



Major Risk Installations and Land Use Planning: Application of the Local Authority Guidelines in Piedmont (Italy)

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The Italian government implemented the European Directive “Seveso 2”, concerning the control of major industrial risks, with the 334/1999 - Legislative Decree (LD, 1999) on the implementation of 96/82/EC for the control of major accident hazards involving dangerous substances, which, together with the 09/05/2001 - Ministerial Decree on the minimum requirements for land-planning and urban-planning in areas in the vicinity of major risks installations, introduced land use planning criteria for areas close to “Seveso” type factories for the very first time in Italy. The “Regione Piemonte” implemented these national laws through guidelines that are known as “Guide Lines for the assessment of industrial risk in land use planning: Strategic Environmental Assessment and Technical Report on Major Industrial Risks”. The provincial administrations and municipalities then had to transpose the regional laws into their urban and land use planning instruments. Until now, only the provincial administration of Turin has introduced a variation of the provincial land-use plan (Piano Provinciale di Coordinamento Territoriale), while the municipalities in the province are currently updating their urban plans with the introduction of Technical Reports on major Industrial Risks.

The application of these laws requires a multidisciplinary approach: updated and exhaustive knowledge on the hazardous substances handled by the different companies involved in the analysis and on the possible accidents is essential, but the analyst should also be able to use the land-use analysis correctly and interpret the environmental, urban and historical assets which could be considered vulnerable elements in the case of an industrial accident. Local authorities are often not sufficiently prepared for this kind of multilevel analysis, because they do not have the human or economic resources or even the technical abilities necessary to conduct it; as a result, they frequently do not understand the importance of urban and land planning in the areas around major risk installations.

This paper offers some reflections regarding the application of regional and provincial laws concerning major industrial risks and urban and land use planning, and focuses on their application problems and capabilities with reference to some practical cases.

1. Application of the National and Regional Seveso normative

The 334/1999 - Decree (LD, 1999) on the implementation of 96/82/EC for the control of major accident hazards involving dangerous substances, entered into force in October 1999. This decree, which represents the adoption of the Seveso 2 European Directive, establishes, for the very first time, the adoption of minimum safety requirements concerning land use planning for those areas in which there are major risk industrial installations. The adoption of the 09/05/2001 - Ministerial Decree on the

minimum requirements for land-planning and urban-planning in areas in the vicinity of major risks installations, introduced important novelties: provinces and municipalities are now obliged to update their urban planning instruments (*Piani di Coordinamento Provinciali* and *Piani Regolatori Comunali* – Provincial Coordination Plans and Municipality Regulating Plans) to 334/1999 Legislative Decree (LD, 1999), and to draw up a Technical Document which, in relation to the location of the Seveso installations, identifies and disciplines the areas that have to be subjected to specific regulations. In order to draw up the Technical Document, also known as RIR – *Rischio di Incidente Rilevante* (Major Risk Accident), it is necessary to conduct a detailed analysis of the territorial and environmental vulnerability of the land, dividing urban areas and buildings into vulnerability classes in relation to the land building index and to the number of people that are generally present, as foreseen by the 09/05/2001 - Ministerial Decree. According to what has been established in the 09/05/2001 - Ministerial Decree (MD, 2001), the coordination between the regulations that derive from 334/1999 Legislative Decree (LD, 1999) and the urban and land use planning and environmental protection instruments is the duty of the regions, which in turn have to arrange the planning procedures between all the territorial organisations that are involved. In Piedmont was approved on 26 July 2010 the 17/377 - Regional decree and Guide lines for the assessment of industrial risk in land use planning: Strategic Environmental Assessment and Technical Report on Large Industrial Risks.

The 17/377 - Regional decree and Guide lines (RD, 2010a) offers detailed information on the contents and ways of drawing up the RIR Technical Document, but the municipality administrations point out some difficulties about it, due to both a lack of financial and human resources and to an insufficient scientific and technological preparation relative to the required expertise. The drawing up of the document is in fact based on environmental and land analyses, but also on evaluations of a chemical engineering nature.

