Behavioral Aspects of Emergency Management and Public Involvement

The Problem

Industrial societies are often described as "mass societies" which is certainly true with respect to urbanization, mass production, mass traffic, mass communication etc.. However, there are other aspects involved than mere quantities or density. The notion "mass" contains an ideological tinge tracing back to the early 19th century and its upraising masses. Thinkers like LeBon, Ortega y Gasset, and many others (see Dombrowsky/Schorr 1986) have linked together the fear of radical social change and the people who were both its most affected victims and its promoting force - the working class people. They were seen as social and political danger for the occidental culture, its religion and ethics, its order and stability. The masses were seen as a herd-like crowd, driven by instincts and emotions, being easily suggestible, and thus persistently endagered to stempede or turn into a mob. Most concepts of masses, of mass panic, of looting and of rioting stem from that time period and a theorizing which combined biology, Darwinism, psychoanalysis, and the philosphy of decay and descent (vgl. Bracher 1978).

Over time, the most poignant imputations faded, although never disappeared. Until today, mass society still connotes subliminal feelings beyond mere quantities. During crisis and under stress, this out-of-date image of a herd-like mob that tends against the order, revives; then leaders begin to mistrust their followers, managers their staffs, and in the last resort governments their people. Even experienced administrators expect panic, looting and the rapid disintegration of social order and individual moral as the most likely behavior in emergency situations. Thus, large scale accidents and disasters are primarily seen as a challenge to the public order, at least to national security.

However, the pertinacity of the negative image of mass behavior has an empirical basis: Particularly fires but also other accidents, predominantly in discothekes, cinemas, theatres and other buildings (stadioms, high-risers, airports, train & subway stations) often affect panic or other "irrational" reactions ending up in damage and casualties. Most experts assume some sort of a biological, anthropogenetic susceptibility. In case of perilous threat, the endangered beings stick together and mobilize all ressources available for survival. In former times, dangers to life may have been answered adaquately by powering up physically, both together, individually and

collectively, at least to be fit for flight or fight. In modern times, however, this bio-physical automatism for mobilization more and more has turned into an inadaquate reaction. Against the dangers to life which civilization brings to the fore, physical reactions are least necessary whereas the higher complexe cerebral capabilities like presence of mind, analytical thinking, flexibility, understanding and co-operation become necessary in the first place. Threats in modernity need to be responded in a "cold-blooded" manner although ones blood begins to heat up under stress. Thus, the bio-physical program of "bodylizing" in the face of danger has turned to counter-productiveness because of paralyzing the intelectuall capabilities to react deliberately. As a consequence, in case of urgency the modern individual has not only to cope adequately with the threats coming from outside but also with an evolutionary program from the inside that is no longer supportive. In the worst case, as panic shows, the "wrong" inside takes command and the outside sinks down in chaos. Mastering disasters as well as other failures means the opposite: empowered by the concordant presence of mind *and* body, the acting individual will be able to focus his attempts toward appropriate coping strategies.

As a matter of fact, modern societies did not pay much attention to the conflict between biological and social evolution. Except functional elites (like pilots, radar controllers, power plant operators etc.), the vast majority neither was nor is trained for mastering ones basic instincts and drives which go along with stress situations and more severe threats to life and safety. The consequences are momentous, although still neglected or even overseen: As long as the evolutionary program of biology is not domesticated systematically from childhood on, the individuals automatically mobilize their basic energies which is intertwined with strong negative emotions and affects, primarily with fear, rage, resentment, and aversion, but also with strong positive feelings toward kins and bread like care, affection, and passion.

