbon steel tank.

How is it transported to Building 119?

A 4,000-gallon tank truck delivers it up to four times per year.

Has there ever been an accident?

No, there are no reportable vinylidene chloride releases from Kodak's delivery and storage tank systems since it was installed in 1984.

What are some scenarios?

Case scenarios are hypothetical emergencies that Kodak works to prevent, as well as prepare its neighbors. These scenarios are based on fire or explosion due to a hypothetical release of vinylidene chloride. Two types of scenarios have been predicted: a worst-case and a most probable. Boundaries have been calculated to show the boundaries of damage in each scenario.

What are the hazards?

Potential health hazards based on this scenario are: inhalation of vapor, external exposure, and flying debris.

What kind of injuries could occur?

Inhalation could cause dizziness, drowsiness, and at high levels a lowering of consciousness. External exposure of the vapor could cause temporary irritation and redness of the skin and eyes. Flying debris could cause injuries and burns.

What is the Most-Probable Case Scenario?

How used to transfer liquid from the tank truck to the storage tank ruptures and approximately 30 gallons is released before the flow to the tank shut off. Liquid and vapor spread less than 25 feet – contained within Kodak Park.

What is the Worst Case Scenario?

Tank Truck fails during unloading and the entire 4,000 gallons is released instantaneously. Vapor from the liquid could spread 625 feet at most – a slight off-site, and north of West Ridge Road.



Legend

- Yellow circle: Worst Case Scenario Area
- Blue circle: Most Probable Case Scenario Area
- Black circle: Source Location
- Red line: Roads
- Blue line: Rail Roads
- Green line: Property Zone
- Red star: Kodak Park Business Neighborhood
- Blue star: Kodak Park Residential Neighborhood
- Green star: Property Zone

How do I protect myself in a scenario?

In the unlikely occurrence of a scenario, stay in your home and leave area immediately. See map on other side of page for area predicted to be affected by scenario. Higher ground is preferred in the event a heavier-than-air gas may travel along the ground.

How do I respond to injuries?

If released, get in fresh air and call 911 for medical attention. For skin irritation, remove contaminated clothes, rinse skin and then wash with water and soap. For eye irritation, rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.

Formaldehyde

What is it?

Formaldehyde is a colorless gas with a strong odor that can be very irritating. Often purchased as a liquid form (mixed with water and methanol).

How is it used?

It is used to produce a variety of photochemical products used by our customers. Formaldehyde is also used commonly as a common disinfectant, preservative, disinfectant and is found in plywood, paints, and insulation.

How is it stored?

In a 10,000 gallon bulk chemical storage tank.

How is it transported to Kodak Park?

Formaldehyde is delivered in a 3,000-gallon tank truck.

Has there ever been an accident?

No, there are no reportable formaldehyde releases during storage or in sales operations since the tank was installed in 1993.

What are some scenarios?

Case scenarios are hypothetical emergencies that Kodak works to prevent, as well as prepare its neighbors. These scenarios are based on a release of formaldehyde. Two types of scenarios have been predicted: a worst-case and a most probable. Boundaries have been calculated to show the boundaries of damage in each scenario.

What are the hazards?

Potential health hazards based on this scenario are: from external exposure to the gas form of formaldehyde.

What kind of injuries could occur?

External exposure of the gas could cause irritation to the skin as well as burning and burning of eyes. High levels could cause coughing, vomiting, severe headache, and irregular heart beat. Long term effects from prolonged high levels of exposure include allergies, asthma, eye damage, dermatitis, and cancer.

What is the Most-Probable Case Scenario?

A distribution pipe is ruptured during a transfer. An estimated 450 gallons of material is released before a operator implements emergency shutdown. Vapor and liquid spread 450 feet – fully contained within Kodak Park.

What is the Worst Case Scenario?

Entire contents of the tank trailer are released as the formaldehyde is being transferred to the storage tank. Liquid spreads 500 feet – contained within the boundaries of Kodak Park.



Legend

- Yellow circle: Worst Case Scenario Area
- Blue circle: Most Probable Case Scenario Area
- Black circle: Source Location
- Red line: Roads
- Blue line: Rail Roads
- Green line: Property Zone
- Red star: Kodak Park Business Neighborhood
- Blue star: Kodak Park Residential Neighborhood
- Green star: Property Zone

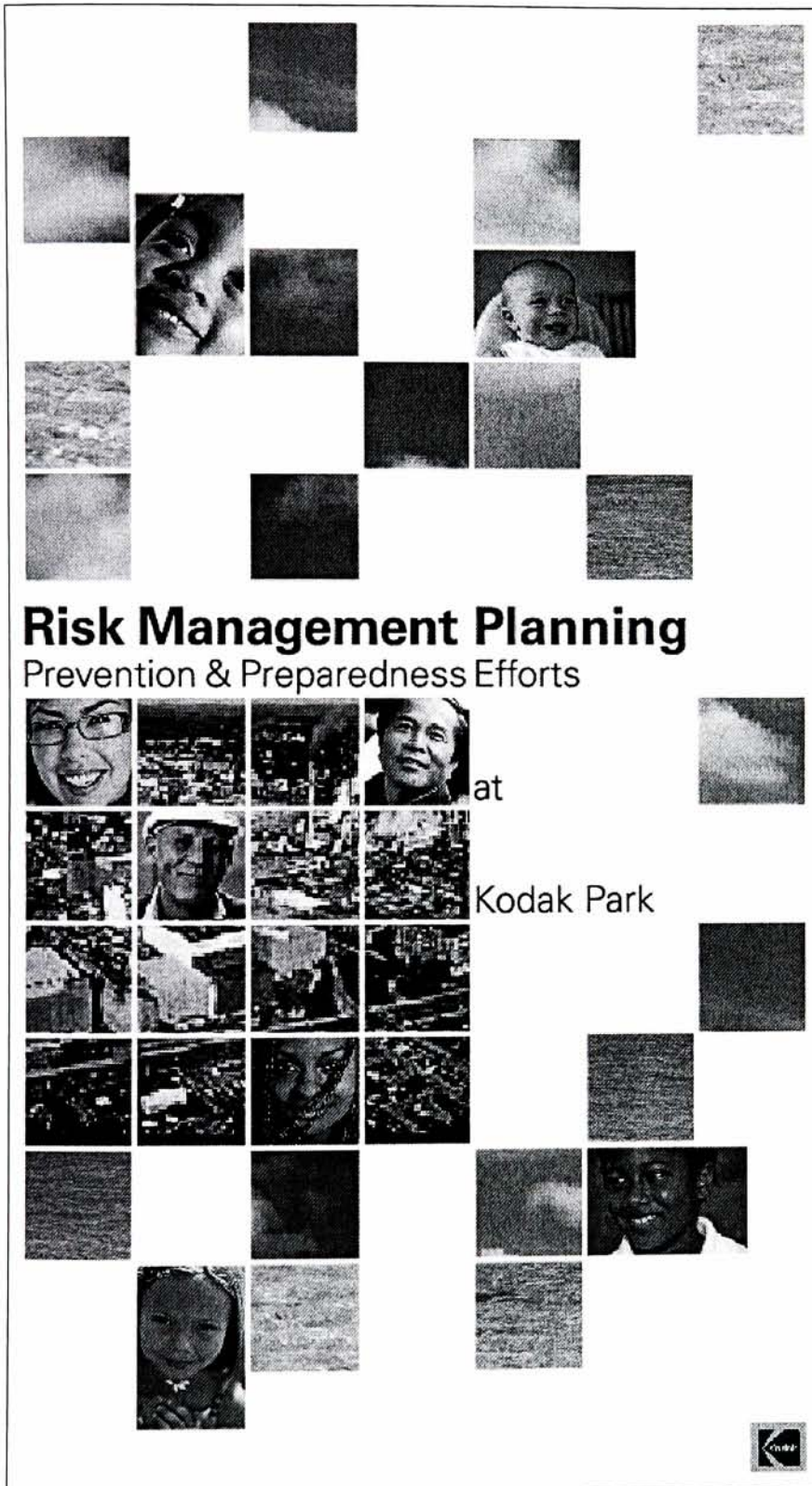
How do I protect myself in a scenario?