Another problem related to the drawing up of the RIR Technical Document pertains to the particular physiognomy of the built up landscape in Italy: the entire national territory is in fact characterised by towns and urban agglomerates with high housing densities, which, in many cases, have grown without any control and without the use of Town Planning instruments. The situation is further complicated in hilly areas, or at the foot of mountains, where the land available for urban development is very limited and where a jumble of residential and industrial zones has been created, with consequent problems concerning the protection of the areas surrounding the industrial plants.

In a similar context, the drawing up of the RIR Technical Document appears more and more necessary in order to guarantee the safety of the citizens and the safeguarding of the environment as well as of the historical-architectonic patrimony: with this document, the municipalities can obtain in depth and updated knowledge concerning the environmental and territorial receptors, but also about the elements of pressure that are present throughout the municipality territory, and they can then arrange planning measures for the areas surrounding the Seveso activities, in this way offering controlled and safe development and growth conditions to both industries and other urban functions.

2. Drawing up of the RIR Technical Document (Regional Guidelines)

According to (RD, 2010a), the RIR Technical Document should be drawn up by municipalities with a Seveso plant on their territory or those not housing a “Seveso” company, but interested in evaluating the damage of a possible accident in a company that hosted by a nearby municipality. The RIR drawing up has three phases: 1) Data collection of the production activities, and of the territorial and environmental receptors; 2) Evaluation of the territorial and environmental compatibility; 3) Planning.

2.1 Data collection

The first stage of the RIR Technical Document foresees an extensive data collection throughout the entire municipality territory, and it involves very different types of investigations: this ranges from information of a naturalistic type to other of an urban-architectonic type, and even of a purely engineering type. A constant interaction between the various municipality offices is however necessary (above all between the Technical Office and the Environmental Office), and a great capacity to summarise and document the collected data is essential.

The Guidelines established that all the non-craftsman type productions throughout the municipality territory should be identified and characterised. Safety Reports and Notifications can be used for the

characterisation of Seveso activities, while it is necessary to prepare a questionnaire for all the other activities in order to understand which hazardous substances are detained, the storage methodology, the presence of high pressure/high temperature processes or ionizing radiation, the prevention and protection measures adopted, but also the transport modalities of the hazardous goods. The collection of the data relative to non Seveso activities can create some problems as the companies are under no obligation to denounce the substances they use in their manufacturing processes.

The data collection stage is also conducted in relation to the territorial and environmental receptors; as far as the former are concerned, all the areas, buildings and infrastructures that are characterised by a significant presence of people, and which in some way constitute sensitive objectives in the case of accidental events, are considered vulnerable territorial elements. According to the 09/05/2001 – Ministerial Decree (MD, 2001) and to the 17-377 Regional decree and Guide lines (RD, 2010a), vulnerable elements should be divided into 6 categories (from A to F, ref. Table 1) on the basis of the number of people that are present, the attendance frequency and the mobility capacity of the people.

As far as environmental vulnerable elements are concerned, both the 09/05/2001 – Ministerial Decree and the 17-377 Regional decree and Guide lines (RD, 2010a) define a series of factors that should be considered, including protected natural areas, areas suffering from hydrogeological instability, historical-environmental-landscape areas of high value, zones with high vulnerability aquifers, etc. All the environmental receptors identified as vulnerable throughout the municipality territory should be grouped, on the basis of the Guidelines, into two categories: very high environmental vulnerability elements and relevant environmental vulnerability elements.

2.2 The territorial and environmental compatibility evaluation

A territorial and environmental compatibility analysis requires that the data from the industries are crossed with those relative to the territorial and environmental shape, and the interaction between industrial activities and urban functions, the road conditions and the environmental characteristics of the examined area are evaluated case by case. Very different disciplines and professional expertise come into play at this stage: a good capacity to analyse and read the territory and the ecosystems is necessary, together with the capability of interpreting the mapping of the consequences of accidental events, and the potential hazards connected to the substances stored in the industrial activities.

As far as territorial compatibility is concerned, the 17-377 Regional decree and Guide lines (RD, 2010a) offer a detailed definition of each step of the evaluation process: the damage areas for Seveso activities defined in the Safety Cases or in notifications should be superimposed onto the territorial area category identified during the previous data collection stage. The regulations define the compatibility cases on the basis of the category of the effects of the accidental event - Elevated Lethality, Start of Lethality, Irreversible Damage and Reversible Damage – and of the probability of occurrence.

