



Innovative strategies, methods and tools for occupational risks management of
manufactured nanomaterials (MNMs) in the construction industry

GUIDE FOR THE IMPLEMENTATION OF A RISK MANAGEMENT MODEL IN RELATION WITH MANUFACTURED NANOMATERIALS (MNMs) IN THE CONSTRUCTION SECTOR

Scaffold Public Documents - Ref.: Scaffold SPD14

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15.10.2014



The Scaffold research has received funding from the European Community's Seventh Framework Programme (FP7/20072013) under grant agreement number 280535.

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1 EXECUTIVE SUMMARY

The systematic approach of management system standards and other management reference are the basis to implement a Risk Management Model (RMM) that can help the construction sector to take into account MNMs risks.

The RMM developed in this report is designed using requirements of OHSAS 18001 (structure, elements, etc.) with additional requirements derived from the guidelines established in ISO 31000. The correspondence with OSHAS and ISO 31000 is included for reference and also a brief description of the preview changes that ISO 45001 will introduce in OH&S management.

From the 'management' point of view, the RMM is developed in consistency with the PDCA (Plan-Do-Check-Act) cycle for continual improvement as other management standards but tailored for the special case of MNMs risk management.

The main conclusion is that the MNMs Risk Management Model will allow all type of organizations in construction sector to take into account MNMs risks in occupational health and safety systems (in case of previous implementation of OSHAS) or use the model itself in case the company does not have a formal management system based in OSHAS.

From a formal perspective, this report is the base document to develop other more practical SCAFFOLD RM guides and tools, specially the Guide for the initial review, monitoring and audit (SPD15) and the Guide for the SMEs (SPD16) that will develop each model requirement into more useful information for companies and specially the Industrial Cases in SCAFFOLD project.

Other SCAFFOLD results will be incorporated to produce the final RM guide (SPD17) that will condense the aspects of the RMM and the systematic approach combined with the best practices, methods and tools for MNMs risk prevention, risk assessment and risk protection.

The effectiveness of this RMM will be validated through its implementation in case studies.

2 OBJECTIVES

The objective of this report is to provide a reference guide for implementation of the designed RISK MANAGEMENT MODEL for the construction sector.

The specific objectives are:

- OSHAS 18001 particularization for construction sector companies and MNMs risks;
- derive and include requirements for the model based on the guideline and best practices or risk management include in ISO 31000;
- establish the basis for the final RMM guide (SPD17), where the innovative results of SCAFFOLD risk prevention, risk protection, risk for the construction industry will be integrated (product design, risk assessment and protection measures);
- be the base to other RMM guides and tools within SCAFFOLD and the test and validation in case studies.

3 SCOPE

The scope of this report is to define specific requirements include as RMM that should be applied in any type of organization irrespective of size and type, in all its areas and levels. Every subsector involved in construction cycle could apply the MNMs RMM but with different necessities, perceptions and criteria (manufacture, building and civil construction and demolition).

This set of requirements collected as RMM are destined to allow a construction sector organization to control the MNMs risk for OH&S and improves its performance. This report does not establish performance criteria for occupational health and safety nor gives detailed specifications for the RMM design.

This RMM doesn't state specific OH&S performance criteria or detailed specifications for design a management system. It does not include specific requirements for other management system although their elements could be aligned or integrated with the RMM.

The relation and correspondence between the RMM and OSHAS and ISO 31000 clauses are included in a specific section to trace the correspondence between the design model and these references.

4 THE RISK MANAGEMENT MODEL FOR MNMs

The conceptual work of develop a new model based on OSHAS 18001 and ISO 31000 is a really new approach that needs the participation of different AENOR perspectives: standardization, certification technical management and also audit experiences in both areas.

The principal difficulties in the model design are related with:

- the fact that ISO 31000 is not a requirement standard but a guideline, then does not include specific rules it is made on recommendations;
- the conversion of recommendations from ISO 31000 into specific requirements;
- the analysis of this requirements that should be added to complete OSHAS 18001 ;
- the decisions on the risk assessment approach in the model taking into account that both references have different definitions;
- the model is design to be applied to all type, size and context organization (as all other management systems) and this is a difficult approach to consider also the detailed information needed taking into account nanorisks. The specificity for MNMs risk is not simple to find in this general model. The final RM guide (SPD17) will be the one that includes all SCAFFOLD's innovative results from other guidelines and other works that will 'shape' this general model to a more adapted guideline for MNM risks.

AENOR have worked in a multidisciplinary team to deal with the specific task of the MNMs RMM design that has the overview of a 'standard' taking into account the easy understanding of SCAFFOLD partners and especially for the final audit work of the implementation in case studies. It is necessary to remark that beside the formal appearance of a common standard there is an innovative point of view for nanorisks OH&S issues.

On the other hand it is necessary to comment that the evolution of ISO 45001 is tracked by direct the participation of AENOR in the ISO/PC 283 / WG 1 OH&S Requirements that is drafting the projects in each step of the ISO standardization work, and the creation of national groups to evaluate and discuss the changes to be introduce once ISO 45001 will be the worldwide OH&S management reference.

From June 2014 the CD ISO 45001 (committee draft) is available and presents these principal differences with OSHAS 18001:

- a risk assessment perspective (including aspects as integration);
- a stronger focus on the "context" of an organization and interested parties (an organization has to look beyond its immediate health and safety issues and take into account what the wider society expects of it, including their contractors and suppliers);

- a stronger role for top management and leadership (with the inclusion of High Level Structure -as other management systems standards in revision- and the consideration that the occupational health and safety aspects are embodied in the overall management system of the organization);
- emphasizing of the compliance evidence and the identification of necessities at every moment;
- improvement indicators development.

Finally, the last part of this section includes in a similar index as management system standards, the 'specification' itself to implement a RMM.

NOTE The numeral of each sub clause attends to the preliminary architecture in a preliminary Scaffold report on the RMM architecture (D 5.1). Because of that, the first number 4 related to this section has been eliminated. This is important information considering that other SCAFFOLD RM guides and tools will make cross references with this section.

Introduction

This report specifies the requirements for the RMM MNMs that will allow a construction sector organization to develop and implement a policy and objectives that take into account the legal requirements/reference values and health risks information for MNMs.

The RMM is designed to be applicable for organizations of all types and sizes in construction sector and can be tailored to geographical, cultural and social specific conditions.

The cornerstone of the approach is the continual improvement as in other management systems reference documents. The success of the model depends on the commitment of all the organizational levels and functions in the structure and especially top management.

This type of model allows an organization to develop an OH&S policy that considers MNMs risk and establish objectives and processes to achieve the compromises in the policy taking the necessary decisions for continual improvement and show the conformity of the implemented model with the requirements in this report.

