

## JRC SCIENCE AND POLICY REPORTS

# COMPETENCY AND TRAINING OF SEVESO INSPECTORS

*Recommendations and Summary of  
Current Practice in EU Member States  
and Affiliated Countries*

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Abstract

This document contains a summary of perceived needs and practices in relation to competency requirements and training programmes for Seveso inspectors of EU Member States and other Seveso countries to support effectiveness of oversight and enforcement of the Seveso Directive on major hazard sites. The information was gathered mainly through a survey of a cross-section of individual Seveso inspectors from various countries and a workshop of representatives of Seveso inspection authorities across Europe. The study found that there are no standard universally applicable requirements for competency and training of Seveso inspectors. Nonetheless, Seveso inspection programmes generally consider that Seveso inspectors must have some form of basic training and training on the job as a foundation for their work with periodic training to update and diversify their skill sets. This report describes the range of competency requirements, training content and delivery mechanisms offered over the period of study, as experienced by a number of individual Seveso inspectors, and described by inspection authorities of various EU Member States and affiliates.

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## EXECUTIVE SUMMARY

Following 15 years of implementation of the Seveso II Directive, it is widely recognised by competent authorities that fulfilment of the enforcement obligations within the Directive requires staff possessing a unique set of competencies and skills. Moreover, these competencies and skills must be nurtured and augmented over time to remain high quality and current with evolving technology and to understand and sometimes use new models, methodologies and applications that are being deployed to increase process safety.

In 2007 the Technical Working Group for Seveso Inspections was asked by the Committee of CA to develop a recommendation for an EU competency and training syllabus for Seveso inspectors. The Working Group concluded that the concept of having one syllabus was inconsistent with how the Seveso Directive is implemented in practice in Member States. Different legal frameworks and the assignment of various enforcement responsibilities is so varied that a single syllabus could not be recommended. Furthermore, there is no particular evidence that different approaches to inspector training and competency are more effective than others, beyond the fact that more experience and more training will eventually lead to a more effective inspection workforce.

On the other hand, from the results of these exercises, it was immediately clear that generic recommendations regarding the importance of maintaining a training programme for Seveso inspectors would be relevant and useful. In lieu of a recommended syllabus, the recommendations have included this explanation of current practice as derived from the survey and workshop results. In this way, the document can be used as both a benchmarking reference as well as a menu of options for inspectorates looking for ideas.

Therefore, this document contains a summary of results of a survey of Seveso inspectors and a follow-up subsequent workshop on competency and training requirements involving a majority of Member States across a six-year period, from 2005 – 2011. However, due to a combination of factors, mainly reduced resources at EU level and the loss of key contributors in the Seveso Inspectors Working Group due to reassignment, the report's publication was delayed until this year. Despite the delay, it has been considered that the good practice and insights of various contributors to the knowledge gathering activities remain largely valid and that the report should be published in any case.

Important points resulting from the survey and workshop are incorporated in the current document and in the annexes. Examples of syllabi used in some countries are also provided in **Annex 1**.

## SUMMARY OF FINDINGS FROM THE STUDY OF SEVESO INSPECTOR COMPETENCY REQUIREMENTS AND TRAINING PROGRAMMES

Some general conclusions can be drawn from the detailed descriptions of competency and training practices in Seveso inspection programmes. The table on the next page provides a general summary of the range of approaches to Seveso inspector training across Europe. One can note the following:

- **Individual inspectors should be well-equipped with the proper competencies** so that their inspections have a real possibility of improving risk management on their Seveso sites. Control of major hazards requires fundamentally a multi-disciplinary expertise, and competencies in each of the disciplines is generally acquired through experience and training. The central challenge of the inspection authority is to match inspector experience and competency with the inspection plan of the inspector.
- **There is no standard universally applicable syllabus for training Seveso inspectors.** There is no specific course structure that can be recommended to guide competent authorities in building their Seveso inspection training programmes. The objectives and content of training programmes are linked directly with the perceived role and obligations of the inspection authority in inspection and enforcement of the Seveso directive in their country. Moreover, competency needs can be addressed in numerous ways using a combination of competency requirements, basic plus periodic training.
- **Competency requirements vary considerably** depending on the needs and objectives of the organization's Seveso inspection programmes. The emphasis on specific professional credentials (beyond a university degree), experience and specific skill sets was not uniform across authorities. These aspects were influenced by a variety of factors unique to the organization, including its staffing and training strategy, the experience and competency of existing inspections staff, and the availability of appropriately experienced and skilled individuals in the work force.
- **Basic training, and especially on the job training, are considered essential.** Seveso inspection programmes generally consider that Seveso inspectors must have some form of basic training as a foundation for their work. Training on the job is considered a critical element of training by all inspection programmes. In contrast, the emphasis on coursework and the content of courses offered as basic training varied considerably across countries and inspectorates.

**Table from Chapter 3. Summary of the Various Approaches to Seveso Inspector Training in Europe**

| Type of Training  | Structure  | Content  | Duration  |
|-------------------|--|--|---|
| Basic training    | On the-job training is an essential component in most countries. In addition, many countries have established specific courses. In some authorities, a test or series of tests must be passed.   | At a minimum, courses usual cover the legal system, regulatory obligations, enforcement and inspections strategy. Additional content varies considerably from country to country.  | Considerable variation starting with a minimum of a week up to 6 months in some countries. On-the-job training ranges from a few months to a year.  |
| Periodic training | Very broadly defined. Can include formal training programmes and courses as well as ad hoc professional development opportunities organised locally as well as internationally. Formal courses on specific topics as well as exchange of good practice and lessons learned are included in this definition. Several countries regularly organize joint training for all its Seveso inspection authorities. | Focus varies with time and inspection objectives, but generally tends to be either improving technical or administrative skills, or updating regulatory knowledge. Some authorities link inspector grades with the amount and type of training completed. Needs and strategy related to maintaining competency in specialized areas of industrial safety also influence training objectives. | Usually ranges from 1-2 days to a couple of weeks per year. In some countries training is fixed for a specific number of days each year, but in many countries it depends on the need and availability of training opportunities. |

- **Periodic training is also highly valued but definition and content of such training varies** even more than basic training across authorities. Local influences play an even more critical role in determining the nature and content of periodic training. Resources in particular may influence the frequency and systematic structuring of periodic training opportunities. In addition, the objective of inspections and other roles played by inspectors (e.g., review of safety reports) and inspection/accident experiences will strongly determine content. Periodic training priorities may be influenced by a perceived need to maintain or improve co-ordination and consistency with other authorities internally and externally.
- **Seveso inspectors generally view professional development as a combination of specialised training, good practice and lessons learned exchange, and improvement of general professional skills.** The desire to improve “technical skills” was expressed by a majority of participants (when combining both generic and specific responses). Where such skills were specifically identified risk assessment, process safety and plant operations topped the list. Legal, communication and administrative skills were also highly valued by a wide number of participants as well as training on overall inspection strategy
- **National and international seminars and conferences to exchange good practice and lessons learned were considered valuable learning resources.** In addition to participation in international events such as the EU Mutual Joint Visit workshops and IMPEL conferences, several countries host national events and have established national networks of inspectors. Survey responses were particularly strong in emphasizing the value of any opportunity to exchange information with other Seveso inspectors.



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# COMPETENCY AND TRAINING OF SEVESO INSPECTORS

## 1. BACKGROUND OF THE STUDY

### 1.1. INTRODUCTION

This document summarizes the state of practice in Member States for training and competency of inspectors, derived from the combined findings of a workshop on Seveso competency and training and from a survey on competency and training completed by Seveso inspectors at EU-sponsored workshops. The workshop was particularly helpful in confirming the degree to which trends cited in the survey are widely reflective of trends across the broad spectrum of Seveso inspectorates in Europe. In particular, several Seveso inspectorates in Europe were not included in the survey but their practices were described in the workshop.

This document is divided into four parts as follows:

Section 1 – The need for recommendations and best practice exchange on Seveso inspector competency and training

Section 2- Knowledge-gathering activities for the recommendations on competency and training practices of Seveso inspection programmes

Section 3 - General principles and considerations that influence competency and training choices in Seveso countries

Section 4 - Competency requirements for seveso inspectors – Common principles and examples of good practice

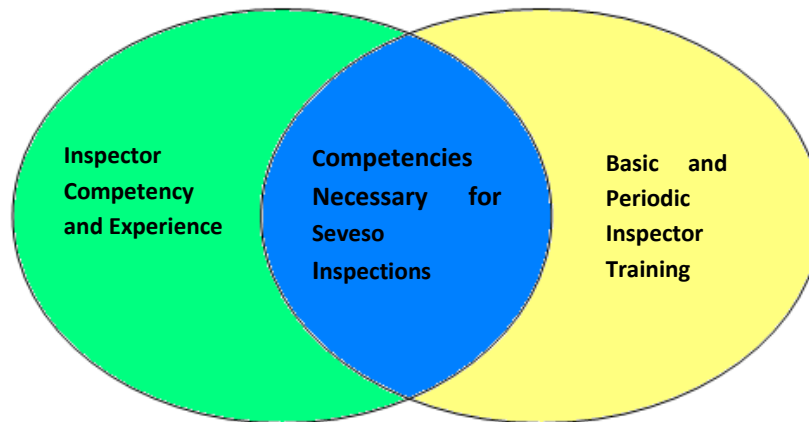
Section 5 - Different types of ongoing training/professional development activities

Section 6 – Summary and conclusions

## 1.2. THE NEED FOR RECOMMENDATIONS AND BEST PRACTICE EXCHANGE ON SEVESO INSPECTOR COMPETENCY AND TRAINING

Control of major hazards, also known alternatively as loss prevention or process safety management, is fundamentally a multi-disciplinary expertise, and competencies in each of the disciplines is generally acquired through experience and training. Over 30 years experience with the Seveso Directive suggests that it is not possible for an inspector to check compliance in a meaningful way without a fundamental knowledge of all the elements that contribute to effective control of major hazards. In addition, inspection is in itself a field of expertise that is also multi-disciplinary. Seveso inspectors therefore, have to somehow acquire on the job or from past experience competency in a number of disciplines, some of which are inter-related, but others, such as risk assessment, are stand-alone disciplines and highly specialised.

