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# ISO 14001: identifying and evaluating environmental aspects

*We at SCCM are convinced – and our experience has proven – that any organization, large or small, will achieve better environmental performance by using the ‘plan-do-check-act’ approach outlined in the ISO 14001 standard.*

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# ISO 14001: Identifying and evaluating environmental aspects

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# I Introduction

The purpose of this document is to provide a better understanding of how to give shape in practice to the 'environmental aspects' element (identifying environmental aspects and determining which aspects can have a significant impact, section 4.3.1 of the standard) when implementing an environmental management system following the ISO 14001 standard. The document is intended as an **aid; organizations can choose whether to use the suggestions in it or not.**

This document contains two sample situations that illustrate the process. SCCM has a separately available publication, 'Holland transport' (currently in Dutch only), which shows an environmental management system worked out for one small company. The core idea is that an organization has to know where it is influencing the environment, in order to set the right priorities for improvement. The ISO 14001 standard requires that a system can ensure that this process can be repeated at a later time (under different circumstances). As the example in 'Holland transport' shows, a complicated system is neither necessary nor required.

The first section of the document further defines a number of concepts, and explains in detail the choices which must be made when planning this element of the ISO 14001 standard. The second section discusses how to conduct the identification and evaluation. The third section shows how to work out a number of additional points for attention. The information in this document can apply to all types of organizations (manufacturing, services, wholesale/retail, government agencies etc.).

This publication also includes using a risk calculation as a possible way to evaluate the environmental aspects. This approach determines risk based on the probability and the consequences. This approach may be advantageous:

- if your organization works with an integrated environmental, occupational health/safety (OHS) and safety management system. Organizations with OHS and safety management systems usually use the risk calculation when identifying and evaluating the environmental aspects, as do organizations with integrated systems. We will discuss how to define 'probability and impact'.
- if your organization intends to make agreements with government authorities about the use of systemic supervision. To properly work out the details of this type of supervision, it is important that the company and the supervisors involved agree on the significant risks. Government authorities are often used to working with this method as well.

## 2 Requirements of the ISO 14001 standard

The text of the ISO 14001 standard regarding environmental aspects (section 4.3.1) reads as follows:

*The organization shall establish, implement and keep records of (a) procedure(s)*

- a) *to identify the environmental aspects of its activities, products and services within the defined scope of the environmental management system that it can control and those it can influence, taking into account planned or new developments, or new or modified activities, products and services, and*
- b) *to determine those aspects that have or can have significant impact(s) on the environment (i.e. significant environmental aspects).*

*The organization must document this information and keep it up to date.*

*The organization must ensure that it takes the significant environmental aspects into account when setting up, implementing and maintaining its environmental management system.*

Once the organization has determined its significant environmental aspects, it must formulate objectives and targets, as well as the programme of procedures for meeting them (clause 4.4 of the standard). Since priorities must be set when formulating the objectives, this should be seen as the next step after evaluating the environmental aspects.

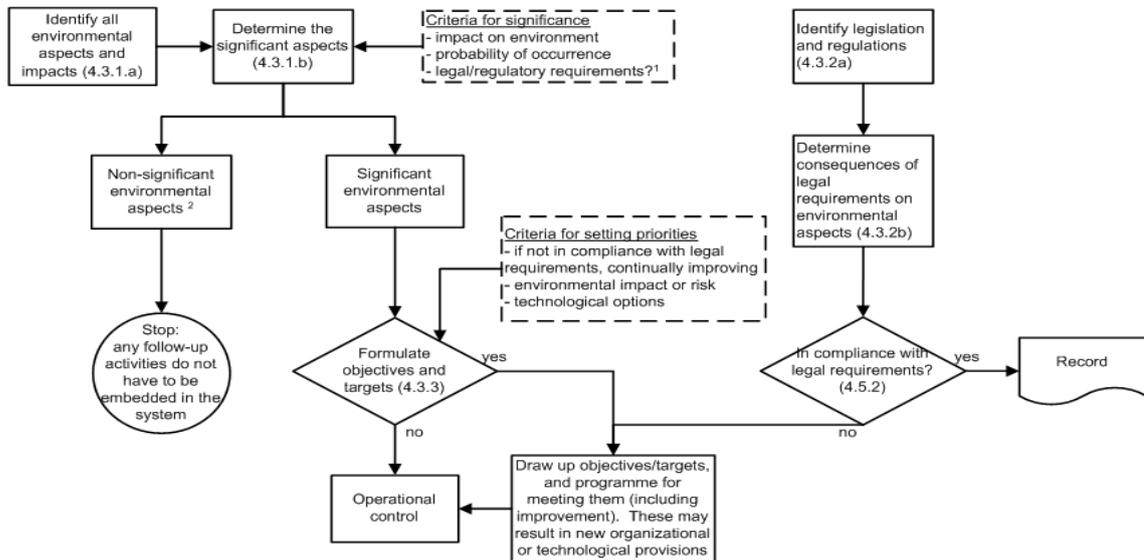
The following steps can be drawn from the text above:

- Step 1: Identifying the environmental aspects which the organization can control or influence
- Step 2: Determining which environmental aspects have significant impacts
- Step 3: Determining and taking measures for the selected significant environmental aspects
- Step 4: Updating the identification and evaluation of environmental aspects

An organization will have to make choices at each of these steps. For example, when identifying aspects, it must decide on the level of detail at which to do so, and then which environmental impacts must be considered and designated as significant. For environmental aspects with significant environmental impacts, the question is which objectives must be identified and how they can be embedded in the system. This document will discuss each of these steps, using two imaginary companies as examples: a manufacturer of concrete products for road construction, and an engineering firm (a service provider).

Figure 1 shows steps 1 through 3.

FIGURE 1: IDENTIFYING AND EVALUATING ENVIRONMENTAL ASPECTS



**Notes to figure 1**

- 1 In practice, companies sometimes choose to declare any environmental aspect covered by legislation and/or regulations ‘significant’. Since there are legal requirements in many areas, the disadvantage of this approach is that many environmental aspects will be significant, and thus this step will not help to distinguish them. If an aspect’s actual or potential environmental impact is what primarily determines its significance, it gives a clearer ‘focus’ to the programme. If all of the environmental aspects covered by legislation and/or regulations are declared significant, the focus is on step 3, in which the objectives and targets are formulated. Then priorities are set using their environmental impacts as a criterion. If the existence of legislation and/or regulations is not used as a criterion for determining significance, the relevant environmental aspects will still be addressed in the management system, because of the commitment to comply with legislation and regulations and the evaluation of the legal requirements. As far as the end results are concerned, there is little difference between the two approaches. Either way, compliance with legislation and/or regulations is built into the system.
- 2 An environmental aspect that is not significant (for example, due to its limited impact on the environment) can have lower priority in the management system. It does not mean that the aspect may be ignored completely or that no measures need to be determined. For example, the waste paper generated by a chemical company’s office is an environmental aspect, but for a chemical company, the impacts of paper use and separating waste streams are relatively limited. Most organizations will take measures to sort their waste paper anyway, both because the Dutch Environmental Management Act requires taking ‘due care’ to protect the environment wherever possible, and as a measure that can stimulate employee involvement in the EMS. Organizations with a limited number of environmental aspects may choose to classify all of them as ‘significant’.