This guide includes requirements that can be objectively audited; nevertheless it does not establish absolute requirements for the management performance of MNM risk beyond the commitments included in the HSE policy, the legal requirements to be comply with or another requirements subscribed by the organization for health prevention and continual improvement. Because of this, two organizations that perform similar activities with different performance in MNMs risk management can both comply with the requirements.

It should be emphasized that many requirements could be applied simultaneously, or be reconsidered at any time.

There is a main difference between this specification that describes the requirements for the organization's RMM and could be used for certification/registration and/or self-declaration of RMM and a non certifiable guidance aimed to provide generic assistance to an organization to establish implement and improve the MNMs risk management.

The nanotechnological risk management covers a complete range of perspectives, including those with strategic and competitive implications. One organization that proves the successful implementation of this specification should ensure all interested parties that has an appropriate MNMs RMM.

This guide does not include specific requirements for other management system as quality management system, environmental management system or finance management, although their elements could be aligned or integrated with this other systems. It is possible that an organization could adapt it management system (or systems) to establish a MNMs RMM that complies with the requirement in this report.

The complexity and detailed level of the RMM, the documental extension and the resources dedicated depend on many factors like the RMM scope, the organization's size, the activities performed, produced products and services and the organizational culture. This would be the particular case of SMEs.

General principles in MNMs risk management

Risk management is established on some general principles to be applied independently of organization size, the nature of developed activities, context or specific characteristics.

The organization shall respect the general principles included in the following list.

These principles are aligned with ISO 31000 principles of risk management:

- a) It creates and protects value.
- b) It is an integral part of all organizational processes.
- c) It is part of decision making.
- d) It is explicitly addresses uncertainty.
- e) It is systematic, structured and timely.
- f) It is based on the best available information.
- g) It is management is tailored.
- h) It is takes human and cultural factors into account.
- i) It is transparent and inclusive.
- j) It is dynamic, iterative and responsive to change.
- k) It is facilitates continual improvement of the organization.

Additionally to the general risk management principles, the organization shall take into account and follow the following principles related with management system:

- a) **Leadership:** The top management shall encourage and involve all the people in the organization for the successful objective achievement.
- b) **Interested party focus:** Consider and know the expectatives and necessities of interested parties.
- c) **Efficiency:** Risk management with efficiency criteria, compatible with the creation of added value and the effects on organization continual improvement at medium and long term point.

- d) **Additionality:** Best practices voluntary integrate in the organization management and culture besides the established compliance with the legal framework. This best practices that go beyond, cannot be considered as an alternative to obviate legal compliance.
- e) **Transversality:** Management risk integration into the decisions and actions inside the organization. This integration is known as responsibility and shared mission of the organization (and not only direct risk managers).

1 Scope

This specification includes the requirements for a nanotechnological risk management (MNM's RMM), destined to allow a construction sector organization to control the MNM's risk for occupational health and safety and improves its performance. This specification does not establish performance criteria for occupational health and safety nor gives detailed specifications for the RMM design.

This specification applies to any company/organization in construction sector that aimed at:

- a) establishing a MNM's RMM to eliminate or minimize the personnel risk and other interested parties that would be exposed to occupational safe and safety dangers associated with its processes and activities;
- b) implementing, maintaining and continuously improving a RMM;
- c) conformity assurance of establishes OH&S policy;
- d) proving conformity with this specification, by
 - 1 self-evaluation and self-declaration; or
 - 2 searching for the conformity confirmation by the interested parties inside the organization, such as clients; or
 - 3 searching for the self-declaration confirmation by an external party;
 - 4 searching for a certification/register of the MNM's RMM by a third part certification company.

All the requirements are aimed to be incorporate at any RMM. The level of application depends on factors like the organization's OH&S policy, the nature of its activities and the risk and complexity of its operations. This specification is expected to treat risks derived from nanomaterials, and not other health and safety areas like employers welfare programs, product security, property damages or environmental impacts.

2 Normative references

The standards referenced below may be of assistance in implementing the various elements of a MNM's Risk Management Model:

OHSAS 18001, *Occupational health and safety management systems- Requirements*

OHSAS 18002, *Occupational health and safety management systems- Guidelines for the implementation of OHSAS 18001.*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 MNMs risk

effect of uncertainty on objectives.

NOTE 1 An effect is a deviation from the expected — positive and/or negative.

NOTE 2 Objectives can have different aspects (such as financial, health and safety, and environmental goals) and can apply at different levels (such as strategic, organization-wide, project, product and process).

NOTE 3 Risk is often characterized by reference to potential events and consequences, or a combination of these.

NOTE 4 Risk is often expressed in terms of a combination of the consequences of an event (including changes in circumstances) and the associated likelihood of occurrence.

NOTE 5 Uncertainty is the state, even partial, of deficiency of information related to, understanding or knowledge of an event, its consequence, or likelihood.

[Adapted from ISO 31000]

3.2 MNMs risk management

coordinated activities to direct and control an organization with regard to risk.

[Adapted from ISO 31000]

3.3 MNMs risk management policy

statement of the overall intentions and direction of an organization related to MNMs risk management

[Adapted from ISO 31000]

3.4 communication and consultation

continual and iterative processes that an organization conducts to provide, share or obtain information and to engage in dialogue with stakeholders regarding the management of MNMs risk.

[ISO 31000]

3.5 stakeholder

person or organization that can affect, be affected by, or perceive themselves to be affected by a decision or activity

NOTE A decision maker can be a stakeholder.

3.6 MNMs risk assessment

overall process of risk identification, risk analysis and risk evaluation.

[Adapted from ISO 31000]

3.7 MNMs risk identification

process of finding, recognizing and describing risks

NOTE 1 Risk identification involves the identification of risk sources, events, their causes and their potential consequences.

NOTE 2 Risk identification can involve historical data, theoretical analysis, informed and expert opinions, and stakeholder's needs.

[Adapted from ISO 31000]

3.8 risk owner

person or entity with the accountability and authority to manage a risk.

[ISO 31000]

3.9 event

occurrence or change of a particular set of circumstances

NOTE 1 An event can be one or more occurrences, and can have several causes.

NOTE 2 An event can consist of something not happening.

NOTE 3 An event can sometimes be referred to as an “incident” or “accident”.

NOTE 4 An event without consequences can also be referred to as a “near miss”, “incident”, “near hit” or “close call”.

[ISO 31000]

3.10 consequence

outcome of an event affecting objectives

NOTE 1 An event can lead to a range of consequences.

NOTE 2 A consequence can be certain or uncertain and can have positive or negative effects on objectives.

NOTE 3 Consequences can be expressed qualitatively or quantitatively.

NOTE 4 Initial consequences can escalate through knock-on effects.

[ISO 31000]

3.11 likelihood

chance of something happening

NOTE 1 In risk management terminology, the word “likelihood” is used to refer to the chance of something happening, whether defined, measured or determined objectively or subjectively, qualitatively or quantitatively, and described using general terms or mathematically (such as a probability or a frequency over a given time period).

