A (partly) new PIMEX strategy

To use the method for characterisation of exposure as a part of an epidemiological study

Ann Hedlund (ahd@du.se), Ing-Marie Andersson and Gunnar Rosén
Theme Working Life, Högskolan Dalarna, Sweden.

The background to this study is the overall aim to learn more about health effects of exposure. At the fertilizer production factory in Herøya Industripark, Porsgrunn, Norway is the occurrence of chronic occupational pulmonary disease (COPD) 9%. Questions have been raised if there is a correlation between decline in lung function and working conditions in fertilizer production. Occupational aerosols are known risk factors for COPD and gas exposure and dust affects the lung function.

The study has been performed at seven different work places at Herøya Industripark. Average measurements for a sample of workers show low exposure. Those low exposures are not seen as an explanation to the occurrence of COPD. Instead questions were raised about health effects of exposure peaks.

The aim is to develop a method using PIMEX in epidemiological studies. More precisely is the aim to identify peaks of work place exposure and use the data to refine questionnaires in follow up studies on lung function. In focus are work tasks when workers accomplish rounds during 30-90 minutes in the plant to control and maintain the production. Measurements were conducted at 20 rounds during a week in May 2009. Two PIMEX equipments with telemetry equipment for wireless transmission of the monitoring signal were used. One person was recording working operations while another was carrying the laptop and handling the PIMEX program during the monitoring.

In this study was for example peak exposure of ammonia identified in connection with filter cleaning. That information can be used as basis to better understand the correlation between exposure and health effects. One way is to combine the information about peak exposure with information about how often the worker perform work tasks causing the peak. That information can then be related to the occurrence of COPD and decline in lung function. The identification of peaks also gives the possibility to identify when health measurements shall be done. For example, doing spirometry measurements directly before and after the peak exposure.

Another experience from this study was to walk around during the measurements. The camera person and the laptop person had to walk close together because of short cables between the camera and the laptop. The plant had several floors and the pair went up and down many stairs during the rounds. Some experiences are:
- The pair, recording person and laptop person, must synchronies their movements.
- The telemetry for the monitoring signal went well.
- High battery capacity is needed.
- It is difficult to record the worker all the time if he/she walks fast and the work place has many stairs and small passages.
- It is good to have some kind of equipment to carry the laptop with when using it walking around.