**Technological risks, Major Incidents**

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| **Reminders of this module's objectives:**  At the end of the module, participants:   * Will know what the technological risks are * Will know the main accidentology of the Total Group and oil sector * Will have understood what lessons the industry (and the Total Group) drew from major incidents * Will have understood that technological risk and workstation risk are not directly linked |

This document is the trainer guide. You can follow it because it contains all of the elements that will enable you to lead such a module, namely the instructions for exercises, accompanying Powerpoint references and/or various resources such as films, e-learning, etc., the questions to ask participants, the exercises to be completed if necessary.

**Estimated duration:** 1 hour 15 minutes

**Teaching methods:** In-class presentation.

**Prerequisites:** none

**Important points for preparing the sequence:**

Before beginning this module, we recommend you ensure:

* That the “Industrial catastrophes” and “Piper Alpha” films are available.

**Welcome the participants:**

Welcome to this module.

To start with, let's look together at the objectives of this module and how it is rolled out.

**Show slide 2.**

**Ensure that the contents are clear to everyone.**

**5 minutes** **00:05**

**Sequence 1:**

***The aim of the sequence:*** *participants should understand what a technological risk is and be aware of its specificities compared to workstation risks.*

During this sequence, we will see what the term “technological risk” means and the difference compared to workstation risk.

Let us start with a quiz. From this list, could you give examples of the consequences (on people, facilities, the company and neighbors) in these cases?

**Show slide 3.**

**Let participants answer.**

**After 3 minutes, scan the slide again, asking participants to give their answers. Once an answer is given by a participant, ask the others if they are in agreement. In the event of disagreement, ask each person for their reasons.**

To sum up, if you had to separate them into 2 main categories, that would you choose?

**Let participants answer.**

**Steer the participants onto the idea of severity (impacts many elements in one fell swoop, and with a potentially significant scope) and the concept of the frequency of these types of incidents (how many times have you heard someone talk about it or how many times has it occurred?).**

**Show slide 4 as the answer.**

**Specify: that for technological risk, this involves catastrophic accidents, but that these rarely occur on an industry level.**

**Concerning workstation risk: this involves accidents of a relatively moderate severity, but that occur relatively often in the life of a site/subsidiary (cuts, sprains, nips, breaks, etc.)**

**Add:**

Technological risk is very specific to the oil and gas industry. It is this kind of risk which has led to the industry's major incidents during last few decades.

To continue, let's list examples of each type of risk together. Who can tell us what type of risk this corresponds to?

**Let the participants answer. Pay close attention to the answers to ensure that the classification is correct.**

**10 minutes** **00:15**

To illustrate examples of catastrophes (technological risks), i.e. a significant but quite infrequent impact, let us take a few minutes to watch the following film.

**Show the film (slide 5).**

**When the film is finished, discuss with participants.**

What are your impressions on the catastrophes we have just seen?

What common points can you note between these catastrophes?

**Let the participants give their answers, and establish the link with infrequent technological risks that have catastrophic consequences.**

Let us go into a little more detail on the dangerous phenomena at the source of these incidents.

**Show slides 6 to 12, then ask whether a participant can describe any of these phenomena.**

**Review each phenomena up to slide 12 to establish the link between these phenomena and the major incidents seen previously.**

**(The aim is for participants to recognize the various types of phenomena.)**

To reinforce what a major incident is, we will look at one in its entirety. This is the Piper Alpha catastrophe, an explosion on an oil platform in 1988. This kind of event is known as major or technological. It is of course rare, but has catastrophic consequences.

**Show the film, slide 13.**

**Stop at 22 minutes.**

**Once stopped, ask:**

How do you feel about this catastrophe?

We already spoke about the characteristics of the major risks (rare but with significant consequences). Which errors were you able to identify on this one in particular which lead to such disastrous consequences?

***Answers: communication issues, lack of adherence to procedures, occupants not ready to cope with the emergency, responsibility of neighboring platforms, the boat seemed unable to cope with this kind of emergency, etc.***

**Thank participants and establish the link with the next sequence:**

These catastrophes pushed the oil industry, including Total, to make changes so that such catastrophes would never happen again.