NOTE 2 The English term “likelihood” does not have a direct equivalent in some languages; instead, the equivalent of the term “probability” is often used. However, in English, “probability” is often narrowly interpreted as a mathematical term. Therefore, in risk management terminology, “likelihood” is used with the intent that it should have the same broad interpretation as the term “probability” has in many languages other than English.

[ISO 31000]

3.12 level of risk

magnitude of a risk or combination of risks, expressed in terms of the combination of consequences and their likelihood

[ISO 31000]

3.13 MNMs risk evaluation

process of comparing the results of risk analysis with risk criteria to determine whether the risk and/or its magnitude is acceptable or tolerable

NOTE Risk evaluation assists in the decision about risk treatment process to modify risk

NOTE 1 Risk treatment can involve:

- avoiding the risk by deciding not to start or continue with the activity that gives rise to the risk;
- taking or increasing risk in order to pursue an opportunity;
- removing the risk source;
- changing the likelihood ;
- changing the consequences ;
- sharing the risk with another party or parties (including contracts and risk financing); and
- retaining the risk by informed decision.

NOTE 2 Risk treatments that deal with negative consequences are sometimes referred to as “risk mitigation”, “risk elimination”, “risk prevention” and “risk reduction”.

NOTE 3 Risk treatment can create new risks or modify existing risks.

[Adapted from ISO 31000]

3.14 continual improvement

recurring process of enhancing the MNMs RMM in order to achieve improvements in overall MNMs risk management performance consistent with the organization’s MNMs risk management policy.

NOTE 1 The process need not take place in all areas of activity simultaneously.

[OHSAS 18001:2007]

3.15 corrective action

action to eliminate the cause of a detected nonconformity (3.11) or other undesirable situation.

NOTE 1 There can be more than one cause for a nonconformity.

NOTE 2 Corrective action is taken to prevent recurrence whereas preventive action (3.22) is taken to prevent occurrence.

[OHSAS 18001:2007]

3.16 incident

work-related event(s) in which an injury or ill health (regardless of severity) or fatality occurred, or could have occurred

NOTE 1 An accident is an incident which has given rise to injury, ill health or fatality.

NOTE 2 An incident where no injury, ill health, or fatality occurs may also be referred to as a “near-miss”, “near-hit”, “close call” or “dangerous occurrence”.

NOTE 3 An emergency situation is a particular type of incident.

[OHSAS 18001:2007]

3.17 nonconformity

non-fulfilment of a requirement

NOTE A nonconformity can be any deviation from:

- relevant work standards, practices, procedures, legal requirements, etc.
- MNMs RMM requirements.

[Adapted from OHSAS 18001:2007]

3.18 occupational health and safety

conditions and factors that affect, or could affect, the health and safety of employees or other workers (including temporary workers and contractor personnel), visitors, or any other person in the workplace.

NOTE Organizations can be subject to legal requirements for the health and safety of persons beyond the immediate workplace, or who are exposed to the workplace activities.

[OHSAS 18001:2007]

3.19 objective

goal, in terms of MNMs risk management performance, that an organization sets itself to achieve

NOTE 1 Objectives should be quantified wherever practicable.

NOTE 2 Objectives are consistent with the MNMs risk management policy.

[Adapted from *OHSAS 18001:2007*]

3.20 MNMs risk management policy

overall intentions and direction of an organization related to its MNMs risk management performance as formally expressed by top management

NOTE 1 The MNMs risk management policy provides a framework for action and for the setting of objectives.

[Adapted from *OHSAS 18001:2007*]

3.21 organization

company, corporation, firm, enterprise, authority or institution, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration

NOTE For organizations with more than one operating unit, a single operating unit may be defined as an organization.

[OHSAS 18001:2007]

3.22 preventive action¹

action to eliminate the cause of a potential nonconformity (3.11) or other undesirable potential situation

NOTE 1 There can be more than one cause for a potential nonconformity.

NOTE 2 Preventive action is taken to prevent occurrence whereas corrective action (3.4) is taken to prevent recurrence.

[OHSAS 18001:2007]

3.23 workplace

any physical location in which work related activities are performed under the control of the organization

NOTE When giving consideration to what constitutes a workplace, the organization should take into account the OH&S effects on personnel who are, for example, travelling or in transit (e.g. driving, flying, on boats or trains), working at the premises of a client or customer, or working at home.

[OHSAS 18001:2007]

3.24 Nanomaterial/NOAH

as defined in *2011/696/EU Commission Recommendation of 18 October 2011 on the definition of nanomaterial* or in case of broader scope not covered by this definition the ones identified by the ISO/TC 229 Nanomaterials included in ISO/TC 27687:2008 and ISO/TS 80004-1:2010.

4 Requirements for the Occupational Health and Safety MNMs Risk Management Model

4.1 General Requirements

The organization shall establish, implement and maintain the MNMs RMM by ensuring that is applied through a MNMs risk management plan at all relevant levels and functions of the organization as part of its practices and processes.

4.1.1 Context

The organization shall establish the external and internal context in which the organization seeks to achieve its objectives related to OH&S and affecting to capacity to carry out the expected results of MNMs RMM.

External context can include: the cultural, social, political, legal, regulatory, financial, technological, economic, natural and competitive environment, whether international, national, regional or local; and relationships with,

¹ In ISO /CD 45001 the preventive action is not specifically included taking into account that all the system is establish with a prevention approach.

and perceptions and values of external stakeholders.

Internal context can include: governance, organizational structure, roles and accountabilities; policies, objectives, and the strategies that are in place to achieve them; infrastructure; critical areas; the human resources and knowledge; information systems; relationships with, and perceptions and values of, internal stakeholders.

4.1.2 Necessities and expectations for stakeholders

The organization shall identify the internal and external stakeholders affected to MNMs RMM, and establish the requirements for them.

It is necessary to ensure the necessities and expectations for stakeholders are understood and taken into account.

The stakeholders affected for the MNMs RMM, can include, but not limited to: owners, shareholders, investors and partners; employees; customers, users and consumers; product suppliers, service providers and partners; alliances and collaborative efforts; government; community and society.

4.1.3 Scope determination and requirements for the MNMs RMM.

The organization shall determine the limits and applicability of MNMs RMM to establish its scope.

When this scope is determined, the organization must take into account the external and internal aspects and requirements of the stakeholders referred to in 4.1.2 .

The scope should include, among other information, the workplace, organizational units and locations.

In defining the scope of MNMs RMM, the organization shall document and explain those exclusions which should not affect the ability and responsibility of the organization to provide the achievement of its objectives, the continuity of the organization and its activities, as well as compliance with legal, regulatory and other requirements.

The organization shall establish, document, implement, review and continuously improve the MNMs RMM effectively in accordance with the requirements of this specification, and determine how you will comply with these requirements.

