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*MOBILITA' E CONFLITTI*

**TeMA**

trimestrale del *Laboratorio Territorio Mobilità e Ambiente - TeMALab*



Dipartimento di Pianificazione e Scienza del Territorio  
Università degli Studi di Napoli "Federico II"

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# TeMA

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Dipartimento di Pianificazione e Scienza del Territorio  
Università degli Studi di Napoli "Federico II"

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# Industrial Risk Communication and Conflict Mitigation Strategies

## Comunicazione del rischio industriale e strategie di mitigazione dei conflitti

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Public risk communication and risk acceptance are critically related issues. The level of conflict generated at local scale by industrial hazardous sites, as well as from many other sources of hazard, mainly depends on the capacity of people to understand the nature of the risk to which they are exposed and to evaluate what level of risk they are ready to accept. Hence, the social acceptance of risks mainly depends on the capacity of the risk managers or public authorities, responsible for the territorial risk management, to exchange information with the citizens and to communicate about their local strategy and the risk prevention decision-making process (Couch, Kroll-Smith 1991, November 2004). In these terms, risk communication can be seen as a key feature of the risk management process, even if it often deals with different and conflicting perspectives supported by controversial-members, activists, government officials, scientists, and corporate executives that may disagree about the nature, magnitude, or severity of the risk in question.

One of the main goals of the risk communication is the conflict resolution. Conflicts result mainly from the different risks' perceptions among the main stakeholders (e.g. population think that the risk is high while the Authorities think that is low). The main consequence of conflicts is to render difficult the application of the risk management strategies and to lessen their efficiency. In response to conflicts, risk communication can highlight more clearly the nature and size of the conflict, leading the way to a more informed dialogue. It can support a consensus-building process, although it is not designed to eliminate dissent. Informed dialogue and consideration of community concerns facilitate effective strategies and decision-making if risk communication principles are applied. Problems in risk communication can arise from a series of errors, including individual communicators providing inaccurate and incomprehensible information, groups of communicators

Lombardy is one of the most densely populated and industrialized regions in Europe, where nearly 280 Seveso sites are located. The issue of risk communication, as set by the European Seveso Directive is therefore of high relevance in this region. Nevertheless, the Lombardy Region Authorities consider that the implementation of the Directive's provisions is too weak. Therefore, the Lombardy Region financed an exploratory research in November 2009 and all the research activities ended in February 2011. (Éupolis Lombardia 2011). The research was conducted in order to estimate the existing gaps in risk communication, the subsequent conflicts and to evaluate how to improve the participation of the population in the emergency preparedness activities. The main goal of the project was to improve the communication of risk to the population exposed to industrial risks, hence to mitigate the related social conflict on the basis of an institutional learning process involving governmental bodies industrial organizations and the population. The project was supported by a multidisciplinary research group, which investigated the following aspects:

- the regional activities regarding the risk communication at local level;
- the nature and status of the main stakeholders groups' perception of the industrial risks and the existing conflicts, collected through interviews and groups' discussions;
- the analysis of the gaps and ways of improvement related to an effective strategy of communication between industry, population and emergency services.

A forum involving all the institutional stakeholders was set to discuss this issue.

The paper reports the main results of the research and illustrates the potential strategies to improve the risk communication and the population participation and preparedness for the Lombardy Region. The results showed that the level of risk perception of the population in Lombardy is still too low to define a program of communication without having considered in more detail the mode of involvement of the population. In a context characterized by a distorted perception of risk, the low risk perception could be a sensitive issue that may impend the start of the communication process because it could generate anxiety, alarmism or unnecessary conflicts. Nevertheless, the experiments carried out showed that the population potentially exposed to the industrial risks, if properly involved, shows particular interest in issues related to prevention and self-protection. According to the main results of research project, the involvement of population into a dedicated programme on risk communication should not present a significant concern and the conflict between the industries and the population does not appear to be a particular obstacle to risk communication. On the contrary it was shown that collaboration could be beneficial for all the stakeholders while the most significant limitation to this process, is the low public perception of the problem.



showing a disunited front, the social amplification of a modest risk or the mishandling of sensitive information (Smillie, Blissett 2010). Currently, guidelines are available for communicators, providing specific advice on how to avoid such mishaps in order to enhance the communication of risk-related information (e.g. De Marchi, Funtowicz 1994, EPA US 2007, UK Resilience, U.S. NRC 2004, Christensen 2007).

Considering the key role of public authorities and hazardous industries operators in the risk management and related prevention activities, it can be argued that they have a huge responsibility to mitigate or amplify potential conflicts among the population and other relevant local stakeholders exposed to industrial risks. An effective risk communication process is crucial to increase the participation of the population to the risk management process and therefore to reduce the potential territorial conflict. Risk communication is characterized as one way of facilitating more effective, democratic and participatory risk management strategies. An emphasis on formal communication approaches as a mean to improve decisions and decrease conflict highlights the challenge of managing hazards within a culturally heterogeneous society (Lash 2000). Communication and participatory strategies will be considered successful only if diverse communities can be engaged as partners in the policy process. Because responses to risk are embedded and evolve within broader social environments, achieving the promise of risk communication across a diverse society may not be possible absent an understanding of how socio-cultural variables and past experiences shape the exchange of ideas or information in any particular situation (Renn 1981). Engaging

