



Nanosafety: From research to implementation of risk management and Safe Innovation in the nanotechnology industry

Strategies, methods and tools for occupational nanosafety in construction:
Results of the EU project Scaffold.

Jesús M. Lopez de Ipiña
Industry and Transport Division

14.1
MILLION OPERATIVES

6.5%
OF EUROPE'S TOTAL EMPLOYMENT

28.7%
OF INDUSTRIAL EMPLOYMENT

42.3
MILLION WORKERS

in the EU depend, directly or indirectly,
on the construction sector*

Multiplier effect:

1 person working in the construction industry
=
2 further persons working in other sector*

* source: Communication from the Commission "The Competitiveness of the Construction Industry", COM(97) 539 of 4/11/1997, chapter 2

3

MILLION ENTERPRISES
95% are SMEs with fewer than
20 and 93% with fewer than 10
operatives

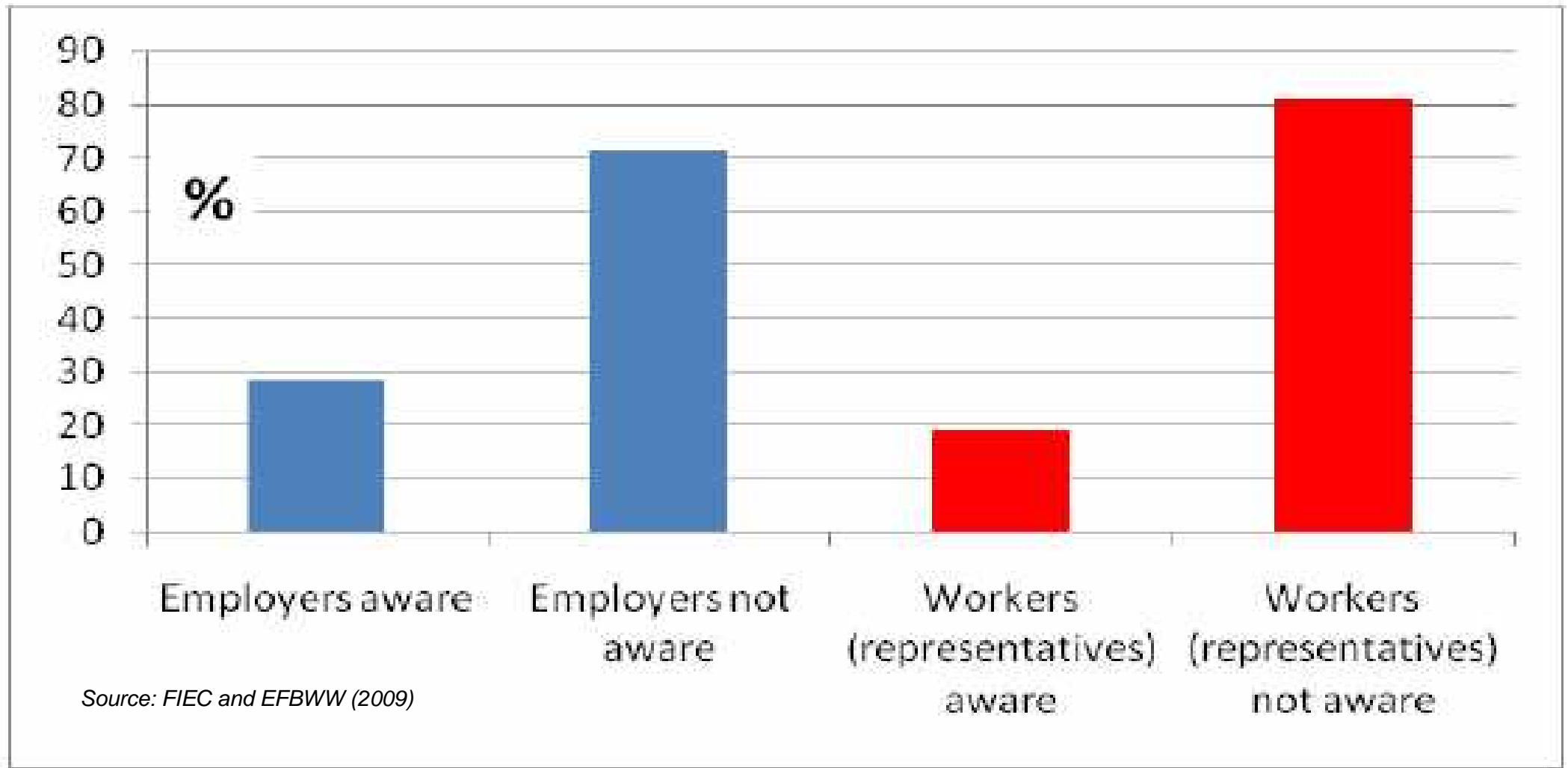
€ 1,211
BILLION

**Total construction
in 2014 (EU28)**

8.8%
OF GDP IN 2014 (EU 28)