In the unlikely occurrence of a scenario, stay in your home and leave area immediately. See map on other side of page for area predicted to be affected by scenario.

How do I respond to injuries?

If exposed to formaldehyde, remove contaminated clothes, wash skin with soap and water. For eye irritation, rinse with plenty of water for several minutes (remove contact lenses if easily possible). Visit doctor for any mild injuries, as long term injuries can be serious.

Cover of the redesigned pamphlet.



Prevention

Health, safety, and environmental (HSE) professionals are assigned to every area of Kodak Park. They assist in the safe operation and design of facilities, processes, and equipment. The HSE professionals oversee the following resources that prevent accidents.



Hang Lee, a Kodak Park HSE professional

Employees

Highly trained and skilled employees are our most important resource in safely operating our facilities and protecting the community.

Mechanical Integrity

We rigorously inspect and test operating equipment and perform preventive and remedial maintenance.

Process Control Systems

Sophisticated computer process control systems monitor a variety of process parameters and alert operators should a potential problem develop.

Process Hazard Analysis

Safety reviews are conducted for processes that could present a significant hazard.

Assessment Process

Routine assessments and periodic formal audits are conducted to ensure that safe operating practices are developed and followed.

Incident Reviews and Investigations

Incidents involving hazardous materials are investigated. Corrective actions to prevent recurrence are implemented and experiences are shared across the site.

Preparation

Kodak Park is prepared for accidents with on-site firefighting resources and internal response plans.



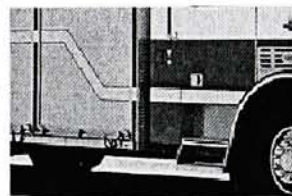
The Kodak Park Hazmat response vehicle



The Kodak Fire Department (KFD), with a tradition dating back more than 100 years, today maintains two fire stations at Kodak Park and employs about 80 professional firefighters, technicians and support staff. These highly trained personnel are prepared to handle a wide variety of emergencies, including chemical hazards, and are equipped with a modern hazardous materials (Hazmat) response vehicle.

Kodak firefighters are also a community resource. Kodak's Hazmat vehicle is one of five in Monroe County. Because of their expertise, KFD firefighters are often called by community agencies to provide assistance. The KFD also conducts regular drills with community agency personnel to enhance their ability to work together during an emergency.

Kodak building personnel also know their role in an emergency. All buildings at Kodak Park have written plans describing actions in the case of an emergency.



Vinylidene Chloride

What is it?

Vinylidene chloride is a colorless liquid with a sweet odor. It can evaporate into vapor and is flammable.

How is it used?

Polymers are manufactured from it for photographic films and papers in Building 119. Many types of plastic are also made of vinylidene chloride, including plastic wrap for storing food.

How is it stored?

An underground 6,700-gallon, double-walled stainless steel tank.

How is it transported to Building 119?

A 4,000-gallon tank truck delivers it up to four times per year.

Has there ever been an accident?

No, there are no reportable vinylidene chloride releases from Kodak's delivery and storage tank system since it was installed in 1994.

What are case scenarios?

Case scenarios are hypothetical emergencies that Kodak works to prevent, as well as prepare its neighbors. These scenarios are based on fire or explosion due to a hypothetical release of vinylidene chloride. Two types of scenarios have been predicted: a worst-case and a most probable. Boundaries have been calculated to show the boundaries of damage in each scenario.

What are the hazards?

Potential health hazards based on this scenario are inhalation of vapor, external exposure, and flying debris.

What kind of injuries could occur?

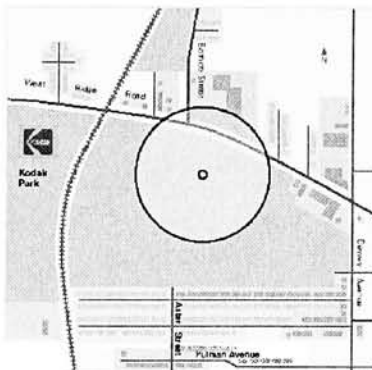
Inhalation could cause dizziness, drowsiness, and at high levels a lowering of consciousness. External exposure of the vapor could cause temporary irritation and redness of the skin and eyes. Flying debris could cause injuries and burns.

What is the Most-Probable Case Scenario?

Hose used to transfer liquid from the tank truck to the storage tank ruptures and approximately 50 gallons is released before the flow to the hose is shut off. Liquid and fumes spread less than 25 feet – contained within Kodak Park.

What is the Worst Case Scenario?

Tank trailer fails during unloading and the entire 4,000 gallons is released instantaneously. Fumes from the liquid could spread 625 feet at most – slightly off-site, just north of West Ridge Road.



Legend

- Roads
- Rail Roads
- Worst Case Scenario Area
- Most Probable Case Scenario Area
- Scenario boundaries
- Kodak Park Business Neighbor
- Kodak Park Residential Neighbor
- Property Zone

How do I protect myself in a scenario?

In the unlikely occurrence of a scenario, stay on foot and leave area immediately. See map on other side of page for area predicted to be affected by scenarios. Higher ground is preferred as the vapor is heavier than air and may travel along the ground.

How do I respond to injuries?

If inhaled, get to fresh air and rest. Refer for medical attention. For skin irritation, remove contaminated clothes, rinse skin and then wash with water and soap. For eye irritation, rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.

Formaldehyde

What is it?

Formaldehyde is a colorless gas with an intense odor that can be very irritating. Often purchased in a liquid form (mixed with water and methanol).

How is it used?

It is used to produce a variety of photochemical products used by our customers. Formaldehyde is also used commonly as a corrosion inhibitor, preservative, disinfectant and is found in plywood, paints, and insulation.

How is it stored?

In a 10,000-gallon bulk chemical storage tank.

How is it transported to Kodak Park?

Formaldehyde is delivered in a 5,000-gallon tank truck.

Has there ever been an accident?

No, there are no reportable formaldehyde during storage or transfer operations since the tank was installed in 1991.

What are case scenarios?

Case scenarios are hypothetical emergencies that Kodak works to prevent, as well as prepare its neighbors. These scenarios are on a release of Formaldehyde. Two types of scenarios have been predicted: a worst-case and a most probable. Boundaries have been calculated to show the boundaries of damage in each scenario.

What are the hazards?

Potential health hazards based on this scenario are from external exposure to the gas form of formaldehyde.

What kind of injuries could occur?

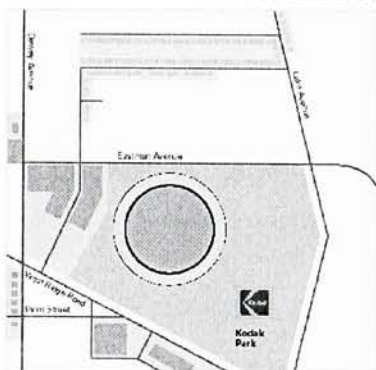
External exposure of the gas could cause irritation to the skin as well as burning and burning of eyes. High levels could cause coughing, congestion, severe headache, and irregular heart beat. Long term effects from prolonged high levels of exposure include allergies, eczema, eye damage dermatitis, and cancer.

