Summary Model: Submit before December 15th to:
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9th IWA Odour & VOC/Air Emission Conference
26-27 October 2021 Bilbao, Spain

ABSTRACT

EVALUATION OF OCCUPATIONAL EXPOSURE RISK FOR EMPLOYEES WORKING IN OLFACTOMETRIC ANALYSIS TO ODOROUS POLLUTANTS EMITTED FROM REFINERIES

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The emission of odorous volatile organic compounds is a relevant problem for different types of industries due to their negative environmental and health effects. Among the industries potentially causing odour problems, refineries are one of the most complex and interesting cases. Nowadays, dynamic olfactometry is the only technique available to quantify an odour and involves human assessors. These examiners, during olfactometric analysis, sniff, at increasing concentrations, the diluted odorous emission and they may potentially be exposed to toxic compounds. Therefore, the aim of this work is the evaluation of the potential occupational hazard for examiners involved in odour measurements, focused on refinery emissions. In order to reach this, it is fundamental to characterise refineries odorous emissions, in terms of quantification and identification of the species present. For this purpose, an experimental activity was carried out in order to analyse refineries odour emissions and obtain chemical information about pollutants present in refineries emissions. The toxicological evaluation was conducted by comparing the maximum concentration observed in samples with toxicological thresholds (TLVs), in particular the limits for continuative workers exposition (TLV-TWA). From this comparison, two important toxicological parameters have been calculated: the *Hazard Quotient* (HQ), calculated dividing the concentration of each single compound by the TLV-TWA, and the *Hazard Index* (HI), obtained by summing the HQ values of all the pollutants present in a odorous sample. If the HQ and the HI are higher than 1, the risk for panellists exposure is not acceptable and specific protections are needed for the workers.
From our results, it is possible to state that panellists are exposed to a non-negligible risk during the analysis of odour samples from refineries, and it is thus necessary to define a minimum dilution value for these samples, according with the HI values observed for the different refinery odour emission sources. Indeed, the study shows that the maximum HI values observed for real samples of refinery odour emissions are between 10^1 e 10^2. Therefore, in order to conduct olfactometric analysis in a safety condition, the minimum dilution value to be set for refinery emissions is 100. This value is always lower than the odour concentrations typically observed for refinery samples. Therefore, examiners detect odour concentration of such samples before the compounds present become dangerous. This allows to state that the olfactometric analysis of refinery samples can be generally conducted in safety conditions.

Indicate preference of kind of presentation

¤ Oral Communication

☐ Poster

Indicate topic of your work for the conference:

☐ Policy and associated regulations for odour and air quality.

¤ Odour/VOC measurement, monitoring&sensor technologies.

☐ Odour/VOC perception, impact, formation and dispersion.

☐ GHG emissions particulate matter and industrial emissions.

☐ Source characterization and odour/VOC mapping.

☐ Odour/VOC abatement, mitigation and neutralization.

☐ Odour/VOC from waste water, sewer systems and livestock.

☐ Air emissions and sustainable solutions for waste handling

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