stakeholders and the public at an early stage in decisions about risks can help ensuring that decisions will reflect better the public's values and can reduce the scope for misunderstanding, disagreement and resentment later on. This can make it easier to implement measures to address risks, particularly where these require the public to take action. Providing clear and accurate information about the nature of risks can help people making realistic assessments of the risks they face, and where appropriate, to make informed judgements on how to handle risks themselves. This can in turn help to foster a climate

of greater empowerment and reassurance, and reduce the risk of rumours and scares (Slovic 1986). On the contrary, a deficit of information or of public involvement may drive to an amplification and distortion of public risk evaluation and the potential generation of conflict. As Kasperson (1992) well investigated "risk amplifiers," i.e. concerns over a given risk are more driven by interpersonal communication than by mediated communication, as in the mass media; certain organizational characteristics, such as the lack of organizational commitment to the risk management function or the bureaucratic attenuation of information flow within the organization, serve to attenuate risk signals; and social distrust acts to heighten risk perceptions, to intensify public reactions to risk signals, to contribute to the perceived unacceptability of risk, and to stimulate political activism to reduce risk. According to Kasperson et al (1996) amplification occurs at two stages: in the transfer of information about the risk, and in the response mechanisms of society. Signals about risk are processed by individual and social amplification stations, including the scientist who communicates the risk assessment, the news media, cultural groups, interpersonal networks, and others. Key steps of amplifications can be identified at each stage. The amplified risk leads to behavioural responses, which, in turn, result in secondary impacts (Petts et al. 2001).

This paper aims to report the experience gained during a research project financed by the Lombardy Region in November 2009. The research was developed under the supervision of IReR – Istituto Regionale di Ricerca della Lombardia (now named Eupolis Lombardia) and it ended in February 2011. The project focused on the identification of gaps and constraints, which may affect the involvement



of population exposed to industrial risks into the risk prevention process and management. In particular it evaluates the aspects that may trigger a high level of conflict (Éupolis Lombardia 2011).

#### **Risk and Conflict Management: the Risk Perception Role**

The perception of risk in a population is its representation in terms of social, material and financial values. Any social system exposed to significant risk has a direct or indirect knowledge about it. The social system receives multitude of signals, information and knowledge on the risk. Various "risk brokers" mediate such patterns of information.

The "risk brokers" are risk experts, public sector officials, the media, dedicated emergency response teams as well as industrial (e.g., petrochemical plant) or natural systems (e.g., volcano) that are the sources of the risk. They are "risk information brokers" themselves whenever they provide, directly or indirectly, risk information and provide means for discussions about risks. For instance, a chemical plant develop an internal risk communication plan directed to develop a continuous feedback and transactions with an external population exposed to their risks... Another example, a volcano indirectly and accidentally sends out messages in terms of signs, signals of imminent or no risk to

eruption. Such kind of signals will be interpreted directly by the exposed population. It should also be noted that the means of communication that lead to and mediate this information have evolved considerably (e.g., dedicated websites, blogs, on-line news, newspaper investigations, dedicated television channels, etc.). This evolution of the media has certainly triggered a "globalization" of risk perception (Beck 1999).

Risk perception is not neutral. As suggested by Porto (2006): "Human factors as well as actual risks of loss of business (or labour) have strong impact on the emotional state of a population. Such elements must be evaluated when considering a general "risk acceptance" by a population. This condition reflects a choice between the economical and material gains accepting the risk on the one hand, and the respect for cultural and environmental values on the other hand".

#### *"Risk-perception"- induced conflicts*

It is essential to know the target population (i.e., a population exposed to a risk) in order to understand the social perception of risk, and any conflict deriving from it. This knowledge brings light on how that population tends to perceive and interpret the condition of risk to which it is exposed to, and how it would tend to act accordingly (a behavioural trend). The study of the target population can



in fact identify communication strategies to minimize inappropriate behaviours leading to decisional behavioural or attitudinal conflicts.

#### *Managing risk perception effects*

The risk manager capacity to design a risk communication programme is hugely facilitated if he or she knows how the target population see and represent the risk. Also, the management of societal conflicts caused by biased perceptions of the same risks can be improved drastically by such knowledge about the population.

As a consequence, the following questions should be answered to prepare a more informed risk communication strategy:

- What is known about the population's knowledge on the source of risk: who creates the risk?
- What is known about the population's knowledge on the systems dedicated to communicate the risk?

#### *Profiling and Conflict*

Knowing the population receiving a risk information means knowing what to say in advance in order to minimize potential misunderstandings and negative interpretations and understanding (Walker et al. 1998). Thus, the profiling of a target population becomes essential. Previous research (Porto 2006) has shown that the more a dangerous event is frequent and known, the greater the adaptation and acceptance to live with it. This condition can lead to land-use planning disputes on the choices of potential industrial installations. Interestingly, the people living closer to the source of risk (e.g., industrial installation) are even more cognizant of such risks (Lalo 1990).