Hiring experienced process safety professionals can be a significant advantage to an inspections programme but is not often possible due to availability and cost. Therefore, as noted later in this document, most inspection authorities adopt a strategy of hiring staff that have education and experience that make them likely to be a good inspector, but with the inspection that a substantial part of the competencies that they need will be learned on the job through experience and training

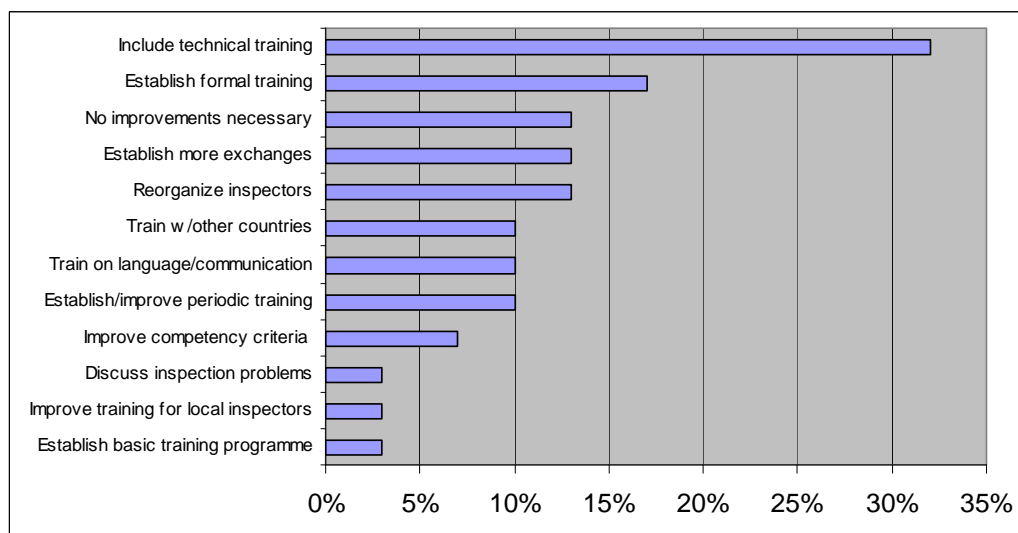


**Figure 1: Typical Training Strategy to Provide Seveso Inspectors with Necessary Competences**

The inspector must essentially have the competence to evaluate the adequacy of the site's compliance with all the elements of the safety report and the safety management system **(see Text Boxes 1 and 2)**. In essence, these elements include understanding of chemical engineering processes for Seveso type industries, principles of mechanical engineering (for reliability and integrity issues), behaviour of numerous dangerous substances and their effects on people and the environment, techniques for identifying hazards and assessing consequences, psychological disciplines of organizational behaviour and human-machine interfaces (human factors), and emergency planning.

The challenge is complicated further by the sheer diversity of major hazard industries and the vast number of dangerous substances and potential reactions involved. For example, the e-MARS database established to record major accidents at Seveso sites lists 45 different industrial sectors. It is estimated there are over 500 substances released or involved in accidents recorded in the database. Moreover, for most equipment and many activities, there exist codes and standards and even regulations of which the inspector must be aware and in some cases they must be very knowledgeable.

Furthermore, inspection itself is an expertise. It follows a disciplined process that starts with strategic planning, following onto inspection preparation, the inspection itself and follow-up. Several important elements of the process include a firm grasp of all the legal aspects (legislation, rights and obligations of the regulator and the regulated, and the legal process), and co-ordination with other authorities and external experts. In addition, as many of the surveyed inspectors emphasised, excellent communication and writing skills are necessary to maximise the possibility that inspection findings will be addressed.



**Figure 2: Survey Respondent Suggestions for Improvements to Seveso Inspector Training Programmes (N = 30)**

### 1.3. A RECOMMENDATION FOR INDIVIDUALISED TRAINING PLANS FOR SEVESO INSPECTORS

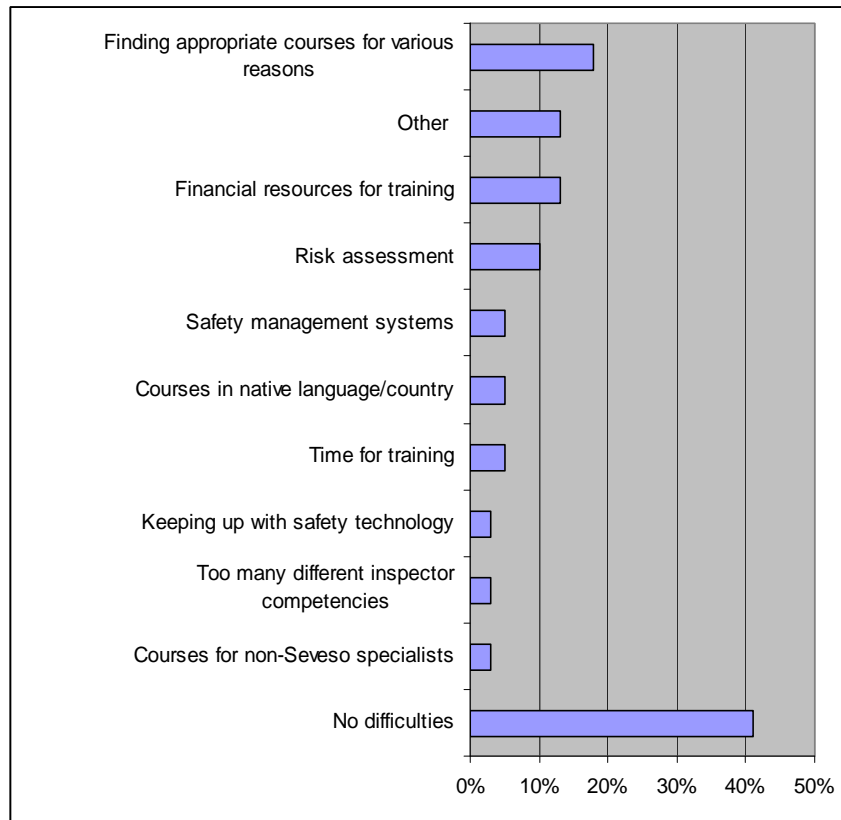
Training of Seveso inspectors should aim to prepare them for inspection of a wide variety of sites, equipment and processes where the hazards presented by the presence of dangerous substances and the resources and attention to process safety on site may also be vastly different. Even experienced staff can be limited in their ability to be effective in all situations because they may only have had direct working experience with a subset of industry types and management approaches. Moreover, there is not always the opportunity to acquire certain necessary skills, such as accident investigation, without specific training. As shown in Figure 1, the central challenge of the inspection authority is to match inspector experience and competency with the inspection plan of the inspector. In addition to highlighting the multi-disciplinary nature of major hazard control, Section A1 also notes the additional complexity that arises stemming from the diversity of sectors represented by Seveso sites. Different sectors require a different and often specialised knowledgebase of inspectors for effective evaluation of the operator's demonstration that all necessary measures to protect humans and the environment have been undertaken.

These sectors in particular are differentiated in numerous ways relevant to safety, such size and complexity, types of processes, types of equipment, engineering, operational equipment, staff expertise and balance sheets.<sup>1</sup> In addition, sites differ from one another in terms of particular risk management challenges and sometimes the significance of certain challenges to safety, such as the risk assessment process or human factors, on particular sites requires specialised expertise to evaluate.

Therefore, it is clear that individual inspectors should be well-equipped with the proper competencies so that their inspections have a real possibility of improving risk management on their Seveso sites. This challenge becomes increasingly critical when access to experts in particularly important expertises are not available to the authorities. There is no doubt that it is a significant challenge for inspectors and the inspection authority as a whole to keep abreast of all the competencies that might be required to implement within their annual Seveso inspection plan. However, inspection authorities generally find that working strategically they can make significant progress in maintaining and increasing the competency of their staff. The following description of needs and practices associated with Seveso inspector training is aimed to help inspection authorities in establishing and improving their training goals and strategies.

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<sup>1</sup> This fact is highlighted in the 2008 joint publication by the European Commission's Joint Research Centre and the Netherlands, *Enforcement of Seveso II: An Analysis of Compliance Drivers and Barriers in Five Industrial Sectors on Seveso* highlighting strengths and weaknesses of Seveso compliance in five industrial sectors (mineral oil refineries, batch processors, pharmaceutical production, LPG storage, and fertiliser production).



**Figure 3: Challenges in Completing Needed Training Courses (N = 39)**

#### 1.4. CHALLENGES IN ACHIEVING EFFECTIVE SEVESO INSPECTOR TRAINING

The information gathered for this report indicated that the majority of inspection authorities generally offer some kind of basic and periodic training for Seveso inspectors. However, as noted in the survey, programmes sometimes have difficulty in obtaining precise training necessary for Seveso inspectors. The survey highlighted some of these challenges, that were also recognised in the workshop presentations.