What is the Most-Probable Case Scenario?

A distribution pipe is ruptured during a transfer. An estimated 450 gallons of material is released before an operator implements emergency shutdown procedures. Liquid spreads 400 feet – fully contained within Kodak Park.

What is the Worst Case Scenario?

Entire contents of the tank trailer are released as the formaldehyde is being transferred to the storage tank. Liquid spreads 500 feet – contained within the boundaries of Kodak Park.



Legend

- Roads
- Rail Roads
- Worst Case Scenario Area
- Most Probable Case Scenario Area
- Scenario boundaries
- Kodak Park Business Neighbor
- Kodak Park Residential Neighbor
- Property Zone

How do I protect myself in a scenario?

In the unlikely occurrence of a scenario, use cloth to ventilate air and leave area immediately. Reference the map above for the area predicted to be affected by scenarios.

How do I respond to injuries?

If exposed to formaldehyde, remove contaminated clothes, wash skin with soap and water. For eye irritation, rinse with plenty of water for several minutes (remove contact lenses if easily possible). Visit doctor for any mild injuries, as long term injuries can be serious.

<p>Survey 2</p> <p>To be filled out after completing "Survey 1" and reading Pamphlets C & D.</p>	<p>This survey will be used only for thesis research by a M.A. candidate at RIT.</p> <p><i>Risk Management Planning Pamphlets</i></p>
<p>Circle the most appropriate option for each line:</p>	
How much of the information in Pamphlet D did you skim?	0% 20 40 60 80 100%
How much of the information in Pamphlet D did you read?	0% 20 40 60 80 100%
Does Pamphlet D represent Kodak's control of the situation more or less effectively than Pamphlet C?	More effectively Less effectively No change
Was Pamphlet D more alarming or more comforting than Pamphlet C?	More alarming More comforting No change
Was Pamphlet D more helpful or more harmful than Pamphlet C?	More helpful Less harmful Neither No change
Was Pamphlet D more clear or more vague than Pamphlet C?	More clear More vague No change
Was Pamphlet D more trustworthy or more deceiving than Pamphlet C?	More Trustworthy More Deceiving No change
Which topic was improved the most in Pamphlet D?	Case scenarios Prevention methods none Preparation methods Description of chemical
Which topic was improved the least in Pamphlet D?	Case scenarios Prevention methods none Preparation methods Description of chemical
Which pamphlet do you consider to be most informative?	Pamphlet C Pamphlet D they are the same
<p>General comments:</p>	

<p>Survey 1</p> <p>To be filled out after reading Pamphlet</p>	<p>This survey will be used only for thesis research by a M.A. candidate at RIT.</p> <p><i>Risk Management Planning Pamphlets</i></p>
<p>Circle the most appropriate option for each line:</p>	
How much of the information in Pamphlet C did you skim?	0% 20 40 60 80 100%
How much of the information in Pamphlet C did you read?	0% 20 40 60 80 100%
How much control do you think Kodak Park has managing the risks outlined in Pamphlet C?	0% 20 40 60 80 100%
How much of this information was alarming?	0% 20 40 60 80 100%
Please rate Pamphlet C for the following:	Alarming Comforting
Helpful Harmful	
Clear Vague	
Trustworthy Deceiving	
Which topic was most effectively explained?	Case scenarios Prevention methods none Preparation methods Description of chemical
Which topic was least effectively explained?	Case scenarios Prevention methods none Preparation methods Description of chemical
<p>General comments:</p>	

The following pages are surveys with responses. In each one, the survey about the original pamphlet is on the left and the survey responding to the redesign is on the right.

Survey 2

To be filled out after completing
"Survey 1" and reading Pamphlet A & B

This survey will be used only for those research
by a MFA candidate at RIT
Risk Management Planning Pamphlets

Circle the most appropriate option for each line:

- How much of the information
in Pamphlet B did you skim? 0% 20 40 60 80 100%
- How much of the information
in Pamphlet B did you read? 0% 20 40 60 80 100%
- Does Pamphlet B represent
Kodak's control of the situation more
or less effectively than Pamphlet A? More effectively Less effectively No change
- Was Pamphlet B more alarming or
more comforting than Pamphlet A? More alarming More comforting No change
- Was Pamphlet B more helpful
or more harmful than Pamphlet A? More helpful Less harmful Neither No change
- Was Pamphlet B more clear
or more vague than Pamphlet A? More clear More vague No change
- Was Pamphlet B more trustworthy
or more deceiving than Pamphlet A? More Trustworthy More Deceiving No change
- Which topic was explained the most
in Pamphlet B? Case scenarios Prevention methods none
Preparation methods Description of chemical
- Which topic was explained the least
in Pamphlet B? Case scenarios Prevention methods none
Preparation methods Description of chemical
- Which pamphlet do you consider
to be most informative? Pamphlet A Pamphlet B they are the same

General comments:

2.3.1
2.3.2
2.3.3
2.3.4

Survey 1

To be filled out after reading
Pamphlet A - C -

This survey will be used only for those research
by a MFA candidate at RIT,
Risk Management Planning Pamphlets

Circle the most appropriate option for each line:

- How much of the information
in Pamphlet A did you skim? 0% 20 40 60 80 100%
- How much of the information
in Pamphlet A did you read? 0% 20 40 60 80 100%
- How much control do you think
Kodak Park has over managing
the risks outlined in Pamphlet A? 0% 20 40 60 80 100%
- How much of this information
was alarming? 0% 20 40 60 80 100%
- Please rate Pamphlet A for the following:
- | | | | | | | | |
|----------|---------|-------|-------------|------------|---------|-------|-----------|
| Alarming | Helpful | Clear | Trustworthy | Comforting | Harmful | Vague | Deceiving |
|----------|---------|-------|-------------|------------|---------|-------|-----------|
- Which topic was most effectively explained? Case scenarios Preparation methods none
Preparation methods Description of chemical
- Which topic was least effectively explained? Case scenarios Preparation methods none
Preparation methods Description of chemical

General comments:

The impact of pamphlet may be
different if I were a nearby
resident.

Survey 2

To be filled out after completing
"Survey 1" and reading Pamphlet A & B

This survey will be used only for thesis research
by a MFA candidate at FIT
Risk Management Planning Pamphlets

Circle the most appropriate option for each line:

How much of the information
in Pamphlet B did you skim? 0% 20 40 60 80 100%

How much of the information
in Pamphlet B did you read? 0% 20 40 60 80 100%

Does Pamphlet B represent
Kodak's control of the situation more
or less effectively than Pamphlet A? More effectively Less effectively No change

Was Pamphlet B more alarming or
more comforting than Pamphlet A? More alarming More comforting No change

Was Pamphlet B more helpful
or more harmful than Pamphlet A? More helpful Less harmful Neither No change

Was Pamphlet B more clear
or more vague than Pamphlet A? More clear More vague No change

Was Pamphlet B more trustworthy
or more deceiving than Pamphlet A? More Trustworthy More Deceiving No change

Which topic was improved the most
in Pamphlet B? Case scenarios: Prevention methods: none
Preparation methods: Description of chemical

Which topic was improved the least
in Pamphlet B? Case scenarios: Prevention methods: none
Preparation methods: Description of chemical

Which pamphlet do you consider
to be most informative? Pamphlet A Pamphlet B they are the same