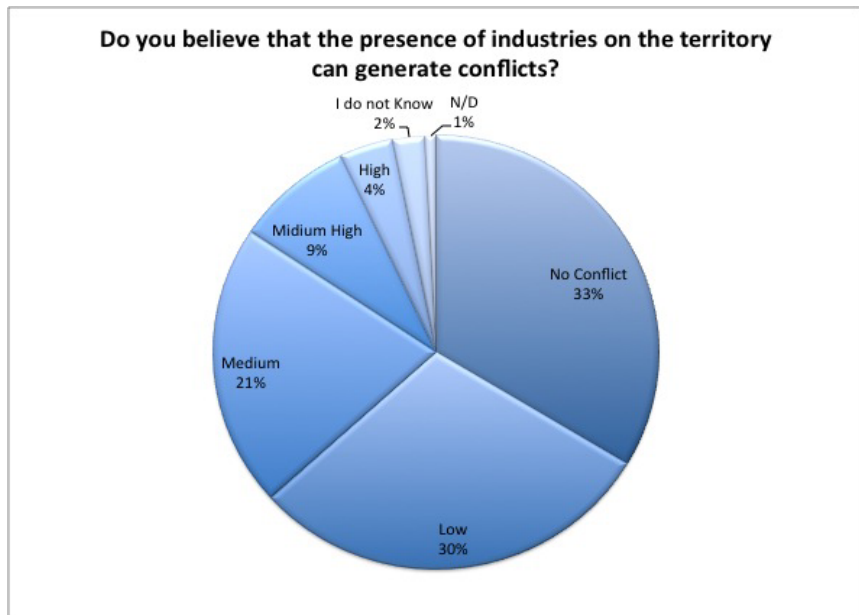
#### *Cultural homogeneity and conflict*

A population expressing a shared set of values, beliefs and attitudes when it represents a risk would suggest a potential cultural homogeneity and cohesion. This creates a degree of predictability about the population response. On the opposite (Slovic 2000, Irwin et al. 1999):

- Groups culturally highly cohesive and homogeneous can develop very strict/rigid perceptions of risks.
- Multi-cultural groups can develop very different risk perceptions and perceptual conflicts, which could be hardly reconcilable.

#### *Economic dependence and adaptation*

Social groups living closer to the sources of risk tend to be



Level of perception of Mayors on the territorial conflict related to the industries.

economically dependent from that source (directly or indirectly). These social groups tend to:

- Increase adaptability and acceptance of the expected risk (Porto 2006).
- Consider the risk as less threatening and less unacceptable showing a lower sense of insecurity (Wiegman et al. 1990).
- Underestimate the probability of accidental events.
- ignore risk related information, act less (Wiegman et al. 1990).

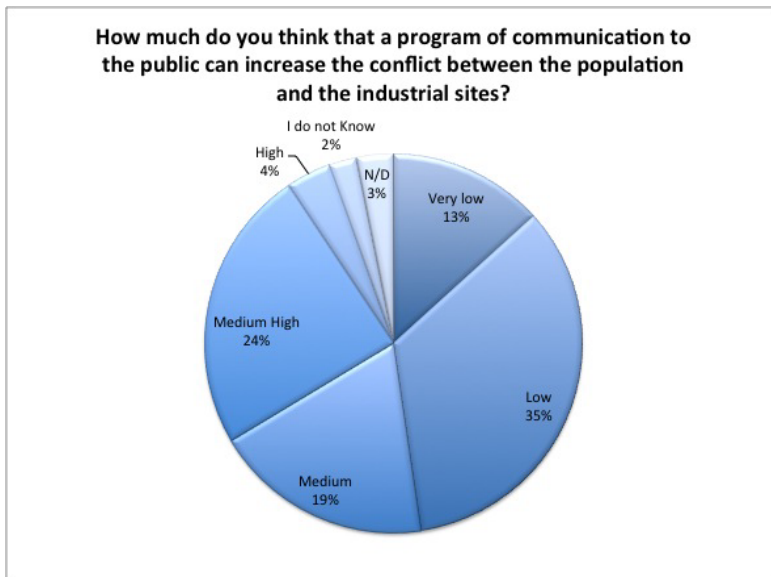
#### *Legal vs. social legitimacy and conflict*

Rosenthal (1990) has suggested that if a believes that an industry (source of risk) does not meet certain social expectations, that industry will not get a social legitimization, even when it meets all legal, procedural and industrial standards. The question of legitimacy and credibility thus becomes of paramount importance, as a key factor towards the mitigation of conflicts caused by different social perceptions of risk (Couch, Kroll-Smith 1991).

At this point the alternative risk communication as a legitimate "legal" or "social" is to be considered:

- Legal Legitimacy: provide information about the risks in accordance with applicable regulations (e.g., Seveso Directive). The credibility is based on compliance.
- Social Legitimacy: explore the benefits as well as the risk-related problems associated with the presence of industrial activities (or natural hazards) in the community.

The economic and social utility and the social responsibilities are highlighted, but risk-related problems about health, psychological well being, impact on property values, traffic, etc.... are not removed from the discussion.



Level of perception of Mayors on the increment of conflict related to the development of communication program dedicated to public about risk and prevention measures. The distortion of Mayors about the value of a communication strategy limits the implementation of communication plan.