Having to do with risks: Perception, Assessment and Handling

Risk assessment experts, government, and industry often are irritated that the public seems to worry about the "wrong" risks. Based on mortality statistics as reference this is certainly true. The risks that kill and the risks that distress or frighten people are completely different. This is particularly true when nuclear energy is taken into account. The correlation between expected annual mortality and public fears in fact is absolutely low, albeit harshly contested (see Gefahren der Atomkraft 1998). For long, the nuclear industry defined this difference as perceptual distortion and assumed that in the conflict between experts and public over what is "really"

risky, the lay public is simply wrong. Thus, the official policy was to ignore the public, to propagate mere safety, and to declare fears as (ideologically) forced up emotional reaction, lately as irrational, hysterical, even psychopathological.

Today, also risk assessment experts agree in the finding that "risk" means a lot more than mortality statistics, turned into narrow comparisons of the likelihoods to be killed (for example: smoking versus car driving versus flying versus nuclear melt down). The classic definition of risk - how many people are how likely to incur how much damage if X is done - underestimates the fact that risk-taking is composed out of many components among which the risk to be killed is only one and not always the most important. As a matter of fact, risk is what risk experts define as such and what their assessments are designed to estimate. The limitation of risk to the definition of experts and make it stick dogmatically is not only an impressive example of the power (and ignorance) of expertise as of industry and government as well, but also of the reasons why the lay public increasingly mistrusts both experts and scientists.

Risk proper, of course, is more than scientifically calculated hazards, defintions of experts, and statistics of failures. It is also what goes into laypeople´s perception of "riskyness". Peter Sandman (1987) called these underestimated components "outrage", which he defined as everything relevant for risk-taking, including concerns and fears. With Sandman´s terminology, nuclear energy is a "high-outrage"-risk because in the public perception this risk is not only judged to be extraordinary dangerous but also unevadable in its consequences. Moreover, many feel excluded from participation from and involvement in decision-making processes. Instead of being asked for acceptance people feel exposed to risks which again are exclusively defined by experts to be "societally exactible".

However, the legally legitimate definition of a risk as exactible is neither tentamount with consent nor with a risk-taking on friendly terms. Representative polls as well as opponent movements against particular risks underline that risk-taking is some sort of a social ressource, similar to education or skills, without which, in the long run, modernization and invention would be impossible. More important than an active, consentient support of ventures is accordance with risks in the case of impact. The potential damage of risks will only be endured if the risk is judged worth to be taken.

At this point, the risks of nuclear energy are the highest outrage because even the proponents feel overtaxed when being asked for the degree of consequences they would endure in case. Consequently, safety is emphasized

and argued that a fatal risk is insignificant and therefore negligible. Here, then, as Peter Sandman (1987) argues, is the fundamental premise of argumentation: Apart from valuation, the outrage-components of all participants are as real, as tangible, as measurable as risks. In fact, in most cases better outrage data are available than risk data (see the problem to measure correlations between leucemia and low-level-radiation within limited boundaries). Outrage is human behavior, is attitude, preference, choise, decision-making - in short: social action in the sense of Emile Durkheim (1970), who wanted to explain facts with established social facts, i.e. with given social phenomena. Outrage as non-risk factors are given social phenomena, highly effective ones too, in terms of having a legitimate claim to policy attention: How people assess risks is the product of outrage.

The new dimension: low probability, high consequences

A second aspect has been neglected for long. During the process of industrialization, most risks could have been minimized. Thus, safety standards increased and have made our world safer than ever before. This fact of social evolution is not only empirical with reference to survival of humankind and average duration of life but also logically because the degree of controllability is increasing relative to humankind´s insight in the conditions of his material life. On the other hand it is exactly this success which as well has created increasingly greater risks. The irresistible agglutination, aggregation and acceleration of people, energies, and ressources have also blown up the potential damages risks can create. Thus, at the same time, the probability of risks is decreasing while their consequences become increasingly worse.

In addition, the dependency of modern societies on reliable supplies, stable provision with energy and labor force, functional infrastructure, life-lines, communications and co-operation makes them "a risk" and "at risk" at the same time. Modern societies are at risk because of their extreme vulnerability to break-downs and failures, unwilling ones and intented ones, for example by obendience, sabotage, terrorism, or attack. And they are a risk because of the inseperable interdependency of freedom and recklessness, of modernization and risky ventures. Joseph A. Schumpeter (1942) has described this double-faced interrelation as "productive destruction",

 which makes mobility, change, and risk-taking people a basic condition of success.