General comments: Pamphlet "A" made me feel much more
comfortable - b/c the chemicals were not
in the pamphlet but "B" was more
enjoyable to read - made you want to
read it more than "A"

Survey 1

To be filled out after reading
Pamphlet A

This survey will be used only for thesis research
by a MFA candidate at FIT
Risk Management Planning Pamphlets

Circle the most appropriate option for each line:

How much of the information
in Pamphlet A did you skim? 0% 20 40 60 80 100%

How much of the information
in Pamphlet A did you read? 0% 20 40 60 80 100%

How much control do you think
Kodak Park has over managing
the risks outlined in Pamphlet A? 0% 20 40 60 80 100%

How much of this information
was alarming? 0% 20 40 60 80 100%

Please rate Pamphlet A for the following:
Alarming 20 Comforting

Helpful 20 Harmful

Clear 20 Vague

Trustworthy 20 Deceiving

Which topic was most effectively explained? Case scenarios: Preparation methods: Preparation methods Prevention methods: none
Description of chemical

Which topic was least effectively explained? Case scenarios: Preparation methods: Preparation methods Prevention methods: none
Description of chemical

General comments: Clear and straightforward generally
throughout the pamphlet - There
was no part that I really didn't
1) want to read 2) understand. Not
serious enough though

Survey 1

To be filled out after reading
Pamphlet A

This survey will be used only for these research
by a MFA candidate at FIT
Risk Management Planning Pamphlets

Circle the most appropriate option for each line:

How much of the information
in Pamphlet A did you skim? 0% 20 40 60 80 100%

How much of the information
in Pamphlet A did you read? 0% 20 40 60 80 100%

How much control do you think
Kodak Park has over managing
the risks outlined in Pamphlet A? 0% 20 40 60 80 100%

How much of the information
was alarming? 0% 20 40 60 80 100%

Please rate Pamphlet A for the following

Alarming Comfoting

Helpful Harmful

Clear Vague

Trustworthy Deceiving

Which topic was most effectively explained? Case scenarios Prevention methods none
Preparation methods Description of chemical

Which topic was least effectively explained? Case scenarios Prevention methods none
Preparation methods Description of chemical

General comments:

Survey 2

To be filled out after completing
"Survey 1" and reading Pamphlet A & B

This survey will be used only for these research
by a MFA candidate at FIT.
Risk Management Planning Pamphlets

Circle the most appropriate option for each line:

How much of the information
in Pamphlet B did you skim? 0% 20 40 60 80 100%

How much of the information
in Pamphlet B did you read? 0% 20 40 60 80 100%

Does Pamphlet B represent
Kodak's control of the situation more
or less effectively than Pamphlet A? More effectively Less effectively No change

Was Pamphlet B more alarming or
more comforting than Pamphlet A? More alarming More comforting No change

Was Pamphlet B more helpful
or more harmful than Pamphlet A? More helpful Less harmful Neither No change

Was Pamphlet B more clear
or more vague than Pamphlet A? More clear More vague No change

Was Pamphlet B more trustworthy
or more deceiving than Pamphlet A? More Trustworthy More Deceiving No change

Which topic was explained the most
in Pamphlet B? Case scenarios Prevention methods none
Preparation methods Description of chemical

Which topic was explained the least
in Pamphlet B? Case scenarios Prevention methods none
Preparation methods Description of chemical

Which pamphlet do you consider
to be most informative? Pamphlet A Pamphlet B they are the same

General comments:

Survey 1
To be filled out after reading
Pamphlet A

This survey will be used only for thesis research
by a MFA candidate at FIT.
Risk Management Planning Pamphlets

Circle the most appropriate option for each line:

How much of the information
in Pamphlet A did you skim? 0% 20 40 60 80 100%

How much of the information
in Pamphlet A did you read? 0% 20 40 60 80 100%

How much control do you think
Kodak Park has over managing
the risks outlined in Pamphlet A? 0% 20 40 60 80 100%

How much of this information
was alarming? 0% 20 40 60 80 100%

Please rate Pamphlet A for the following

Alarming

Comforting

Helpful

Harmful

Clear

Vague

Trustworthy

Deceiving

Which topic was most effectively explained? Case scenarios Prevention methods none
Preparation methods Description of chemical

Which topic was least effectively explained? Case scenarios Prevention methods none
Preparation methods Description of chemical

General comments:

Survey 2
To be filled out after reading
Pamphlet A & B

This survey will be used only for thesis research
by a MFA candidate at FIT.
Risk Management Planning Pamphlets

Circle the most appropriate option for each line:

How much of the information
in Pamphlet B did you skim? 0% 20 40 60 80 100%

How much of the information
in Pamphlet B did you read? 0% 20 40 60 80 100%

Does Pamphlet B represent
Kodak's control of the situation more
or less effectively than Pamphlet A? More effectively Less effectively No change

Was Pamphlet B more alarming or
more comforting than Pamphlet A? More alarming More comforting No change

Was Pamphlet B more helpful
or more harmful than Pamphlet A? More helpful Less harmful Neither No change

Was Pamphlet B more clear
or more vague than Pamphlet A? More clear More vague No change

Was Pamphlet B more trustworthy
or more deceiving than Pamphlet A? More Trustworthy More Deceiving No change

Which topic was improved the most
in Pamphlet B? Case scenarios Prevention methods none
Preparation methods Description of chemical

Which topic was improved the least
in Pamphlet B? Case scenarios Prevention methods none
Preparation methods Description of chemical

Which pamphlet do you consider
to be most informative? Pamphlet A Pamphlet B they are the same

General comments:

Survey 1

To be filled out after reading
Pamphlet A

This survey will be used only for thesis research
by a MFA candidate at RIT
Risk Management Planning Pamphlets

Circle the most appropriate option for each line.

How much of the information
in Pamphlet A did you skim? 0% 20 40 60 80 100%

How much of the information
in Pamphlet A did you read? 0% 20 40 60 80 100%

How much control do you think
Kodak Park has over managing
the risks outlined in Pamphlet A? 0% 20 40 60 80 100%

How much of this information
was alarming? 0% 20 40 60 80 100%

Please rate Pamphlet A for the following:

Alarming Contorting

Helpful Harmful

Clear Vague

Trustworthy Deceiving

Which topic was most effectively explained? Case scenarios Prevention methods: none
Preparation methods: Description of chemical

Which topic was least effectively explained? Case scenarios Prevention methods: none
Preparation methods: Description of chemical

General comments:

Survey 2

To be filled out after completing
"Survey 1" and reading Pamphlet A & B

This survey will be used only for thesis research
by a MFA candidate at RIT
Risk Management Planning Pamphlets

Circle the most appropriate option for each line.

How much of the information
in Pamphlet B did you skim? 0% 20 40 60 80 100%

How much of the information
in Pamphlet B did you read? 0% 20 40 60 80 100%

Does Pamphlet B represent
Kodak's control of the situation more
or less effectively than Pamphlet A? More effectively Less effectively No change

Was Pamphlet B more alarming or
more comforting than Pamphlet A? More alarming More comforting No change

Was Pamphlet B more helpful
or more harmful than Pamphlet A? More helpful Less harmful Neither No change

Was Pamphlet B more clear
or more vague than Pamphlet A? More clear More vague No change

Was Pamphlet B more trustworthy
or more deceiving than Pamphlet A? More Trustworthy More Deceiving No change

Which topic was improved the most
in Pamphlet B? Case scenarios Prevention methods: none
Preparation methods: Description of chemical

Which topic was improved the least
in Pamphlet B? Case scenarios Prevention methods: none
Preparation methods: Description of chemical

Which pamphlet do you consider
to be most informative? Pamphlet A Pamphlet B they are the same

General comments:

Survey 1

To be filled out after reading
Pamphlet A

This survey will be used only for thesis research
by a MFA candidate at RIT.
Risk Management Planning Pamphlets

Circle the most appropriate option for each line.