## 3 The implementation

### 3.1 Step 1: Identifying environmental aspects

The standard uses the term ‘identifying’ environmental aspects. In practice this is often referred to as ‘making an inventory’ of environmental aspects. This document will stay on the practical side and will also refer to ‘making an inventory’ of environmental aspects. Making this inventory is a crucial step in developing an environmental management system. It is in this phase that the organization lays down the environmental themes dealt with within its environmental management system. It is accordingly not a step taken only once. At regular intervals (for example, annually) the organization must determine whether the inventory and priorities are still up to date.

#### Environmental aspects and environmental impacts

The standard distinguishes between environmental aspects and environmental impacts.

The environmental aspects of an organization can cause environmental impacts. Examples of environmental impacts are acidification of water and soil, the greenhouse effect, etc. An environmental impact is the consequence of the environmental aspect on people, plants or animals.

Since it is very difficult for an organization to accurately evaluate its environmental impacts, the ISO 14001 standard distinguishes between environmental aspect and environmental impact. The point of the environmental management system is to control and curtail the environmental aspects in order to prevent environmental impact. The environmental aspects are reasonably easy for an organization to evaluate, and give a good idea of the points to consider in the environmental management system.

TABLE 1: EXAMPLES OF DIFFERENCES BETWEEN AN ENVIRONMENTAL ASPECT AND ITS ENVIRONMENTAL IMPACT

ENVIRONMENTAL THEME	ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT
Air (acidification)	Sulphur dioxide emissions from transport, heating etc.	Acidification of water and soil
Water	Discharges of polluted water	Adverse impacts on water ecosystems
Soil	Leakages from pipes	Soil pollution
Natural resources /energy	Use of water and non-renewable energy, lighting, paper consumption	Depletion of natural resources, air pollution, greenhouse effect

A helpful idea when making the inventory of environmental aspects is to start by naming a few environmental themes. An inventory can then be made of potential environmental aspects for the organization as a whole or by activity or department. An example of an environmental theme is air. The environmental aspect is the emission of gases such as CO<sub>2</sub>. The environmental impact is the greenhouse effect. Other possible themes are: water, soil, use of raw materials, energy, waste, radiation, nuisance (such as vibration, smells, noise). The environmental themes are shown in somewhat more detail in annex 1.

## 3.2 Scope and level of detail of the environmental aspects inventory

Section 4.3.1 of the standard indicates that the organization must identify the environmental aspects of its activities, products and services within the scope of its environmental management system. The organization only has to identify the environmental aspects that it can control and that it can influence.

The annex to the standard indicates that an organization must look at processes such as the following:

- design and development;
- production processes;
- packaging and transportation;
- environmental performance and procedures of contractors and suppliers;
- waste processing;
- extraction and distribution of raw materials and natural resources;
- distribution, use and life span of products.

Although the above summary from the ISO 14001 standard is oriented more towards manufacturing companies, some if not all of it can apply to other organizations such as service companies, wholesalers/retailers and government agencies. 'Production processes' can be applied to all the processes around the delivery of a service. For example, for an engineering firm, it can involve all the environmental aspects associated with an object or building it designs. For a retailer, they can be the specifications of the products it purchases. Factors such as paper use and a building's energy consumption may also be relevant in 'production' of services.

The purchasing processes are also relevant for all types of organizations, because they may have environmental aspects associated with the goods and services it purchases. These aspects involve both qualities of the products/services themselves and the methods associated with their production, packaging and transport.

With regard to environmental aspects outside of the organization, the greatest degree of influence an organization can exercise on environmental aspects probably lies with the environmental performance of contractors and of purchased products and services. The degree of influence can be expressed when the significance of the environmental impacts is determined. Examples of environmental aspects of suppliers which can be influenced are the emissions from a transport company's lorries or a cleaning company's procedures. The type of engine will influence fuel consumption and thereby emissions into the air. When selecting a carrier, the organization can set requirements for the vehicles used by the carrier. If it is hiring a cleaning company, it may consider factors such as how often the company cleans and the types of products it uses.

An organization is expected to determine how it deals with suppliers and the requirements it sets for the products and services it purchases. Of course, the influence of a given item will partly depend on its proportional significance within the organization.

As indicated in the annex of the standard in the overview of processes, the following points should be kept in mind during the inventory:

- The inventory includes not only the environmental aspects which the organization can completely control, but also those that it can influence. An organization can also be said to have influence if, when purchasing products or services, it can set requirements about the environmental impacts which occur with third parties, or can provide information to users of its own products.
- Environmental aspects must be identified which are associated with both current and relevant previous activities, products and services, as well as with planned or new developments, and new or modified activities, products and services.
- Attention must be paid to usual and unusual business conditions, conditions during shut-down and start-up and potential emergency situations such as fire, loss of electric power, leaks of hazardous materials etc.

The inventory results in an overview of environmental aspects and the environmental impacts they cause (see table 2A and 2B).

### 3.3 The relationship between identifying environmental aspects and identifying legislation and regulations

Compliance with legislation and regulations is a core assumption of the ISO 14001 standard. Clause 4.3.2 states that an organization must have an inventory of the environmental legislation and regulations that apply to its environmental aspects and the resulting legal requirements. This inventory is related to the identification and evaluation of environmental aspects:

- Subjects covered by environmental legislation and/or regulations will obviously be environmental aspects as well. Otherwise there is a discrepancy between what the organization and the government find environmentally relevant. The legal requirements can be used as a checklist to ensure that all the environmental aspects have been identified.
- It may be practical to directly link the environmental aspects to the applicable requirements from the legislation and/or regulations, since this will satisfy clause 4.3.2.
- In the next step (determining significance), the question is to what degree the existence of legislation and/or regulations that apply to an environmental aspect also determines its significance. There are several possible approaches to answering this question (see notes under figure 1).
- The degree to which additional activities must be undertaken in the objectives, targets and programmes (article 4.3.3) depends upon how great the estimated risk is of violating these legal requirements. Organizational measures aimed at reinforcing the guarantee of compliance can be among the additional activities.

There are a number of ways to make and embed the link between the environmental aspects and legislation/regulations:

- Consider them two separate processes that are compared to each other later.
- Integrate the identification of legislation and/or regulations (and the requirements arising from them) in the identification and inventory of environmental aspects.

Points for attention:

- It is important to translate the requirements in legislation and/or regulations into their consequences for the environmental aspects (both significant and non-significant). This process must give a good idea of the concrete standards or provisions involved with a process or activity.
- The organization must be able to generate an easily accessible overview of the applicable legislation and/or regulations (and the requirements arising from them), since the organization will need this overview to evaluate its own compliance (clause 4.5.2).

SCCM has published a separate document about this subject, entitled 'Compliance with legislation and regulations for users of environmental and/or occupational health and safety management systems'. It contains detailed examples of how to make sure that compliance is embedded in an environmental management system (EMS).

