

Inspections On Process Industry During The Pandemic: The Safety Management System Continuity

Romualdo Marrazzo, Fabrizio Vazzana

ISPRA (Italian National Institute for Environmental Protection and Research), Roma, Italia

Abstract

The article is aimed at representing the activities of enforcement and monitoring industrial sites, carried out during the COVID period, with reference to the inspections on SMS (Safety Management System) of process industry establishments subject to the obligations of Legislative Decree 105/2015 (transposition decree of Directive 2012/18 / EU, so-called Seveso III). Starting from the problem of conducting inspections during the pandemic, it explains the alternative method introduced by the Italian Competent Authorities to ensure the continuity of the activities, in compliance with the standard procedure. It consists of performing some phases remotely, identifying what can be done through documentary examination and what must be done on site. Information on the status of the establishments in pandemic conditions are given, with a focus on process industry case studies as crude oil extraction/process centre and oil refinery (considered strategic activities by the Italian legislation enacted during the pandemic). The management continuity of operational activities was ensured, with no interruptions to processes and no changes to significant SMS procedures (i.e. confirmation of the implementation of the measures provided for in the emergency plan). In addition, company measures for the prevention and containment of the virus diffusion are listed, in terms of work reorganization measures for operational staff and non-operating personnel, as well as access procedures at the site and contrast and virus containment in application of COVID-19 protocol and "Contingency Plan", in agreement with the workers' unions. The paper ends with the lessons learned from the inspection's activities, with attention to non-compliances issued concerning the respect of frequencies for training, the contents of training activities carried out in "remote" mode, the consultation with worker representatives and the compliance with timing/frequency of maintenance activities. The strengths and benefits of the new inspection method is at last explicit, thus allowing the continuation of the control activity to be ensured.

Keywords: safety management system, inspections, covid, continuity, monitoring, remote, process industry

1. Introduction

The article is aimed at representing the activities of enforcement and monitoring industrial sites, carried out during the COVID-19 period (TWG 2. 2021), with particular reference to the inspections on SMS (Safety Management System) of process industry establishments subject to the obligations of Legislative Decree – D.Lgs. 105/2015 (Italian transposition decree of Directive 2012/18 / EU, so-called "Seveso III") (GU. 2015). The health emergency from SARS-CoV-2 has resulted in limitations in carrying out on-site inspections on the national territory. Starting from this problem, National Institute for Environmental Protection and Research (ISPRA - Istituto Superiore Protezione e Ricerca Ambientale), National Fire Brigades (CNPVF – Corpo Nazionale Vigili del Fuoco), Institute for Accident Prevention and Safety at Work (INAIL – Istituto Nazionale Assicurazione Infortuni sul Lavoro) and Ministry of Environment, in compliance with the standard procedure given in the D.Lgs. 105/2015, have introduced an alternative method for ensuring the continuity of the SMS inspections activities (CNPVF-MI. 2020).

It gives the possibility of performing some phases remotely, identifying what can be done through documentary examination and what must be done on site, with possible completion of documentary analysis. The work carried out has made it possible to develop this specific procedure starting from important references of international bodies and institutions, such as CCPS (CCPS. 2020), OSHA (OSHA. 2020) and others (SEPA. 2020).

2. Overview of legal requirements concerning the Seveso III directive

The D.Lgs. 105/2015, the Italian transposition decree of the Seveso III Directive, is aimed at the prevention of major accidents involving dangerous substances. The D.Lgs. 105/2015 covers establishments where dangerous substances may be present (e.g. during processing or storage) in quantities exceeding certain thresholds. Operators of the establishments are obliged to take all necessary measures to prevent major accidents and to limit their consequences for human health and the environment.

Depending on the amount of dangerous substances present, establishments are categorized in lower and upper tier, with different obligations. The requirements include, among others: notification of all concerned establishments; deploying a Major Accident Prevention Policy (MAPP) through the implementation of a Safety Management System for Prevention of Major Accident (SMS-PMA); producing a Safety Report (SR) for upper-tier establishments; producing an Internal Emergency Plan (IEP) for upper tier establishments; providing information in case of accidents.