In particular, Figure 3 shows a general difficulty in finding appropriate materials and courses in specialty areas. Several survey respondents mentioned specifically that opportunities for training on safety management systems and risk assessment may be limited. More generally, keeping up with safety technology and the various competencies that they may require also poses challenges to many programmes. Moreover, it was noted that when specialised training materials or courses exist, they sometimes do not exist in the native language of the inspectors.

This situation gives support for the ongoing efforts of the various Seveso countries, through EU Seveso inspector workshops, the EU level Seveso Inspections Working Group, and the Major Accident Hazards Bureau (MAHB) to exchange best practices and make them available

to inspection authorities. MAHB in collaboration with the various involved Seveso countries currently conduct a number of activities as part of these efforts, in particular:

- Guiding Phase II of the EU's programme of annual workshops (the "Mutual Joint Visit" programme) that facilitates exchange of best practice and other knowledge among Seveso inspectors on special topics
- Summarising and disseminating the results of the Mutual Joint Visit workshop exchanges in the Seveso Inspection Series publication
- Publishing Common Inspection periodically on narrowly defined topics of interpretation and guide practice as well as other topics
- Disseminating the above output and other products generated from the EU Seveso Inspections Working Group on the web exchange platform of the European Commission's Major Accident Hazards Bureau (<http://minerva.jrc.ec.europa.eu>)

## 2. SEVESO INSPECTOR COMPETENCY AND TRAINING: STUDY FINDINGS AND CONCLUSIONS

To help foster good practice throughout EU Seveso inspectorates, it was decided that a reference knowledge base of current practices in Member States and other Seveso implementing countries. Two main activities were identified, and subsequently completed, to achieve this objective. The first activity was a survey of Seveso inspectors to obtain feedback on their experience in regard to access and frequency of training throughout their job life. The second activity was a special session, or workshop, in the context of the TWG 2 annual meeting.

The entire activity took place across a six-year period from 2005 – 2011, where recommendations were finalised. However, due to a combination of factors, mainly reduced resources at EU level and the loss of key contributors in the Seveso Inspectors Technical Working Group due to reassignment, the report's publication was delayed until this year. Despite the delay, it has been considered that the good practice and insights of various contributors to the knowledge gathering activities remain largely valid and that the report should be published in any case.

### 2.1. SUMMARY OF KNOWLEDGE-GATHERING ACTIVITIES

It was determined that it was important to solicit the opinion of individual inspectors and their organisations on competency and training needs and good practice that might be recommended for fulfilling those needs. For this reason, knowledge was obtained through two mechanisms: a survey of a cross-section of Seveso inspectors across Europe and a workshop featuring presentations on the competency requirements and training programmes of the inspectorates represented by the workshop participants. The survey was aimed to solicit the opinion of individual Seveso inspectors on what training topics were important to their professional development and feedback on their experience in regard to training opportunities offered by their organisation. Results of the survey are provided in the next chapter. A copy of this survey is included in this report in **Annex X.**) The survey was distributed to Seveso inspectors who participated in the EU's Mutual Joint Visit programme workshops for Seveso inspectors across a number of years. Since the survey was the first activity in the programme, the last survey was conducted in 2007.<sup>2</sup>

Following the survey, a workshop on Seveso inspector competency and training was conducted in 2009 within the annual meeting of the EU Seveso Inspections Technical Working Group. The workshop was intended as a complement to the survey results to help

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<sup>2</sup> There is anecdotal evidence to suggest that training activities in some countries have declined after the economic crisis of 2009. For this reason, a new survey may be recommended in the near future to understand how inspection programmes are coping with training needs in the current period.

give a well-rounded interpretation of the status of of Seveso inspector competency requirements and training across Europe.

Collectively, the survey and workshop included input from every Member State but not every inspectorate. (It is estimated that there are more than 150 Seveso inspectorates throughout Europe.) However, as shown in the next chapter, there was considerable diversity among inspectorates that did participate either through the survey or through the TWG 2 mini-workshop. Independently, sampling a mostly different audience, both the survey and the workshop reached more or less the same conclusions about typical requirements, optional approaches and their influences. From this it seems evident that the analysis and recommendation below will largely be considered relevant and applicable for most Seveso inspectorates in the European Union and associated States.

The original objective of the activity had been to recommend an ideal syllabus for competency requirements and training of Seveso inspectors throughout Europe. Indeed, from the results of these exercises it was immediately clear that generic recommendations regarding the importance of maintaining a training programme for Seveso inspectors would be relevant and useful. On the other hand, providing a specific recommended syllabus would be difficult given the diverse approaches and responsibilities of the various Seveso inspectorates across Europe. Therefore, the recommendations are general and short and cover training and competency requirements broadly.

In lieu of a recommended syllabus, the recommendations have included this explanation of current practice as derived from the survey and workshop results. In this way, the document can be used as both a benchmarking reference as well as a menu of options for inspectorates looking for ideas.

Important points resulting from these exercises are incorporated in the current document and in the annexes. In the process of gathering this information, three syllabi were collected from individual Seveso inspection programmes (UK Health and Safety Executive, Belgian FSP Employment and Labour and the French Ministry of Ecology, Sustainable Development and Sea). The syllabi are included with this document in **Annex 2**.

## 2.2. SUMMARY OF FINDINGS FROM THE WORKSHOP ON SEVESO INSPECTOR COMPETENCY AND TRAINING REQUIREMENTS

In June 2009 each country present in the TWG meeting (see Table 3, p. 19) made a short presentation on competency and training requirements in their country or in their organization. This session consisted of presentations from 18 different Seveso countries, some representing all the inspectorates of their country and others representing only their own inspectorate. The perspective of industry was also presented.



**Table 1: Profiles of Seveso Competency and Training Workshop Presenters**

| Representative of ... | Competency and Training Approaches Described for ...   |
|-----------------------|--|
| <b>Belgium</b>        | All Seveso inspectorates in Belgium in general, more detailed information on content training program for labour safety inspectorate |
| <b>Croatia</b>        | Ministry of Environment Inspectorate   |
| <b>Czech Republic</b> | All Seveso inspectorates in Czech Republic   |
| <b>Denmark</b>        | All Seveso Inspectorates in Denmark  |
| <b>EPSC</b>           | Requirements and challenges in industry  |
| <b>Finland</b>        | Tukes, the Safety Technology Authority   |
| <b>France</b>         | DRIRE (Regional Office for Industry, Research and Environment)   |
| <b>Germany</b>        | Seveso Inspectorate of Hesse, Germany  |
| <b>Hungary</b>        | National Directorate for General Disaster Management   |
| <b>Italy</b>          | Environmental agencies (National and regional)   |
| <b>Netherlands</b>    | Labour Inspectorate  |
| <b>Norway</b>         | Directorate for Civil Protection and Emergency Planning  |
| <b>Poland</b>         | State Fire Service   |
| <b>Portugal</b>       | Environment Inspectorate   |
| <b>Romania</b>        | Inspectorate for Emergency Situations  |
| <b>Sweden</b>         | Swedish Civil Contingencies Agency   |
| <b>Turkey</b>         | Ministry of Environment and Forestry   |
| <b>United Kingdom</b> | Health and Safety Executive  |

From the workshop it was concluded that competency requirements and training programmes for Seveso inspectors can vary widely between countries, and also inspectorates, depending on the following factors:

- **Role of the inspectorate.** Two aspects are particularly influential: 1) whether the inspectorate is considered the lead organization for fulfilling Seveso inspection obligations or whether it is a secondary partner; and 2) whether or not inspectors assigned to Seveso inspections typically have other types of inspection responsibilities (e.g., environment, occupational safety, fire safety).
- **Scope of inspections as defined by the country/inspectorate.** This element is partly defined by the role of the inspectorate as noted above. However, it is independently also shaped by historical, social and legal frameworks. These frameworks impose a certain philosophical approach to and often some practical limitations on enforcement.
- **Authority to verify Seveso compliance effectiveness (quality assurance).** Countries/inspectorates may differ substantially in terms of how far the scope of inspections can go, e.g., whether it is a simple compliance check or an actual verification that safety measures are of an adequate quality, i.e., effectiveness.. This element is not a primary influence but a result of the combination of the above two factors. However, it is so important in influencing competency and training requirements that it is highlighted separately as a key factor.
- **Resources for Seveso inspections,** in particular, financial and staff resources, but also competency and experience available in the country's work force.

### 2.3. SUMMARY OF DETAILED FINDINGS FROM THE SURVEY AND WORKSHOP

The main purpose of the survey was to obtain a cross-section of opinions concerning training needs of individual inspectors. Inspectors were also asked objective information on the current training regime in their respective organisations. Since the survey was administered at 5 different events, some authorities were represented more than once. In addition, many of the authorities of the survey respondents were also represented in the workshop. The results of the surveys were complemented by presentations from inspection authorities, that further explained how competency requirements and training programmes worked from an organisational standpoint. In fact, the duplication helped clarify responses leading to a more complete response about practices in certain authorities.

The analysis of results did not attempt to eliminate duplication or resolve conflicts in information coming from representatives of the same authority. The data on training programme structure and focus was intended to be indicative only, reflecting the actual experience of the individual inspector rather than the formal curriculum established by the authority.