How much of the information
in Pamphlet A did you skim? 0% 20 40 60 80 100%

How much of the information
in Pamphlet A did you read? 0% 20 40 60 80 100%

How much control do you think
Kodak Park has over managing
the risks outlined in Pamphlet A? 0% 20 40 60 80 100%

How much of this information
was alarming? 0% 20 40 60 80 100%

Please rate Pamphlet A for the following:

Alarming	Comforting
Helpful	Harmful
Clear	Vague
Trustworthy	Deceiving

Which topic was most effectively explained? Case scenarios Prevention methods none
Preparation methods Description of chemical

Which topic was least effectively explained? Case scenarios Prevention methods none
Preparation methods Description of chemical

General comments:

Survey 2

To be filled out after completing
"Survey 1" and reading Pamphlet A & B

This survey will be used only for thesis research
by a MFA candidate at RIT.
Risk Management Planning Pamphlets

Circle the most appropriate option for each line:

How much of the information
in Pamphlet B did you skim? 0% 20 40 60 80 100%

How much of the information
in Pamphlet B did you read? 0% 20 40 60 80 100%

Does Pamphlet B represent
Kodak's control of the situation more
or less effectively than Pamphlet A? More effectively Less effectively No change

Was Pamphlet B more alarming or
more comforting than Pamphlet A? More alarming More comforting No change

Was Pamphlet B more helpful
or more harmful than Pamphlet A? More helpful Less harmful Neither No change

Was Pamphlet B more clear
or more vague than Pamphlet A? More clear More vague No change

Was Pamphlet B more trustworthy
or more deceiving than Pamphlet A? More Trustworthy More Deceiving No change

Which topic was improved the most
in Pamphlet B? Case scenarios Prevention methods none
Preparation methods Description of chemical

Which topic was improved the least
in Pamphlet B? Case scenarios Prevention methods none
Preparation methods Description of chemical

Which pamphlet do you consider
to be most informative? Pamphlet A Pamphlet B they are the same

General comments:

K

Survey 1

To be filled out after reading
Pamphlet AThis survey will be used only for thesis research
by a MFA candidate at RIT.
Risk Management Planning Pamphlets

Circle the most appropriate option for each line:

How much of the information
in Pamphlet A did you skim? 0% 20 40 (60) 80 100%How much of the information
in Pamphlet A did you read? 0% (20) 40 60 80 100%How much control do you think
Kodak Park has over managing
the risks outlined in Pamphlet A? 0% 20 40 (60) 80 100%How much of the information
was alarming? 0% 20 (40) 60 80 100%

Please rate Pamphlet A for the following:

Alarming Comforting

Helpful Harmful

Clear Vague

Trustworthy Deceiving

Which topic was most effectively explained? Case scenarios Prevention methods none
Preparation methods Description of chemicalWhich topic was least effectively explained? Case scenarios Prevention methods none
Preparation methods Description of chemical

General comments:

8

Survey 2

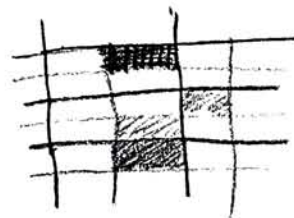
To be filled out after completing
"Survey 1" and reading Pamphlet A & BThis survey will be used only for thesis research
by a MFA candidate at RIT.
Risk Management Planning Pamphlets

Circle the most appropriate option for each line:

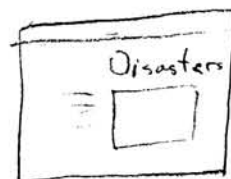
How much of the information
in Pamphlet B did you skim? 0% 20 (40) 60 80 100%How much of the information
in Pamphlet B did you read? 0% 20 40 (60) 80 100%Does Pamphlet B represent
Kodak's control of the situation more
or less effectively than Pamphlet A? More effectively Less effectively No changeWas Pamphlet B more alarming or
more comforting than Pamphlet A? More alarming More comforting No changeWas Pamphlet B more helpful
or more harmful than Pamphlet A? More helpful Less harmful Neither No changeWas Pamphlet B more clear
or more vague than Pamphlet A? More clear More vague No changeWas Pamphlet B more trustworthy
or more deceiving than Pamphlet A? More Trustworthy More Deceiving No changeWhich topic was improved the most
in Pamphlet B? Case scenarios Prevention methods none
Preparation methods Description of chemicalWhich topic was improved the least
in Pamphlet B? Case scenarios Prevention methods none
Preparation methods Description of chemicalWhich pamphlet do you consider
to be most informative? Pamphlet A Pamphlet B they are the same

General comments:

Examples $\left\{ \begin{array}{l} 3 \text{ aspects} - \text{placement in matrix} \\ \text{goals (evidence of ?)} - \\ \text{history - progress} \end{array} \right.$



examples from redesign
of Kodak Park Planning



or found:

Created

examples of messages
designed with heavy
focus on one goal

one design (complete)
or many designs

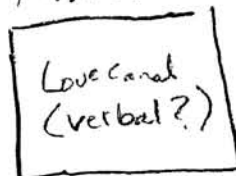
same
changed
each
time.

focus on
different
parts

From
Case studies:



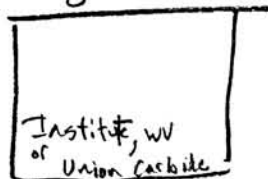
Mistrust



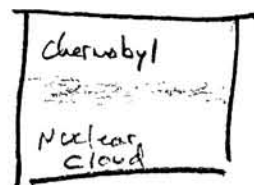
~~Mistrust~~
Inconsistency

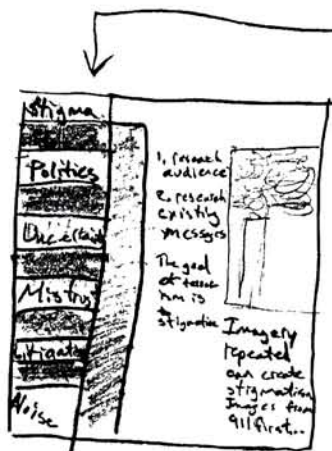


Litigation



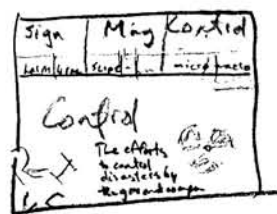
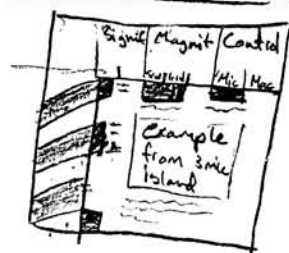
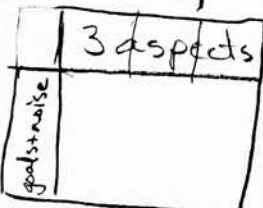
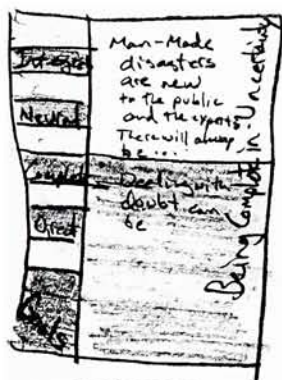
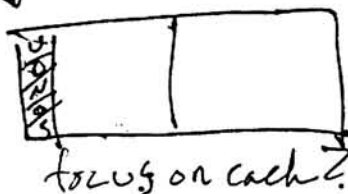
Associations



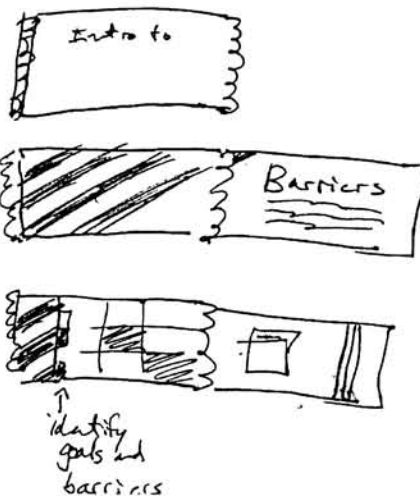


possibility of flap(s) to introduce components and then show them throughout examples.