### 3.4 Step 2: Determining which environmental aspects have a significant impact

In the first step, the environmental aspects were determined that can be controlled and influenced. In step 2, you will select the significant environmental aspects. These are the aspects which 'have or can have significant impact on the environment' according to clause 4.3.1 and that 'must be addressed as a priority' according to annex A.3.1. These are the environmental aspects that must at least be addressed in the environmental management system, and for which objectives for improvement may be formulated.

The procedure for determining significance must be repeated periodically. It is important that the assessment be reproducible, so that the results can be compared. In this section, we will work out two variants for determining whether an environmental aspect is significant. This method is also used to set priorities, which is a part of formulating objectives.

As also indicated in the notes to figure 1, there are several approaches to involving the existence of legislation and/or regulations in determining the significance of an environmental aspect:

- a) All environmental aspects to which legislation and/or regulations apply are classified as 'significant'.
- b) The existence of environmental legislation and/or regulations that apply to an environmental aspect is considered, but is not a determining factor.
- c) The existence of environmental legislation and/or regulations has no influence on significance.

Approach a) has the advantage that it is clear, but the disadvantage that there is little distinction between the environmental aspects, since legislation and regulations apply to so many environmental aspects. The fact that there are legislation and/or regulations that apply to an aspect does not by definition mean that the aspect has a significant impact on the environment. With approach b), the presence of legislation and/or regulations is used as one of the criteria. If there is a great deal of legislation and/or regulations that apply, their existence can be used as a criterion for significance, since this indicates that the government takes an interest in this subject. With approach c) the assumption is that the consequences for the environment are what determine significance. Compliance with legislation and/or regulations is ensured through clauses 4.3.2 and 4.5.2, as well as in the system's implicit commitment to compliance.

Assigning significance to an environmental aspect does not automatically mean that objectives for its improvement must also be formulated. Clause 4.3.3 (Objectives, targets and programmes) is intended to be used for setting priorities. The significant environmental aspects will be addressed in the management system, which guarantees that measures are implemented. There must also be a consideration of whether improvement is possible in the significant environmental aspects. Criteria playing a part here include technological options, financial implications, environmental impact and changes to legislation and regulations. This will be discussed in step 3.

Two possible ways to determine significance are shown below.

### **Variant 1 Qualitative comparison**

In variant 1, the organization itself determines a number of relevant criteria and uses them to evaluate their environmental aspects, documenting beforehand how priorities were set. This approach is suitable for organizations with relatively few environmental aspects. These organizations are often smaller ones, such as the company in our 'Holland transport' publication.

Possible criteria for evaluation are:

- Are there legislation and regulations which apply?
- What is the range and frequency of the aspect?
- Have internal standards been drawn up?
- Are there associated environmental risks (with 'permanent' environmental damage) before and after any measures are taken?
- Is there a nuisance for neighbours and/or have they complained, or is there any significance for employees?
- Are there local conditions, for example, are a company's premises close to a nature preserve or water-collection area?

Table 2 lists the evaluation criteria for the inventory as used in our samples. The companies have chosen the following as principles for determining their significant environmental aspects:

- The environmental aspects with legal requirements are significant;
- The environmental aspects with considerable (permanent) environmental impacts are significant;
- The environmental aspects which have generated complaints are significant.

The table below was compiled based on the above; here the environmental aspects are 'weighed' to arrive at a selection.

The table is the result of 3 steps:

- 1 making the inventory of environmental aspects and impacts;
- 2 weighing their significance;
- 3 the end result: which environmental aspects are significant and which environmental aspects must be assigned improvement measures?

TABLE ZA: QUALITATIVE INVENTORY OF TWO ACTIVITIES OF A CONCRETE FACTORY: SIGNIFICANCE OF ENVIRONMENTAL ASPECTS AND POSSIBLE MEASURES  
NOTE: NOT ALL ASPECTS HAVE BEEN COMPLETELY WORKED OUT IN DETAIL

ACTIVITY	ENVIRON- MENTAL THEME	ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT	LEGAL REQUIRE- MENTS	SURROUNDINGS / COMPLAINTS	IMPACT BEFORE MEASURE	IMPACT AFTER MEASURE	SIGNIFICANT ASPECT	DEGREE OF CONTROL	POSSIBLE MEASURE <sup>1)</sup>
Transportation and storage	Waste	Concrete mortar and raw materials: spillage, sweepings (not usable in process)	Depleting natural resources, waste	No	No	Moderate	Low	Yes	Good (operational instructions)	Catcher
	Noise and vibrations	Average 140 lorries/day as result of delivery and disposal movements	Disturbance to surroundings/ neighbours	No	Occasional	Low	Low	Yes		
	Air	Emissions from transport vehicles, dust (blown about)	Acidification, greenhouse effect, health	Yes	Yes frequent about dust	Moderate	Low	Yes		Study making modifications to vehicles
	Water	Rainwater from site contaminated with concrete mortar and raw materials	Impact on water in ecosystems (insofar as discharged into surface water)	Yes, <sup>2)</sup>	No	Moderate	Moderate	Yes	Good (operational instructions for good management)	Only if discharge limits are exceeded
	Soil (only from an incident)	Leakage from vehicles, storage of material, underground tanks, spillage	Contaminated soil	Yes	No	High	High	Yes		Study extra accident-prevention measures
	Energy	Energy consumption from external (diesel) and internal transportation (LPG, diesel)	Depletion of natural resources							Modify driving habits, motors and vehicles
Measuring and mixing	Waste	Packaging of dyes, leftover concrete from cleaning mixer plant	Waste of materials and energy							
	Noise and vibrations	Refilling mixer plant and escape of air from vents	Disturbance to surroundings							
	Air	Refilling mixer plant, emissions limited by dust filters	Disturbance to surroundings							Maintenance dust filters
	Water	Rinse water from cleaning mixer plant, partly re-used in process	Impact on water ecosystems if discharged to surface water							
	Energy	Electric motors of mixing machines, heating of mixing water	Depletion of natural resources							Energy saving plan

<sup>2)</sup> The environmental licence sets prescribed limits for discharge of contaminated rainwater.