### 2.3.1. DESCRIPTION OF SURVEY RESPONDENTS

As noted in Table 2 (on the next page), the survey resulted in a total of 57 participants representing competent authorities in 22 Member States, 2 EEA/EFTA countries and 2 Candidate Countries. Table 3 (p. 17) shows the distribution of inspectors by function. Respondents were given a number of options to describe their profile, including:

- whether or not they were a Seveso inspector, and/or if they had an inspections management role,
- whether or not the inspector has other responsibilities besides Seveso inspections
- whether they inspected other legislation besides Seveso, and
- whether or not the organization was the lead authority for Seveso inspections in their country.

The responses were grouped for analysis in Table 1 according to these attributes. Table 2 summarises the survey respondents per country.

**Table 2: Profile of Survey Respondents by Country**

|                 |    |
|-----------------|----|
| <b>EU-15</b>    | 33 |
| <b>NEW MS</b>   | 16 |
| <b>EFTA/EEA</b> | 3  |
| <b>CC</b>       | 3  |
| <b>OTHER</b>    | 1  |
| <b>UNKNOWN</b>  | 1  |
| <b>TOTAL</b>    | 57 |

- Twelve (12) EU-15 countries represented with BE, UK, DE, SV, NL most represented (3-5 respondents each)
- Ten New MS represented – with Hungary most represented (3 responses)
- Two EEA/EFTA countries represented– Norway and Switzerland
- Two Candidate Countries represented – Turkey and Croatia
- One industry respondent

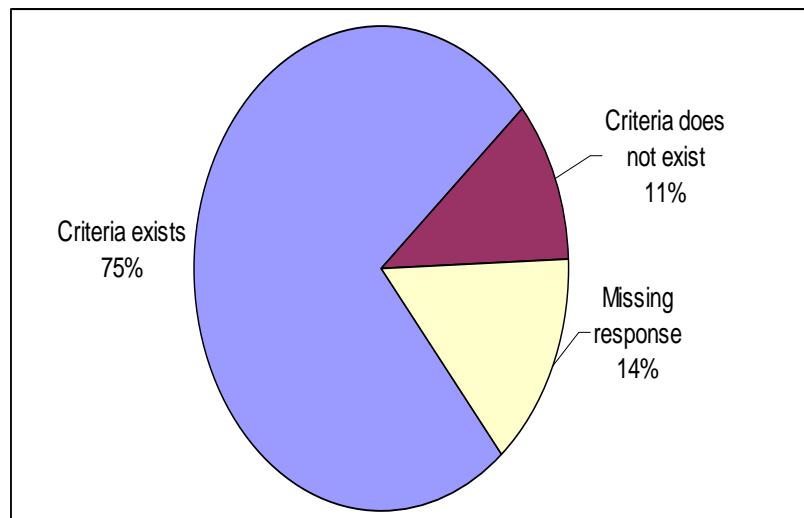
**Table 3: Position and Responsibilities of Surveyed Inspectors**

| <b>RESPONDENT PROFILE</b>  | <b>No. of Respondents</b> | <b>% Respondents</b> |
|--|---------------------------|----------------------|
| SEVESO INSPECTOR   | 44                        | 79%                  |
| NOT AN INSPECTOR   | 11                        | 20%                  |
| INSPECTION DEPARTMENT MANAGER  | 13                        | 23%                  |
| <b>... HAS OTHER RESPONSIBILITIES BESIDES INSPECTIONS, INCLUDING</b> | <b>11</b>                 | <b>20%</b>           |
| -POLICY  | 4                         | 36%                  |
| -SAFETY REPORT   | 2                         | 18%                  |
| -LEGAL, PROCEDURAL   | 4                         | 36%                  |
| -CIVIL PROTECTION  | 1                         | 9%                   |
| -OTHER   | 1                         | 9%                   |
| <b>ALSO INSPECTS OTHER LEGISLATION</b>                               | <b>28</b>                 | <b>50%</b>           |
| - ENVIRONMENT  | 17                        | 30%                  |
| - OCCUPATIONAL SAFETY  | 9                         | 16%                  |
| - RADIATION  | 2                         | 4%                   |
| - CIVIL PROTECTION/FIRE SAFETY                                       | 2                         | 4%                   |
| - HIGH RISK NON-SEVESO   | 3                         | 5%                   |
| - TRANSPORTATION (UN ADR)  | 1                         | 2%                   |
| <b>THE ORGANIZATION ...</b>  |                           |                      |
| ... IS THE LEAD SEVESO AUTHORITY                                     | 33                        | 59%                  |
| ... SHARES BUT DOES NOT LEAD INSPECTIONS                             | 15                        | 27%                  |

### 2.3.2. FINDINGS ON COMPETENCY REQUIREMENTS

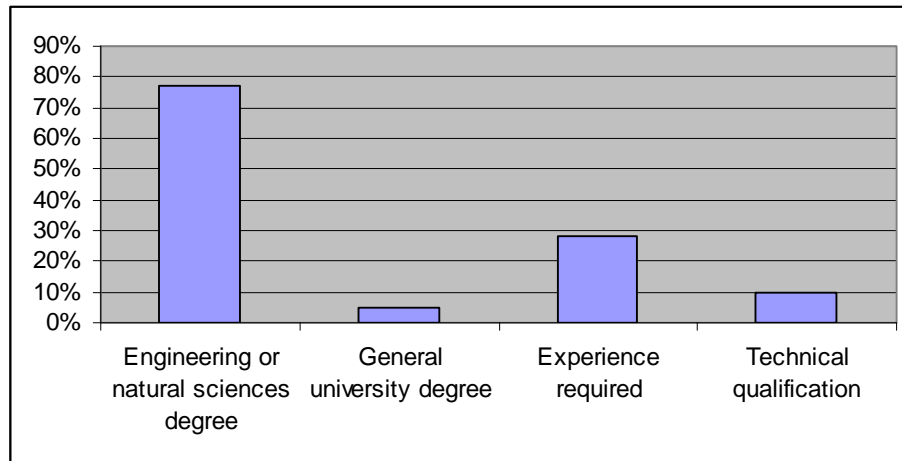
**Most Seveso inspection authorities have formal competency requirements.** It is hard to determine the exact break-down between all the different Seveso inspection programmes in Seveso countries. However, based on the workshop and survey results (see Figure 4), it can be concluded that a majority of inspection programmes have formal competency requirements. (This tendency was reflected by 39, or 74%, of all responses to the survey).

**Level of education.** Competency requirements reported in the survey and in the mini-workshop emphasised the importance of a university degree. In the survey, this emphasis was reported by 32, or 82%, of the respondents with formal competency requirements.



**Figure 4: Presence of Formal Hiring Criteria in Respondent Organisations (N = 53)**

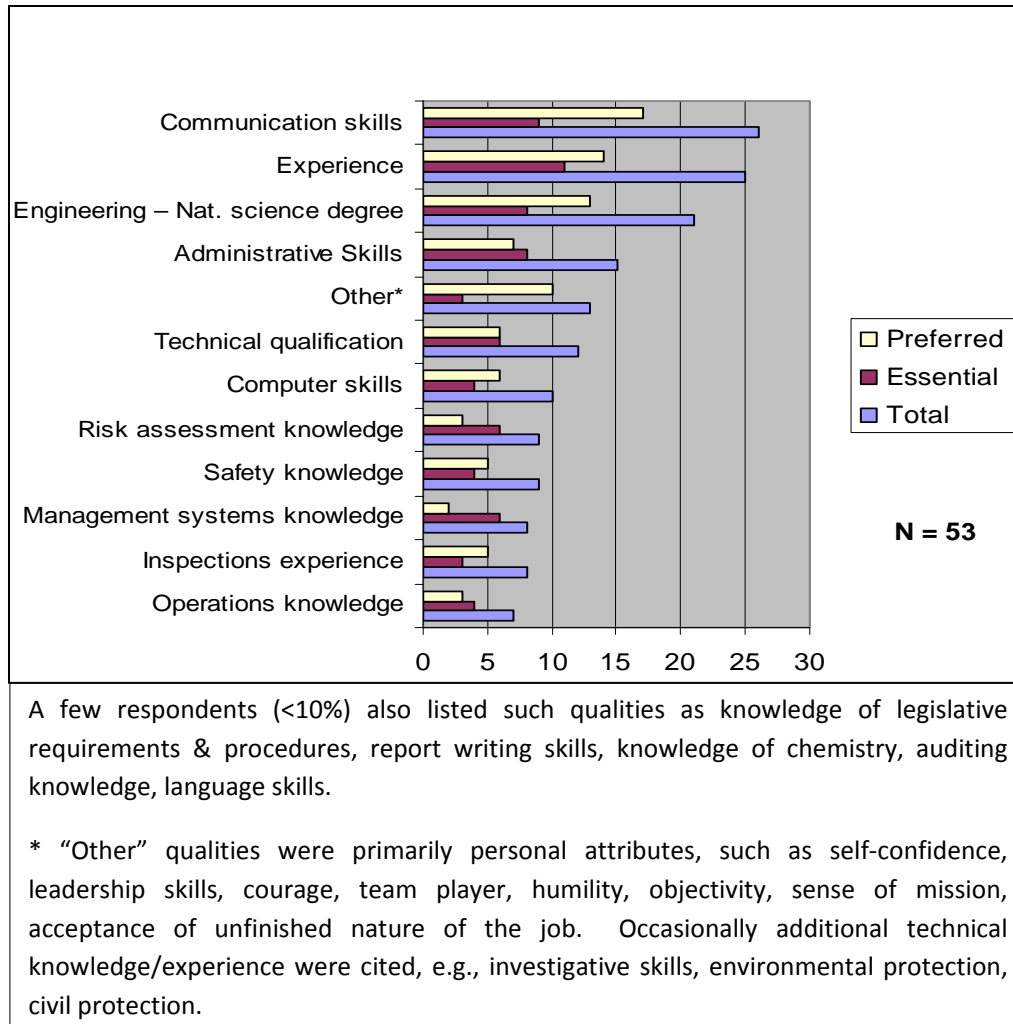
- **Type of degree.** According to the workshop and the survey, the preferred university degree was a natural science or engineering degree (in a few cases, a Master's degree). For a small number of programmes a technical university degree was not specifically indicated. In addition some emergency response authorities hire only graduates of emergency responder degree programmes (which include two years or more of full-time coursework in the subject).
- **Past experience.** Past experience was not always required. When desired or required, prior employment in industry and as an inspector seemed to be considered most relevant. A few survey respondents also mentioned experience with management systems and a number of other competencies specifically associated with major hazard control (see Figure 5, p. 20).