Subcontracting: 45 %

***OHS performance:** Close to one in four (23.1 %) fatal accidents at work took place within the construction sector*



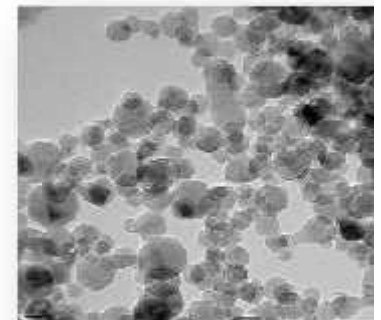
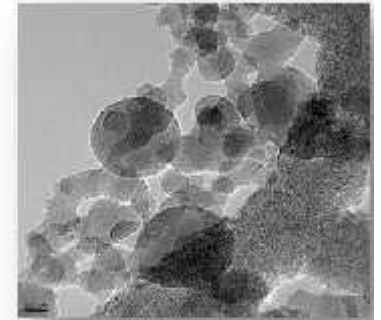
- “The **employer** shall have a **duty to ensure** the safety and health of workers **in every aspect related to the work**” (Directive 89/391/EEC).
- “The **employer** shall be **alert** to the need to adjust these measures to take account of **changing circumstances** and aim to improve existing situations” (Directive 89/391/EEC).
- “... **nanomaterials are similar to normal chemicals / substances in that some may be toxic and some may not.** Possible risks are related to specific nanomaterials and specific uses” *COM(2012) 572 final, Second Regulatory Review on Nanomaterials*

- Companies and workers are using and handling MNMs and nano-products in construction
- Exposures are produced at different stages of the construction industry life cycle
- Legal uncertainty
- Proactive approach (98/24/EC):
 - Prevention of risks
 - Assessment of risks
 - Specific protection and prevention measures
 - Arrangements to deal with accidents, incidents and emergencies
 - Information and training for workers
 - Occupational exposure limit value
 - Consultation and participation of workers
 - Health surveillance



SCAFFOLD is an **industry-oriented** idea specifically focussed on providing **practical, robust, easy-to-use and cost effective solutions** to the **European construction industry**, regarding current **uncertainties** about occupational exposure to MNMs.

Category of exposure scenario	MNM and application				
	nano-TiO ₂ (NPs, depollutant mortar & self-cleaning coatings)	nano-SiO ₂ (NPs, self-compacting concrete)	nano-Clay (fire retardant panels)	Carbon nano-fibres (coating laminates)	nano-cellulose (insulations)
1.- MNM manufacturing					
2.- Manufacturing products containing MNMs					
3.- Application / assembling on-site					
4.- Machining					
5.- Demolition					
6.- Accidental fires					



MNM vs NEP, Low concentrations MNMs, Indoor/Outdoor

Skeleton OHSAS 18001 (+ ISO 31000)



Large company
With

SME
Without

Partially – Fully implemented - Certified

The aim of the SCAFFOLD project is to **develop, test, validate in real conditions and disseminate** a new holistic, consistent and cost effective **Risk Management Model (RMM)** to manage occupational exposure to MNMs in construction.

1. FOUR QUICK GUIDES:

1. Risk Prevention Guide
2. Risk Assessment Guide
3. Risk Protection Guide)
4. Risk Management Guide



Guidance for occupational risk management of processes using products containing MNMs in the construction industry