In Italy, based on the information in the inventory of establishment notifications, there are about 1.000 Seveso sites, subdivided into 50% of upper tier and lower tier establishments.

Main typologies of Seveso establishments, as indicated in the Figure 1 (MATTM, ISPRA. 2018), are:

- chemical & petrochemical plants
- LPG storage depots
- electroplating works
- mineral oil storage depots
- explosive & fireworks production and storage
- other typologies: refineries; natural gas underground storages; thermopower plants; industrial gases production and storage; steel and metal plants; agrochemicals depots; alcohol distillation plants; toxic depots.

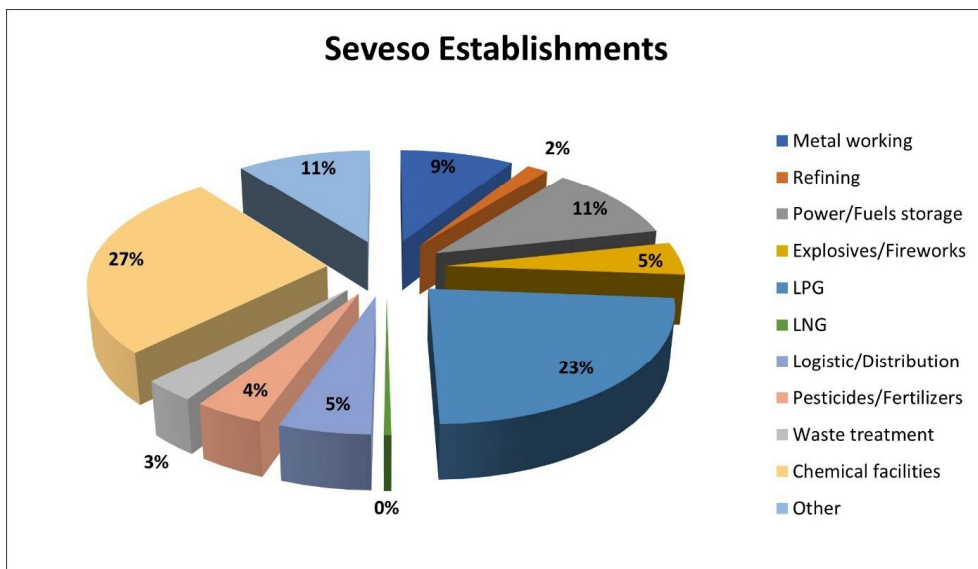


Fig. 1. Main typologies of Italian Seveso establishments.

3. The inspection activity on the SMS of industrial sites

Safety management in industrial companies is a key responsibility that ensure effective oversight of local hazards (Ferjencik, 2020). According to Bragatto et al. (2015), practitioners, including inspectors and auditors, are well aware of the challenges associated with implementing a safety management system in organizations.

The SMS-PMA inspections are carried out by a Commission, made up of three members belonging to National Institute for Environmental Protection and Research (ISPRA - Istituto Superiore Protezione e Ricerca Ambientale),

National Fire Brigades (CNVVF – Corpo Nazionale Vigili del Fuoco) and National Workers’ compensation Authority (INAIL – Istituto Nazionale Assicurazione Infortuni sul Lavoro), to verify the suitability of the operator MAPP carrying out a planned and systematic examination of the systems being employed at the establishment, whether of a technical, organisational or managerial nature.