When an organization chooses to outsource any activities that affect conformity to requirements, the organization shall ensure control over such process. The type and extend of control to be applied to these outsourced processes shall be defined within the MNMs RMM.

NOTE 1 An “outsourced activity” is an activity that the organization needs for its MNMs RMM, and which the organization chooses to have performed by an external party.

NOTE 2 Ensuring control over outsourced activities does not absolve the organization of the responsibility of conformity to all requirements, including legal and regulatory.

4.2 MNMs risk management policy and management commitment

4.2.1 Management commitment

Top management shall ensure that the roles, responsibilities and authority in the organization, as well as accountability for managing OH&S matters related to MNMs risk. These shall be documented and communicated within the organization to facilitate effective management of MNMs Risks.

Among others, identify risk owners and people who have accountability of performance, implementation and maintenance of MNMs RMM at all levels of the organization and ensure that they have the appropriate skills to manage MNMs risks

4.2.2 MNMs risk management policy

Top management shall define and authorize the organization's MNMs risk management policy and ensure that within the defined scope of its MNMs RMM it:

- a) is appropriate to the nature and scale of the organization's OH&S matters related to MNMs risks;
- b) includes a commitment to prevention of injury and ill health and continual improvement in MNMs RMM and MNMs risk management performance;
- c) includes a commitment to at least comply with applicable legal requirements and with other requirements to which the organization subscribes that relate to its MNMs risks;
- d) provides the framework for setting and reviewing objectives;
- e) is documented, implemented and maintained;
- f) is communicated to all persons working under the control of the organization with the intent that they are made aware of their individual MNMs RMM obligations;
- g) is available to stakeholders; and
- h) is reviewed periodically to ensure that it remains relevant and appropriate to the organization.

4.3 Planning

4.3.1 MNMs risk assessment

4.3.1.1 General

The organization shall establish, implement and maintain a procedure(s) for the ongoing MNMs risk identification, MNMs risk assessment, and determination of necessary controls.

NOTE ISO/IEC 31010 provides guidance on risk identification, analysis and evaluation techniques.

4.3.1.2 MNMs risk identification

The organization shall establish, implement and maintain a procedure(s) for the ongoing MNMs risk identification. The procedure(s) for MNMs risk identification shall take into account:

- a) Identify sources of MNMs risk, areas of impacts, events (including changes in circumstances) and their causes and their potential consequences;

- b) activities of all persons having access to the workplace (including contractors and visitors);
- c) human behaviour, capabilities and other human factors;
- d) identified risks originating outside the workplace capable of adversely affecting the health and safety of persons under the control of the organization within the workplace;
- e) hazards created in the vicinity of the workplace by work-related activities under the control of the organization.

NOTE 1 It may be more appropriate for such risks to be assessed as an environmental aspect.

- f) infrastructure, equipment and materials at the workplace, whether provided by the organization or others;
- g) changes or proposed changes in the organization, its activities, or materials;
- h) Operations, process and activities (routine and non-routine activities) and their workplaces.
- i) Legal and other requirements to which the organization subscribes that are applicable to it.
- j) modifications to the MNMs risk management model, including temporary changes, and their impacts on operations, processes, and activities;
- k) any applicable legal obligations relating to risk assessment and implementation of necessary controls);
- l) the design of work areas, processes, installations, machinery/equipment, operating procedures and work organization, including their adaptation to human capabilities.

The MNMs risk identification is included:

- a) those events that could create, enhance, prevent, degrade, accelerate or delay the achievement of objectives;
- b) sources of MNMs risk, whether or not under the control of the organization;
- c) areas of risk impacts on operations, processes and activities of the organization;
- d) the causes and potential consequences of the risks, include examination of the knock-on effects of particular consequences, including cascade and cumulative effects.

NOTE Comprehensive identification is critical, because a risk that is not identified at this stage will not be included in further analysis.

The organization should apply risk identification tools and techniques that are suited to its objectives and capabilities, and to the risks faced. Relevant and up-to-date information is important in identifying MNMs risks. This should include appropriate background information where possible. People with appropriate knowledge should be involved in identifying MNMs risks.

The organization shall document and keep the results of identification of MNMs hazards, risk assessments and determined controls up-to-date

4.3.1.3 MNMs risk evaluation

The organization shall establish, implement and maintain a procedure for MNMs risk evaluation, so that the nature and level of risk is understood to prioritize the risks to be addressed and to facilitate decision making in the organization.

First, the organization shall define criteria to be used to evaluate the significance of MNMs risk. The criteria should reflect the organization's values, MNMs risk policy, objectives and resource, and some criteria can be imposed by, or derived from, legal and regulatory requirements and other requirements to which the organization subscribes. When defining risk criteria, factors to be considered should include the following:

- a) establishment of the internal and external context;
- b) the nature and types of causes and consequences that can occur and how they will be measured;
- c) how likelihood will be defined;
- d) the timeframe(s) of the likelihood and/or consequence(s);
- e) how the level of risk is to be determined;
- f) the views of stakeholders;
- g) the level at which risk becomes acceptable or tolerable; and
- h) whether combinations of multiple risks should be taken into account and, if so, how and which combinations should be considered.

NOTA The MNMs Risk Criteria shall be documented and communicated.

MNMs Risk evaluation involves developing an understanding of the MNMs risk. The organization shall establish, implement and maintain a procedure(s) for MNMs risk evaluation. The purpose of risk evaluation is to develop an understanding of the MNMs risk and assist in making decisions into the organization, about which risks need treatment and the priority for treatment implementation.

MNMs Risk is analyzed by determining consequences and their likelihood, and other attributes of the risk. The way in which consequences and likelihood are expressed and the way in which they are combined to determine a level of risk should reflect the type of risk, the information available and the purpose for which the risk assessment output is to be used. These should all be consistent with the MNMs risk criteria. It is also important to consider the interdependence of different risks and their sources.

Afterwards, risk evaluation involves comparing the level of risk found during the analysis process with risk criteria established. Based on this comparison, the need for treatment can be considered.

4.3.2 MNMs risk treatment

The organization shall establish, implement and maintain a procedure(s) for selecting one or more options for modifying risks, and implementing those options. Once implemented, treatments provide or modify the controls.

MNMs risk treatment options are not necessarily mutually exclusive or appropriate in all circumstances. The options can include the following:

- a) avoiding the MNMs risk by deciding not to start or continue with the activity that gives rise to the MNMs risk;
- b) taking or increasing the MNMs risk in order to pursue an opportunity;
- c) removing the MNMs risk source;
- d) changing the likelihood;

- e) changing the consequences;
- f) sharing the MNMs risk with another party or parties (including contracts and risk financing); and
- g) retaining the MNMs risk by informed decision.

Selecting the most appropriate MNMs risk treatment option involves balancing the costs and efforts of implementation against the benefits derived, with regard to legal, regulatory, and other requirements. The purpose of MNMs risk treatment plans is to document how the chosen treatment options will be implemented: the reasons for selection of treatment options, responsible, proposed actions, resources requirements, performances measures and timing and schedule.