TABLE 2B: QUANTITATIVE INVENTORY OF TWO ACTIVITIES OF AN INFRASTRUCTURE ENGINEERING FIRM: SIGNIFICANCE OF ENVIRONMENTAL ASPECTS AND POSSIBLE MEASURES  
NOTE NOT ALL ASPECTS HAVE BEEN COMPLETELY WORKED OUT IN DETAIL

ACTIVITY	ENVIRON- MENTAL THEME	ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT	LEGAL REQUIRE- MENTS	SURROUNDINGS / COMPLAINTS	IMPACT BEFORE MEASURE	IMPACT AFTER MEASURE	SIGNIFICANT ASPECT	DEGREE OF CONTROL	POSSIBLE MEASURE <sup>1)</sup>
Advisory services and internal organization	Air	Employee car emissions (leased and private)	Acidification, greenhouse effect	No (proposed law)	With regard to other impacts of an engineering firm, relatively large					"Green" lease scheme, smaller cars, reduce no. of km, change driving habits
	Various	Environmental aspects associated with recommendations about structures and materials to be used	Various	Sometimes	Can be relatively large depending on project					
	Energy	Energy consumption of computer equipment	Depletion of natural resources	No	Small compared to consumption of building					Energy-efficient computer equipment
	Waste	Waste products of office activities	Air or soil pollution (depending on processing)	Yes	Limited					Reduction in paper consumption
Building management	Energy	Energy consumption for heating and lighting office	Depletion natural resources	No	Relatively large					Energy savings for office building
	Waste	Maintenance to building and facilities	Pollution air or soil at waste processing	Yes	Relatively large with regard to other impacts of an engineering firm					Agreements with service suppliers about waste disposal
	Air	Emissions from maintenance to building and facilities	Air pollution from maintenance to building and facilities	Yes <sup>2)</sup>	Main impact from accidents					Verify suppliers are complying with legal requirements

**Notes on table 2A en 2B:**

The tables are examples of the inventory of part of the activities of a concrete factory and of an engineering firm. The organization itself can choose the level of detail that works best for it. For example, the company could choose to give an even more concrete indication of its environmental aspects by itemizing the electrical motors in the last line of table 2A or by itemizing the buildings and facilities in the last line of table 2B.

<sup>1)</sup> The potential improvement can be either a technological / 'technical' measure or a control measure/system modification.

Also, instead of naming the measure at this point, a 'yes/no' in the table can indicate whether a measure is possible, and the measure can be named in the next step: formulating objectives.

<sup>2)</sup> Examples of legal requirements are cooling fluid directives for cooling installations and emissions limits for heating plants.

According to section 4.3.2 of the ISO 14001 standard, an organization must identify the legal and other requirements associated with its environmental aspects, as explained in our previously mentioned publication on compliance.

## **Variant 2 Quantitative evaluation of environmental aspects**

A quantitative evaluation of environmental aspects determines the most significant environmental aspects, using a formula derived from the Fine and Kinney method to determine which impact has the highest risk (risk = probability x consequences). In the example below, a number of elements have been added to the method: compliance with legislation and regulations, the potential for improvement of the environmental aspect and any requirements from the head office are also considered. Of course, there are many possible variations to this approach.

It must be realized that the risk matrix method implies a precision which does not exist in reality. Estimates will always be somewhat subjective. The strength of this approach is that several stakeholders can exchange estimates and arguments, enabling them to arrive at a perspective that reflects the order of magnitude and compares the identified risks.

### **How to deal with current preventive measures (initial or residual risk)**

The question when determining both the 'consequence' and the 'probability' of a given environmental aspect is to what degree the EMS considers any existing technical and/or organizational measures intended to prevent and/or reduce the environmental impacts.

Two approaches are possible:

- Evaluating on the basis of the 'baseline' situation; in other words, evaluating the impacts as if no measures are in place to reduce or prevent them.
- Evaluating on the basis of the impacts, keeping existing measures in mind. This is to determine any 'residual risk', combined with the probability and the consequences of a failure or malfunction of the measures in place (such as a dust filter or watertight floor).

The probability and the consequence of an environmental aspect are usually determined based on the preventive measures in place. Sometimes, however, the government attaches importance to the 'baseline' risk, that is, the risk in the absence of preventive measures, or a complete failure of the measures in place. The aim is to get an idea of the preventive measures associated with the potentially high-risk environmental aspects. It is important for the supervisory body to have an idea of how well the preventive measures function (even if the probability and impact of a failure are estimated to be low).

### **Consequences for the environment**

The consequences (impact) can be defined in several ways. It can be limited to the direct impact on the environment, but can also be defined more broadly to include secondary impacts. For example, 'damage to reputation' can be a secondary impact and a reason for placing a given environmental aspect in a higher risk category.

Table 3 shows several possible definitions of the impact.

TABLE 3: EXAMPLES OF LEVELS OF IMPACTS

RISK LEVEL	SAMPLE LEVELS OF CONSEQUENCES	SAMPLE EXPLANATION OF ENVIRONMENTAL IMPACT
1	No impact	No harm to the environment. No financial consequences.
2	Negligible or very temporary impact	Minor environmental damage, remaining within the organization's premises and system. Negligible financial consequences.
3	Slight impact (easy to clean up)	Pollution or emission serious enough to harm the environment, but without long-term impact. Can be easily cleaned up if necessary. One-time violation of a requirement, or a single complaint.
4	Considerable impact	Limited emissions, but with influence on the surroundings and long-term damage to the environment. Repeated exceedances of limits or repeated complaints.
5	Major impact	Severe environmental damage requiring extensive clean-up measures. Continual exceedances of limits and/or widespread nuisance and/or long-term environmental damage.

The company may set the risk level, the first column of table 3, in any way it sees fit. The risk level indicates the extent of the hazard (not its likelihood), and is weighed in the total evaluation of the environmental aspect.

#### Likelihood of occurrence

Table 4 shows a number of possible classifications using a 5-point scale. The scale may be made smaller or larger as the organization sees fit. It can assign a numerical value to each level in order to calculate the risk.

TABLE 4: SAMPLE CLASSIFICATIONS FOR THE LIKELIHOOD OF ENVIRONMENTAL IMPACTS

RISK LEVEL	EXAMPLE 1	EXAMPLE 2	EXAMPLE 3	EXAMPLE 4
1	Extremely low – highly unlikely	Unheard of in our branch of industry	< 1 incidence/year	Practically impossible
2	Low – improbable but possible	Have heard of it in our branch of industry	Annually	Conceivable but improbable
3	Moderate – rarely occurs	Has happened in our company	Monthly	Conceivable
4	High – occurs now and then	Happens several times a year in our company	Weekly	Quite possible
5	Very high – occurs regularly	Happens several times a year at our site	Daily	Extremely likely

#### Compliance with legislation and regulations

The ISO 14001 standard does not require an organization to include compliance with legislation and regulations in the evaluation of its environmental aspects. If it chooses to do so, then the non-compliant environmental aspects should emerge from the risk assessment as the most significant environmental aspects. As a result, their risk levels will be higher than those of the other elements of the risk assessment. Please note that any environmental aspects that are not in compliance with legislation and regulations must be resolved before a certification process can be completed, unless agreements have been made with the competent authority about them.

TABLE 5: POSSIBLE CATEGORIES OF COMPLIANCE WITH LEGISLATION AND REGULATIONS

RISK LEVEL	SAMPLE LEVEL OF COMPLIANCE WITH LEGISLATION AND REGULATIONS
1	Complies with legislation and regulations
5	Minor violation
10	Major violation or frequent minor violation

### Potential for improvement

The standard states that the organization must keep its significant environmental aspects in mind when setting objectives and targets. If an aspect's potential for improvement is weighed when determining its significance, then environmental aspects which have little or no potential for improvement will be determined less significant. This makes it easier to formulate objectives or targets for the significant environmental aspects. The standard does not require the potential for improvement to be weighed when setting objectives or targets.