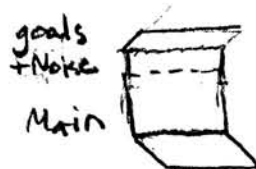
use as a table of content



Sketches of caution bars extended to guidebook.



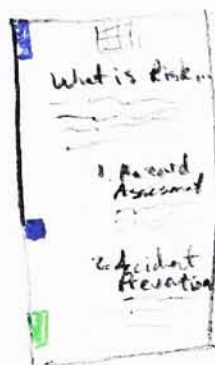
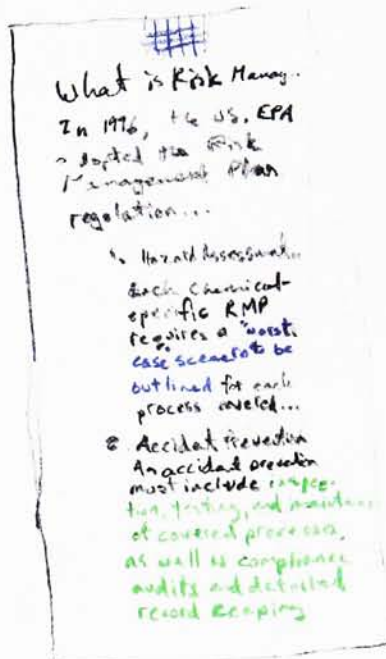
Considerations for binding and folding possibilities.



transparency
and overlapping labels



Color code black + white
copy of example



Side bars



Percentage
used shown
in Pie Chart

	Benefit	Harm	Quantity	Level	Scope	Micro	Macro
Stigmatism	Important details about the risk, which are currently unknown						
Ignorance	Recognizing or including the different aspects or viewpoints						
Politics	Communication and progress hindered from a social concern						
Mistrust	Designing responsibility in ethical situations						
Inconsistency	Personal interests of those who gain or lose from the message						
Litigation	Not taking a risk, allowing the audience to make a decision						
Associations	Lack of a credibility causing the message to be disregarded						
Uncertainty	Organizing information so it can be understood by the audience						
Conceivability	Different messages from different sources, especially the media						
	Encouraging a change in behavior						
	Potential legal ramifications for acknowledging a risk's harm						
	Using language that is understood by the audience						
	Strong correlations, like stereotypes that overwhelm judgment						
	Showing relevant information, eliminating misleading visuals						
	Complete lack of realization of the risk						
	Organizing information so it can be understood by the audience						
	Extreme ability to imagine harm, overvaluing judgment						
	Leaving an easy to recall impression without stigmatizing						

Defining Barriers & Goals

	Benefit	Harm	Quantity	Level	Scope	Micro	Macro
Stigmatism							
Ignorance							
Politics							
Mistrust							
Inconsistency							
Litigation							
Associations							
Uncertainty							
Conceivability							

Risk is inherently uncertain and all risk messages will contain an amount of uncertainty. This creates a challenge for creating messages that often aid in judgment. The designer should research specific uncertainties early in the design process. Risk assessment should be questioned about what and how much is unknown.

One way that the designer can help to create a complete message is simply informing the audience about these uncertainties. The designer decides how much to emphasize the unknown, as it may cause stigmatism, avoid leading the audience to jump to conclusions. Being complete with over obvious information may avoid these effects. Clarifying the different opinions or evidence about the uncertainty can be given a fairly range and sometimes means speculation.

	Benefit	Harm	Quantity	Level	Scope	Micro	Macro
Stigmatism		Has a direct effect no school relocation confusion				How to help their parents	
Ignorance						How to respond ask questions draw ok to cry	
Politics							
Mistrust							
Inconsistency							
Litigation							
Associations							
Uncertainty							
Conceivability							

Summary

Barriers of human-caused disaster messages

Integrity

Complete lack of realization of the risk

10

Ignorance

Personal interests of those who gain or lose from the message

12

Neutral

Politics

Lack of a credibility, causing the message to be disregarded

12

Persuasive

Mistrust

Different messages from different sources, especially the media

13

Direct

Inconsistency

Potential legal ramifications for acknowledging a risk's harm

14

Non-technical

Litigation

Strong correlations, like stereotypes that overwhelm judgment

14

Simple

Associations

Important details about the risk, which are currently unknown

15

Complete

Uncertainty

Extreme ability to imagine harm, overwhelming judgment

15

Comprehensible

Conceivability

Memorable

Goals of human-caused disaster messages

Designing responsibility in ethical situations	16
Not taking a side, allowing the audience to make a decision	17
Encouraging a change in behavior	18
Being straight-forward about the risk issues	18
Using language that is understood by the audience	19
Showing relevant information, eliminating meaningless visuals	21
Recognizing or including the different aspects or viewpoints	22
Organizing information so it can be understood by the audience	22
Leaving an easy to recall impression without stigmatizing	23

Examples Visual Messages in response to Human-Caused Disasters



The outside flaps on this page
are used in this chapter
to break down the needs, goals,
and barriers of each example.

Distribution of risk aspects in a corporate disaster planning brochure



Building 119
Wireless Chloride Storage Tank



Overnight Storage Chloride



Released

Kodak, June 1996

Purpose

Inform community about disaster risks & methods of planning and prevention required by the EPA

Criticism

Strong macro control content
Visuals could be more specific to benefit
Will not likely cause stigmatism
Lack some magnitude content (level or quantity)
No micro control content
Repeats information without adding substance
Unnecessary writing about legal requirement



This collage represents the distribution of the brochure. The pages are arranged in a grid-like fashion, with some pages overlapping others.