The organization shall be a planned the MNMs risk treatment plans evaluation. It shall be periodic.

The monitoring and review shall be a planned part of the risk management process and involve regular checking or surveillance.

4.3.3 Legal and other requirements

The organization shall establish, implement and maintain a procedure(s) for identifying and accessing the legal and other MNMs RMM requirements that are applicable to it.

The organization shall ensure that these applicable legal requirements and other requirements to which the organization subscribes are taken into account in establishing, implementing and maintaining its MNMs RMM.

The organization shall keep this information up-to-date.

The organization shall communicate relevant information on legal and other requirements to persons working under the control of the organization, and other relevant stakeholders.

4.3.4 Objectives and programmes

4.3.4.1 Objectives, goals and programmes of MNMs RMM for

The organization shall establish, implement and maintain documented objectives, goals and programmes of MNMs RMM at relevant functions and levels within the organization.

The objectives and goals shall be measurable, where practicable, and consistent with the MNMs Risk management policy, including the commitments to the prevention of injury and ill health, to compliance with applicable legal requirements and with other requirements to which the organization subscribes, and to continual improvement.

When establishing and reviewing its objectives, an organization shall take into account the internal and external context, the legal requirements and other requirements to which the organization subscribes, and its MNMs risks. It shall also consider its technological options, its financial, operational and business requirements, and the views of relevant stakeholders.

The organization shall establish, implement and maintain a programme(s) for achieving the MNMs RMM objectives. Programme(s) shall include as a minimum:

- a) designation of responsibility and authority for achieving objectives at relevant functions and levels of the organization; and
- b) the means and time-frame by which the objectives are to be achieved.

The programme(s) shall be reviewed at regular and planned intervals, and adjusted as necessary, to ensure that the objectives are achieved.

4.3.4.2 MNMs risk management planning

Top management shall ensure that:

- a) the planning of the MNMs RMM is carried out in order to meet the requirements given in 4.1 as well as the objectives, goals and programmes, and
- b) the integrity of the MNMs RMM is maintained when the changes to the MNMs RMM are planned and implemented.

4.4 Implementation and operation

4.4.1 Resources, roles, responsibility, accountability and authority. General

Top management shall take ultimate responsibility for OH&S and MNMs RMM.

Top management shall demonstrate its commitment by:

- a) ensuring the availability of resources essential to establish, implement, maintain and improve the MNMs RMM.

NOTE 1 Resources include human resources and specialized skills, organizational infrastructure, technology and financial resources;

- b) defining roles, allocating responsibilities and accountabilities, and delegating authorities, to facilitate effective MNMs RMM; roles, responsibilities, accountabilities, and authorities shall be documented and communicated.

The organization shall appoint a member(s) of top management with specific responsibility for MNMs RMM, irrespective of other responsibilities, and with defined roles and authority for:

- a) ensuring that the MNMs RMM is established, implemented and maintained in accordance with this model;
- b) ensuring that reports on the performance of the MNMs RMM are presented to top management for review and used as a basis for improvement of MNMs RMM.

NOTE 2 The top management appointee (e.g. in a large organization, a Board or executive committee member) may delegate some of their duties to a subordinate management representative(s) while still retaining accountability.

The identity of the top management appointee shall be made available to all persons working under the control of the organization.

All those with management responsibility shall demonstrate their commitment to the continual improvement of MNMs RMM performance.

The organization shall ensure that persons in the workplace take responsibility for aspects of MNMs RMM over

which they have control, including adherence to the organization's applicable MNMS RMM requirements.

4.4.1.1 Responsibility and authority

Top management shall ensure that responsibilities and authority are defined and communicated within the organization.

4.4.1.2 Management representative²

Top management shall appoint a member of the organization's management who, irrespective of other responsibilities, shall have responsibilities and authority that includes:

- a) ensuring that processes needed for the MNMs RMM are established, implemented and maintained,
- b) reporting to top management on the MNMs RMM performance and any need for improvement, and
- c) ensuring the promotion of awareness of MNMs RMM requirements.

NOTE The responsibility of a management representative can include liaison with external stakeholders on matters relating to MNMs RMM.

4.4.1.3 Infrastructure

The organization shall determine, provide and maintain the infrastructure needed to achieve conformity to MNMS RMM requirements. Infrastructures includes, as applicable,

- a) buildings, workspace and associated utilities;
- b) process equipment (both hardware and software), and
- c) supporting services (such as transport, communication or information systems).

4.4.2 Competence, training and awareness

The organization shall ensure that any person(s) under its control performing tasks that can impact on OH&S matters related to MNMs risks is (are) competent on the basis of appropriate education, training or experience, and shall retain associated records.

The organization shall identify training needs associated with its MNMs risks and its MNMs RMM. It shall provide training or take other action to meet these needs, evaluate the effectiveness of the training or action taken, and retain associated records.

The organization shall establish, implement and maintain a procedure(s) to make persons working under its control aware of:

- a) the MNMs risk consequences, actual or potential, of their work activities, their behaviour;

² In ISO/CD 45001 the figure of management representative is not included because as explained before OH&S aspects are integrated in overall management system, so the responsibility is for the top management

- b) their roles and responsibilities and importance in achieving conformity to the MNMs risk management policy and procedures and to the requirements of the MNMs RMM, including emergency preparedness and response requirements;
- c) the potential consequences of departure from specified procedures.

Training procedures shall take into account differing levels of:

- a) responsibility, ability, language skills and literacy; and
- b) risk.

4.4.3 Communication, participation and consultation

4.4.3.1 Communication and information

The organization shall establish, implement and maintain with the stakeholders, internal and external communication and reporting mechanisms and procedures in order to

- a) internal communication among the various levels and functions of the organization;
- b) communication with contractors and other visitors to the workplace;
- c) receiving, documenting and responding to relevant communications from external stakeholders.

The communication and reporting mechanisms should, where appropriate, include processes to consolidate risk information from a variety of sources, and may need to consider the sensitivity of the information.

4.4.3.2 Participation and consultation

The organization shall establish, implement and maintain a procedure(s) for:

- a) the participation of workers by their:
 - appropriate involvement in MNMs risk identification, risk evaluation and determination of controls;
 - appropriate involvement in incident investigation;
 - involvement in the development and review of MNMs RMM policies and objectives;
 - consultation where there are any changes that affect their OH&S related to MNMs risks;
 - representation on OH&S related to MNMs matters.

Workers shall be informed about their participation arrangements, including who is their representative(s) on MNMs matters.

- b) consultation with contractors where there are changes that affect their OH&S related to MNMs risks.

The organization shall ensure that, when appropriate, relevant external stakeholders are consulted about pertinent Occupational, Health and Safety matters related to MNMs risks.

