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

Research on Risk Prevention to occupational exposure to MNMs in the framework of the European project SCAFFOLD

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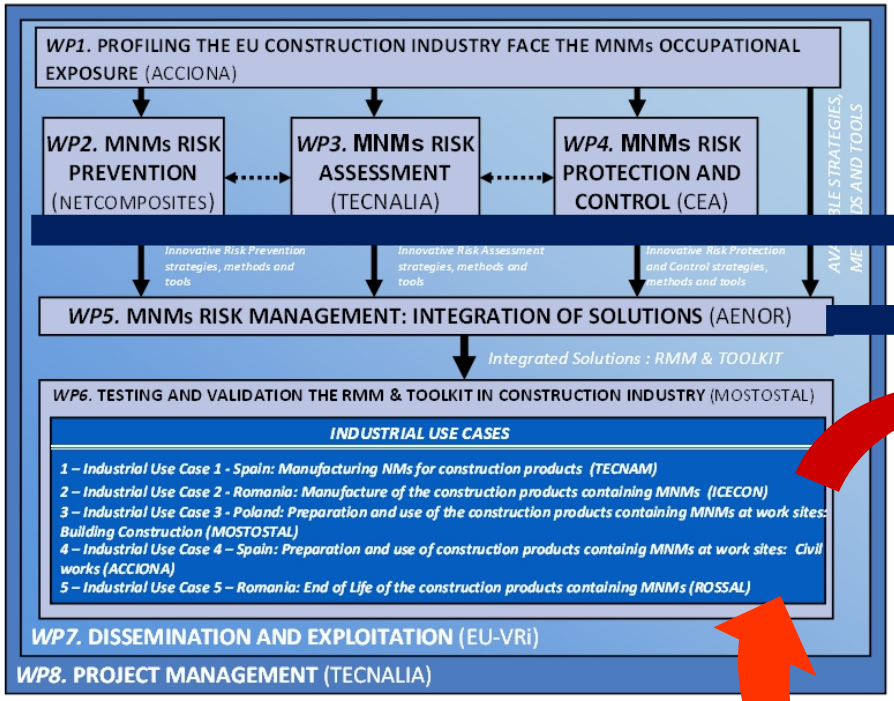

INTEGRATING A COMMON VISION (Delphi workshops)

Best Practices Guides containing a common vision on new strategies, methods and tools to implement MNMs RPe (WP2), RA (WP3), RPo (WP4) and RM (WP5) in the **European construction sector**

IMPLEMENTATION

*"In order to develop a **common vision** and ensure **consensus** partners and stakeholder groups involved in the project, **a one-day Delphi workshop** will be organised to reach these goals".*

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Scaffold – Library of solutions

SCAFFOLD HANDBOOK
(D7.7) (AENOR)

4 QUICK GUIDES:

- Risk Prevention Guide (D2.7, NETCOMPOSITES)
- Risk Assessment Guide (D3.13 (TECNALIA)
- Risk Protection Guide (D4.13) (CEA)
- Risk Management Guide (D5.12) (AENOR)

Suggested contents:
1.- Mapping the construction sector
2.- Basic knowledge and examples (Windows)
3.- Best practices
Anexes: Definitions, References, Links, Document for workers, etc
(***Same structure for the 4G***)

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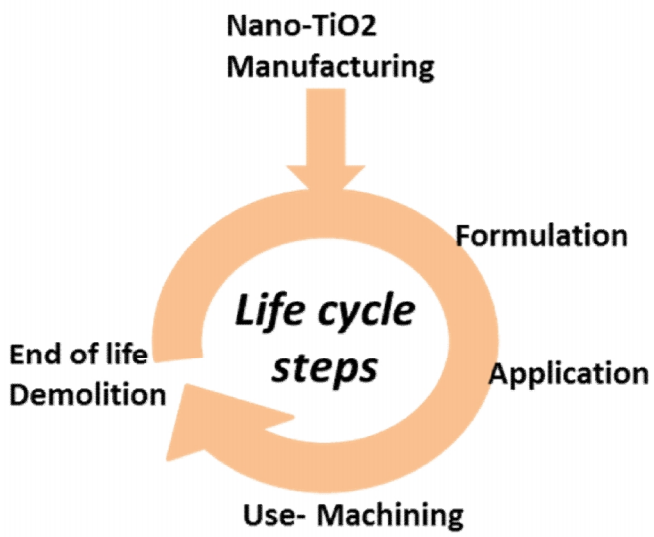

With respect to the OHS risks the project contemplates the following steps: risk prevention, risk assessment, risk protection and risk management. **The project includes a specific work package focused on risk prevention by safe-by-design of new construction products.**

Nanoparticle	Application
TiO_2	Self-cleaning and depolluting mortar
SiO_2	Self-compacting concrete
Nanoclay	Fire resistant polymeric panels
Cellulose nanofibers	Insulating polyurethane foam
Carbon nanofibers	Electromagnetic interference shielding

Nanoparticle	Potential adverse effects
TiO_2	There are some indications that it may cause pulmonary toxicity after repeated dose inhalation. In vivo studies performed with high doses also indicate a carcinogenic potential of TiO_2 Nano-TiO_2 is considerably more toxic than micro-TiO_2
SiO_2	A lot of toxicity data available. Main concerns are related to the inflammatory lung effects
Nanoclay	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 fibres.
Carbon nanofibers	Based on the very limited data, there are indications that these materials may cause pulmonary inflammation. Evaluation complicated by differences in/unclearness related to composition.