Disasters as well as acts of terrorism have shown how easy the functionning

of modern societies is to interrupt and how vast and lasting the consequences can be. Thus, emergency management has to face the dilemma to prepare not for the risks but for the consequences - because they do harm people and interrupt society, not the likelihood of the risks´ onset.

The quest for certainty: staying sane and safe

Analogue to "outrage", which has been defined as everything atrocious from a risk except the likeliness of its damage, another outrage is effective within society: acts that offend peoples sense of decency. Social interactions are characterized by rules, normes, and beliefs. Reciprocity is key to maintain individual interaction and society in general. Turning away from mutual giving and receiving is judged as violation of ones´ basic values and therefore as justification to start up with negative reciprocity which is commonly called reprisal, retaliation or simply revenge. It took long for modern societies to convince their members to delegate personal power to the state and to regulate violations of reciprocity via jurisdiction. Similar to formal and informal structures, which are seldom congruent, also jurisdiction and justice may fall apart. This is particularly true for those risks which are not accepted although defined exactible. They simply become perceived unjust and illegitimate. Consequently, reciprocity is given up, risk-taking will be refused and turned into risk-aversion as strongest personal expression of dissent.

Risk-Communication: what makes a dialogue possible?
Emergency preparedness: Who prepares for what and who does it belief?
Functional differentiation: actors and interests, problems and solutions
Stakeholder involvement
Integrated emergency planning
Information, warning, measures
How to carry conviction: credibility, applicability, practical value and general benefits
Coping with nuclear emergency

This contribution is concerned with the communications processes that support the management of technological crises, emergencies and disasters such as Chernobyl, Seveso, Bhopal, and Three Mile Island as well as chemical fires and spills and other emergencies that effect the public. Global emergencies

have focused world attention on technological hazards, but natural hazards and local emergencies are no less important to the population.

The new view is that risk communication extends beyond the time of the disaster itself. It also includes disaster risk communication and technology implementation prior to any emergency to help people understand risk associated with disaster and what to do when emergency occurs. In addition to traditional communication during the disaster, it includes communication after the disaster regarding safety of food, water and energy supply, available medical care, the provision of social and psychological support in returning to normal life and other material and technical assistance.

Enhancing crisis communication is important to industry, government and the public. The public is becoming increasingly concerned about technological failures as our reliance on technology increases. Better preparedness and more public awareness can increase public acceptance of and confidence in abilty to manage high consequence technologies including ability to manage its failures. Failed communications in emergencies has increased the loss of life and property and public skepticism. Effective communication can a) engender confidence and trust in authorities; b) give rise of acceptance of risks and risk management and c) reduce the consequences of disasters.

Communication problems often result from little or poor planning as well as a failure to conceptualize the issues from the perspective of the affected population. This represents a management failure. Effective planning and communication is good management and can be recognized by industrial managers, politicians and the public. Risk communication about technological disasters needs to be an integral part of technology management. It must be considered in the design, choice and deployment of technological options. Finally, new laws, such as SARA Title III in the US and directives such as the Seveso Directive in Europe, require government, business and industries, and the public to engage in risk communication as part of the process of siting and managing technologies for production, shipping and waste management.

Case studies, retrospective analyses and other descriptive studies of past disaster have helped identify myths and provide guidance for the disaster communication process. Contrary to conventional wisdom:

* People almost never panic in emergencies. Such behavior as running away

from a threat is often misinterpreted as panic, even if flight or rapid evacuation is appropriate.

* Failure to heed warnings is a more significant problem. People rarely respond to the first warning they hear. In fact getting people to respond at all is a significant problem; especially when people do not trust in the information by the authorities.