TABLE 6: POSSIBLE CATEGORIES FOR POTENTIAL FOR IMPROVEMENT

RISK LEVEL	EXAMPLE OF POTENTIAL FOR IMPROVEMENT
1	No improvement possible
3	Minor improvement possible (for example <1% improvement for the environmental aspect)*
5	Major improvement possible (for example >1% improvement for the environmental aspect)

\* Improvements include reducing energy consumption, emissions to air, waste etc. The percentage is determined on the basis of the organization's environmental aspects. Of course, a figure like 5 or 10% may be more realistic.

### Corporate requirements (requirements from the head office)

Organizations that are part of a larger concern may have requirements for particular environmental aspects that are set by their head office as part of company policy or as company targets. This can make some environmental aspects more significant than others.

Of course, this only applies to organizations if they are part of a concern, **and** if this concern sets requirements for particular environmental aspects. If this is not the case, this element can be omitted.

TABLE 7: POSSIBLE CATEGORIES FOR CORPORATE REQUIREMENTS

RISK LEVEL	EXAMPLE OF CORPORATE REQUIREMENT (REQUIREMENT FROM THE HEAD OFFICE)
1	No corporate requirement
2	Existing corporate requirement

Example from the concrete industry

TABLE 8: SAMPLE EVALUATION OF ENVIRONMENTAL ASPECTS FOR CONCRETE FACTORY

ACTIVITY	ENVIRON- MENTAL THEME	ENVIRONMENTAL ASPECT	LEGAL REQUIRE- MENTS	ENVIRONMENTAL IMPACT	COMPLIANCE WITH LEGISLATION/ REGULATIONS	IMPACT	PROBABILITY	POTENTIAL FOR IMPROVEMENT	REQUIREMENT FROM HEAD OFFICE	RISK *	EXPLANATION OF ENVIRONMENTAL ASPECT AND ANY MEASURES
Transportation and storage	Waste	Concrete mortar and raw materials: spillage, sweepings (not usable in process)		Depletion of natural resources, waste	1 <sup>1</sup>	2 <sup>1</sup>	5 <sup>1</sup>	3	1	30	Various control measures in place. Minor improvement can be made in separating and reducing waste.
	Noise and vibrations	Average 40 lorries/day as result of delivery and disposal movements	Yes (see ..)	Disturbance to surroundings	1	3 <sup>2</sup>	4 <sup>2</sup>	1	1	50	High tonnage lorries sometimes cause greater nuisance.
	Air	Emissions from transport vehicles	Yes (see ..)	Acidification, greenhouse effect, health	1	5 <sup>3</sup>	5 <sup>3</sup>	3	2	150	70% of the company's own lorries have EURO V engines. Driving habits determine risk to a significant degree.
	Air	Dust (blown about)	Yes (see ..)	Health	5	4 <sup>4</sup>	4 <sup>4</sup>	3 <sup>4</sup>	2 <sup>4</sup>	160	Worse in dry windy weather. Screens and sprayer system needed.
	Water	Rainwater from site contaminated with concrete mortar and raw materials		Impact on water in ecosystems (insofar as discharged into surface water)							
	Soil (only from an accident)	Leakage from vehicles, storage of material, underground tanks, spillage		Contaminated soil							
	Energy	Energy consumption from external (diesel) and internal transportation (LPG, diesel)		Depletion of natural resources							
Measuring and mixing	Waste	Packaging of dyes, leftover concrete from cleaning mixer plant		Waste of materials and energy							
	Noise and vibrations	Refilling mixer plant and escape of air from vents		Disturbance to surroundings							
	Air	Refilling mixer plant, emissions limited by dust filters		Disturbance to surroundings							
	Water	Rinse water from cleaning mixer plant, partly re-used in process		Impact on water ecosystems if discharged to surface water							
	Energy	Electric motors of mixing machines, heating of mixing water		Depletion of natural resources							

#### Notes to probability and consequences assessment:

\* The risk is calculated by multiplying all scores entered, thus:

Risk = compliance x consequence x probability x potential for improvement x corporate requirement

- 1 The environmental impact of spillage and sweepings is very limited. Spillage losses are limited because technical and organizational measures have been taken. Since spills are normally swept up and discarded along with the regular waste, their impact is negligible (2). Spills occur with some regularity (5).
- 2 Noise and vibration levels are compliant, but do cause nuisance. Not a long-term impact and the environmental impact is slight (3). It occurs weekly, and there are about five complaints per year, so frequency is 'regular' (4).
- 3 Most transport vehicles meet legal requirements for emissions limits. There is an investment programme for other lorries (potential for improvement = 3). All engines must eventually meet the EURO V standard and thereby also ALARA. There is an impact on the environment, which can be improved (reduced) by acquiring new vehicles. Driving behaviour strongly determines emissions, resulting in an estimated major (5) impact. Drivers have taken 'new driving style' courses and driving behaviour is being monitored, resulting in the probability being 'high' (5). The head office has set additional transport emissions requirements (2).
- 4 Under certain weather conditions, the maximum permitted levels for dust are occasionally exceeded (minor violation). The spread of particulates may result in long-term health problems, and there are occasional complaints, making this impact 'considerable' (4). Depending on weather conditions, dust 'drift' is a regular occurrence (4). Additional requirements for preventing dust emissions have been set by the head office (2). More measures can be taken to prevent dust emissions (potential for improvement = 3), but due to their high cost they have not yet been taken.

Although the probability and consequences of an environmental aspect cannot be objectively determined, if a number of people make an estimate independently of each other, and then discuss their findings with each other, they can arrive at a uniform assessment. We recommend first making individual assessments, then discussing the arguments and making a joint assessment.

We also recommend documenting the reasoning used to determine the probability and consequences for a number of environmental aspects. This improves the reproducibility, especially if different people are involved the next time this is done.

The next step is to determine the objectives and targets and the details of any control measures.

#### Quantitative evaluation of environmental aspects for service companies

The procedure for evaluating environmental aspects described above is suitable for service companies, trade or government departments as well as manufacturers. Although the methods are no different for the various types of organizations, the calculated level of risk (probability x consequences) may be lower, given that the severity of the impact is usually lower for companies other than manufacturers.

### 3.5 Step 3: Following up on the selected significant environmental aspects/ determining and taking measures

The significant environmental aspects can now be grouped based on the evaluation in step 2. Table 9 shows one arrangement.

TABLE 9: FOLLOW-UP ACTIONS AFTER EVALUATION OF ENVIRONMENTAL ASPECTS

NATURE OF FOLLOW-UP	CRITERION	ACTION
No action	Environmental aspects with extremely limited impacts and/or which the organization cannot influence (includes non-significant aspects)	Inapplicable
Conducting / keeping existing measures	Significant environmental aspects with an acceptable risk and which comply with legal requirements	Continue to work to achieve current objectives/standards
Improvement programme	Environmental aspects with a high or unacceptable risk and environmental aspects not in compliance with legal requirements	Formulate objective for improvement programme including implementation plan

Sometimes there are too many points for improvement to tackle them all at once, and priorities will have to be set. It is important that the priorities can be justified. The environmental aspects classified as 'unacceptable' and/or not in compliance with legislation and regulations have priority in any case, and the organization must have an action plan for these environmental aspects. If compliance with legislation and/or regulations is an issue, we recommend coordinating the action plan with the competent authority.