For example, for an “unlikely event ($10^{-4} > p \geq 10^{-6}$)”, in the “Reversible Damage” zone, the BCDE and F categories are considered compatible; for a “probable” event in the “Reversible Damage” zone, only structures classified as DE or F can be present.

As far as non-“Seveso” activities are concerned, a territorial criticality assessment is performed and circular areas are plotted that indicate the potential damage connected to the type of substance that is stored. A ranking of “very critical/critical/not critical” is assigned to each activity, on the basis of the area and/or point vulnerable territorial elements that are inside the plotted areas. For example, if the company stores toxic substances, and territorial elements that have been classified as “A” fall into the potential damage circles, the company will be evaluated as “Very critical”; however, this criticality evaluation can be decreased on the basis of the prevention and protection measures the company adopts.

The approach is more complicated as far as environmental compatibility is concerned: the Guidelines only offer some examples of incompatibility and specify that the adoption of prevention and protection measures by the company can reduce the danger for environmental receptors. Since the actual criticality of an industrial activity depends on a series of variables – the type of substance stored, the foreseen accidental events (energetic-toxic with environmental effects), and the vulnerable environmental elements that are present – the Guidelines ask for a case by case environmental compatibility evaluation. It is obvious that the reliability of the analyses depends on both the accuracy of the previously collected environmental information and on the capacity of interaction of the different

expertise at play: in order to evaluate the effects of an industry on the territory, it is necessary to understand how the specific accidental event acts over a vast range of possible environmental conditions (for example, the spilling of certain substances can cause a certain effect on cultivation A, but not on cultivation B).

2.3 Planning

The planning stage impose the restraints pertaining to the areas surrounding the activities and can request the adoption of specific prevention and protection measures for individual companies in order to mitigate the hazardous territorial and/or environmental situation. In this case, a further effort is requested of those who draw up the RIR Technical Document, in that they have to set up the rules that will then be transferred and harmonised inside the Technical Actuation Rules of the Municipality Regulation Plans, and this inevitably leads to a series of difficulties connected to the previous planning provisions for the areas surrounding the companies, and to limitations of the building possibilities that are often necessary to introduce.

The planning stage starts with the definition of two concentric areas of respect, named "Exclusion area" and "Observation area" for the Seveso activities and for the other activities, whenever judged "critical" or "very critical". The two areas are drawn up starting from the border of the plant and have sizes that depend on the level of criticality that has been assigned. The exclusion area can be of 100, 200 or 300 m, depending on the case, while the observation area must extend to at least 500 m from the plant boundary. The adoption of management measures relative to the control of the traffic conditions, in the case of an accident, should above all be foreseen inside the observation area, while more restrictive measures, including the prohibition of carrying out modifications that involve an increase in the anthropic load, and the prohibition of introducing new urban functions that fall into categories A and B, must be introduced inside the exclusion area. However, a careful evaluation of the measures that should be adapted to safeguard the environment and the already existing buildings in order to protect these buildings and activities is necessary case by case.

3. Drawing up of the RIR Technical Document (Provincia di Torino Guidelines)

The "Provincia di Torino" is the only province that has so far elaborated a Variation of the Territorial Coordination Plan in order to update it to the prescriptions of the 09/05/2001 – Ministerial Decree (MD, 2001). The so-called "Seveso Version" of the Plan was approved by the "Regione Piemonte" however on 12 October 2010.

The indications of the Seveso Version to the Provincial Coordination Plan are analogous to those of the 17-377 Regional decree and Guide lines (RD, 2010a), see paragraph 2. However, the Province introduced further obligations for plant managers, which are not considered in the Regional Regulations. The managers in fact have to draw up a Territorial and Environmental Compatibility Report for new installations of Seveso factories, or for changes to already existing Seveso factories that could involve an increases in the risk of accidental events. These reports should be sent to the municipality offices, which will then decide on the request on the basis of the actual compatibility of the intervention. As far as territorial compatibility is concerned, the factory manager should make a classification, according to the categories outlined in the 09/05/2001 – Ministerial Decree (MD, 2001), of all the areas that fall into the observation area of the activities (500 m); the Municipality will then verify whether either categories A or B fall into the exclusion area, and will determine whether the new installation or modification is feasible or not.