* People are not overwhelmed by information. They are highly motivated to receive information which will help them cope. If they do not have good information rumors and ad-hoc advice will be followed with adverse, somehow counterproductive consequences.

* People do not want only simple and non-technical information. Trustworthy and specific, situationally relevant information and personal relevance are key.

* False alarms are typically viewed by officials as a constraint to getting people to respond in a future emergecy situation. Research has shown, however, that if the basis for the mistake is explained, that people will respond to another warning.

Research has also provided knowledge that has improved the management of the communications processes:

* Multiple sources and channels are necessary to improve the penetration and acceptance of emergency and preparedness messages.

* It is helpful to provide ways for affected publics to positively confirm the communications of warning, informations and instructions.

* Warnings from credible sources are the most effective. The credibility of sources depends on the experiences which have been made in previous crisis situations.

*Frequent warnings with consistent messages are necessary.

* People who are not in the mainstream of society due to ethnicity, language barriers or other handicaps are less likely to act on warnings.

New research is needed to further improve emergency risk communications.

Little is known about the effectiveness of pre-emergency risk communications. No attempts have been made to compare efforts on a transnational basis or to share and contrast European and American experiences with risk communications in emergencies. We still lack knowledge on the unintended and counterproductive effects of informations and communications. More research is needed on the optimum design of public information and of communications. More research is needed on the optimum design of communications systems and the wording of warning messages and information strategies. Finally, as new computers and communication technologies are developed, research is needed on how to apply such technology to improve emergency risk communication practices and to avoid negative side-effects caused by the use of this new technology.

All attempts to divide the process of disaster into specific sequences brought the knowledge home to scientists that time and space become the most influential variables when people try to cope with disasters. The loss of sovereignty of time is equivalent to pressure: Without the chance to weigh one's alternatives rationally, deciding is at random and therefore far below optimum. The loss of sovereignty of space is equivalent to narrowness: Without the chance to keep distance from danger and threat, fear ("Angst") is taking command and makes people literally feel trapped and driven into a corner.

In terms of decision-making theory, this is known as "deciding under stress". But it is not only the lack of time and space which makes people stressed, it is also the lack of information. Although (tolerably) incomplete in-formation is normal in every-day life, under stress incomplete information is diminishing time and space in particular. Conversely, complete information may enlarge time and space because intellectual sovereignty procures internal (emotional, psychological) distance and instantaneous readiness (of mind and body). Thus, information is a "functional equivalent" of time and space.

Proportional to the onrush of danger, the speed of getting ready and prepared makes the disaster: Is the danger faster than any protection, wreckage is unavoidable; is readiness as fast as the onset of danger, withstanding is propitious; and is readiness faster than the onset of danger, even precautionary measures are to utilize. Hence, disaster can be defined as result of interfering periods of time, or, in other words, as proportion of

correlating speeds: the speed which people need to analyze their situation is the first factor that determines the rapidity of an upcoming danger. Stunned people "accelerate" the onset of danger; fast reactions "decelerate" the onset of danger. Consequently, threats have no speed of its own, no absolute, unevadable velocity. Thus, it is the human reaction to risk and danger that makes the choice out of the spectrum from total failure to total safety.

Analyzing the meaning of "velocity of threat", different physical conditions of metamorphosis are to distinguish: a danger in the state of risk is only a latent, a likely damage which threatens those who fear this risk. Anew, the turn from risk to danger is the turn from latency/potentiality to manifestation, but this is not necessarily identical with damage, although risk is defined by the range and likelihood of damages. In fact, the turn towards damage is determined by specific conditions (amount of energy, involved substances and materials, constructive and architectonic standards, location, weather a.s.o.) and lasts a correspondent period of time. During this time, adequat responses beguile the metamorphosis form risk to damage and that is the minimization of risk afterwards.