If priorities need to be set for the improvement of the remaining environmental aspects, the following criteria may be used:

- scope of the investments (if desired, in proportion to the improvement in the risk matrix);
- technical feasibility;
- importance of the improvement for neighbours (for example, if the aspect is a nuisance factor);
- the importance of the environmental impact in the government's environmental policy.

One example of the importance of the environmental impact in government environmental policy is the subject of energy. The Dutch government has made reducing energy consumption a top priority as part of its international climate policy. Since there is very little laid down in legislation and/or regulations on this subject, the question is how to work out the importance of this subject in the risk calculation. In the example from table 3, the question is primarily how to estimate the 'consequences'. Given that the emissions involved have long-term consequences, this aspect scores high. The assessment of the impact depends on:

- the amount of energy consumption in the organization's total energy consumption;
- the technical measures already taken;
- the influence of employees on actual consumption.

In the example from table 8, the subject of energy is worked out for the company's various operations/ processes. The weight of the element can differ for each activity. Companies that have a separate energy savings plan (for example, if they have entered into a covenant) may choose not to work out this subject by process, but to make reference to the energy savings plan.

The selected significant environmental aspects are the basis for working out the other elements of the environmental management system:

- The organization must see to it that it keeps the significant environmental aspects in mind when setting up, implementing and maintaining its environmental management system (section 4.3.1).
- An organization must keep in mind its legal and other requirements as well as its significant environmental aspects when setting its objectives and targets (section 4.3.3).
- The organization must identify and plan work activities that relate to the identified significant environmental aspects in accordance with its environmental policy, and environmental objectives and targets, and its goal is to see to it that these activities are carried out **under specified conditions**. This can be done by setting, implementing and keeping records of procedures related to the identified significant environmental aspects of goods and services used by the organization, and informing suppliers, including contractors, about the procedures and requirements applicable to them (section 4.4.6).

Activities and operations dealing with significant environmental aspects, as stated in section 4.4.6 of the standard, must be performed under specified conditions. This means that the negative impacts of the significant environmental aspects are controlled or minimized in order to meet the requirements of the organization's environmental policy and to achieve its objectives and targets. If an environmental aspect is significant, it does not automatically mean that short-term improvement objectives must follow. There may be budget, technical, or other constraints on making immediate improvements. However, the organization is expected to indicate how it will tackle this environmental aspect in the medium term. Research into how to implement an improvement can also be a follow-up. At the time when the inventory of environmental aspects is updated, the organization will have to determine if there are any changes (such as new technologies) which now make it possible to formulate concrete objectives.

If a given environmental aspect has not had an improvement objective formulated for it, although a control measure is desirable, then the control measures should be laid down in the environmental management system. Examples of such measures are modifying working procedures (such as lowering temperature, turning off lights, changing filters more frequently) and modifying the procedure or operational instructions in which these activities are described. Other possibilities include informational presentations or materials (separately or in already scheduled meetings), modifying the emergency plan to give better control of the aspect in case of emergency, and improving internal reporting in the event of nonconformity with the existing situation. A control measure often results in an improvement of the environmental aspect.

Objectives are laid down in an environmental programme (section 4.3.4), in which activities related to the improvement are also laid down.

An organization must have a systematic procedure which clearly shows how follow-up is given to the control or improvement of environmental aspects with significant impacts (immediate or longer-term).

Tables 10A and 10B show which objectives and improvement measures the concrete company and the engineering firm will be implementing for its significant environmental aspects.

TABLE 10A: FOLLOW-UP ACTIONS WITH REGARD TO SIGNIFICANT ENVIRONMENTAL ASPECTS AT A CONCRETE COMPANY  
(TABLE IS NOT COMPLETELY FILLED IN)

NO.	ENVIRONMENTAL ASPECT	RISK	MAIN MEASURES (TECHNICAL/ ORGANIZATIONAL)	OBJECTIVE IMPROVEMENT	IMPROVEMENT PROGRAMME 2010-2012
1	Concrete mortar and raw materials: spillage, sweeping waste (insofar as not usable in process)	30	Better couplings/connections, work instructions for drivers (no. 25)		Inapplicable
2	Transportation and storage, dust (blown about)	70	Instructions for loading/unloading, supply management, portable screens	0 complaints 2013	Depending on weather, wetting down site. Look into placing screens and coverings.
3	Rainwater from site contaminated with concrete mortar and raw materials		Twice daily sweeping terrain	No exceedance of discharge limits, through monthly sampling of waste water	Training employees, analysis of waste water incl. control and improvement
4	Leakage from vehicles, stored material, underground tanks				Research possibility of extra measures
5	Energy consumption of external (diesel) and internal transportation (LPG, diesel)		New vehicles must meet emissions requirements		Course for drivers, purchase criteria and selection process for replacing vehicles
6	Refilling mixer plant and emission limited by dust filters				Inspect for proper maintenance
7	Electric motors of mixing machines, heating of mixing water			Total energy -20% less than 2012	See energy saving plan

TABLE 10B: FOLLOW-UP ACTIONS WITH REGARD TO SIGNIFICANT ENVIRONMENTAL ASPECTS AT AN ENGINEERING FIRM  
(TABLE IS NOT COMPLETELY FILLED IN)

NO.	MILIEUASPECT	MOGELIJKE MAATREGEL UIT TABEL 2	DOEL-/ TAAKSTELLING	PROCEDURE/ WERKINSTRUCTIE	VERBETERACTIE IN MILIEUPROGRAMMA
1	Employee auto emissions (leased and private)	'Green' lease schemes, smaller cars, 'green' maintenance (use of reconditioned parts)	By June, study of possibilities, costs and environmental savings		Change lease arrangement for new cars within 1 year if financially feasible
2	Employee auto emissions (leased and private)	Reducing km driven by improving communications (telephone/picture-phone, internet/e-mail etc.)	By December, study of possibilities and modifications		Application of measures dependent on cost and results
3	Employee auto emissions (leased and private)	Course in improving driving habits	Reduce fuel consumption by 15%	Lay down possible measures from course in environmental management system	Training course for employees within 6 months
4	Energy consumption computer equipment	Energy-efficient computer equipment and agreements about turning off equipment	Reduce energy consumption by 10% within 2 years	Lay down agreements about turning off equipment in environmental management system	Study energy-efficient equipment, opt for efficiency when buying new equipment. Effective immediately.
5	Energy consumption for office heating and lighting	Energy saving for office building	Study possibilities		Implementing measures dependent on costs and results. Goal is 20% energy savings in 3 years, depending on possibilities.
6	Building and facility maintenance	Agreements with service providers about waste disposal	Lay down agreements in contracts, and inspect for compliance	Modify procedure for purchasing and evaluating suppliers	Annual evaluations of major service providers using supplier evaluations
7	Emissions from maintenance to building and facilities	Verify service providers' compliance with legal requirements	Better overview of service providers	Modify procedure for evaluating suppliers	Annual audits of major service providers

Since a number of environmental aspects will occur in multiple places in the organization, there is sometimes the question of what level of abstraction to choose when working out the environmental aspects.