#### An Application: The Regione Lombardia Case Study

Lombardy is one of the most densely populated and industrialized regions in Europe. Following the accident that occurred in 1976 in Seveso, a village located few kilometres, North of Milan, the European Union prompted the adoption of legislation aimed at the prevention and control of such accidents. In 1982, the first EU Directive 82/501/EEC – so-called Seveso Directive – was adopted. On 9 December 1996, the Seveso Directive was replaced by the Council Directive 96/82/EC, so-called Seveso II Directive. This Directive was extended by the Directive 2003/105/EC. The Seveso II Directive applies to some thousands of industrial establishments where dangerous substances are present in quantities exceeding the thresholds in the Directive. Lombardy is interested by nearly 280 Seveso sites, nearly a quarter of all Italian industrial sites interested by the Directive.

The Seveso Directive requires specific measures on risk communication to the population. Nevertheless, the Lombardy Region Authorities consider that the implementation of such provisions is too weak. Therefore an exploratory research was launched, in order to estimate the gaps in risk communication and to improve the participation of the population in the emergency preparedness activities.

The project was supported by a multidisciplinary research group, which investigated the following aspects:

- The regional situation regarding the risk perception at local level and the risk communication approaches

adopted by the local authorities. A questionnaire was sent to each municipality, where a Seveso industrial site is located.

- The analysis of the gaps and ways of improvement related to an effective strategy of communication between industry, population and emergency services. A forum involving all the institutional actors involved in the risk management, was set to discuss this issue.

- The analysis of public's perception and identification of gaps and conflicts. Three case studies were investigated, simulating a potential industrial accident at local level. Public meetings were organized to evaluate the public's perception of risk and the related knowledge about the emergency behaviour of people.

One of the main results of the project was the rise of public authorities' awareness about the level of preparedness of the population to face industrial accident. The public meetings and workshops, involving governmental bodies (local, regional, and national), industrial organizations and the population, contributed to stimulate

an institutional learning process about the risk perception of local community and to characterise the related level of conflict.

#### *Risk perception and conflict from public authorities perspective*

In order to evaluate the risk perception and the level of conflict, two types of public authorities were interviewed: all the Majors of the municipality, where at least one Seveso industry is located and the Safety Control Authorities, i.e. the Environmental Protection Agency and the Fire Brigade Rescue Services.

In order to evaluate the role of the Majors it should be pointed out that in Italy, the Civil Protection is a "national service" organized on four levels of competencies and responsibilities, thus conceived to identify solutions to different problems. The first level is municipal: the Mayor is the first Civil Protection authority within the Municipality, the one closest to citizens. Then if the Municipality is unable to cope with an emergency on its own, the Province, the Government's territorial Offices – i.e. the Prefectures – and, subsequently, the Region intervene by activating all intervention means to help the areas affected by the disaster. In the event of more serious and widespread emergency situations, the intervention falls under the direct responsibility of the Prime Minister operating through the national Department of Civil Protection. The role of the Municipality during peacetime is to promote and improve the level of preparedness of the citizens, to set prevention and emergency plans. During an emergency its responsibility

is to evaluate rapidly and accurately the severity of the incident and respond appropriately, speeding up the deployment of rescuers. Therefore the role of the Major is one of most crucial within the contest of the full risk management process. A set of 196 questionnaires was sent to each Major of municipalities interested by at least one industrial site at risk. Of these, 102 questionnaires were returned, i.e. approximately 52% of the reference sample. To summarise the main results of the survey and in order to evaluate what was the evaluation of the Majors about the risk perception and the role of communication, it should be considered that:

- The 62% of respondents considered that the level of industrial risk is negligible or low.
- The Majors were asked to relate the level of risk-taking (in this case perceived) by the exposed population with the possible socio-economic benefits related to the presence of industries in its territory: 58% of the answers did not reveal the perception of special socio-economic benefits.
- Only 14% of the survey sample believe that in their territory there is a "High" or "High level" of conflict due to the presence of Seveso industries, while 30% consider the level of conflict irrelevant.
- The degree of public information and knowledge regarding how to behave in an emergency is substantially inadequate despite the activities and initiatives carried