Effective external and internal communication and consultation should take place to ensure that those accountable for implementing the MNMs RMM and stakeholders understand the basis on which decisions are

made, and the reasons why particular actions are required.

4.4.4 Documentation

4.4.4.1 General

The MNMs RMM documentation shall include:

- a) the MNMs risk management policy and objectives;
- b) description of the scope of the MNMs RMM;
- c) description of the main elements of the MNMs RMM and their interaction, and reference to related documents;
- d) documents, including records, required by the model; and
- e) documents, including records, determined by the organization to be necessary to ensure the effective planning, operation and control of processes that relate to the management of its MNMs risks.

NOTE It is important that documentation is proportional to the level of complexity and risks concerned and is kept to the minimum required for effectiveness and efficiency.

4.4.4.2 MNMs Risk manual

The organization shall establish and maintain a MNMs risk manual that includes

- a) the scope of the MNMs RMM;
- b) the description of the main elements of the MNMs RMM and their interaction, and reference to related documents;
- c) the main types of MNMs risks and MNMs risk criteria;
- d) the documented procedures established for the MNMs RMM, or reference to them.

4.4.5 Control of documents

Documents required by the MNMs RMM shall be controlled. Records are a special type of document and shall be controlled in accordance with the requirements given in 4.5.4.

The organization shall establish, implement and maintain a procedure(s) to:

- a) approve documents for adequacy prior to issue;
- b) review and update as necessary and re-approve documents;
- c) ensure that changes and the current revision status of documents are identified;
- d) ensure that relevant versions of applicable documents are available at points of use;
- e) ensure that documents remain legible and readily identifiable;
- f) ensure that documents of external origin determined by the organization to be necessary for the planning and operation of the OH&S management system are identified and their distribution controlled; and

- g) prevent the unintended use of obsolete documents and apply suitable identification to them if they are retained for any purpose.

4.4.6 MNMs operational control

The organization shall determine those operations and activities that are associated with the identified risk(s) where the implementation of controls is necessary to manage the MNM's risk(s). This shall include the management of change (see 4.3.1).

For those operations and activities, the organization shall implement and maintain:

- a) documented procedures to cover situations where their absence could lead to deviations from its MNMs RMM policy and objectives;
- b) operational criteria in the procedures;
- c) operational controls, as applicable, for the organization and its activities;
- d) controls related to contractors and other visitors to the workplace?
- e) controls related to the goods and services used by the organization and communication applicable procedures and requirements for stakeholders and;
- f) controls related to the stakeholders of the organization.

4.4.7 MNMs emergencies preparedness and response

4.4.7.1 MNMs incidents preparedness and response

The organization shall establish, implement and maintain a procedure(s) to identify the potential for emergency situations related to MNMs risks and to respond to such emergency situations.

The organization shall respond to actual emergency situations and prevent or mitigate associated adverse OH&S matters related to MNMs risks consequences.

In planning its emergency response the organization shall take account of the needs of relevant stakeholders.

The organization shall also periodically test its procedure(s) to respond to emergency situations related to MNMs risks, where practicable, involving relevant stakeholders as appropriate.

The organization shall periodically review and, where necessary, revise its emergency preparedness and response procedure(s), in particular, after periodical testing and after the occurrence of emergency situations (see 4.5.3).

4.4.7.2 Recuperation from an organization activity interruption

The organization shall establish a procedure (s) that ensures the continuity of the activities of the organization to events that are likely to interrupt them.

Take into account especially those activities related to MNMs risk that support the products and / or services of the organization.

These procedures shall ensure the resilience of the organization with minimum conditions for continuing to

operate in the most effective manner.

Recovery procedure(s) in activity to an interruption of it must determine:

- a) the minimum conditions necessary for the continuation of the activities of the organization;
- b) the period within which the activity must be recovered to the conditions set after an interruption;
- c) the steps and actions to take when the interrupt occurs;
- d) protocols appropriate internal and external communication;
- e) the persons responsible for managing the recovery of such activities;
- f) the resources needed to deal with the recovery of activity.

The organization shall periodically review and modify where necessary, procedures for recovery of activity to an interruption of the activity of the organization, taking into account the needs of relevant stakeholders as appropriate.

NOTE 1 The ISO 22301 standard specifies the minimum requirements for a management system for business continuity of an organization.

4.5 Checking

4.5.1 Monitoring and measurements of MNMs risk management activities

The organization shall establish, implement and maintain a procedure(s) to monitor and measure MNMs RMM performance on a regular basis. This procedure(s) shall provide for:

- a) performance measures that track conformity with the programs, controls and operational criteria as well as the qualitative and quantitative measures appropriate to the needs of the organization;
- b) monitoring of the extent to which the organization's MNMs RMM objectives are met;
- c) monitor the effectiveness of the controls (for health as well as for safety related to MNMs risks);
- d) proactive measures of performance that monitor conformance with the MNMs RMM programme(s), controls and operational criteria;
- e) reactive measures of performance that monitor ill health, incidents (including incidents, accidents, near-misses, etc.), and other historical evidence of deficient MNMs RMM performance;
- f) detecting changes that may occur in the context of the organization, including changes to MNMs risk criteria and the risk itself which can require revision of corrective and preventive actions and priorities
- g) recording of data and results of monitoring and measurement sufficient to facilitate subsequent corrective action and preventive action analysis.
- h) identifying emerging MNMs risks;

The responsibilities of performance measurement and monitoring shall be clearly defined.

If equipment is required to monitor or measure performance, the organization shall establish and maintain

procedures for the calibration and maintenance of such equipment, as appropriate. Records of calibration and maintenance activities and results shall be retained.

4.5.2 Legal compliance evaluation

Consistent with its commitment to compliance, the organization shall establish, implement and maintain a procedure(s) for periodically evaluating compliance with applicable legal requirements (see **4.3.2**).

The organization shall keep records of the results of the periodic evaluations.

NOTE The frequency of periodic evaluation may vary for differing legal requirements.

The organization shall evaluate compliance with other requirements to which it subscribes (see **4.3.2**). The organization may wish to combine this evaluation with the evaluation of legal compliance referred to in 4.5.2.1 or to establish a separate procedure(s).

The organization shall keep records of the results of the periodic evaluations.

NOTE The frequency of periodic evaluation may vary for differing other requirements to which the organization subscribes related to MNMs risks.

4.5.3 Incident investigation, nonconformity, corrective action and preventive action

4.5.3.1 Event and incident investigation

The organization shall establish, implement and maintain a procedure(s) to record, investigate and analyse event and incidents in order to:

- a) determine underlying MNMs RMM deficiencies and other factors that might be causing or contributing to the occurrence of incidents;
- b) improve the MNMs risk identification, evaluation and treatment process
- c) identify the need for corrective action;
- d) identify opportunities for preventive action;
- e) identify opportunities for continual improvement;
- f) communicate the results of such investigations.