**Figure 5: Competency Requirements of Respondent Organisations (N = 39)**

The degree to which past experience is required or preferred in hiring new Seveso inspectors appeared to be a decision based on a number of subjective factors:

- the level of formal training on inspections protocol and strategy available within the organization
  - the level of formal training on major hazard control within the organization
  - the experience level of the existing inspections staff; and
  - the importance of Seveso relative to other inspections work of the organisation.
- **Required or Preferred Skills.** In addition to education and experience requirements or preferences, many inspectorates emphasised communication (especially report writing and persuasion/negotiation), administrative and computer skills. For essential and preferred competencies identified in the survey, see **Annex 2**.
  - **Competency test.** In addition, some inspection programmes require prospective inspectors to pass a competency test prior to hiring into the organization or prior to hiring as a Seveso inspector (if an internal candidate).
  - **Resources.** This factor covers finance as well as staff time available for training and other resource-related influences, such as ease of access to training, e.g., existing training facilities.



**Figure 6: Essential and Preferred Competencies for Inspecting Seveso Installations**

- **Training content and structure.** In discussing training, it is particularly important to distinguish between:
  - basic-generic training (basic training for all inspectors in the organization)
  - basic-Seveso training (basic training whose content is specifically designed to aid Seveso inspections) training, and
  - periodic (or ongoing) Seveso specific training.

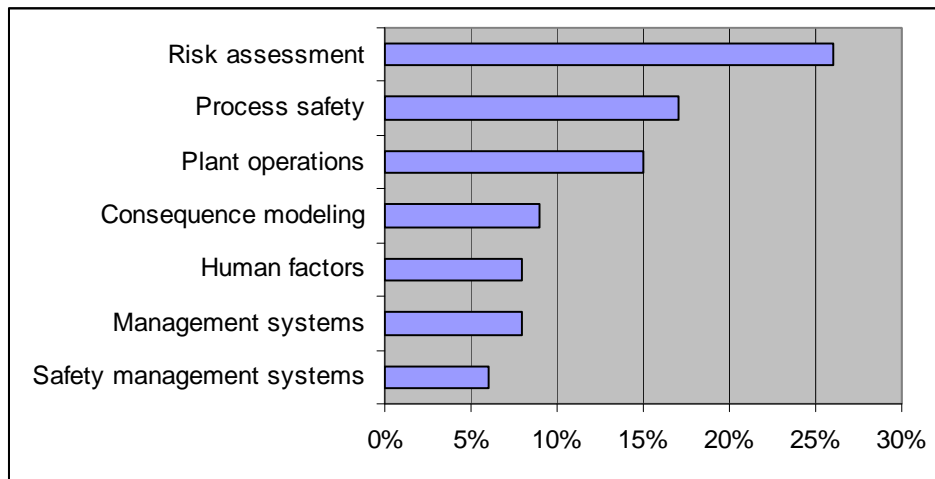
### 2.3.3. DIFFERENT TYPES OF ONGOING TRAINING/PROFESSIONAL DEVELOPMENT ACTIVITIES

These types of training are described in detail in the section below as follows :

**Basic Seveso inspector training**, which consists normally of both basic-generic and basic-Seveso training

**Periodic training and professional development** for Seveso inspectors, that is, structure and content

**Mechanisms for delivering ongoing training/professional development activities** for Seveso inspectors. This section describes the variety of ways in which the periodic training described in E2 is actually implemented by various countries or individual authorities.



C1.

**Figure 7: Technical Training Priorities of Surveyed Inspectors (N = 53)**

#### 2.3.3.1. Basic Seveso inspector training

**Formal basic training.** From the workshop and survey results it appears that basic training exists in the majority of inspection programmes (confirmed by 80% of respondents to the survey).

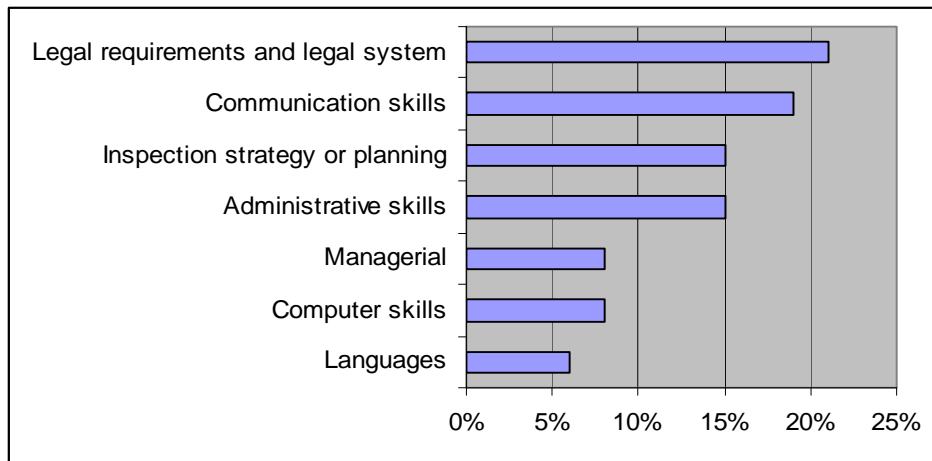
**Standardised course list or material.** At least seven inspectorates (18%) represented in the survey were reported to have a standard set of training courses, although some other inspectors reported a more or less standardised “self-study” programme. However, the workshop presentations suggested that the percentage was probably higher than represented in the survey. Such decisions are not always driven by resource limitations but also by the organization’s role in Seveso and its philosophy and priorities. For example, some authorities tend to hire more experienced professionals and tailor coursework to the individual.



It should be noted also that some authorities also tied training course work to promotion to a more senior grade level.

- **Topics covered.** At minimum, formal courses usually consist of regulatory obligations, the legal system and inspections strategy. Many Seveso inspectorates have other inspection responsibilities and so often basic training is not oriented only towards Seveso. However, many basic training programmes also include material on plant operations and process safety (40% and 33% respectively in the survey).

ANNEX 2 contains examples of training syllabi used by different Seveso inspectorates.



**Figure 8: Non-Technical Training Priorities of Surveyed Inspectors (N = 53)**

- **Duration of basic training coursework.** As shown in Figure 10 (p. 24) The duration of basic coursework (i.e., all basic courses offered in total) varied considerably. A length of 3-6 months was cited by a number of countries. However, the period of formal training courses was much shorter in some countries (sometimes only a week). probably because of such factors as 1) a preference for self-training rather than formal courses and/or 2) the tendency to hire more experienced professionals, formally trained specialists (e.g., emergency responders) or to hire internally from other inspection programmes.
- **“On-the-job” training.** Training on the job was clearly considered by all inspection programmes an essential element of training. From the workshop it is evident that virtually all programmes provide on-the job training. For this type of training the new inspector accompanies more experienced inspectors to inspections for a period of time ranging from a few months to a year in some cases.

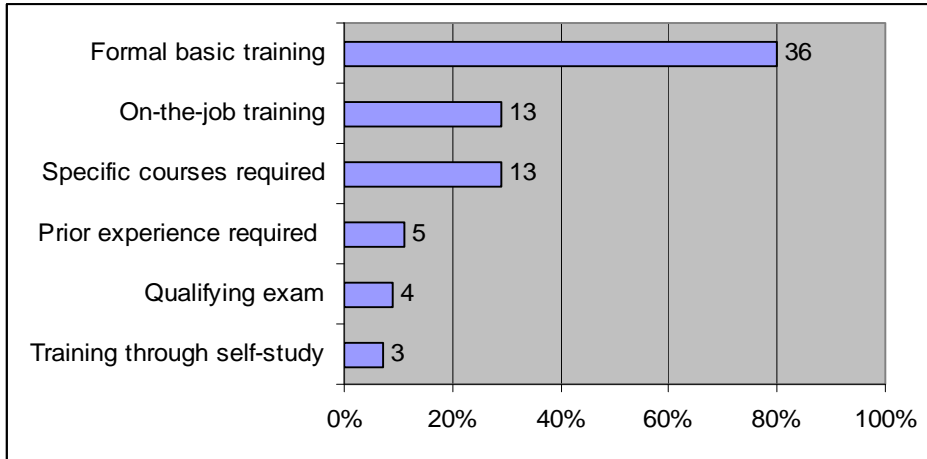


Figure 9: Basic Seveso Inspector Training Of Surveyed Inspectors (N = 45)

