Expression of interest for the European concerted action on "Sustainable Materials Technologies" Cost 530.

1.1. Title :

Assessment of the safety and impacts on the environment and on human health of processes using powders technologies

1.2. Proposer :

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1.3. Outline of activity :

The theme of the work undertaken will be to assess the industries using powders technologies, in particular the metallurgy industries for a first part, on an environmental point of view, including the health and safety issues for the production plant employees.

Always more materials are made with powders technologies in almost every types of industries : chemistry, pharmacy, agro-processing industry, metallurgy… Powders should always be handled with care because of their toxicity, flammability and explosivity sometimes important. Powder is a material assimilated to dust : it can be responsible for allergies and its manipulation is dangerous. The difficulty to confine powders has several consequences, especially when being transferred or mixed with other products. First, any impurity in the powder could be hazardous for the further operations of the process. Furthermore this volatile material easily increases the pollution over the machines and in the air at the work place. The future study could precise all those characteristics.

The study of such a production plant should lead to a better understanding of those processes in order to low impacts of their activity on the environment and on the health of employees, and also to improve the production plant safety.

The environmental study could possibly develop the following points :

- assessment of the energy consumption of the process, calculation of efficiencies, losses, etc.,
- assessment of the produced wastes and of the chain of recycling,
- assessment of the impact of the manipulation of powders on human health,

- study of the safety of the process that could lead afterwards to an environmental risk assessment.

1.4. Resources available :

At the Haute Ecole Valaisanne, we have competencies in mechanical engineering, especially in powders technologies (atomisation, characterisation, mixing, handling, etc.). There is also a laboratory for chemistry analyses (RMN, IR analyses, Scanning Electronic Microscope with EDX and WDX, …). Some projects are also carried out in the environmental domain in food industries.

1.5. Skills or expertise sought from other partners :

We would like to collaborate with industrial partners using powder technologies. The work group could be constitued of partners from various fields such as metallurgy, ceramics industries, chemistry, pharmacy. This environmental study could also be applied to grains silos, sawmills, flourmills, etc.
We are also opened to work with an environmental expert for a complete environmental study.