The scope of the inspections is:

- Verify the compliance of the Major Accident Prevention Policy Document with the required contents
- Verify the compliance of the Safety Management System with the structural requirements and required contents
- Verify the implementation of the major accident prevention policy
- Verify the compliance of the technical, organizational and management systems adopted for the prevention and mitigation of major accidents, by ascertaining the actual functionality of the SMS and its implementation methods
- Ascertain the level of awareness and involvement of the subjects who carry out functions or activities relevant to safety, at each level of the SMS-PMA, of their role and the actions to be taken

Two fundamental legislative instruments are relevant:

- D. Lgs. 105/2015 – Allegato B “Linee guida per l’attuazione del Sistema di Gestione della Sicurezza per la prevenzione degli incidenti rilevanti”. In this annex information about MAPP and SMS structure are given: technical contents, deepness, training activities. The state of the art is also cited: UNI 10617 (UNI10616), ISO 45000-ISO14000-EMAS (only aspects of Major Accident Prevention)
- D. Lgs. 105/2015 – Allegato H “Criteri per la pianificazione, la programmazione e lo svolgimento delle ispezioni”. It gives criteria and procedures for conducting inspections, including formats (checklist, operational experience, critical systems) for SMS-MAPP inspections. There are also simplification of some items for establishments with high standardization (depots, storage sites, transferring, etc.).

During an inspection, the commission must verify the implementation of the SMS through the following elements:

- Operational experience cards: recording of events that occurred at the establishment and similar establishments over the last 10 years
- Inspection Checklist: verification of SMS elements, and in particular: Major Accident Prevention Policy; Organisation and personnel; Identification and evaluation of major hazards; Operational control; Management of change; Planning for emergencies; Monitoring performance; Audit and review
- Events – measures table: events analysed in risk analyses, highlighting prevention and protection systems

The main findings of an SMS inspection are identified between:

- Minor non-compliance: evidence of formal aspects not adequately fulfilled (for example, the requirement for a standard adopted voluntarily not completely satisfied, due to lack of adequate supporting documentation, an element of the SMS adopted by the operator but without adequate documentation to support it, etc.).
- Major non-compliance: evidence of substantial non-compliance with legal requirements, technical standards taken as reference for the SMS or corporate standards. A minor non-compliance not corrected (for example, identified during the last inspection and not taken into consideration by the operator), may also become a major non-compliance during the subsequent inspection.

4. The new SMS inspection procedure

4.1. The new phases of inspections

The new procedure for carrying out SMS inspections on Seveso establishments, as shown in Figure 2, consists of three phases:

- Phase I – Preparing the inspection.
- Phase II – Starting the inspection.
- Phase III - Conclusion of the control activity.

The Phase I of the inspection is preparatory, through the acquisition of documentation in relation to the establishment to be inspected.

The information necessary for carrying out the inspection is acquired by the Inspection Commission at least through:

- The acquisition of documentation relating to the state of the establishment from the Competent Authorities (CA).

- The acquisition of the format provided by the D.Lgs. 105/2015 for the Seveso inspection (check list, sheets for operational experience analysis, events-measures table for critical systems analysis).
- Any further documentation relating to the establishment relevant for the activities to be carried out.

The Commission proceed to the preliminary technical examination of the documentation sent by the site operator, through certified e-mail, identifying in advance, in preparation for Phase II, the points on the inspection checklist and any additional aspects that can be checked by means of a documentary examination and/or require a specific on-site check.

This is a phase in which the Commission prepares the activities, acquiring the establishment documentation and communicating to the operator the inspection procedure and start. There is a pre-analysis consisting in the identification of 'documentary' checklist points and points to be checked on site; then, there is a first verification of the 'documentary' points, identification of those to be investigated with the operator in phase two.

The Phase II consists of document review and analysis activities on operational experience and points of the inspection checklist, which must consider the documentary evidence, requested from the site operator and acquired via certified mail.

The analysis of the critical technical systems takes place with the examination of the inspection checklist for "operational control" and "emergency planning" and will subsequently consider the functionality tests to be carried out during the on-site visit.

The document verification is carried out remotely via videoconference (VdC).

It is an important moment of comparison with company:

- For the necessary clarifications / insights on the data acquired
- For joint analysis of the operational experience sheets, check-list and events-measures table
- Identification and planned examination of the technical, organizational and management systems applied in the establishment.