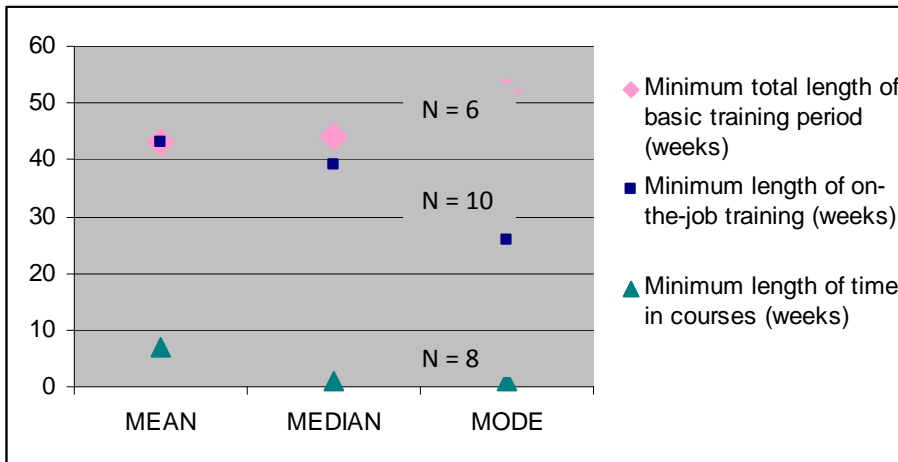


Figure 10: Duration Of Basic Training Elements According To Surveyed Inspectors

- **Duration of on-the-job training period.** The main difference between approaches tends to be the duration of this period. A duration of three to 6 months seemed to be the standard minimum but several authorities reported longer on-the-job training periods (nine months to a year). In some authorities inspection responsibilities also increased gradually over a period of years, starting with more simple regulatory requirements and moving to more complex inspections over time.

### 2.3.3.2. Periodic training and professional development

Most inspection programmes offer some kind of periodic training (see Figure 11, p. 26) but resources availability and formality of such training varies considerably.

- **Definition of periodic training.** The definition of periodic training should be considered very broadly. A portion of authorities have formal structured courses available for professional development of inspectors (from the survey and workshop this portion is estimated to be between 10-20%). In some inspectorates these include courses specific to Seveso inspections and in other inspectorates, formally offered courses are limited to generic inspection, enforcement and administration topics. Where formal courses are not available on Seveso-specific topics, inspectorates may create additional opportunities for this training outside the formal training system, such as ad-hoc courses, technical workshops and inspector exchanges. In many inspectorates, these events are the only opportunity for periodic training.
- **Duration and frequency of periodic training.** If periodic training is defined as above, it can be estimated that most inspectorates regularly offer opportunities for periodic training (37, or 88%, of 42 respondents). The frequency of periodic training ranges (on average) from 1-2 times a year (excluding certification or degree course work), with each event lasting anywhere from one day to up to a week and occasionally 2 weeks (see Figure 12).
- **Focus of professional development.** Professional development generally aims at one or more of the following objectives:
  - *Improving technical expertise associated with major hazard control.* These skills are generally of a scientific or engineering nature or (e.g., identifying and controlling potential reactive hazards) or tool-based (e.g., using analytical software such as PHAST).
  - *Maintaining current knowledge on regulatory obligations and legal procedures for enforcement.* Inspectors need to keep abreast of changes in the regulatory and legal reference frameworks.

- *Improving administrative skills including inspections management and strategy.* These areas of study include strategic, organizational, managerial and communication aspects of Seveso inspections.
- **Training topics.** Discussions about ongoing training among Seveso inspectors focus mainly on training topics specifically related to risk assessment and risk management on Seveso sites. Administrative topics (e.g., communication skills and report writing) are also often emphasised.

#### **2.3.3.3. Different types of ongoing training and professional development activities**

##### *a) Formal training opportunities for professional development*

Typical training content as described by the surveyed inspectors is shown in Figure 13. Opportunities are usually structured in a number of typical ways, in particular:

- **Formally established training programme managed internally.** Some inspectorates, especially larger inspectorates, have formal training academies or regularly organized training courses internally for professional development.
- **Formal arrangements with external providers.** Some inspectorates tend most often to organize training courses using external providers and sometimes make standing arrangements with one provider (university) for specialised courses. Inspectorates that do not have formal professional development organised internally use a number of options, including self-study and ad hoc training with internal specialists.
- **Continuing education support.** Some inspectorates provide incentives, such as financial assistance, salary increases or paid study time, for earning a particular degree or safety certification. Some inspectorates require inspectors earn certain credentials prior to a certain level of promotion.

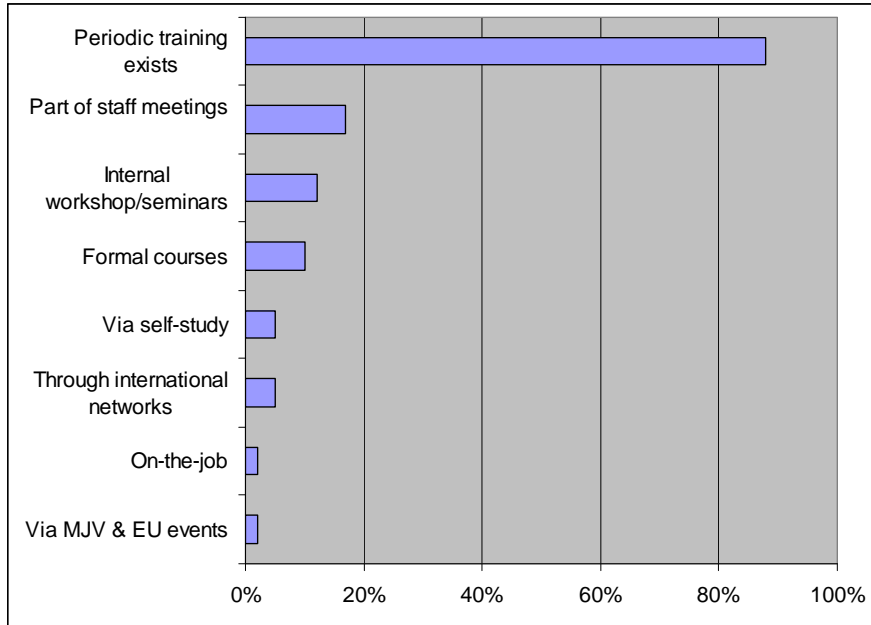


Figure 11: Status of Periodic Training According to Surveyed Inspectors (N = 42)

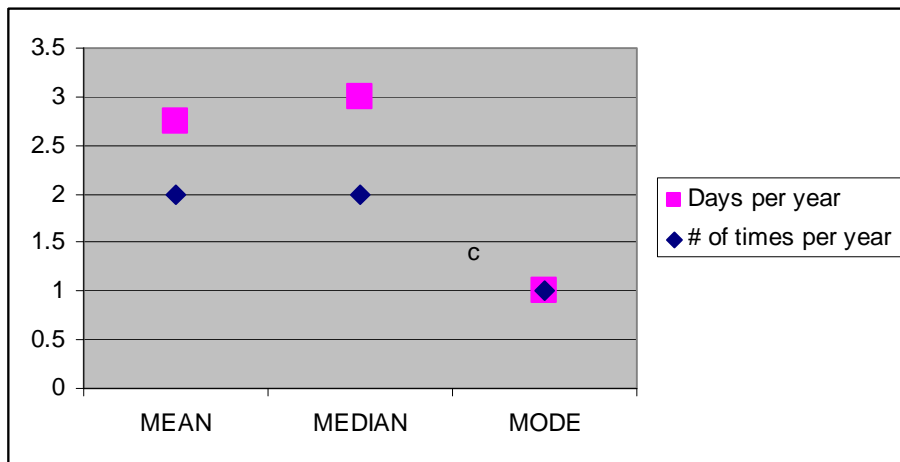
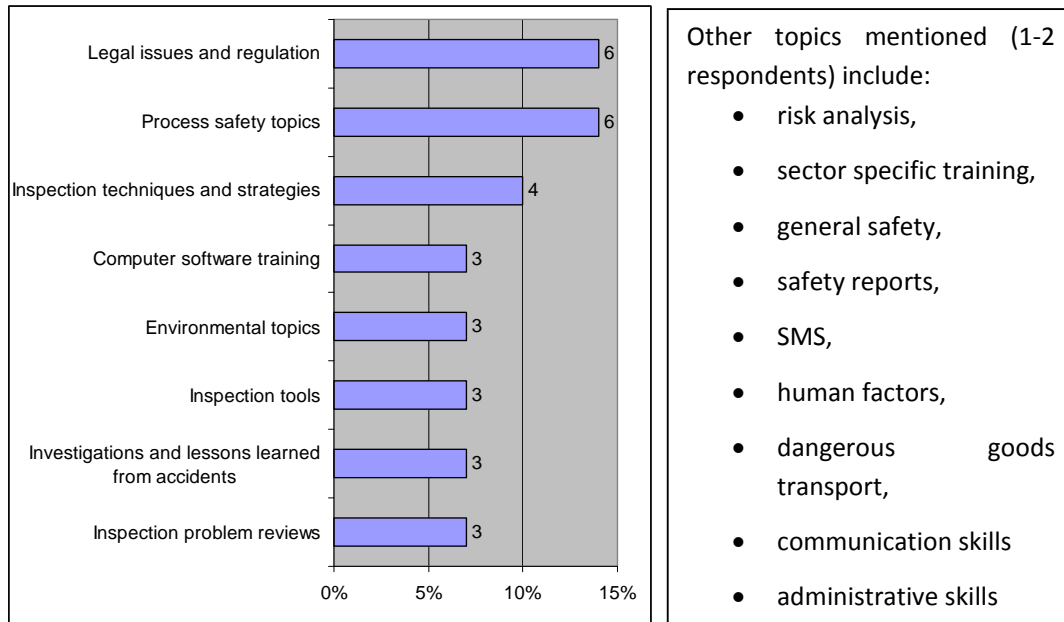