Significance		Magnitude			Control		
Benefit	Harm	Level	Quantity	Scope	Macro-	Micro-	
Images of sky and field suggest benefit nonspecifically. Writing describes specific benefits of Kodak Park and the two chemicals				Writing explains that alternate case scenario will be contained within Kodak Park, inferring that those outside park will not be affected.	Visuals of rigid grid over photographs suggest control. Writing describes plant safety record & control methods (staff, internal fire department, audits computer systems).	Additional control could be developed for workers to protect themselves from specific scenarios.	Inform & Educate Reduce Stigmatism
	Writing describes potential harm of the two chemicals fire, explosion flying debris burns, injury						Joint Problem-Solving
				armed region shown for worse case and alternate case scenarios. Map shows nearby streets & buildings (outlines only).		Scale of the potential harm, especially the chemical area, is uncertain.	Induce Response Warn
							Protective Action

1. **Introduction**
 2. **Methodology**
 3. **Results**
 4. **Discussion**
 5. **Conclusion**
 6. **References**
 7. **Appendix**
 8. **Index**
 9. **Table of Contents**
 10. **Figure 1**
 11. **Figure 2**
 12. **Figure 3**
 13. **Figure 4**
 14. **Figure 5**
 15. **Figure 6**
 16. **Figure 7**
 17. **Figure 8**
 18. **Figure 9**
 19. **Figure 10**
 20. **Figure 11**
 21. **Figure 12**
 22. **Figure 13**
 23. **Figure 14**
 24. **Figure 15**
 25. **Figure 16**
 26. **Figure 17**
 27. **Figure 18**
 28. **Figure 19**
 29. **Figure 20**
 30. **Figure 21**
 31. **Figure 22**
 32. **Figure 23**
 33. **Figure 24**
 34. **Figure 25**
 35. **Figure 26**
 36. **Figure 27**
 37. **Figure 28**
 38. **Figure 29**
 39. **Figure 30**
 40. **Figure 31**
 41. **Figure 32**
 42. **Figure 33**
 43. **Figure 34**
 44. **Figure 35**
 45. **Figure 36**
 46. **Figure 37**
 47. **Figure 38**
 48. **Figure 39**
 49. **Figure 40**
 50. **Figure 41**
 51. **Figure 42**
 52. **Figure 43**
 53. **Figure 44**
 54. **Figure 45**
 55. **Figure 46**
 56. **Figure 47**
 57. **Figure 48**
 58. **Figure 49**
 59. **Figure 50**
 60. **Figure 51**
 61. **Figure 52**
 62. **Figure 53**
 63. **Figure 54**
 64. **Figure 55**
 65. **Figure 56**
 66. **Figure 57**
 67. **Figure 58**
 68. **Figure 59**
 69. **Figure 60**
 70. **Figure 61**
 71. **Figure 62**
 72. **Figure 63**
 73. **Figure 64**
 74. **Figure 65**
 75. **Figure 66**
 76. **Figure 67**
 77. **Figure 68**
 78. **Figure 69**
 79. **Figure 70**
 80. **Figure 71**
 81. **Figure 72**
 82. **Figure 73**
 83. **Figure 74**
 84. **Figure 75**
 85. **Figure 76**
 86. **Figure 77**
 87. **Figure 78**
 88. **Figure 79**
 89. **Figure 80**
 90. **Figure 81**
 91. **Figure 82**
 92. **Figure 83**
 93. **Figure 84**
 94. **Figure 85**
 95. **Figure 86**
 96. **Figure 87**
 97. **Figure 88**
 98. **Figure 89**
 99. **Figure 90**
 100. **Figure 91**
 101. **Figure 92**
 102. **Figure 93**
 103. **Figure 94**
 104. **Figure 95**
 105. **Figure 96**
 106. **Figure 97**
 107. **Figure 98**
 108. **Figure 99**
 109. **Figure 100**
 110. **Figure 101**
 111. **Figure 102**
 112. **Figure 103**
 113. **Figure 104**
 114. **Figure 105**
 115. **Figure 106**
 116. **Figure 107**
 117. **Figure 108**
 118. **Figure 109**
 119. **Figure 110**
 120. **Figure 111**
 121. **Figure 112**
 122. **Figure 113**
 123. **Figure 114**
 124. **Figure 115**
 125. **Figure 116**
 126. **Figure 117**
 127. **Figure 118**
 128. **Figure 119**
 129. **Figure 120**
 130. **Figure 121**
 131. **Figure 122**
 132. **Figure 123**
 133. **Figure 124**
 134. **Figure 125**
 135. **Figure 126**
 136. **Figure 127**
 137. **Figure 128**
 138. **Figure 129**
 139. **Figure 130**
 140. **Figure 131**
 141. **Figure 132**
 142. **Figure 133**
 143. **Figure 134**
 144. **Figure 135**
 145. **Figure 136**
 146. **Figure 137**
 147. **Figure 138**
 148. **Figure 139**
 149. **Figure 140**
 150. **Figure 141**
 151. **Figure 142**
 152. **Figure 143**
 153. **Figure 144**
 154. **Figure 145**
 155. **Figure 146**
 156. **Figure 147**
 157. **Figure 148**
 158. **Figure 149**
 159. **Figure 150**
 160. **Figure 151**
 161. **Figure 152**
 162. **Figure 153**
 163. **Figure 154**
 164. **Figure 155**
 165. **Figure 156**
 166. **Figure 157**
 167. **Figure 158**
 168. **Figure 159**
 169. **Figure 160**
 170. **Figure 161**
 171. **Figure 162**
 172. **Figure 163**
 173. **Figure 164**
 174. **Figure 165**
 175. **Figure 166**
 176. **Figure 167**
 177. **Figure 168**
 178. **Figure 169**
 179. **Figure 170**
 180. **Figure 171**
 181. **Figure 172**
 182. **Figure 173**
 183. **Figure 174**
 184. **Figure 175**
 185. **Figure 176**
 186. **Figure 177**
 187. **Figure 178**
 188. **Figure 179**
 189. **Figure 180**
 190. **Figure 181**
 191. **Figure 182**
 192. **Figure 183**
 193. **Figure 184**
 194. **Figure 185**
 195. **Figure 186**
 196. **Figure 187**
 197. **Figure 188**
 198. **Figure 189**
 199. **Figure 190**
 200. **Figure 191**
 201. **Figure 192**
 202. **Figure 193**
 203. **Figure 194**
 204. **Figure 195**
 205. **Figure 196**
 206. **Figure 197**
 207. **Figure 198**
 208. **Figure 199**
 209. **Figure 200**
 210. **Figure 201**
 211. **Figure 202**
 212. **Figure 203**
 213. **Figure 204**
 214. **Figure 205**
 215. **Figure 206**
 216. **Figure 207**
 217. **Figure 208**

Factoring

Introduction

Distribution of risk aspects in a corporate disaster planning brochure

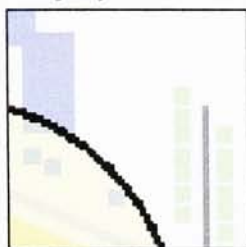


Maps Content, Scale, Form, & Color

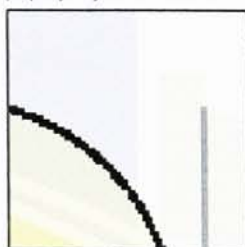
Maps display the predicted or actual magnitude of a disaster. The designer makes various decisions that affect the readers understanding and reaction to the information.

The content chosen to be shown in the map can reveal specific surroundings of the disasters. Scale can affect the perceived size of the disaster and the amount of surrounding content. The forms and color can code the content, establish a subtle hierarchy, and reflect the level of harm posed by the disaster.

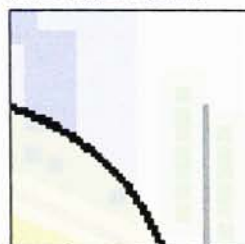
buildings only



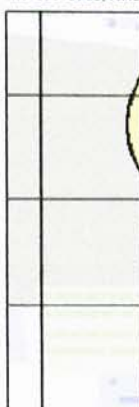
property only



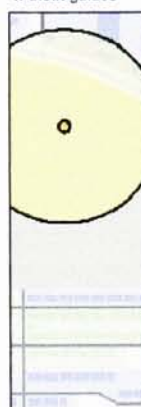
with buildings and property



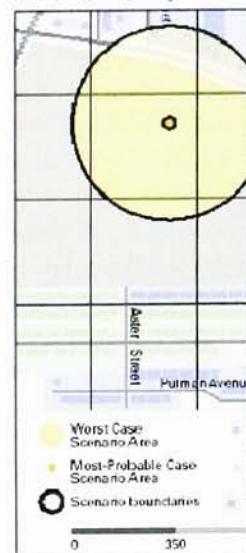
without roads, rails



without guides



with roads, rails, and guides



Content

Deciphering the important content should be the designer's first decision. While doing this, he or she should constantly consider the audience, their knowledge, and their potential concerns.