Here, then, two completions have to be made. The one is dealing with human response to risk and danger, the other with the minimization of risk. Risks, as the above has shown, can be minimized afterwards - through adequat response - and beforehand. In praxis, the latter is based upon the former: Without any idea of possible dangers and failures, the conceptualization of "risk" is impossible, too. Historically, the concept of risk has been accrued from (grievous) experiences, because it was the error and not the success that demanded remedy and durable betterment. Generally speaking, remedial measures and betterments are surmounted failures, which have been incorporated into material culture (better techniques, solid machinery, safer plants) and into knowledge. Again, information is the functional equivalent to risk-reduction.

Now, the sequences of stage-models come into the play again. The so-called "pre-disaster conditions" (see Powell 1954) are pretty much the same what is called "impact". The impact-phase, as Powell puts it, is characterized by some sort of inventory, an immediate diagnosis of the situation after the impact. The pre-disaster conditions, however, are characterized by the set of individual and cultural capabilities which are necessary to cope appropriatly with the effects of potential disasters. Transformed into "information", both phases signify the same, regardless of time and space.

Taking time and space into consideration, the asynchronism of "pre-disaster conditions" and "impact" becomes as obvious as the urgency to synchronize the specific informations of both phases in case of emergency. To withstand and survive threatening events, relevant informations of both phases are indispensable, because stereotypes like "Keep calm!", "Don't panic!" are absolutely meaningless. Alike the cacophony of the wilderness that scares city- dwellers almost to death when they sleep the first time in their lifes under the open sky, the "codes" of modern risks have to be explained and understood as well as the meaning of the sounds of wilderness. It is this information that helps to keep mind and body, fear and "angst", under control. While utilizing these informations people fall back upon the stockpile of cultural knowledge which was accumulated in the past and which is built of the experiences of the threats humankind has survived before. If we might be able to watch ourselves simultaneously in slow- and quick-motion, the stockpile of accumulated experience appears as (historical) sequence of emergencies along with solutions and the actual emergency appears as extended crosschecking of the situation's requirements and a fitting solution out of the historical reservoir. Thus, the chance to survive an emergency depends on the length of time to dispose of the information which enable a person to do a correct diagnosis of the situation and an appropriate therapy, i.e. an adequate response (rescue and remedy).

The sequence of warning has to be reconsidered now. In former days, a few danger-signals might have been sufficient to alarm one's company. Today, the danger-signals of sirenes or other technical warning-systems are neither instructive nor fast enough. Yet, not the warning-systems are to blame but those who need to be warned. Analogical to threats, which have no speed of its own, no absolute velocity, either warnings have no absolute velocity and no significance in its own. The speed of warning depends on the cultural standard of alertness; and the significance of signals depends on the risk-perception and the risk- taking behavior of all people. Therefore, warning-signals need a specific receptivity, an auditory which is instantly and autonomously capable to interpret the contextual meaning of signals. Consequently, it is not the warning- system that has to be expanded with more detailed information but those who have to utilize the warning. The individual's capability to cope with emergencies by synchronizing different informations needs a corresponding capability on the level of daily risk-handling: Only a rational risk-assessment and an appropriate stockpile of knowledge and protection-measures led to a permanent alertness and an operative preparedness. Both is the precondition to realize warning-signals and to survive disasters.

1. On what do we rely when no personal experiences have been made? Answering this question, the importance of theoretical orientations becomes quite obvious. Most people never experience disaster. What they know or think they know comes from the media, the movies or other "second hand" sources. Unfortunately, in most cases false impressions are created and, consequently, misleading orientations come into life.

2. The almost ineradicable myths about human behavior in disaster are panic, looting, large scale deviance, disobedience, and all sorts of personal break down. Fortunately, the contrary is true: In most cases people behave close to the pattern they always show up with. In other words: people keep relatively cool and they act prosocial. Thus, the question is why all the myths will be preferably expected to occur? (Any idea? Don't worry, the question will be answered - during the lecture, of course. Otherwise you wouldn't need to listen and I could stay at home in bed...)