In this second phase, the on-site inspection is planned and first conclusions are given, in terms of:

- Identification of specific points to be verified on-site
- Organization of on-site inspections
- Discussion with H&S (Health & Safety) Manager and occupational physician
- Minutes of activities carried out in VdC
- Preliminary drafting of the Inspection Final Report (IFR)

After that, the inspection proceeds with the on-site visit and collection of all the evidence to complete the document verification, also through specific and targeted actions, including the acquisition of further documentation.

It is possible to summarize this last phase through:

- Clarifications and additions through "in presence" meeting with the Operator (a/o its representatives).
- Interviews with workers representatives, occupational physician, internal staff and subcontractors.
- Inspection on plants and equipment and relative state of places, preparation of emergency simulations and drills, functional tests of the technical systems, feedback on technical-plant-management systems.

The inspection in the field and the presence in the plants are carried out for the minimum necessary time.

Remotely it is possible to write one or more minutes that summarize the activities carried out.

For the on-site visit, as far as foreseeable, a sufficiently detailed preventive plan will be drawn up on a time basis of the on-site activities to be carried out "in presence" (at the corporate meeting room).

In analogy to what is already provided for in the normal procedure, all the findings emerged during the inspection (both relating to the documentary analysis and the on-site inspection) must be brought to the attention of the Operator at the time of their acknowledgment and reported in the IFR together with the documentary references, in order to adequately justify any non-compliances. In particular, the Commission must ensure that non-compliances are documented clearly and concisely and are supported by evidence.

Once the documentary examination and on-site inspection activities have been completed, in the Phase III the drafting of the inspection final report is completed, after which the non-compliances found are exposed to the site operator in a final meeting via videoconference, making sure these are clearly understood.

The drafting of one or more minutes takes place remotely where, in summary, the activities carried out are reported. In any case, the last minute states the completion of the activities and the communication to the site operator of the inspection results with evidence of the non-compliances found.