Quantity is suggested by showing distinctly separate buildings with small blocks that surround the industrial park. It is clear that four buildings are affected by the disaster scenario above.

When the buildings are ignored and replaced by the property of the neighbors of the industrial park, this content is less quantitative. However, it does reflect the potential harm to the surroundings more accurately.

When the buildings and property are both shown, quantity is shown within the surrounding properties. See the section on color treatment for more information on this separation.

Transportation routes and guides are important secondary details of the map that should not be overlooked. Detours and exit routes are emergency response actions that can be aided by a map. Some neighbors might even feel comfortable avoiding segments of certain roads. The train is more of a landmark in the above example, but should not be overlooked as a familiar guide to neighbors. Other guides include labels of street names, the legend, directional compass, and the grid, which is used for scale. These provide relevant information that can help neighbors gauge their distance from the scenario's boundaries.

Distribution of risk aspects in a corporate disaster planning brochure



Original

What are the hazards?
Potential health hazards from the event are an inhalation of vapors, released vapors, and flying debris.

What kind of injuries could occur?
Inhalation could cause respiratory distress, and a high concentration of vapors could cause temporary loss of vision and mobility of the skin and eyes. Flying debris could cause lacerations and trauma.

What is the Most Probable Case Scenario?
Hazardous material liquid leakage from a tank in the storage area is expected and approximately 100 gallons is released. Within the hour the tank is shut off. Liquid and vapors spread from the tank to the ground within 100 feet.

What is the Worst Case Scenario?
Tank 100 feet from the storage area is damaged. The tank is damaged and approximately 1000 gallons is released. The liquid could spread 100 feet or more in all directions.

How
In the unlikely occurrence
See map on other side of page
Higher ground is preferred
and may travel along the ground



Redesign

Text Grouping, Legibility, & Formatting

Text provides the opportunity for introducing a risk and clarifying complex situations with additional details. The sensitive subject matter creates the challenge of being complete, while not overwhelming the reader. The shaping of this content can affect the immediate impressions, the ease and duration of reading, the sequence of intake, and the reader's comprehension.

Grouping text into meaningful categories reveals relationships that break down the complex set of messages. The designer can select a typographic system to display the writing in a legible manner. This system can be applied to a visual format that reveals the groupings in the most meaningful way.

Random	Positive, Negative	Significance, Magnitude, Control	Inform, Prevent, Predict, Prepare
How did I protect myself as a consumer?	What is the chance?	What is the chance?	What is the chance?
How is it transported?	How is it used?	How is it used?	How is it used?
How do I respond to injuries?	How is it stored?	What are the risks involved?	How is it stored?
How is it used?	How is it transported?	What are the hazards?	How is it used?
What is the chance?	What is the chance?	What kind of injury could occur?	How is it transported?
What is the Most Probable Case Scenario?	What are the risks involved?	What is the Most Probable Case Scenario?	How does one react to a scenario?
How likely are these accidents?	What is the Most Probable Case Scenario?	What is the Most Probable Case Scenario?	What are the consequences?
How is it stored?	What are the hazards?	How is it stored?	What are the hazards?
What are the consequences?	What kind of injury could occur?	How is it stored?	What kind of injury could occur?
What are the hazards?	How do I protect myself as a consumer?	How is it transported?	What is the Most Probable Case Scenario?
What is the Most Probable Case Scenario?	How do I respond to injuries?	How does one react to a scenario?	What are the consequences?
	How does one react to a scenario?	How do I protect myself as a consumer?	How is it transported?
		How do I respond to injuries?	How is it transported?

Grouping

The designer should first read the text and organize it into different groups. Designers must simplify the complexity of the content for themselves before they can explain it to others. Lists of content organized into groups, like the examples

above, show distribution. This can reveal redundancies and incomplete segments of the text. With grouping, the responsible designer can review the messages being shaped and then choose the most appropriate order to deliver to the reader.

The examples at the top of the page arrange twelve questions that were presented and answered in the pamphlet. The following elaborates on these four groupings.

Random grouping of information is seldom appropriate. Continuous lists can overwhelm the reader, and poor ordering can lead to confusion or stigmatism. In the above example the reader would be told about protection from scenarios that have not been introduced.

Positive and negative grouping begins to establish a logical flow and reveal meaning. A sceptical reader may skip over the positive information and go directly to the hazards and injuries.

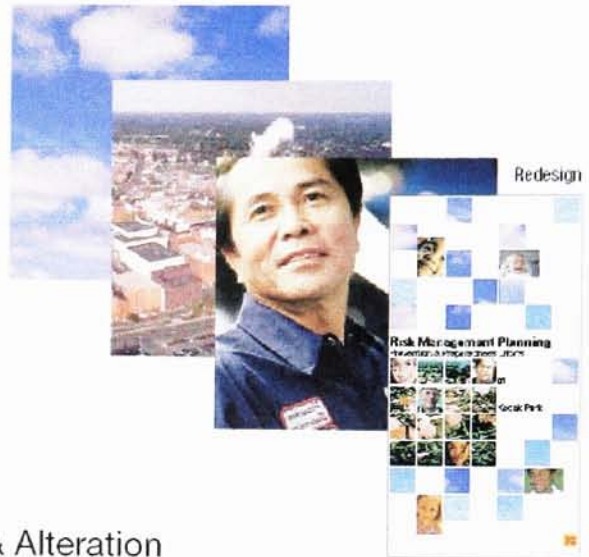
Significance, magnitude, and control grouping provides the designer with a test for completeness. Further sorting can be accomplished with the subcategories that are described in chapter two. This grouping can be meaningful for the reader.

Inform, prevent, predict, and prepare grouping reflect the efforts of the organization releasing the information. This logical flow of content can be revealed through these efforts. The designer can also use this grouping to review the content for completeness.

Distribution of risk aspects in a corporate disaster planning brochure



Original



Redesign

Imagery Selection & Alteration

Images have the potential to help the reader comprehend some of the risk's complexity. They can set the tone of the message, verify and emphasize parts of the writing, and quickly provide visual descriptions more efficiently.

A broad selection of imagery offers a variety of potential communication. Different alterations can be explored to strengthen and layer messages that can be integrated with the other elements.

forced juxtaposed images



Selection

Images that have an informative connection to the risk are preferred, such as the pictures of an industrial plant and the chemical response fire truck. Images that are more generally associated with the subject, such as sky and water imagery, can be effective too. While they may not provide as much specific information, they can create messages when combined with other images. These combinations can be explored with forced juxtaposition, which is demonstrated in the above examples.

Water and clouds begin to suggest safe surroundings that could either reflect success or a susceptible environment. Combining the fire truck with water could create a distracting association to a fire hose.

Various images of employees place appropriate focus on the people keeping the community safe. The size relationship between the above photos of the plant and individual emphasizes the control.

Images of kinds of people create much different combinations, which are dissonant. The above combination reflects the fragile surroundings of the plant, while the bottom combination suggests an alarming message.