4. Case study

This examined case study refers to the drawing up of the RIR Technical Document for the Municipality of Omegna in the Province of Verbano Cusio Ossola; this experience proved to be particularly interesting, both because it was one of the first application cases of the application of the new Regional Guidelines in Piedmont, and because the analysis zone presented some particular features which certainly made the drawing up of the RIR Technical Document more complex - but also more interesting. The town of Omegna looks onto the northern edge of the Orta lake, and is a typical area at the foot of the mountains, characterised by the first signs of the foothills of the mountain relief of the Ossola and Strona Valleys; urban growth has always been concentrated in the areas at the end of the

valleys, between Lake Orta and Lake Maggiore, and over the years a connection has formed between the bordering municipalities of Casale Corte Cerro and Gravelona Toce. During the twentieth century, many municipalities in the zone, including Omegna, underwent a rapid development in production activities, above all connected to the taps and fittings sector, and the industries developed inside town centres without any regulation, with a consequent series of inconveniences connected above all to the problem of pollution. In spite of the transformations that these territories have undergone over the last century, the zone still has a very elevated landscape value, due to the presence of the lakes. In recent years, the beauty of the landscape and architecture in the zone has encouraged touristic fruition.

As far as Omegna is concerned, the duty of drawing up the RIR Technical Document fell to the Municipality, as there are two Seveso activities on its lands: the first is a galvanic sludge depurator, while the second is a galvanic activity. According to what has been established in the 31-286 - Regional Decree of 5 July 2010 (RD, 2010b), the Administration could not approve variations that would lead to modifications in the areas at risk to Seveso activities (*areas of direct impact from an accident originating from production activities*), until the RIR Technical Document had been approved. Since the Omegna industries are often located within residential or commercial areas, or are surrounded by disused areas whose reconversion is foreseen, the Municipality had an urgent need to understand where the areas of risk were in order to be able to go ahead with the normal planning activities.

The drawing up of the RIR Technical Document started with the data collection phase, which required a great deal of time to find and subsequently organise the data; the research activities were conducted both by consultants and by the Municipality offices, and these activities require a continuous feedback and monitoring of the information. As far as the production activities were concerned, the consultants identified the Seveso and sub-threshold Seveso activities on the basis of the regional databanks (named SIAR), while the other potentially hazardous activities were identified on the basis of the ATECO codes recorded in the Chamber of Commerce lists; they were arranged according to their sub-threshold and the other activities in the questionnaire, which was sent out and also collected by the Municipality. The Municipality offices also dealt with collecting the data relative to the presence and frequency of shopping centres, churches, hospitals, schools and nursery schools, while the data relative to the environmental matrices were deduced by the consultants on the basis of regional and provincial cartography.

Once this phase was finished, the companies and environmental vulnerability elements were characterised and after this, a verification of environmental and territorial compatibility was conducted. This latter activity pointed out possible critical situations for 7 companies in the Omegna territory. The exclusion and observation areas were identified for these companies, on the basis of the degree of criticality that had been assigned, and the consequent planning actions were agreed upon: since many of these activities are located in the vicinity of the edge of the Strona Torrent, in areas of very high environmental vulnerability, the exclusion areas were 200 m. The companies located close to the stream are reported in the Figure 3, with the relative exclusion and observation areas.

Some difficulties were encountered by the Administration and the technicians, during the execution of the various phases concerning the comprehension of the necessity of an analysis extended to the entire Municipality, rather than just around the Seveso activities. As foreseen in the Regional Guidelines, the territorial and environmental vulnerability categories should in fact be defined for the entire territory of the municipality, and not only the effects of the Seveso activities were evaluated, but also those of the other production activities: this led to a multiplication of the areas subjected to constraints (the exclusion areas), which in fact limited the potential building in many areas of the Municipality. However, investigations extended to the entire territory of a municipality allows the administration offices to have detailed and complete knowledge of the environmental and territorial receptors present throughout the entire territory that can easily be updated. This knowledge is useful to establish criteria for new installations and modifications of Seveso activities for production areas or harmful activities in general. Furthermore, the inclusion and analysis of non Seveso activities allows the municipalities to collect more detailed information on industries which, although often storing large quantities of hazardous substances, are not subject to any controls as they do not fall into the categories mentioned in the 334/1999 Legislative Decree (LD, 1999).

