Research on Risk Prevention to occupational exposure to MNMs in the construction sector

- 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.

### MNMs | Application | Strategy
---|---|---
TiO₂ | Self-cleaning and depolluting mortar | Use concentrated and stable dispersions
 | | Use n-TiO₂ supported on sepiolite microfibers (safety by design)
SiO₂ | Self-compacting concrete | Use concentrated and stable dispersions
Nanoclay | Fire resistant polymeric panels | Low energy in mixing process to reduce the particle release
 | | Reduce the smoke release from the panels in case of fire
Cell NFs | Insulating polyurethane foam | Achieve good dispersions-NOAAs bounded to the matrix (to reduce the likelihood to release free NOAAs from solid matrix)
CNFs | Composite materials for electromagnetic interference shielding | Highly stable and active nanodispersions: safe handling

**Supporting nanoparticles in microfibers: Safety by design**

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

Measurement data suggests that the occupational exposure to nano-TiO₂ is SMALLER when using sepiolite.

### Occupational Exposure 8h-TWA to TiO₂ (mg/m³)

<table>
<thead>
<tr>
<th></th>
<th>n-TiO₂/Sepiolite</th>
<th>n-TiO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortar manufacturing</td>
<td>0.008</td>
<td>0.073</td>
</tr>
<tr>
<td>Mortar application</td>
<td>0.016</td>
<td>0.043</td>
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</tbody>
</table>

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

**Application of depollutant mortar (nanoTiO₂)**

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