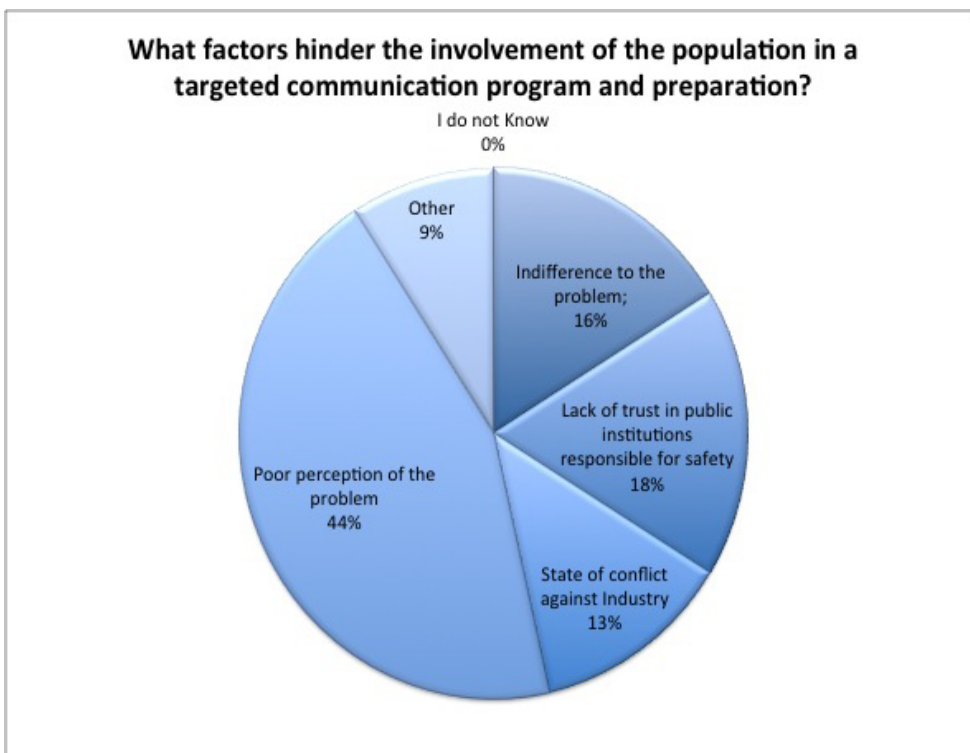
out. However, only 10% of Mayors think that it is useful to provide training opportunities to the population while about 40% indicates that "it is not useful" and 15% "not useful at all".

- About half of the sample think that a communication program does not introduce a significant level of conflict while a third think that the conflict would be increased significantly. In addition, the main obstacle to the definition of a communication program is associated with poor perception of the problem and its importance (about 50% of responses).

Main results can be summarized as follows: the level or risk is generally low; the presence of industrial site does not imply a particular socio-economic benefit for the local community and improving the knowledge about risk is not useful and can introduce some degree of conflict.

In order to evaluate the perspectives and the needs of the Prevention and Safety Authorities (i.e. Industrial Safety Control Authorities, the Environmental Protection Agency and the Fire Brigade Rescue Services) several meeting were organised. In reality all the different phases of the project and the related activities were preliminarily discussed with them (together with a representative of industrial operators) in order to share the goals and the related expected results. The outcomes of the research activities (i.e. workshops, meeting, surveys) were jointly analysed and discussed as well.

Level of perception of Mayors on the main causes that impede the participation of the public in a communications program.



As main result of such experience, it could be argued that these authorities consider as main strategic issue, the possibility of being able to communicate to the public that Seveso industries are subject to stringent inspections and controls. Nevertheless, people have to be aware that even if all relevant control activities, as provided by applicable law, are effectively implemented, a certain degree of risk remains, even if at a very low level.

Communicating to people the concept of residual risk has the advantage to force the population to participate and contribute to the process of risk management. Since authorities have taken all the possible technical measures to prevent an accident and

mitigate impacts, the population can decrease further its risk only by adopting a proactive approach, i.e. by understanding the characteristics of hazards and by learning the auto-protective measures that can be adopted during an emergency. Therefore the communication of institutional activities of the safety control authorities can contribute to ameliorate the perception of risk and the level of conflict.

#### *Risk perception and conflict from industry perspective*

With regard to the generation of a possible conflict with the population, the position of Seveso industries is very explicit and clear. The industry has a vested interest in mitigating the conflict because it can significantly affects the local business activities and it could threaten its permanence on the territory.

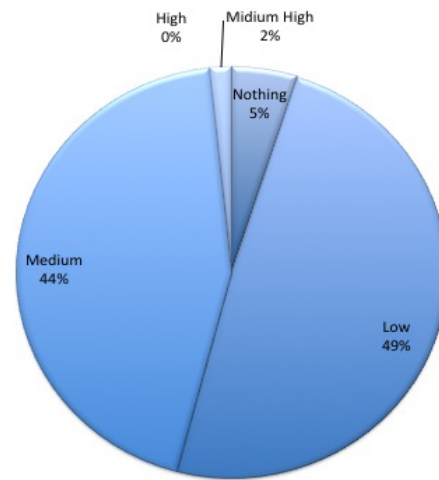
A representative of industrial operators was involved in all the different activities and tasks of the project. During all workshops and meetings, it illustrated its role and the contribution to risk prevention and the needs for a more effective involvement of the population.

Considering the strict controls to which Seveso industries are submitted, the industrial operators declare that they have no reserves to show what is the level of risk to the territory, even because all the relevant information are already public as foreseen by the Seveso Directive. In these terms the Seveso Directive, that aims to prevent major-accident hazards involving dangerous substances and to limit the consequences of such accidents not only for man (safety and health aspects) but also for the environment (environmental aspect), foresees general and specific obligations on both operators and the Authorities which can be considered as two main categories of provisions (Wettig, S. Porter 1999):

- measures related to the prevention of major accidents (e.g. major-accident prevention policy, controls on modifications of installations, and in addition, operators of 'upper tier' establishments, safety reports and safety management systems);
- measures related to limitation of the consequences of major accidents (e.g. land-use planning, and for 'upper tier' establishments, the operator/authorities must meet additional requirements related to emergency planning and information on safety measures to the public).