3. People with extensive emergency experience will be convinced they know about disasters and, therefore, do not need to reflect on definitions. Although, definitions are not only theoretical attempts to order reality but also to declare ones access to reality. The ladder is mere policy which means that definitions are programmatic declarations, disclosing the intentions of those who define.

4. Analyzing the circulating definitions of disaster, one may discover the intentions and interests of the definers, however, what a disaster really is remains obscured. To cope better with distressing, extreme situations, it is of particular importance to differentiate between specifically loaded definitions of a situation and the situation itself. A disaster, thus, is something else than a definition of disaster. Instead of "disaster" you can fill in every other word you have in mind...

5. From a sociological perspective, disaster is neither an event nor an entity of itself. The worst way to perceive "disaster" (or every other extreme of life) is to dichotomize "me" (ego) and "not-me" (alter), i.e. myself and something which is going on outside. The better way to perceive ones place in the world is to reflect the "distances" between oneself and the facts of life. The closer the facts of life will

come the more they touch. Beyond triviality, the connex between touchy effects, affection and affliction, compassion and commitment depends on the distance to ones heart (or soul, or mind, or feelings – no matter how you describe the status of "being touched").

6. Speaking more theoretical, the feeling of being touched is the result of some sort of assessment: "What is the meaning to me?" and, located within concentric circles, to my beloved, to my relatives, to my neighbours, my group, society, nation, world, maybe universe? In fact, there is no dichotomic distinction between individual and outside, between subject and object. There is only relation, interdependency, between communicating forms of consciousness: The dog smells something exciting, she feels attracted and allows a flirt, he finds a piece of metal which is judged as a useful repair gadget… All this is communication aiming at "meaning".

7. No meaning, no relation. Such easy. However, there is even no meaning per se. What is meant in the first place should be seen as hypothesis which is tested via communication. Whether somebody is sympathetic or antipathetic has nothing to to with the way the person actually is but only with the way the person is perceived. Only interaction will transform ones hypothesis, or better: ones prejudice into a more appropriate judgement. However, even this judgement is far from "objectivity" because it is ones correction of ones own prejudice. The more stubborn the prejudice is, the minor the chances of a person are to find a fair judgement.

8. With disaster it is almost the same. There is no disaster, no objective actor, or process, or force which is the disaster but only "something" which has a disastrous meaning to somebody. Whether something is disastrous or not is depending on ones capability to make things work the way they should.

9. Stress may be seen the same way. Whether something is distressing or not is depending on ones capability to make things work the way they are supposed to work. Distress will increase when the distance to meaningful others or objects melts down to a point where control seems impossible. The loss of controllability is as distressing as indicisive meaning. Equal meaning is tantamount to paralysis:

without different meaning, priorities are impossible and, consequently, a structured order of action. Thus, stress has more to do with a loss of organized action than with stressing effects from the outside.

10. Analyzing our modes of controlling the world, we should focus on communication again. Communication is used in a very broad sense: It is the capability to come into contact with everything else, finding out how things work or behave. In this sense we communicate with plants, animals, even with matter or machines (car and computer are excellent examples). We "talk" to our Non-Ego-World in order to make it move the way we want to move it. Thus, communication is permanent correction, conduct, to keep track and to keep others on track.

11. Crises are the moments when corrections lack its effect. The synchronization of coupled interaction gets lost, the loss of control will be realized. If we are able to re-couple interaction, control is reestablished, synchronizsation maintained. Otherwise, the couple will divorce, asynchrony runs into autodynamics: disaster!

12. From an individual perspective, disaster is the loss of controllability, which has more to do with personal capabilities than with objective factors from outside.

13. Transferring the abstract approach into practice, disaster management may become easier. Nevertheless, some efforts are necessary to transform theoretical insight into action. However, there are some techniques to keep distance, to built priorities, and to increase connectivity. This is where the lecture will begin...

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