Figure 12: Frequency and Duration of Periodic Training

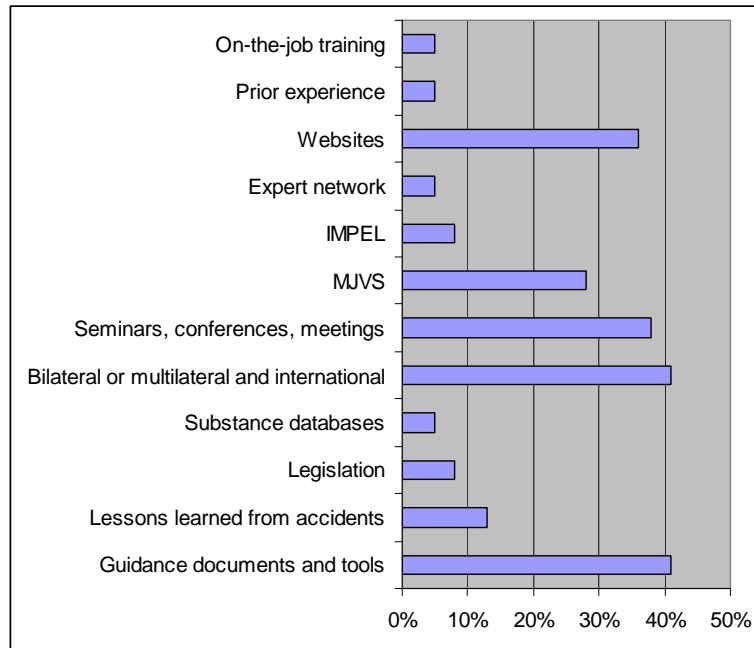


**Figure 13: Typical Periodic Training Content Identified By Respondents (N = 42)**

*b) Professional development and training support outside of formal training programmes*

Several other activities besides courses have proven to be effective as ongoing training and professional development (and authorities with formal programmes also tend to have these activities):

- **Internal meetings between inspectors - all inspectors, inspectors of specific industrial sectors, etc.** Many inspection programmes encourage frequent exchange between inspectors for consultation on specific technical issues or inspection problems and to share lessons learned from inspections and accident investigations. Such exchanges may take place during routine staff meetings or in regular (e.g., quarterly, semi-annual) meetings specifically aimed at exchanging information on inspection and risk management practices.
- **Periodic workshop (e.g., annual, biannual) for Seveso inspectors.** Sometimes inspection programs will organize one- or two-day events on a less frequent basis (annual, biannual) for professional development of their inspectors. The programme content and structure varies with the perceived needs of the inspectors. It can consist of technical training on a particular topic, exchange of lessons learned and best practices, or a mix of the two.



**Figure 14: Other Valuable Resources and Opportunities for Training (N = 39)**

- **Joint training with other national and regional inspectorates.** Some countries formally organised joint training with other Seveso inspectorates. Periodic meetings or workshops maybe organised to promote consistent professional development and foster information exchange among all Seveso inspectorates in the country. The degree of joint activities can depend on how involved different inspectorates are in Seveso. (In some countries one inspectorate dominates and the others have few responsibilities). However, it should be noted that sometimes joint exchanges/training are not arranged for practical reasons and these occur more frequently in countries that have made co-operation among inspectorates a priority.
- **Ad-hoc training and consultation from internal specialists.** Some inspectorates have encouraged Seveso inspectors to specialize in key technical competencies (e.g., human factors, SMS, risk-based inspections). These specialists are encouraged to follow professional development according to their specialty. In addition these internal specialists may also serve as training resources for other staff.
- **Ad-hoc training courses or consultation organised with external provider.** When a training need arises that cannot be satisfied by internal resources, an external provider may be hired for this purpose.
- **International exchanges.** Inspectorates in most countries also value international exchanges through the European Commission's Mutual Joint Visit Programme for Seveso Inspections (MJVs) and IMPEL conferences and workshops.

#### 2.3.4. GENERAL SUMMARY AND CONCLUSIONS

Table 4 on p. 31 provides a very general summary of the range of approaches to Seveso inspector training across Europe.

In addition some general conclusions can be drawn from the detailed descriptions of competency and training practices in Seveso inspection programmes, one can note the following

- Individual inspectors should be well-equipped with the proper competencies so that their inspections have a real possibility of improving risk management on their Seveso sites. Control of major hazards requires fundamentally a multi-disciplinary expertise, and competencies in each of the disciplines is generally acquired through experience and training. The central challenge of the inspection authority is to match inspector experience and competency with the inspection plan of the inspector.
- There is no standard universally applicable syllabus for training Seveso inspectors. There is no specific course structure that can be recommended to guide competent authorities in building their Seveso inspection training programmes. The objectives and content of training programmes are linked directly with the perceived role and obligations of the inspection authority in inspection and enforcement of the Seveso directive in their country. Moreover, competency needs can be addressed in numerous ways using a combination of competency requirements, basic plus periodic training.
- Competency requirements vary considerably depending on the needs and objectives of the organization's Seveso inspection programmes. The emphasis on specific professional credentials (beyond a university degree), experience and specific skill sets was not uniform across authorities. These aspects were influenced by a variety of factors unique to the organization, including its staffing and training strategy, the experience and competency of existing inspections staff, and the availability of appropriately experienced and skilled individuals in the work force. For this reason it is apparent that a single syllabus for Seveso inspectors in all Member States would not be possible or desirable.
- Basic training, and especially on the job training, are considered essential. Seveso inspection programmes generally consider that Seveso inspectors must have some form of basic training as a foundation for their work. Training on the job is considered a critical element of training by all inspection programmes. In contrast, the emphasis on coursework and the content of courses offered as basic training varied considerably across countries and inspectorates.



**Table 4. Summary of the Various Approaches to Seveso Inspector Training in Europe**

| Type of Training  | Structure  | Content  | Duration  |
|-------------------|--|--|---|
| Basic training    | On the-job training is an essential component in most countries. In addition, many countries have established specific courses. In some authorities, a test or series of tests must be passed.   | At a minimum, courses usual cover the legal system, regulatory obligations, enforcement and inspections strategy. Additional content varies considerably from country to country.  | Considerable variation starting with a minimum of a week up to 6 months in some countries. On-the-job training ranges from a few months to a year.  |
| Periodic training | Very broadly defined. Can include formal training programmes and courses as well as ad hoc professional development opportunities organised locally as well as internationally. Formal courses on specific topics as well as exchange of good practice and lessons learned are included in this definition. Several countries regularly organize joint training for all its Seveso inspection authorities. | Focus varies with time and inspection objectives, but generally tends to be either improving technical or administrative skills, or updating regulatory knowledge. Some authorities link inspector grades with the amount and type of training completed. Needs and strategy related to maintaining competency in specialised areas of industrial safety also influence training objectives. | Usually ranges from 1-2 days to a couple of weeks per year. In some countries training is fixed for a specific number of days each year, but in many countries it depends on the need and availability of training opportunities. |

- Periodic training is also highly valued but definition and content of such training varies even more than basic training across authorities. Local influences play an even more critical role in determining the nature and content of periodic training. Resources in particular may influence the frequency and systematic structuring of periodic training opportunities. In addition, the objective of inspections and other roles played by inspectors (e.g., review of safety reports) and inspection/accident experiences will strongly determine content. Periodic training priorities may be influenced by a perceived need to maintain or improve co-ordination and consistency with other authorities internally and externally.
- Seveso inspectors generally view professional development as a combination of specialised training, good practice and lessons learned exchange, and improvement of general professional skills. The desire to improve “technical skills” was expressed by a majority of participants (when combining both generic and specific responses). Where such skills were specifically identified risk assessment, process safety and plant operations topped the list. Legal, communication and administrative skills were also highly valued by a wide number of participants as well as training on overall inspection strategy.
- National and international seminars and conferences to exchange good practice and lessons learned were considered valuable learning resources. In addition to participation in international events such as the EU Mutual Joint Visit workshops and IMPEL conferences, several countries host national events and have established national networks of inspectors. Survey responses were particularly strong in emphasizing the value of any opportunity to exchange information with other Seveso inspectors.

**ANNEX 1: EXAMPLES OF TRAINING SYLLABI OF THREE DIFFERENT SEVESO INSPECTORATES<sup>3</sup>**

The following documents were kindly provided to us by various Seveso inspectorates participating in the competency and training workshop.

**A. BASIC TRAINING PROGRAMME – FPS EMPLOYMENT, LABOUR AND SOCIAL DIALOGUE BELGIUM - SUMMARY**

1. Organisation and functioning of the department
2. Introduction to labour safety and process safety
  - Legal context labour safety
  - Legal context Seveso
  - Legal context classification and labelling of dangerous substances
3. Introduction to the expertise domains
  - 3.1. Typical process installations
    - Warehouse storage
    - Flammable liquids
    - Liquefied flammable gases
    - Reactors
  - 3.2. Layers of protection (highlights = major parts)
    - Fire safety of buildings and process installations
    - Corrosion phenomena
    - Pressure relief systems
    - Pressure equipment
    - Explosion protection
    - Glassware
    - Human factors

---

<sup>3</sup> Please note that these examples reflect the situation in 2010 and curricula may have changed since then.