These measures are obligations for the Operators and they are under constant control of Authorities. According to the activities of the research project, operators declared that they do not concerned to share information also with

#### What is your level of awereness about the prevention and safety activities made by the Industries?



Result of the student survey - Level of student awareness about the activities of risk prevention.

public if this process is well planned and structured. At the contrary they consider an advantage to be able to show to population that are under a permanent process of control and inspection, i.e. that they comply with the safety standard and requirements in force.

For operators an effective communication to the public becomes a strategic tool to reduce the conflict. According to the Seveso Directive operators as well as public authorities have certain obligations to inform the public. These information provisions can be divided into two forms of information: Passive and Active Information (although the Directive does not use these terms). Whereas Passive Information means permanent availability of information i.e. that this information can be requested by the public, Active Information means that the Operator or the Competent Authority themselves need to be pro-active, for example through the distribution of leaflets or brochures, to "actively" inform the public.

The first form of communication is easily implemented because typically means to make available to the public reports where the main information about the public safety are available. The typical result is that the information is available but the public does not access it, even because it is too difficult to be understood by lay people.

The second form need more planning and coordination between Operators and Public Authorities to plan an effective communication strategy, which can contribute to provide correct information and to mitigate the conflict. For the industrial operator there are no constraints to develop a communication program dedicated to the local population, if it can help further reducing the level of conflict. This process, however, cannot be independent from the

mediation and the involvement of local authorities, particularly the mayor (Simmons, Walker 2004).

At the moment the potential conflict with the population is mitigated by compensative measures, i.e. mainly by sponsoring social activities of the local communities. However, the industrial activities still need to be better known by the local population. For this purpose, industries could think to dedicated initiatives that can reduce such gap of knowledge, like for instance, guided tours of the facilities or public meetings where they can illustrate their production activities and the safety measures to prevent accidents. This approach could also improve the relationship with journalists and the media. At the moment, industry suffers from the rather distorted information reported by some local media that in fact can increase the degree of conflict with the local population. In conclusion, the industry sees the opportunity to positively contribute to the training and information of the local population if it can help mitigating the conflict.

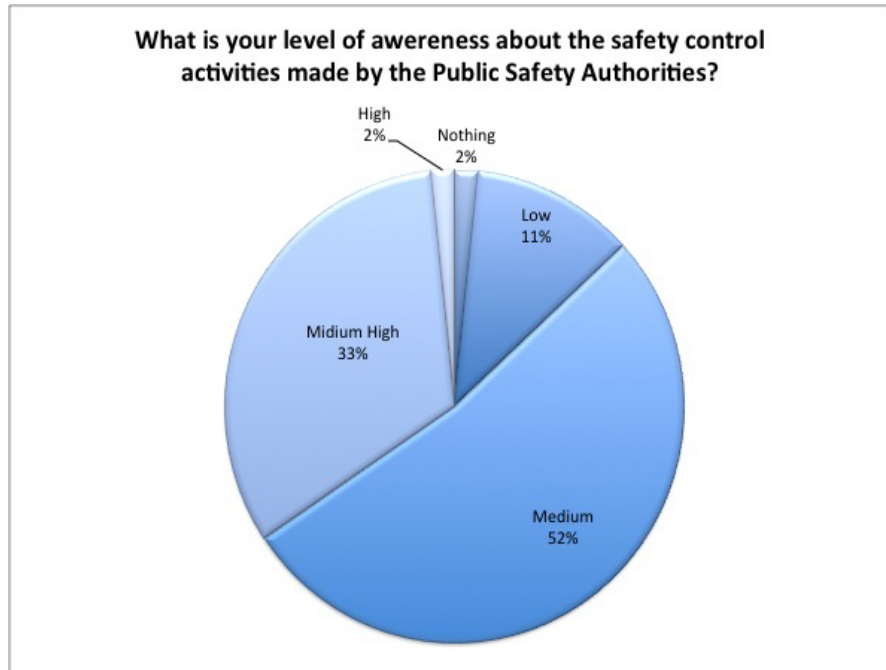
#### *Risk perception and conflict from local community perspective*

In order to correct the risk perception of population related to industrial hazards on the territory, authorities must address pro-actively citizens, informing about their role and contribution to mitigate risks. The biggest mistake that they can do is to deny the problem (even if it occurs in many cases) and to avoid involving the exposed population of concern (Stern 1999).

As already explained, the involvement of the population in the continuous process of communication about the local risk management is rather complex and it can lead to distortion and social amplification of risk perception.

On the other hand it should be noted that in order to develop a proactive approach, it is necessary to check in advance if the authorities comply with the condition of setting mutual trust with the target population.

Moreover, for the exposed population it is surely difficult to have full confidence in the organs of institutional bodies and the authorities in charge of risk management. However complex may be the path to follow, demonstrating attention and commitment to the issue will tend to build and strengthen a relationship of trust that can be beneficial not only in the domain of prevention but also in other spheres of public life. In order to evaluate what was the



Result of the student survey - Level of student awareness about the activities of Public Safety Authorities.