An alternative is to combine a number of environmental aspects that are associated with each other. For example, this company's water consumption may appear in several of its environmental aspects. Instead of formulating a separate objective for each environmental aspect, it may formulate a general objective for reducing water consumption (e.g. a 20% reduction over 3 years) and develop a separate programme for achieving this objective. Many organizations also do this for the energy theme.

### 3.6 Step 4: Updating environmental aspects

The process of making the inventory of environmental aspects, determining the significant impacts and taking measures is not a one-time action. The organization is expected to evaluate, with a certain regularity, whether the aspects in its inventory are still correct and the significance of impacts has not changed, and what measures can still be implemented. A logical point to do this is during the management review, given that this is often the time when changes in and around the organization, as well as the implemented objectives and targets are evaluated, and new objectives and targets are set. There may be changes in policy (either the organization's or the government) and legislation and regulations which have changed the listed environmental aspects, significant impacts and the measures formulated. Also see section 4.4.

## 4 Notes on implementation

### 4.1 Environmental aspects by process or by department?

The inventory of environmental aspects can be made from several perspectives, for example, by process or by department. In the case of large departments, it can be made by process within each department. This choice will largely depend on the structure of the organization. In organizations dominated by processes and process steps, this process perspective will be the best option. In an organization in which the departments play the main part, it may be practical to set out the environmental aspects by department. In both cases the environmental aspects of all business operations are laid down, thus not only the environmental aspects of the primary production process or production divisions, but also of the secondary processes such as administration, design, transport and the like, and of the external processes which the organization can influence.

**TIP:**

→ Larger organizations will find it convenient to use a single format, which makes it easier to put together all environmental aspects having to do with, for example, energy or water later on.

Any separate sub-processes must also be included when listing the environmental aspects by process. These do not need to be immediately recognizable as sub-processes as long as it is clear that all processes have been included. An example will clarify what is meant by a sub-process: in making concrete mortar, the various raw materials are mixed together with additives. One of these additives must be prepared separately; this preparation is a sub-process of manufacturing concrete mortar.

In listing the environmental aspects by department, all activities or processes of all departments covered by the environmental management system must be included in the inventory. Whichever choice is made, the environmental aspects must be determined for the entire organization for which the environmental management system is set up. A process or department may not be excluded from the environmental management system. For example, if the research department is not covered by the environmental management system, its environmental aspects can be incorporated through purchasing, since this service is being purchased from outside.

## 4.2 Who performs the inventory and evaluation of environmental aspects and how?

The choice of whether to list the environmental aspects by department or by process can also be based on the official(s) who have to list the aspects. The aspects can be listed centrally, for example by an environmental coordinator, or more locally, for example by department heads or production supervisors. If the inventory is performed by more than one person, it must be made clear which person is responsible for which elements.

The advantages of a central inventory, done by an environmental coordinator:

- unambiguous: all departments/processes done in the same way with the same depth;
- speed: less dependence on input from other departments.

The advantages of a decentralized inventory, for example by department heads:

- (probably) more knowledge of a process within its own department;
- time savings during implementation of the system;
- greater involvement of departments in managing environmental aspects records.

### TIP:

→ It is useful to use a facilitator in this process. This should be someone who can direct the discussion well, who knows the difference between a hazard and a risk, and who can ensure consistency in the categories (for example, they can estimate whether the risk on one part of the site has not been rated much too high in relation to another risk in another department). Usually this is someone from the quality/H&S/Environment department.

Even if it uses a facilitator, the department or factory must remain responsible for conducting the risk inventory. Otherwise it is easy to blame any anomalies in the inventory on 'the guy from H&S'.

With a decentralized approach, the responsibilities for implementing the various measures can be directly assigned and laid down in the management system. Tasks, competences and other responsibilities can be linked to them later.

## 4.3 Procedure for the inventory of environmental aspects

There is no standard procedure for taking the inventory of environmental aspects. In many cases, the person(s) performing the inventory make up a form listing the various departments and/or processes. The environmental themes and environmental aspects can then be filled in for each department and/or process. After the environmental aspects have been filled in, the environmental impacts are defined. The environmental impacts are important for determining the significance of each environmental aspect. Since assessing the various criteria for evaluating the environmental aspects is somewhat subjective, it is recommended that a number of people make separate assessments independently of each other. By discussing them with each other later, they can arrive at a uniform assessment. We also recommend documenting the reasoning followed in determining the probability and impact for a number of environmental aspects. This improves the reproducibility, especially if different people are involved in the next assessment.

## 4.4 Periodic update of the environmental aspects inventory

The standard states that the environmental aspects and determination of their significance must be kept up to date, without defining how often this must be done. A company usually sets out its environmental objectives annually. It is logical to have the update (evaluation) of the environmental aspects register linked to this process, so that new objectives can come from this information. The significant environmental aspects for which no improvement was possible in the previous year will be looked at in more depth during the evaluation, and it will be determined if improvement is now possible.

A written procedure sets out which official is responsible for performing the update, how frequently it must take place and who makes these decisions.

When performing the update, special attention must be paid to any changes in legislation and regulations, the facilities, the organization, new technology or the production process, as well as, of course, whether environmental impacts have been reduced, for example, by achieving objectives. This can change the environmental impacts, especially the significance of the impacts.

## 4.5 Sources of information

An organization can use existing sources of information in making the inventory of its environmental aspects:

- the environmental licence, use permits, Netherlands 2009 Activities Decree;
- manuals for its branch of industry;
- legislation and regulations and explanatory notes for them;
- Infomil manuals ([www.infomil.nl](http://www.infomil.nl));
- BREF's<sup>1</sup>;
- MJA's (long-term agreements on energy efficiency);
- information and professional journals from the branch of industry concerned.

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<sup>1</sup> BREF stands for BAT [Best Available Technology] Reference Documents, which apply to industrial activities listed in annex 1 of the IPPC guidelines. The BREF's can be downloaded from, among others, the Infomil site: [www.infomil.nl](http://www.infomil.nl).

## 5 Other points to consider

### 5.1 The relationship with legislation and licences

The inventory of environmental aspects (often called the environmental inventory) must be related to the environmental licence and the legal requirements that apply to the company. The environmental licence and the legal requirements can be used as background information in the inventory phase. After the environmental aspects of operations have been established, the licence can be consulted to see if any activities and/or environmental aspects have been inadvertently omitted. Legal requirements that apply to the company can also be consulted for this purpose.