**35 minutes** **00:50**

**Sequence 2:**

***The aim of the sequence:*** *participants should understand that changes were brought about in the oil and gas industry as a result of major incidents.*

Let us now look at the operational consequences of these major incidents and how to prevent them.

In your opinion, following Piper Alpha, a major event, how should such an event be taken into account to prevent it from happening again?

**Let them answer.**

**(expected answers: stricter regulations/standards, stricter national regulations, better communication protocols, more reliable computer systems, etc.).**

Within the Total Group, each incident is subject to investigations and measures are determined to ensure that a similar event does not reoccur.

On a national, European and international level, the authorities are also moving in this direction, in particular in terms of legislation, see the example **in France and Europe**.

**Show slide 14 and give participants a little time to read it.**

**Run through it incident by incident (those involving the Group in black), specifying the consequences and the lessons learned:**

* + - * + **Feyzin (1966): explosion of liquefied gas spheres in a refinery (BLEVE). 18 deaths/84 casualties. Consequence: stricter regulations for refineries.**
        + **Seveso, Italy (1976): toxic cloud of dioxin, serious environmental consequences and poisoning of 193 people (no deaths). Consequence: this incident, which has since given its name to all the** [**high-risk production sites**](https://fr.wikipedia.org/wiki/Directive_Seveso) **in Europe (only 1249 in** [**France**](https://fr.wikipedia.org/wiki/France)**), exposed the dangers of industrial chemical** [**activities**](https://fr.wikipedia.org/wiki/Industrie) **in urban areas.**
        + **La Mède (1992): explosion in a refinery (gas leak). 6 deaths, plant destroyed. Lawsuit in 2002 - 5 rulings. Consequences: protection for control rooms, more stringent inspections on pipe systems, Safety management.**
        + **Erika (1999): significant oil slick (heavy fuel) following the shipwreck of a tanker in a storm. Intense media impact, TOTAL prosecuted. Consequence: “transport risk” taken into account and vetting regulations, crisis communication.**
        + **AZF Toulouse (2001): ammonium nitrate hangar explosion. 30 deaths - largest industrial catastrophe in France since the war. AZF and the plant manager prosecuted (but ruling overturned). Legislative consequences, town planning, probabilistic studies.**
        + **Buncefield, U.K. (2005): explosion then fire at an oil depot (gasoline spillage). No victims but damages > 1 G€. Loss of the subsidiary. Consequences: revision of our internal standards for depots, tightening of the regulations in Europe**

Following these incidents, this awareness has brought about major changes, on a Group level, to the approaches to risk control over the last 20 years:

* Major changes in the design of facilities from the 1990s
* The implementation of management systems since the 2000s
* Emphasis on taking the behavior of individuals into account over the last 10 years

**Show slide 15, commenting on the 4 arrows.**

* **First and foremost, a formalization and constant reinforcement of the regulations**
* **Followed by the implementation of a management system which goes beyond the regulations on safety organization, responsibilities and operation.**
* **Campaigns focusing on the behavior of people, beyond compliance with regulations.**
* **Followed by systems that use previous experience so as not to reproduce the same errors, or, on the other hand, to profit from the positive feedback of others. Emphasize the feedback that enables the internal regulations to evolve.**

**10 minutes** **01:00**

**Sequence 3:**

***The aim of the sequence:*** *participants should understand that the technological risks were measured from the number of HiPos (High Potential Incidents).*

In terms of HSE performance indicators, you are already aware of the TRIR. Who can remind us how it is calculated?

**Let the participants agree on the calculation method then synthesize:**

This indicator is actually based on a number of incidents.

Do you think the major incidents are entered into the TRIR?

**. Let the participants answer (the answer is yes) then show slide 16 with the following comments:**

- If major incidents are considered, measuring just their number per millions of hours worked loses its meaning because the incident is drowned by the numbers. That is why specific indicators are introduced and controlled.

- In particular, we can study the events included in the HiPo category (non-major event, but with a high potential for consequences).

Thank everyone for attending.

**15 minutes** **01:15**