

“Risk, Uncertainty and Decision Analysis for Nanomaterials: Environmental Risks and Benefits and Emerging Consumer Products

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Developing strategies in Brazil to manage the emerging nanotechnology and its associated risks

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1. Risk management

A classic model for risk management begins from hazard identification.

NIOSH (2006) presents a figure with steps to protect workers involved with nanotechnology. This figure shows hazard identification as a first step; hazard characterization as the second; exposure assessment as the third; risk characterization as the fourth up to risk management.

Steps to protect workers involved with nanotechnology

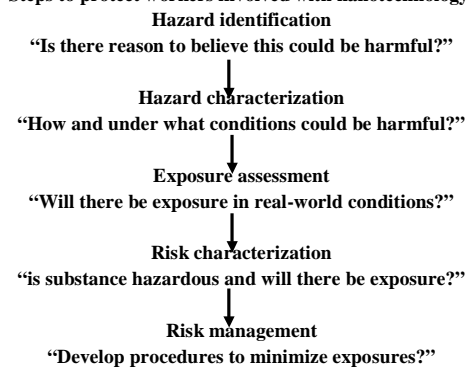


Figure – Steps to protect workers involved with nanotechnology.
Adapted from NIOSH (2006)

When the topic is nanotechnology it is difficult to follow these steps. There are many unknown with regards to first step that is to the hazard identification of nanostructured materials.

Many references show this misunderstanding. It represents one of the difficulties in the risk management (NIOSH, 2006a; ASCC, 2006; Maynard, 2006; USEPA, 2007; Schulte et al., 2007; ACC, 2006; Conti et al., 2008; Helland et al., 2008; ICON, 2006a; ICON, 2006b; Lindberg and Quinn, 2007; ORC-Worldwide; Schmid and Riediker, 2008; USEPA, 2007).

However, despite that, there is a lot to be revealed and studied, the informations already known, as that below, bring enough worry to take engineering control design to minimizing or eliminating workers and people exposure to these materials. It is also relevant to point that classical control preconized in occupational hygiene are questionable because there are little knowing about it's efficiency in workers's protection (Helland et al., 2008; Lindberg and Quinn, 2007).

2. Risk management in Brazil

There are many problems in following all steps on risk management in the developed countries because they don't know all the information about hazards of Nanomaterials. It is even more difficult in developing countries.

The national program “Nanotechnology and Nanoscience Development” by the Ministry of Science and Technology, among its priority actions, has politics on ethical and social impact subjects. Nevertheless, little resource has been addressed in behalf of such objective. Budget released by Institutions that support research sponsor nearly 100% for industrial growth.

Despite the difficulties, researchers and social agents (the organized civil society) decided to discuss the problems with the society and specially with workers. This initiative is considered as a beginning of a risk management process in Brazil, due to difficulties to follow classic steps for this kind of action.

One of the first Brazilian activities to do so, happened during the workshop: “Nanotechnology, Environment and Society for a Possible New World”, which took place at the 5th World Social Forum, in Porto Alegre, 25th, January, 2004. Still in the same year, there was the creation of Renanosoma (a research network in nanotechnology, society and environment), aimed to study and raise up the social, economical, environmental and ethical impacts of nanotechnology.

This network was also responsible for four international seminars related to the theme and coordinates a project about “Public engagement in nanotechnology”, founded by the federal system. Through this project, 3 chats have been organized weekly, via Internet. In there, debates between a main speaker (a previous invited researcher), researchers from all over the country, a social scientist and interested public, work on different views and aspects of nanotechnology's implementation and impacts. But it was since 2006 that many others organizations joined the network to deepen the issue, such as IIEP (Information Exchange, Studies and Research), focused on studies and reality analysis experienced by most of the Brazilian workers. There are also DIESAT (Inter Union Department of Studies and Research on Health and Workplace), DIEESE (Inter Union Department of Statistics and Socio-Economical Studies), FUNDACENTRO (Foundation on Occupational Safety and Health Researches and Studies).

3. FUNDACENTRO project on nanotechnology

In 2007, it began at FUNDACENTRO a project to make a preliminary survey about nanotechnologies impacts to workers health and safety.

This project is continuing in 2008. This year we intend to prepare field research in new products development laboratories and enterprises. The object is assessment of workplace conditions. Many others similar surveys had already been done by others researchers (Helland et al, 2008; Conti et al, 2008). We will try to compare if the risk and safety decision frameworks in Brazilian industry and laboratories are, or not, similar than in other countries.

We are continuing the knowledge dissemination activities about that theme.

In this year we also intend to prepare some events, to produce educational material especially to workers, videos and a website about nanotechnology. This will be hosted in the FUNDACENTRO website.

4 References

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