The investigations shall be performed in a timely manner.

Any identified need for corrective action or opportunities for preventive action shall be dealt with in accordance with the relevant parts of 4.5.3.2.

The results of incident investigations shall be documented and maintained.

4.5.3.2 Nonconformity, corrective action and preventive action

The organization shall establish, implement and maintain a procedure(s) for dealing with actual and potential nonconformity(ies) and for taking corrective action and preventive action.

The procedure(s) shall define requirements for:

- a) identifying and correcting nonconformity(ies) and taking action(s) to mitigate their MNMs risk consequences;
- b) investigating nonconformity(ies), determining their cause(s) and taking actions in order to avoid their recurrence;
- c) evaluating the need for action(s) to prevent nonconformity(ies) and implementing appropriate actions designed to avoid their occurrence;
- d) recording and communicating the results of corrective action(s) and preventive action(s) taken; and
- e) reviewing the effectiveness of corrective action(s) and preventive action(s) taken.

Where the corrective action and preventive action identifies new or changed hazards related to MNMs risk or the need for new or changed controls, the procedure shall require that the proposed actions shall be taken through a risk assessment prior to implementation.

Any corrective action or preventive action taken to eliminate the causes of actual and potential nonconformity (ies) shall be appropriate to the magnitude of problems and commensurate with the MNMs risk(s) encountered.

The organization shall ensure that any necessary changes arising from corrective action and preventive action are made to the MNMs RMM documentation.

4.5.4 Control of records

The organization shall establish and maintain records as necessary to demonstrate conformity to the requirements of its MNMs RMM, and the results achieved.

The organization shall establish, implement and maintain a procedure(s) for the identification, storage, protection, retrieval, retention and disposal of records.

Records shall be and remain legible, identifiable and traceable.

4.5.5 Internal audit

The organization shall ensure that internal audits of the MNMs RMM are conducted at planned intervals to:

- a) determine whether the MNMs RMM:
 - 1) conforms to planned arrangements for OH&S matters related to MNMs risks, including the requirements of this model; and
 - 2) has been properly implemented and is maintained; and
 - 3) is effective in meeting the organization's policy and objectives;
- b) provide information on the results of audits to management.

Audit programme(s) shall be planned, established, implemented and maintained by the organization, based on the results of risk assessments of the organization's activities, and the results of previous audits.

Audit procedure(s) shall be established, implemented and maintained that address:

- a) the responsibilities, competencies, and requirements for planning and conducting audits, reporting results and retaining associated records; and
- b) the determination of audit criteria, scope, frequency and methods.

Selection of auditors and conduct of audits shall ensure objectivity and the impartiality of the audit process.

4.6 Management review

4.6.1 Management model review

Top management shall review the organization's MNMs RMM, at planned intervals, to ensure its continuing suitability adequacy and effectiveness. Reviews shall include assessing opportunities for improvement and the need for changes to the MNMs RMM, including the MNMs RMM policy and objectives.

Records of the management reviews shall be retained.

4.6.1.1 Outputs for review

Input to management reviews shall include:

- a) results of internal audits and evaluations of compliance with applicable legal requirements and with other requirements to which the organization subscribes related to occupational, health and safety matters related to MNMs risks;
- b) the results of participation and consultation (see 4.4.3);
- c) relevant communication(s) from external stakeholders, including complaints;
- d) the MNMs RMM performance of the organization;
- e) the extent to which objectives have been met;
- f) status of incident investigations, corrective actions and preventive actions;
- g) follow-up actions from previous management reviews;
- h) changing circumstances, including developments in legal and other requirements related to occupational, health and safety matters related to MNMs risks; and
- i) recommendations for improvement.

4.6.1.2 Review results

The outputs from management reviews shall be consistent with the organization's commitment to continual improvement and shall include any decisions and actions related to possible changes to:

- a) MNMs RMM performance;
- b) MNMs RMM policy and objectives;

- c) resources; and
- d) other elements of the MNMs RMM.

Relevant outputs from management review shall be made available for communication and consultation.

4.6.2 Data analysis

The organization shall determine, collect and analyse appropriate data to demonstrate the suitability and effectiveness of the MNMs RMM and evaluate where continual improvement of the effectiveness of the MNMs RMM can be made. This shall include data generated as a result of monitoring and measurement and from other relevant sources.

4.6.3 Continual improvement

The organization shall continually improve the effectiveness of the MNMs RMM through the use of the MNMs risk management policy, objectives, goals and programmes, audit results, analysis of data, corrective and preventive actions and management review.

5 CONCLUSIONS

This report will allow any construction sector organization to find a systematic approach to manage its risk associated with MNMs.

The main conclusions based on the design model for the RMM are:

- ✓ the RMM is based on a conformity assessment extended scheme and the PDCA cycle like OSHAS 18001. The outline is very similar to the most implemented management systems ISO 9001 and ISO 14001. This design for the model allows the integration with the other management systems especially for the common requirements (systems requirements as document control, audits, training, etc).
- ✓ the RMM presents itself and innovative conceptual work taking into account derived from ISO 31000 requirements and OSHAS 18001
- ✓ the implementation of this RMM allows the organization to consider MNMs risk into OHSAS system. On the other hand, if the organization has no experience on a systematic approach for managing its occupational health and safety risks, the MNMs RMM implementation could be the first step for a more complete and organized perspective of OH&S risks.
- ✓ the RMM includes specific considerations on initial review, monitoring and audit that will be developed as specific requirements) for the model implementation and improvement in the Guide for the initial review, monitoring and audit (SPD15) and the Guide for the SMEs (SPD16).
- ✓ one organization that proves the successful implementation of this model should ensure all interested parties that has an appropriate MNMs risk management.
- ✓ this report establish the basis for the RM guide (SPD17), where the innovative solution and methods of further SCAFFOLD works will be integrated (product design, risk assessment and protection measures);
- ✓ the drafting of ISO 45001 in each stage will be tracked to ensure future compatibility of the model with this worldwide used future agreed reference for reduce de risk of harm in OH&S context.