- Safety instrumented systems
- Pipelines
- Emergency planning
- Storage tanks
- Pumps and compressors
- Risk analysis for process installations

### 3.3. Dangerous work

- Isolated work
- Confined spaces
- Organisation of shutdowns
- Contractor work
- High pressure work
- Working on height
- Work permit system

### 3.4. Safety management systems

- Risk based inspection
- Safety management systems (general)

### 3.5. Labour safety domains

- ...

## 4. Practice

### 4.1. Accident investigation

### 4.2. Evaluation of safety report

### 4.3. Performing systematic seveso inspections

B. AN EXAMPLE OF IN-HOUSE TRAINING PROVIDED BY HSE'S HAZARDOUS INSTALLATIONS DIRECTORATE (HID) FOR INSPECTORS OF SEVESO SITES IN THE UK<sup>4</sup>

|                 |   |  |
|-----------------|---|--|
| Level 1 Courses |   |  |
| HID A           | Introduction to HID and Hazardous Installations | A basic introductory course for all inspectors new to HID  |
| Level 2 Courses |   |  |
| HID U           | Principles of Regulation in HID                 | Introduction to the principles of regulation at major hazard sites for new inspectors and some administrators  |
| HID B           | Principles of Process Safety                    | Provides regulatory inspectors with an understanding of the hazards posed by flammable/explosive liquids, gases, vapours and dusts and the measures necessary to control or mitigate the risks |
| HID C           | Principles of Human Factors                     | Provides regulatory inspectors with the knowledge and tools to help them address a range of significant and commonly encountered human factors issues  |
| HID D           | Principles of Major Hazard Risk Assessment      | Provides regulatory inspectors and non-Predictive specialist inspectors with an understanding of the techniques commonly used by HID and industry to identify hazards and assess risks         |

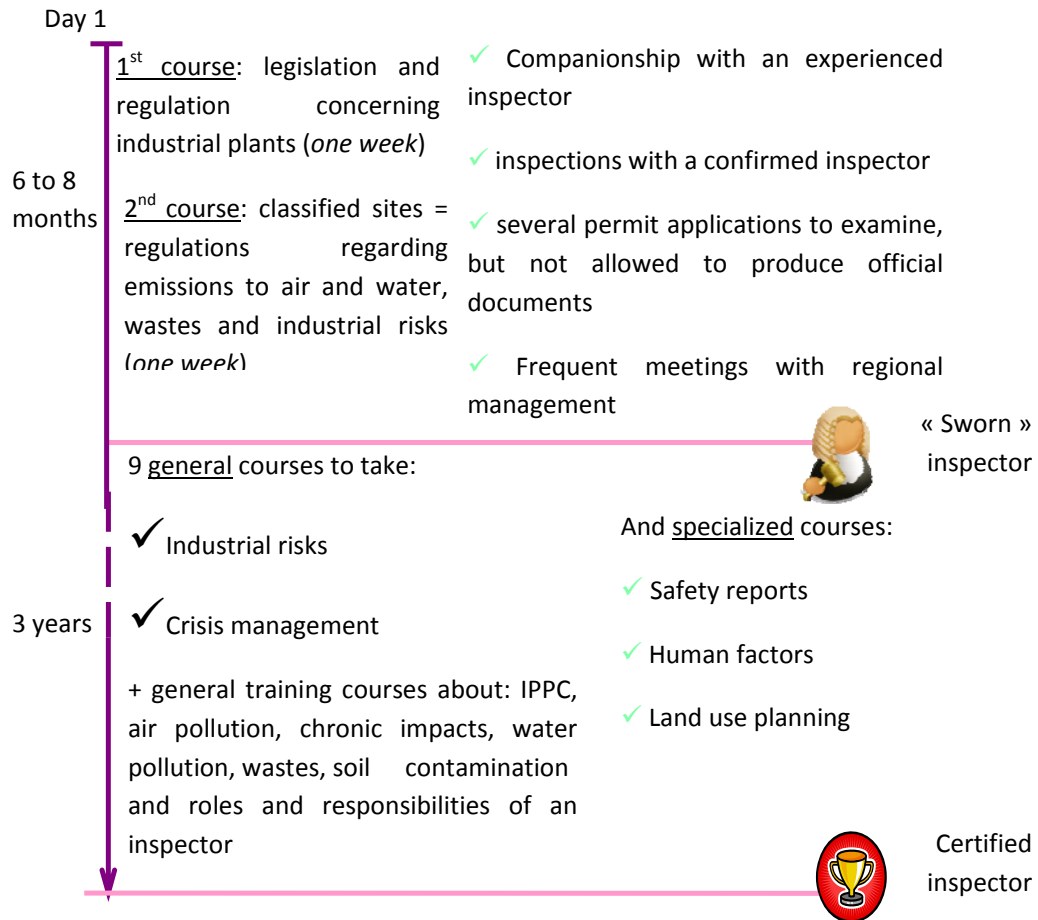
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<sup>4</sup> Please note that this example is representative only and that such technical training is only part of the training of an HSE Seveso inspector. Typical training may also have changed since 2010.

|                 |   |  |
|-----------------|---|--|
| HID E           | Introduction to Basic Chemistry, Unit Processes and Plant | Provides regulatory inspectors (and some specialists) with a basic knowledge of chemistry, chemical processes and process plant  |
| Level 3 Courses |   |  |
| HID F           | Control and Instrumentation on Process Plant              | Provides regulatory inspectors (and some non-C&I specialist inspectors) with an understanding of process control systems and safety instrumented systems in chemical, petrochemical and oil and gas production process plant |
| HID G           | Assessing Health and Safety Management                    | Training for regulatory and specialist inspectors in techniques for the inspection of health and safety management   |
| HID H           | Project Skills for Assessment Managers                    | Provides regulatory inspectors with effective project management skills, for use in their role as safety report assessment managers  |
| HID I           | COMAH Emergency Response                                  | Provides inspectors with the skills and knowledge needed to assess the effectiveness of emergency plans and emergency response arrangements at upper tier COMAH establishments   |
| HID L           | Analytical Investigation Methods (AIMS)                   | Since replaced by an HSE-wide AIMS course  |
| HID N           | Personal Protective Equipment                             | Provides inspectors with practical knowledge of PPE, to enable them to assess the adequacy of arrangements for its selection, use, storage and maintenance   |
| HID             | Confined Spaces/Permit-to-Work                            | Provides inspectors with training in the maintenance of health and   |

|          |                                |  |
|----------|--------------------------------|--|
| O        |                                | safety in confined spaces and in permit-to-work systems in the chemical and oil & gas extraction industries  |
| HID<br>Q | Process Safety Standards       | A follow-up course to HID B (Principles of Process Safety), to equip regulatory inspectors and non-process safety specialists with knowledge of enforceable standards for process safety hazards |
| HID<br>T | COMAH Safety Report Assessment | An introduction to assessment processes and procedures for all inspectors involved in the assessment of COMAH safety reports   |
| HID Z    | Refinery Inspection            | Equips inspectors to target, plan, manage and undertake effective interventions at petroleum oil refineries  |

## EXAMPLE C. TRAINING CURRICULUM FOR SEVESO INSPECTORS IN FRANCE





**ANNEX 2: SURVEY OF COMPETENCY AND TRAINING OF SEVESO INSPECTORS**

Country: \_\_\_\_\_  
 Organisation: \_\_\_\_\_ (optional)

**Competency and Training of Seveso Inspectors - Opinion Survey**

*This survey is a questionnaire aimed at obtaining the opinions of Seveso inspectors on the status of current competency and training of Seveso inspectors for performing effective and efficient inspections. It is also designed to solicit views concerning actual training needs based on your experiences and suggestions in regard to improving current training opportunities. Responses will be used to develop ideas concerning potential tools and guidance for competency and training for Seveso inspectors.*

1. Briefly describe your role in Seveso inspections

*Check all that apply:*

- I am an inspector of Seveso sites.
- I have inspection responsibilities not related to Seveso. If so, Please name then (environment, occupational safety, etc.) \_\_\_\_\_
- My authority is an inspection division with lead responsibility for Seveso inspections
- My authority is an inspection division which shares responsibility for Seveso inspections (but not lead responsibility)
- I manage a department with inspection responsibilities
- I am not directly involved in inspections. My main responsibilities are related to the policy aspects of inspections.
- Other. Please describe. \_\_\_\_\_.

Please provide any additional comments to clarify your answer(s) above.

2. Has your organisation established specific competency criteria or profiles for hiring new inspectors? If so, kindly summarise the criteria below (to the best of your knowledge).

3. In your opinion, what competencies are essential or preferable for inspecting Seveso installations in an efficient and effective manner? (e.g., professional qualifications, type(s) of degrees or certifications, relevant experience, communication skills, computer or administrative skills, etc.) *You may wish to identify which qualifications are “essential” and which are “preferable”.*

4. In your opinion, what areas are priority topics for training of Seveso inspectors given their current responsibilities and challenges? *Your answer may include any kind of training you consider appropriate for your job (e.g., technical, administrative, managerial, language, computer topics, etc.); however, please be specific about the subject area of interest.*

5. What kind of basic and periodic training does your organisation offer for Seveso inspectors?

Basic training for new inspectors?

*(Please include the frequency and duration of the training in your description).*

Periodic training?

*(Please include the subject and type of training in your description.)*

6. Describe any changes you would propose to improve your organisation's training programme, if any.

7. Do you, or does your organisation, experience difficulty in finding training courses or materials for your needs? If so, in what topic areas?

8. Please describe any resources or other opportunities that have been useful for your professional development as a Seveso inspector (e.g., guidance documents, websites, conferences, meetings, etc.)

---

*This space is available for additional comments or to complete responses to survey questions.*

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