Another problem was encountered during the translation phase of the contents of the RIR Technical Document into the urban regulations: the Regional laws in fact impose that the RIR Technical

Document should be contained in a structural version, which should be subjected to approval by the Region, but the insertion of the specific technical dispositions regarding the Seveso activities and the constraints concerning the exclusion areas in the regulations of the Regulation Plan is not so easy. The Guidelines generically prescribe that anything that falls into categories A and B should not be constructed in the exclusion areas, and that no interventions that would involve increases in the anthropic load should be activated: however, the Technical Offices of the municipality have to define precise urbanistic parameters with which to outline the building possibilities and the distinction of use in the exclusion areas, and this can in fact be a contradiction of the very same provisions of the PRG in force or even of the National and regional laws. However, this translation phase of the dispositions of the RIR Technical Document of the plan regulations was followed very closely by the Region and by the Province during the planning activities: the informal meetings, but above all the planning conferences in which the proposing Municipality participated together with the two organisations, helped to clearly define the modalities of drawing up the final RIR Technical Document and the structural variations.

5. Conclusions

On the basis of the work experience that have been undertaken, it is possible to state that the RIR Technical Document is a fundamental instrument for the planning of the territory and to obtain knowledge of the territory itself, but also that the levels of close examination and specificity requested in the investigations are often not part of the expertise of the municipality offices, and this makes drawing up the document very difficult for the municipality offices themselves. The same problem has been encountered in the drawing up of the Compatibility reports, a duty which falls to the managers of the factories and which are foreseen in the Guidelines of the Seveso Variation to the Territorial Coordination Plane of the Province of Turin. It should be pointed out that it would surely be of help for the Piedmont municipalities if all the provinces were to update their Territorial Coordination Plans to the 09/05/2001 – Ministerial Decree (MD, 2001) and to the 17-377 Regional decree and Guide lines (RD, 2010a); this superordinated urban instrument has a vast and strategic baggage of information at its disposal which, at a municipality level, would not be possible, and it constitutes an important point of reference for the drawing up of all the RIR Technical Documents of a certain Province.

Moreover, although it is important to safeguard the health of citizens and the environment, it is also in the interest of the local communities and of the region that these productions should continue. The regions, provinces and municipalities should therefore demonstrate a sufficient level of sensitivity and be able to mediate between the requirements of the production activities and those of the environment, which, at the same time, are the conditions that are necessary for sustainable development: the planning phase of the RIR Technical Document is also certainly the most suitable occasion to sustain the requests of the productive world, in this way drawing up regulation elaborations that are as fair as possible for everybody concerned.

References

- LD, 1999. 334/1999 - Legislative Decree on the implementation of 96/82/EC for the control of major accident hazards involving dangerous substances, 17 august 1999, <www.camera.it/parlam/leggi/deleghe/testi/99334dl.htm>, Accessed 10/05/2012.
- MD, 2001. 09/05/2001 - Ministerial Decree on the minimum requirements for land-planning and urban-planning in areas in the vicinity of major risks installations, <www.provincia.milano.it/export/sites/default/protezionecivile/documenti/09_05_01.pdf>, Accessed 10/05/2012.
- RD, 2010a. 17/377 - Regional decree and Guide lines for the assessment of industrial risk in land use planning: Strategic Environmental Assessment and Technical Report on Large Industrial Risks, 26 july 2010, <extranet.regione.piemonte.it/ambiente/siar/dwd/normativa/dgr17-377.pdf>, Accessed 10/05/2012.
- RD, 2010b, 31-286 - Regional Decree on the repeal of Regional decree 20-13359, 5 July 2010, <extranet.regione.piemonte.it/ambiente/siar/dwd/normativa/dgr31-286.pdf>, Accessed 10/05/2012.