6 CORRESPONDENCE TABLES

6.1 CORRESPONDENCE BETWEEN THE CLAUSES OF THE MNMs RISK MANAGEMENT MODEL AND CLAUSES OF THE OHSAS 18001 STANDARD

MNMs Risk Management Model		OHSAS 18001	
0	Introduction		Introduction
0.1	General		Foreword
0.2	General principles in MNMs risk management		
1	Scope	1	Scope
2	Normative references	2	Reference publications
3	Terms and definitions	3	Terms and definitions
4	Requirements for the MNMs Risk Management Model (only title)	4	OH&S management systems requirements (only title)
4.1	General requirements	4.1	General requirements
4.1.1	Context		
4.1.2	Necessities and expectations for stakeholders		
4.1.3	Scope determination and requirements for the MNMs RMM		
4.2	MNMs risk management policy and management commitment	4.2	OH&S policy
4.2.1	Management commitment		
4.2.2	MNMs risk management policy		
4.3	Planning (only title)	4.3	Planning (only title)
4.3.1	MNMs risk assessment	4.3.1	Hazard identification, risk assessments and determining controls
4.3.1.1	General		
4.3.1.2	MNMs risk identification		
4.3.1.3	MNMs risk evaluation		
4.3.2	MNMs risk treatment		
4.3.3	Legal and other requirements	4.3.2	Legal and other requirements
4.3.4	Objectives and programs	4.3.3	Objectives and program(s)
4.3.4.1	Objectives, goals and programs of risk management for		
4.3.4.2	MNMs risk management planning		

MNM's Risk Management Model		OHSAS 18001		
4.4	Implementation and operation (only title)	4.4	Implementation and operation (only title)	
4.4.1	Resources, roles, responsibility, accountability and authority. General.	4.4.1	Resources, roles, responsibility, accountability and authority	
4.4.1.1	Responsibility and authority			
4.4.1.2	Management representative			
4.4.1.3	Infrastructure			
4.4.2	Competence, training and awareness	4.4.2	Competence, training and awareness	
4.4.3	Communication, participation and consultation	4.4.3	Communication, participation and consultation	
4.4.3.1	Communication and information			
4.4.3.2	Participation and consultation			
4.4.4	Documentation	4.4.4	Documentation	
4.4.4.1	General			
4.4.4.2	MNM's risk management manual			
4.4.5	Control of documents	4.4.5	Control of documents	
4.4.6	MNM's operational control	4.4.6	Operational control	
4.4.7	MNM's emergencies preparedness and response	4.4.7	Emergency preparedness and response	
4.4.7.1	MNM's incidents preparedness and response			
4.4.7.2	Recuperation from an organization activity interruption			
4.5	Checking (only title). General	4.5	Checking (only title)	
4.5.1	Monitoring and measurement of MNM's risk management activities	4.5.1	Performance measurement and monitoring	
4.5.2	Legal compliance evaluation	4.5.2	Evaluation of compliance	
4.5.3	Incidents investigation, non conformity, corrective action and preventive action (only title)	4.5.3	Incidents investigation, non conformity, corrective action and preventive action (only title)	
4.5.3.1	Event and incidents investigation			1
4.5.3.2	Non conformity, corrective action and preventive action			2
4.5.4	Control of records	4.5.4	Control of records	
4.5.5	Internal audit	4.5.5	Internal audit	
4.6	Management review	4.6	Management review	

MNMs Risk Management Model		OHSAS 18001	
4.6.1	Management model review		
4.6.1.1	Outputs for the review		
4.6.1.2	Review results		
4.6.2	Data analysis		
4.6.3	Continual improvement		

6.2 CORRESPONDENCE BETWEEN THE CLAUSES OF THE MNMs RISK MANAGEMENT MODEL AND CLAUSES OF ISO 31000 STANDARD

MNMs Risk Management Model		ISO 31000	
0	Introduction		Introduction
0.1	General		
0.2	General principles in MNMs risk management	3	Principles
1	Scope	1	Scope
2	Normative references		
3	Terms and definitions	2	Terms and definitions
4	Requirements for the MNMs Risk Management Model (only title)	4.3	Design of framework for management risk
4.1	General requirements	4.4	Implementing the framework for managing risk
4.1.1	Context		
4.1.2	Necessities and expectations for stakeholders	4.1	General
4.1.3	Scope determination and requirements for the MNMs RMM	4.3.1 4.3.4	Understanding of the organization and its context Integration into organization processes
4.2	MNMs risk management policy and management commitment		
4.2.1	Management commitment	4.1	General
4.2.2	MNMs risk management policy		
4.3	Planning (only title)	4.2	Mandate and commitment
4.3.1	MNMs risk assessment	4.3.2	Establishing risk management policy
4.3.1.1	General	5.4.1	General
4.3.1.2	MNMs risk identification	5.4 5.4.2	Risk assessment (only title) Risk identification
4.3.1.3	MNMs risk evaluation	5.3 5.3.5 5.4.3 5.4.4	Establishing the context Defining risk criteria Risk analysis Risk evaluation

4.3.2	MNMs risk treatment	5.5	Risk treatment
4.3.3	Legal and other requirements		
4.3.4	Objectives and programs		
4.3.4.1	Objectives, goals and programs of risk management for MNMs	4.4	Implementing the framework for managing risk
4.3.4.2	MNMs risk management planning	4.2	Mandate and commitment
4.4	Implementation and operation (only title)		
4.4.1	Resources, roles, responsibility, accountability and authority. General.	4.3.5	Resources
4.4.1.1	Responsibility and authority	4.3.3	Accountability
4.4.1.2	Management representative		
4.4.1.3	Infrastructure		
4.4.2	Competence, training and awareness		
4.4.3	Communication, participation and consultation	4.3.6	Establishing internal communication and reporting mechanisms
4.4.3.1	Communication and information	4.3.7	Establishing external communication and reporting mechanisms
4.4.3.2	Participation and consultation	5.2	Communication and consultation
4.4.4	Documentation		
4.4.4.1	General		
4.4.4.2	MNMs risk management manual		
4.4.5	Control of documents		
4.4.6	MNMs operational control	4.4	Implementing the framework for managing risk
4.4.7	MNMs emergencies preparedness and response	5.5	Risk treatment
4.4.7.1	MNMs incidents preparedness and response		
4.4.7.2	Recuperation from an organization activity interruption		
4.5	Checking (only title). General		
4.5.1	Monitoring and measurement of MNMs risk management activities	4.5	Monitoring and review of the framework

		5.6	Monitoring and review
4.5.2	Legal compliance evaluation		
4.5.3	Incidents investigation, non conformity, corrective action and preventive action (only title)		
4.5.3.1	Event and incidents investigation		
4.5.3.2	Non conformity, corrective action and preventive action		
4.5.4	Control of records	5.7	Recording the risk management process
4.5.5	Internal audit		
4.6	Management review	4.2	Mandate and commitment
4.6.1	Management model review		
4.6.1.1	Outputs for the review		
4.6.1.2	Review results		
4.6.2	Data analysis		
4.6.3	Continual improvement	4.6	Continual improvement of the framework

7 REFERENCES OF KNOWLEDGE

SCAFFOLD Report D5.1 – RMM architecture and specifications. 30.11.2013.

OHSAS 18001:2007, Occupational health and safety management systems — Requirements

OHSAS 18002:2008, Occupational health and safety management systems — Guidelines for the implantation of OHSAS 18001

ISO 31000:2009, Risk Management — Principles and guidelines

ISO/IEC 31010:2009, Risk management — Risk assessment techniques

ISO 22320:2011, Societal security — Emergency management — Requirements for incident response

AENOR EA 0031 Risk management system

Evolution of ISO/CD 45001