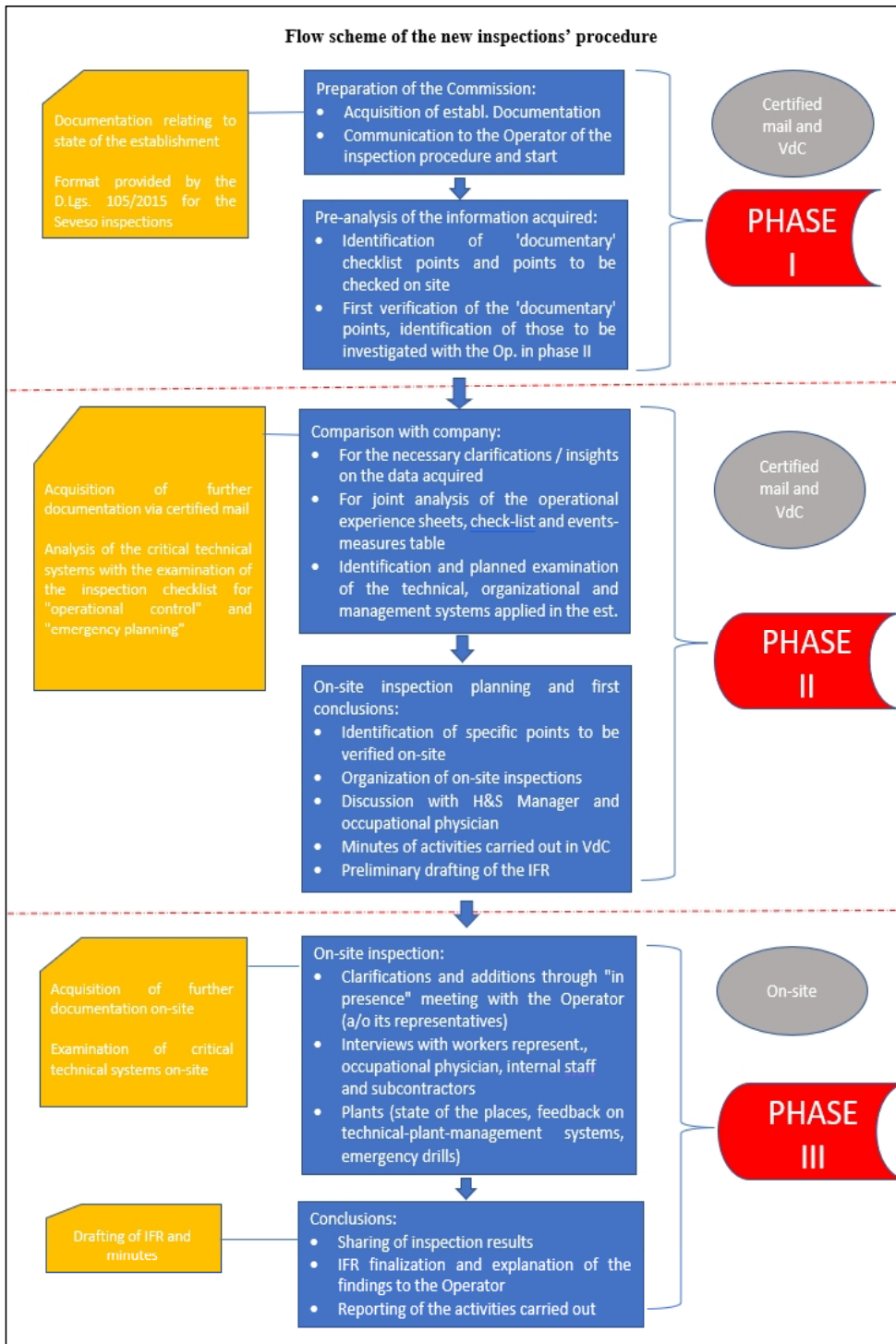


Fig. 2. Flow scheme of the new inspections' procedure.

4.2. Additional commitments and further information needed

The site operator must ensure the possibility of being able to carry out these activities "in presence", through the adoption of specific measures for the prevention and containment of the spread of the SARS-CoV-2 virus.

He must provide preliminary information, to the Inspection Commission, for accessing and staying in safety in the environments identified for carrying out the control activity, in accordance with the legislation and protocols provided.

The commission requests in advance further information on the status of the establishment in pandemic conditions, and in particular indications of any changes or additions to the procedures of the SMS according to the situation that has resulted:

- in relation to any work reorganization measures adopted and to the possible review of training activities, also with reference to the obligations established by current legislation.
- relating to the risk assessment associated with any non-operational status or reduced operation of the plants, also linked to the presence of dangerous substances.
- relating to the management of maintenance activities according to the planned schedule.
- in relation to the management of maintenance activities of the critical technical systems, as identified in the risk analysis.
- in relation to the Internal Emergency Plan and its implementation, with reference to the events to be managed in any situations of limited availability of personnel or absence of personnel (surveillance activity).
- regarding the composition of the emergency response team.

5. Case studies from process industries

5.1. Information on the status of the establishment in pandemic conditions

Based on experiences taken from inspections activities conducted in the pandemic period on process industries belonging to the refining sector as crude oil extraction/process center and oil refineries, that are considered strategic activities by the Italian legislation enacted during the COVID period (GU. 2020) and are a significant portion of the Italian production reality (as indeed indicated in the previous Figure 1), information on the status of these establishments are given.

There were no interruptions to production processes or work activities, through a general continuation of operational activities of the plants.

No consequences on the accident scenarios hypothesized in the Safety Report with the subsequent confirmation of the implementation of the measures provided for in the Internal Emergency Plan. In fact, the presence of figures with roles in the Internal Emergency Plan is constantly guaranteed according to the responsibilities identified.

It is therefore guaranteed the daily compositions of the emergency teams on the site, according to the scenarios taken from the Safety Report.

The management continuity of the establishment activities was ensured, with no interruptions to processes and no changes or additions to significant SMS procedures have been adopted.

On the other hand, the documentation in compliance with the "safety at work" legislation has been updated, due to the new mode of staff presence on site. The only reduction of presence of personnel and activities carried out was that of third-party companies.

However, it is possible to state that the activities connected with the safe operation of plants were ensured.