In making the inventory of environmental aspects and selecting measures for improvement and control, this document indicates that one of the selection criteria is (compliance with) legislation and regulations. It must be said that a company must comply with legislation and regulations before it can be ISO 14001 certified. Why, then, is this one of the criteria? For one thing, with beginning companies, the inventory of environmental aspects is often set up in an early stage, to get an idea of the points for consideration in the environmental management system. The company can also get an idea of the elements which do not (or do not completely) comply with legal requirements or the licence. This can help to solve shortcomings before the certification process.

A change of operations, a change in legislation, regulations, or the licence can mean that companies that have already been certified may temporarily not be able to comply with legislation and regulations. Including these environmental aspects in the inventory shows that the company has noticed the problem and is taking action to solve it. Changes in legislation and regulations can also be a reason for modifying the environmental inventory.

### 5.2 Environmental aspects in emergency situations

Environmental aspects in the event of emergencies or disasters are in many cases different environmental aspects than those of an organization's day-to-day operations. Environmental aspects relating to the soil, for example, usually will only occur in the event of an accident such as a leak. In these situations, the environmental aspects must also be considered differently with regard to the significance of their environmental impacts. The risk and scope of the disaster will often be decisive factors in estimating significance.

The disasters can be incorporated in the regular matrix of the environmental aspects inventory (as with our sample company). However, this carries the risk that potential emergency situations are never given the attention they deserve. It is advisable, especially for companies in the Netherlands subject to the Hazards of Major Accidents Decree (BRZO), to perform a separate inventory of emergency situations. In these cases, the significance of an environmental aspect can not only lead to objectives for taking measures to prevent this environmental aspect and its impacts, but also to establishing and maintaining adequate emergency procedures.

### 5.3 Influence in the chain

As previously indicated in section 3.2 'Scope and level of detail of the environmental aspects inventory', the influence of an aspect on the entire chain must be considered when determining the significance of environmental aspects. This means that a company must look beyond its own products, goods and services and include suppliers of products, goods, services and raw materials as well. The question of whether a given environmental aspect really is significant depends on the influence that the company has on the various elements of the chain.

For example, in our model concrete company, the influence on the chain can be clearly seen with regard to the raw materials it uses. If the company were to look only at its own production process, its inventory would not include mineral extraction. This would be overlooking a significant environmental aspect. The company must keep in mind its influence on the environmental impacts of the environmental aspects in the chain. In many cases, reducing the impact in the chain is more difficult than reducing the organization's own environmental impacts.

As far as purchased goods and services, according to section 4.3.1, in making its inventory of environmental aspects, the company can make a distinction between environmental aspects associated with:

- the activities/services of third parties, performed on the organization's premises;
- the characteristics of products purchased (including such factors as packaging and transportation);
- the way that purchased products are produced on the supplier's premises.

The degree to which influence can be exercised on the environmental aspects is probably the greatest with the first case and the least in the last case. The standard states that environmental aspects which can be controlled and/or influenced must be identified.

Aspects for service companies will differ, depending on the particular branch in which they operate. Here are a few examples:

- The banking sector can look at the influence of its investments, such the kinds of companies it invests in and the environmental impacts these companies cause.
- Transport companies can look at their capacity use and types of packaging. For many companies, lighter packaging and better use of capacity can mean a reduction of their environmental impact.
- Retailers can change their purchasing specifications so that, as much as possible, they buy environmentally friendly (or friendlier) alternatives to products that pollute more. They can inform their customers about the best way to dispose of a product, or take the product back once its life is over.
- Engineering and consultancy firms can look at the impact of their advice and services. What impact does implementing a given recommendation have on the environmental yield of the client organization?

The company must keep in mind its influence on the impacts of the environmental aspects outside the chain. In many cases, it is more difficult to reduce its impact in the chain than to reduce its 'own' environmental impacts.

The environmental inventory only includes these environmental aspects associated with the activities performed for the organization in question. After all, the supplier or contractor may perform activities for other organizations which have different requirements. The degree of detail of the evaluation of the environmental aspects is dependent on the expected environmental impacts and the degree to which reasonable influence can be exercised. Therefore, there can be suppliers or contractors who are not subject to scrutiny because their expected environmental impacts are limited or because no reasonable influence can be exercised on them.

The organization itself must determine which elements of its environmental management system are associated with suppliers and contractors. It should assess, for example, what is necessary to control and reduce environmental aspects (prevention of pollution) or to achieve objectives in the context of continual improvement. The organization only needs to consider pollution associated with these parties' activities performed for its purposes.

The depth and detail of the inventory of environmental aspects of products will differ from product to product. It will be determined by such factors as the indication that there are significant environmental aspects in other parts of the chain, the place of the organization (performing the inventory) in the chain, the degree of influence on other parts of the chain, etc. The essence of this is that the organization knows about relevant environmental aspects occurring in other places in the chain, and considers to what degree they can be influenced. The ISO 14001 standard does not request a detailed life-cycle analysis of these products. External information may be used from, for instance, branch or chain organizations, customers or suppliers.

## ANNEX

# I Environmental themes

### Possible environmental themes:

- Air: an emission into the air
- Water: a discharge to surface water
- Waste: creation of waste products
- Soil: contamination of the soil
- Natural resources: the use of raw materials and natural resources (including energy and water)
- Local aspects: a local environmental issue (such as noxious odours or noise)
- Biodiversity: influence on plant and animal life
- Space: taking up space
- Nuisance: discharge of thermal energy, dust, vibrations or a visual impact (can be specified as radiation, vibration, heat, smell, dust, noise etc.)
- Land use: use of ground

## 2 Fine and Kinney method

Variant 2 (risk matrix) in section 3.4 can be refined by adding the 'exposure' variable. This is an estimate of the frequency or duration of the occurrence of a given hazard. The risk is then determined using the following formula:

**Risk = Probability x Exposure x Consequences**

(for the sake of convenience, all other assessment criteria have been omitted in this formula)

This is what is known as the Fine and Kinney method. Developed initially for evaluating OHS and safety hazards, it is also useful for evaluating environmental aspects.

Here is an example of categories for exposure frequency, with sample scores in parentheses:

- Extremely seldom (1)
- Once a year (3)
- Once a month (5)
- Once a week (7)
- Daily (9)
- Continuous (10)

Adding the 'exposure' variable creates multiple risk matrices (a separate matrix for each level of e.g. exposure or impact). Of course, this can be summarized by indicating the score ranges for the various acceptability levels.

### 3 Additional information about environmental aspects and ISO 14001

- NEN-EN-ISO 14001:2004, published by NEN
- NEN-EN-ISO 14004:2010, published by NEN
- *Werken met ISO 14000*, published by NEN, 2005 (Dutch only)
- Certification scheme for environmental management systems according to ISO 14001, published by SCCM (latest version on the SCCM website, [www.sccm.nl](http://www.sccm.nl))
- EU Commission Recommendation about the EMAS scheme, available for download from the SCCM website [www.sccm.nl](http://www.sccm.nl) (see annex 1 about environmental performance indicators)

## Contact

Please do not hesitate to contact us if you have any questions. We will gladly help companies, organizations, consultants, supervisory bodies, certification bodies and other stakeholders.

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