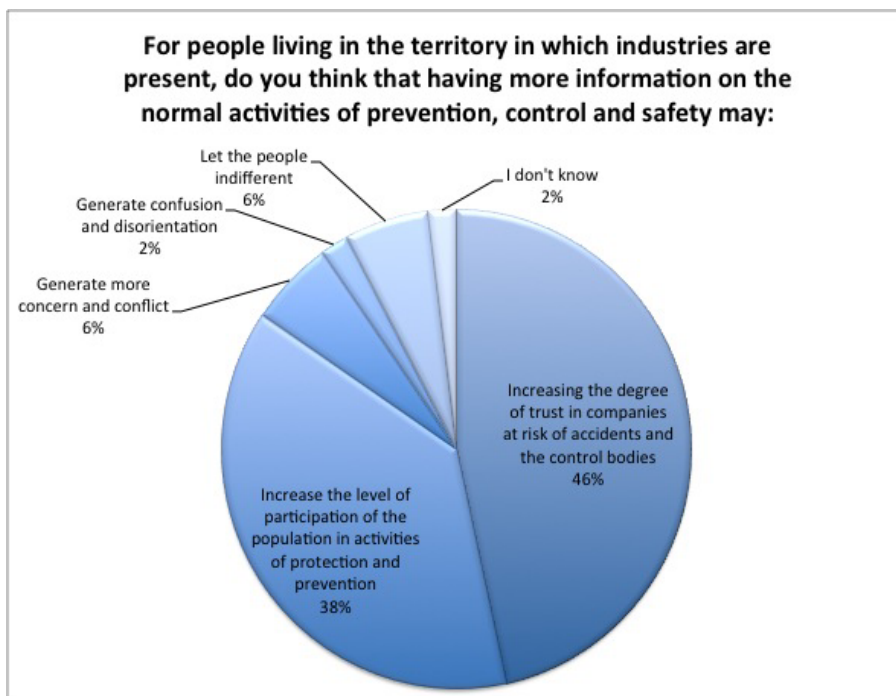
perception of the public exposed to industrial risk, two workshops were organised in a Municipality characterised by a high number of Seveso sites. One workshop was organised in a technical high school, because students can constitute a representative sample of young population of the municipality. The second one was dedicated to representatives of the local population.

A member of each authority involved in the risk management took part to the workshops as well as a representative of the local hazardous industries.

The main outcomes of these experiences are the followings:

- The level of risk perception of population is very low.
- Citizens are aware of the industrial activities in the area but have no particular perception of the risks that these activities entail.
- Citizens are not aware of the existence of an emergency plan, and even if they are aware of it, they consider it too complicated to be made available and usable by the population.
- Participants have no perception about the inspection and control activities made by the authorities.
- Even if industries are controlled and monitored, the participants are not aware that they are still exposed to a minimum and acceptable level of risk (residual risk).
- Participants do not have any perception that the residual risk, as already very low, can be further reduced if they would know the procedures to be followed during the development of a possible emergency.

Finally, the delegation of citizens and students that have participated to the initiative have shown much interest in



Result of the student survey – Perception about expected impacts related to public information about prevention and safety measures.

the issues related to the behaviour of self-protection to adopt in case of an emergency, stating explicitly that citizens would like to participate and contribute more to prevention activities. From these experience the conflict is generated more from the lack of information and scarce attention dedicated by local authorities to this issue, than real risk perception.

#### *Risk perception and conflict from journalist perspective*

Journalist and media are one of the most relevant mean that could steer the amplification and distortion of public risk evaluation and the potential generation of conflict. A dedicated workshop was developed to investigate the role they played at local level.

During the workshop, journalists highlighted how the pre-existence of a relationship of trust with the authorities, as well as the access to the already available information, would make their work more efficient and accurate; it would allow the media providing a better information to its readers and more generally, to the community.

For the journalists, the accessibility to information seems to be the most fundamental aspect of the whole process of communication, especially during emergency. They argued that if as a result of an accident, institutions or companies do not provide information, they are forced to seek elsewhere the information, thus risking to find false and inaccurate information.

Based on this consideration the following suggestions were formulated to improve the communication processes:

- It would be important to establish a communication network that involves industries and Municipality figures to better manage external communication.
- If the newspapers speak of prevention 'one off' there is a risk to create only alarmism among the local populations, but if risk communication and related activities involve the general public and journalist as well, according to a carefully structured program, there will be the advantage to disclose important information for all the citizens, but at the same time, to consolidate a partnership between institutions and the media.
- It might be useful to provide training for journalists.

#### *Lessons learnt on conflict about industrial risks perception*

During the research work and the field activities we mainly understood that the population exposed to industrial risk is willing to participate to the risk management process if properly involved in order to get the factual opportunity to contribute increasing its protection level as well as the protection of the local community. In particular, from all the elements that emerged from the research activity, following aspects can be highlighted:

- Understanding the conflict - All the actors and stakeholders involved in the process of risk management as well as the exposed population have not a rational approach to the evaluation of the risk. This aspect emerged in an evident way during the activities with the students and the public, but also can be recognised in the attitude of Majors and of industries. Therefore, conflict is not generated by the evaluation of evidence but by the differences of an acceptable level of risk. In other terms, the conflict is generated from the different perspectives on the acceptance of risk, real or perceived.
- Implications of conflict for communication - Conflict related to risks derive from an asymmetric level of information and different interpretations and evaluations of risk. It can be resolved by sharing information and interpretation among the different actors involved. These aspects arose from the difference level of information of the safety authorities from one side, and the local authorities and population on the other side.