5.2. Companies measures for the prevention and containment of the virus diffusion

The companies have foreseen work reorganization measures for operational staff and non-operating personnel.

The production operational staff, operating on 3 shifts of 12 hours, reorganized on shifts of 12 hours, with the reduction of daily alternation in the plants and minimization of daily shift changes. The site operators proceeded to the identification of homogeneous groups of shift workers (organized in teams), isolated at home, as reserves in the event of infections of the groups remaining in shift.

For non-operating personnel, the implementation of the teleworking method (smart working) is planned extended to management, executives, day workers (60% of the workforce).

The companies implemented new access procedures to the site with dedicated entrance and exit routes, maintaining 1 m for the personnel, after controls through thermal scanner (no entry if temperature > 37.5 °C).

Organizational measures have been organized at the plants, such as the separation of the changing area in the locker rooms, the diversification of access times to company canteens.

Regarding closed environments, sanitization was carried out and surgical masks were distributed with the implementation of a specific procedure for maintaining their characteristics. Last but not the least, face-to-face meetings (“in presence”) were avoided by using videoconferencing.

The site operators finally issued measures for contrast and containment of the virus in application of COVID-19 protocol and “Contingency Plan”, in agreement with the workers’ unions, consisting of:

- Management of potential asymptomatic positive cases.
- Tracking close contacts in the company site.
- Carrying out screening for detection of potential cases of positive infection and prevention of possible infections.
- Possibility of “quick swab” for entry into the plant a/o for personnel from abroad (in case of multinational companies).
- Ability to house staff, for the entire duration of the shift rotation a/o quarantine, at accommodation facilities in the nearby area (in case of multinational companies).

5.3. Information on the main findings that emerged from inspections

In the Table 1 is summarized the main information regarding the activities conducted, in terms of non-compliances that emerged, according to the definitions of the D.Lgs. 105/2015 and mentioned in the previous par. 3 (Minor Non Compliance-mNC; Major Non Compliance-MNC), of a qualitative-quantitative nature.

Table 1. Information regarding the non-compliances of inspections.

SMS-PMA element	Establishment typology							
	Crude oil extraction/Process center n. 1		Crude oil extraction/Process center n. 2		Oil refinery n. 1		Oil refinery n. 2	
	mNC	MNC	mNC	MNC	mNC	MNC	mNC	MNC
Major Accident Prevention Policy	×	×	×		×	×	×	
Organization and personnel	×	×	×	×	×		×	
Identification and evaluation of major hazards	×				×			
Operational control	×	×	×		×			
Management of change	×		×		×			
Planning for emergencies	×	×	×	×	×		×	
Monitoring performance	×		×		×			
Audit and review	×				×			

6. Conclusions

On the basis of what is indicated in par. 5.3, it is possible to highlight some lessons learned and result of experience from the SMS inspection’s activities carried out, with attention to non-compliances issued concerning the management continuity during the pandemic, such as:

- Respect of time frequencies for training and update sessions.
- Explanation of the contents of training activities carried out in "remote" mode, with a final verification session (“in presence”).
- Consultation with worker representatives on mandatory documentation required by the D.Lgs. 105/2015 (MAPP – Major Accidents Prevention Policy, training program, IEP).
- Compliance with the timing and frequency of inspections on some critical technical systems, performed by staff of third-party companies.
- Checks and controls subject only to actual exercise.

The new inspection method for the SMS inspections ensured the continuation of the control activity on Seveso sites during the health emergency from SARS-CoV-2.

It is important to make explicit the strengths and the benefits of the new procedure, allowing for a complete preliminary document check with a consequent push towards dematerialization.

In addition, the bigger number of remote meetings with manager and company representatives (4/5 days) compared to the previous activities carried out only on-site (in the companies meeting rooms) has given more time available for drafting the final inspection report.

The minimization of site visits and reduction of face-to-face meetings (only 1/2 days on-site) has therefore guaranteed safety and health protection in compliance with the COVID-19 protocols, with at least economic and human savings for Public Administration and companies too.

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