4. STANDARDIZATION (TR)
(CEN TC 352/WG 3/PG 5/Scaffold)



**Library of solutions
for
Risk Management**

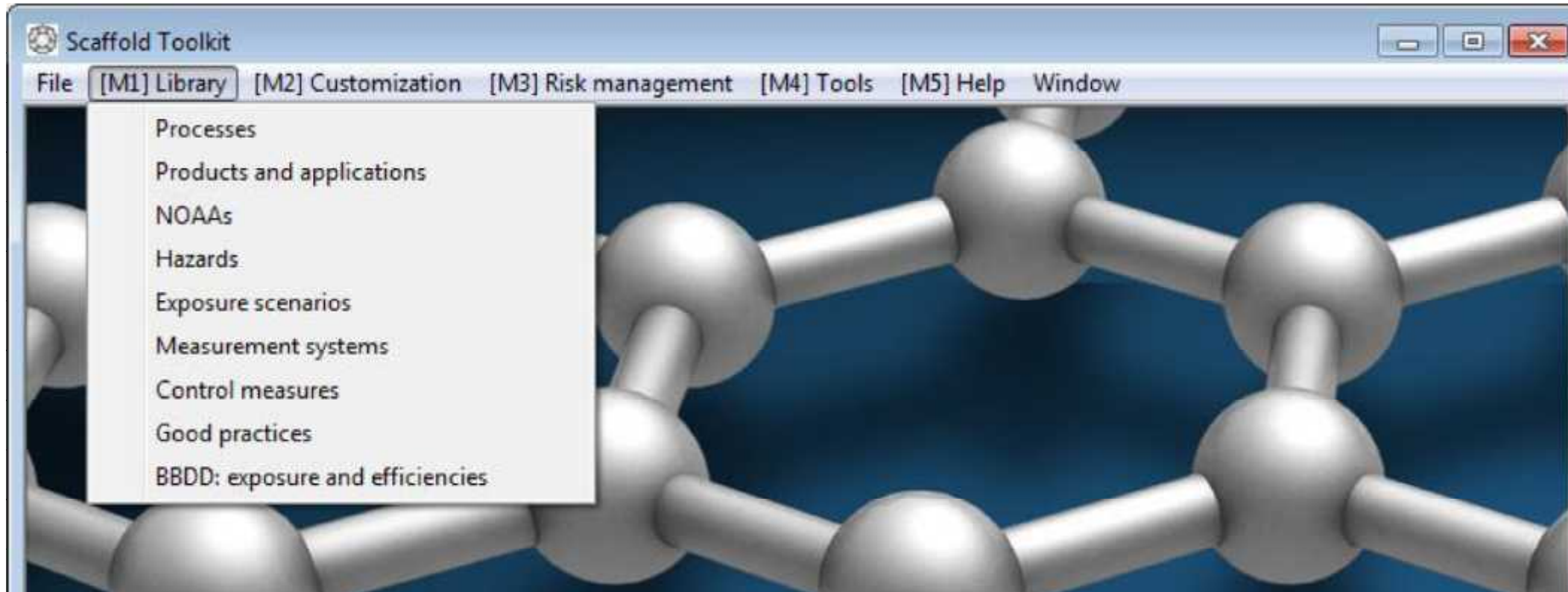


**2. TOOLKIT
(Integration)**

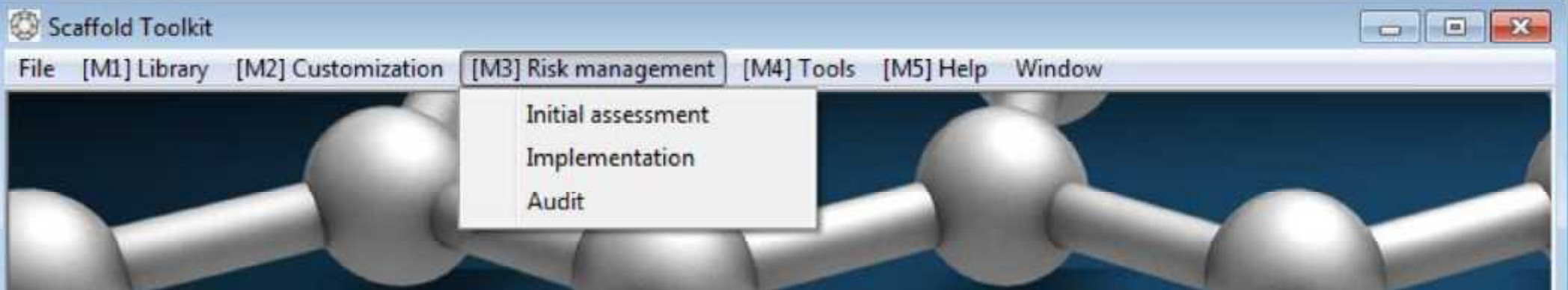
**3. SCAFFOLD
HANDBOOK**
(Project knowledge, contributions from partners, IAB, stakeholders, US/Asia-Pacific)







MODULE	DESCRIPTION
1. Library	It provides a library with documentation for managing nano-risks in construction (RP, RA, RPo, RM)
2. Customization	It allows companies to customize the application to their processes, tasks, scenarios and size. It uses the Module 1 to facilitate data input and generate the company profile.
3. Risk Management	It enables the initial assessment, implementation and audit of RMM guided by a step-by-step dialog. This module deploys two different setups, depending on the company profile (Large company or SME).
4. Tools	It contains the toolbox for nanosafety management: Risk management (scored checklist for diagnostic, implementation or audit), Risk assessment (Qualitative and quantitative approaches), Planning, KPIs, Documents and templates.
5. Help	It gives access to miscellaneous options: file management, configuration, and help (User manuals).