RISK PREVENTION

- A set of traditional constructive materials containing MNMs have been produced and a series of prevention **strategies** have been **designed** in order to prevent their related OHS risks
- These materials presented reduced risks but achieved the same performance than their traditional homologous

- **Safety by design**
- **Concentrated and stable suspensions**
- Reduce dust release during the manipulation
- Chemical modifications in order to reduce smoke in case of fire

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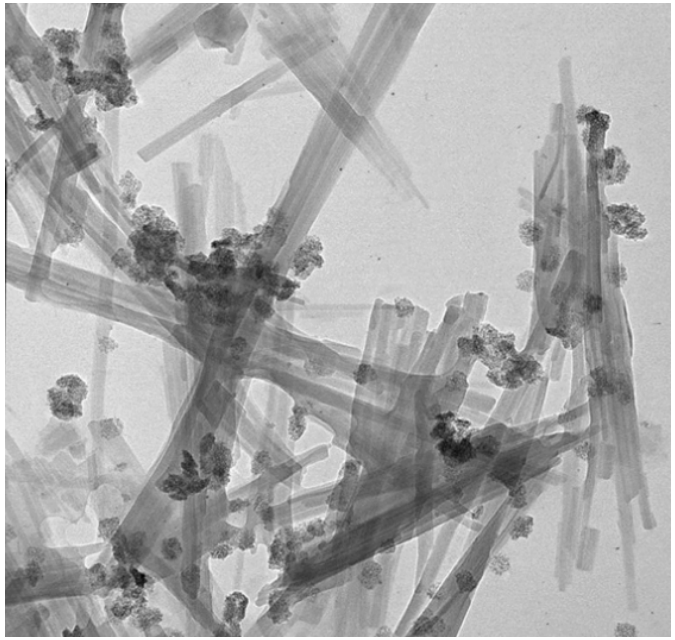

Supporting nanoparticles in microfibers: Safety by design

Measurement data suggests that the occupational exposure to nano-TiO_2 is SMALLER when using sepiolite

Occupational Exposure 8h-TWA to TiO_2 (mg/m^3)		
	n-TiO_2/Sepiolite	n-TiO_2
Mortar manufacturing	0.008	0.073
Mortar application	0.016	0.043

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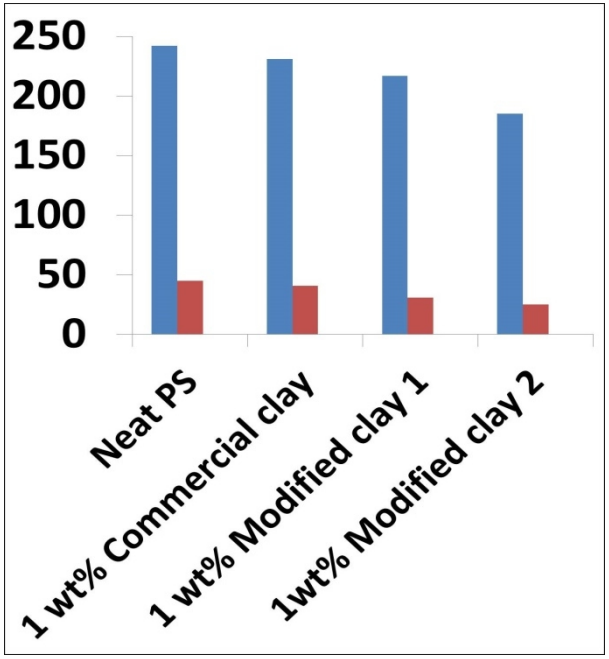
The modification of the nanoclay led to a smaller release of heat and smoke



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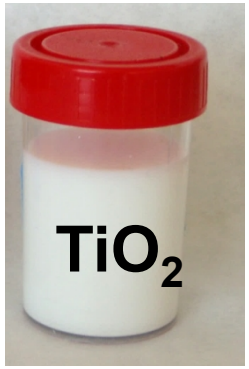
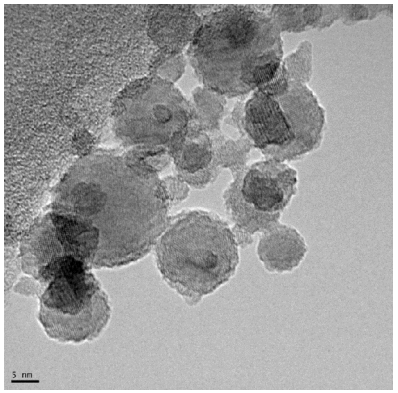
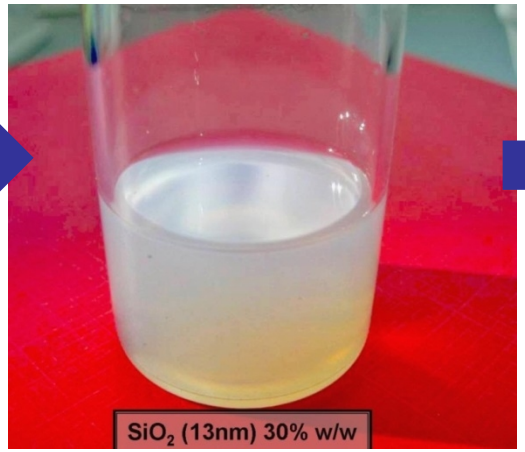




Highly stable and active nanodispersions: safe handling



Thank you very much for your attention