Any other factors that could affect the conflict and that may not strictly be related to risk (e.g. religious or political motivations) will not be solved by sharing information but by specific communication strategies.

- Vested interests - When the conflict arose from vested interests, the communication should clarify the different interests groups' options and how they affect them. For instance, industries make clear what is their own objective: mitigating the conflict with the territory and the population because it could imply high costs and impact on competitiveness. This approach will help rendering explicit what are the different objectives of each stakeholder and it could contribute to find a compromise.
- Decision-making process - within the limits of available knowledge, to inform adequately the actors involved in the risk communication process and the related conflict does not necessary lead to the best decision, i.e. successful risk communication does not always lead to better risk management decisions, because risk communication is only part of risk management. Success is defined in terms of the information about the nature of the conflict which is available to the decision makers rather than in terms of the quality of decisions. Thus, risk communication does not result in consensus about controversial issues or in uniform personal behaviour but in defining the characteristics of the conflict.
- Finally, the public evaluation of risk should be put in perspective. The public have to understand the meaning of to the risk assessment results and to be able to evaluate the risk management process. In particular, it is of very high importance that the population grasps the principle that the "zero risk" solution does not exist.

## Conclusions

Risk communication is of vital importance in today's society, as audiences become ever more questioning about the causes and effects of risk.

However, the communication of risk is a complex activity involving many different types of communicators and receivers, from scientists, to the media, to government agencies, industry and consumer groups, each of which having its own agendas to fulfill. Such variation across the communication of the same risk can lead to confusion, misunderstandings, misreporting in the media and subsequent conflicts.

The goal of risk communication is to produce an informed public. The personal nature of risk issues and the uncertainty associated with estimating risk can provoke considerable anxiety for the public and make adopted risk management strategies less acceptable. (Macgill 1987).

Many risk problems become a matter of heated debate and controversy because they affect local community directly, because the authorities and decision makers disagree, and because of lost trust and credibility. Risk communication should attempt to resolve these conflicts. The research project conducted in Lombardy aimed to investigate what was the actual risk perception of the communities exposed to industrial source of hazard and the related level of conflict. The results showed that the level of risk perception of the population is still too low to define a program of communication without having considered in more detail the mode of involvement of the population. Nevertheless, the experiments carried out showed that the population potentially exposed to the industrial risks, if properly involved, shows particular interest in issues related to prevention and self-protection. The involvement of population into a dedicated programme on risk communication should not present a significant concern, as reported by the Majors and students interviewed, according to which the conflict between the industries and the population does not appear to be a particular obstacle to risk communication. On the contrary it was shown that collaboration could be beneficial for all the stakeholders while the most significant limitation to this process, is the low public perception of the problem. In a context characterized by a distorted perception of risk, the low risk perception could be a sensitive issue that may affect and impend the start of the communication process because it could generate anxiety, alarmism or unnecessary conflicts.

In this regards, the main institutional bodies in charge for inspection and control activities could contribute reducing such misperception and alarmism by communicating to the public on how the prevention and control activities are performed and what could be the residual level of risk. This approach would allow on one side making visible the effort of each public institution to contribute to the definition of a climate of trust among citizens, on the other side, it would help the direct involvement of the population in social prevention activities. In any case, the authorities, in particular local ones that are in tied connection and relationship with the population, should demonstrate a proactive attitude in order to show willingness to dialogue and collaborate with the population. Though difficult, this process could have other positive effects because it would help to create an environment of trust in the authorities that could be useful even for other institutional initiatives, not necessarily related to the prevention of risks. Such approach will call the population upon to contribute to the further reduction of risk (residual risk) by learning about self-protection measures and safe behaviour, in case of an accident. Another important support for reducing the conflict can be derived from the journalists. If properly informed, they can contribute actively to spread and

promote a safety culture. During the meeting with the journalists group, it was possible to shift their interest from the focus on news and information strictly related to an accident, to the opportunity and the advantages related to the collaboration during the prevention phases of the risk management. According to them, they could realistically contribute to the mitigation of conflict and misinterpretation of risk if a collaborative program on prevention, involving the population as well, was set up. In conclusion it could be stated that risk communication contributes concretely to mitigate conflict only if there is an improvement of the relationship of mutual trust and cooperation between the various actors involved in the whole process of risk management and the population potentially exposed to the industrial risks. According to the results of the project activities, industrial operators and authorities should therefore not consider the communication as an administrative burden but as a chance of demonstrating their responsible attitude towards public safety to their local communities including environmental interest groups or other stakeholder groups. In fact, all the participants to the project agreed that the relationship between all players involved (i.e. Operators, Competent Authorities and the public) should be characterized by dialogue and co-operation rather than confrontation. As it is well documented in the

literature, the population does not require an extraordinary amount of detailed information, but the opportunity to trust authorities, to participate and contribute to its own protection. This is key issue to reduce the conflict and distortion of risk perception.

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