Training

Module	Contents	Test	Print
1. General overview of nanorisk in construction	Contents	Test	Print
2. Risk prevention	Contents	Test	Print
3. Risk assessment	Contents	Test	Print
4. Risk protection	Contents	Test	Print
5. Risk management	Contents	Test	Print
6. Using the Scaffold toolkit	Contents	Test	Print

Level	Test	Print
Worker	Test	Print
Supervisor	Test	Print
Director	Test	Print

Test

What is nanotechnology?

- ☐ Nanotechnology is somehow related to chemistry
- ☐ Nanotechnology deals with the study and manipulation of the matter at a scale below 100 nm
- ☐ Nanotechnology represents serious risks for health
- ☐ Nanotechnology is the study of very small materials

Previous Next Finish

	Effects
Minerlay	Limited data available. Evaluation complicated by differences in/unclearness related to composition.
Cellulose nanofibers	Very few studies on nanocellulose toxicity conducted so far. Evaluation complicated by differences in/unclearness related to composition. Nanocellulose materials might be slightly toxic in vitro and in vivo, but the effect is milder than the one caused by MWCNTs and asbestos fibers.
Carbon nanotubes	Based on the very limited data, there are indications that these materials may cause

IUC	Company	Country	Size	Exposure scenario	MNM
1	TECNAN	Spain	SME	Manufacturing nanomaterials : nano SiO ₂ , powder	SiO ₂



Benefits for the company

- Increased knowledge
- Improvement of workers safety
- Internal document for safety of MNMs
- Technical data sheet (MNMs and NEPs)
- Web-site

IUC	Company	Country	Size	Exposure scenario	MNM
2	ICECON	Romania	Large	Manufacturing NEP: Fire resistant panels	Nanoclay



Benefits for the company

- Improvement of working conditions (new product/patent)
- Product data sheet
- Alignment with other MS

IUC	Company	Country	Size	Exposure scenario	MNM
3	MOSTOSTAL	Poland	Large	Use of NEP in building construction: Application of coatings with three methods: brush, roller and spray gun)	SiO ₂

Benefits for the company

- Increased knowledge
- Safely use of materials (NEP)
- Consultancy on risk prevention and protection



IUC	Company	Country	Size	Exposure scenario	MNM
4	ACCIONA	Spain	Large	Use of NEP in civil construction: Construction of a concrete slab	SiO ₂



Benefits for the company

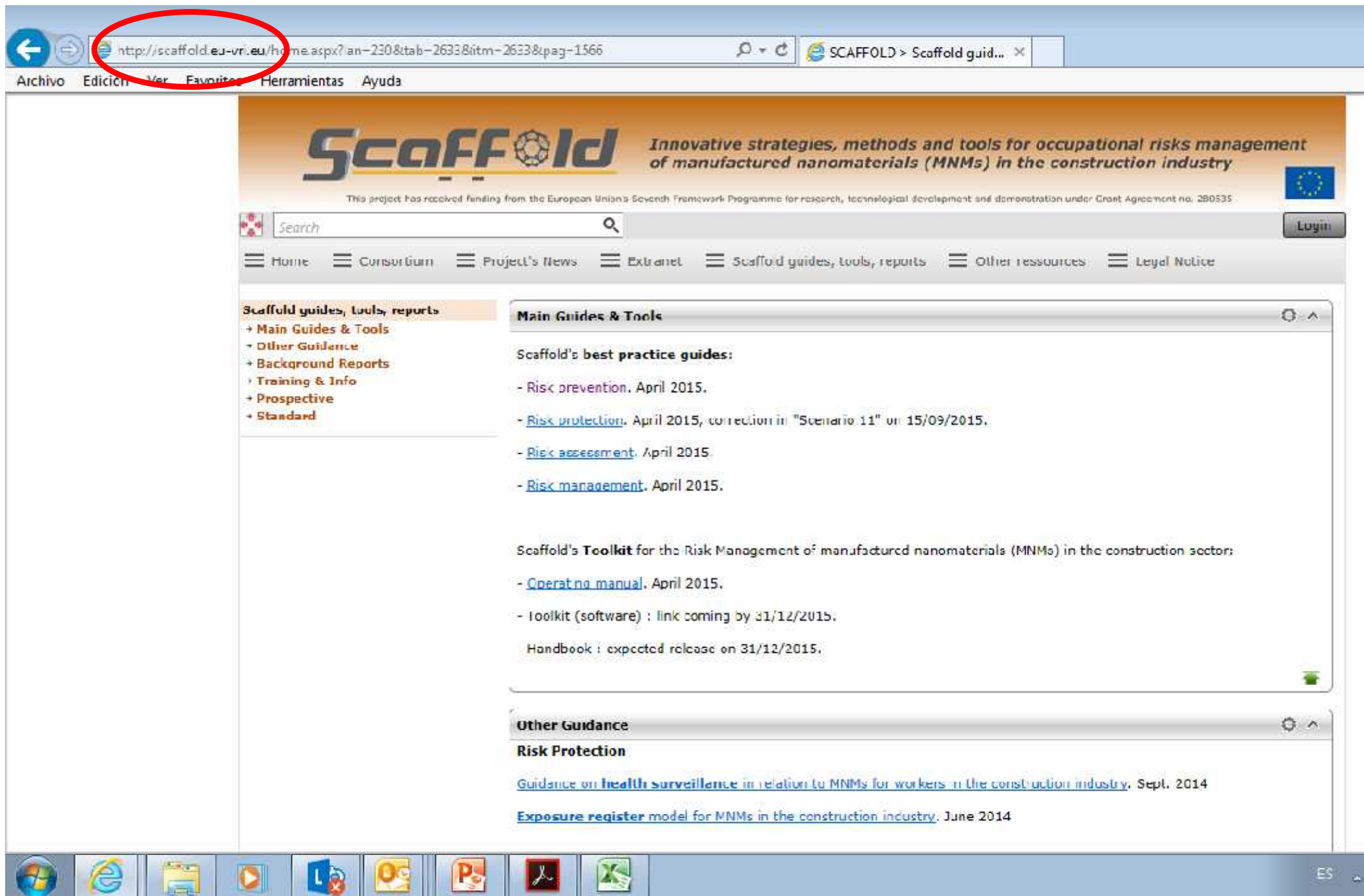
- Implementation of new specific activities for the management of nanorisks (OHSMS)
- Awareness of the MNMs/NEP and the associated risks

IUC	Company	Country	Size	Exposure scenario	MNM
5	ROSSAL	Romania	SME	End of life of NEP: Demolition of fire resistant panels	Nanoclay



Benefits for the company

- “The perfect occasion to demonstrate the validity of the OHSMS in a new field”
- Expanding the OHSMS applicability (demolition of buildings containing MNMs)



http://scaffold.eu-vri.eu/home.aspx?lan=230&tab=2633&itm=2633&pag=1566

Archivo Edición Ver Favoritos Herramientas Ayuda

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

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Scaffold guides, tools, reports

- + Main Guides & Tools
- + Other Guidance
- + Background Reports
- + Training & Info
- + Prospective
- + Standard

Main Guides & Tools

Scaffold's best practice guides:

- [Risk prevention](#), April 2015.
- [Risk protection](#), April 2015, correction in "Scenario 11" on 15/09/2015.
- [Risk assessment](#), April 2015.
- [Risk management](#), April 2015.

Scaffold's **Toolkit** for the Risk Management of manufactured nanomaterials (MNMs) in the construction sector:

- [Operating manual](#), April 2015.
- Toolkit (software) : link coming by 31/12/2015.
- Handbook : expected release on 31/12/2015.

Other Guidance

Risk Protection

- [Guidance on health surveillance in relation to MNMs for workers in the construction industry](#), Sept. 2014
- [Exposure register model for MNMs in the construction industry](#), June 2014

ENVIRONMENT

AIR

"PLATFORM" TOOL FOR SAFE-BY-DESIGN OF PILOT PLANTS



tecna

According to Directive 2006/42/EC on machinery
(Following EN ISO 12100: 2010 and ISO/TR 14121-2:2012)

SAFE PRODUCTION

MNM

CNT



CE

PILOT PLANT

WORK ENVIRONMENT

EN ISO 12100: 2010
EN ISO 14123-1:2015
EN 1093 (1-11): (2008,2009)



NEP

- Buckypapers
- Prepegs
- Veils



GA 646307

WASTEWATER, WASTE, SOIL

Thank you very much for your attention

(jesus.lopezdeipina@tecnalia.com)
(<http://www.scaffold.eu-vri.eu/>)