During the first step- Basic Characterization-BC-the appraiser collects available information to allow reliable estimates of the exposure of the workers and to take the decision whether or not to perform exposure measurements. The second step, or 'Initial Assessment-IA', consists of performing at least 3 (screening test) to 6 representative exposure measurements for the workers of each SEG, in order to demonstrate by using a statistical test whether less than 5% of exposures in the SEG exceed the OELV (compliance). In a third step and based on IA results, a program of 'Periodic Reassessment-PM' determines time intervals ranging from 1 to 3 years for performing new measurements, depending of the levels of exposure. This is based on the assumption that no major changes (e.g. process, RMM, quantities and nature of chemicals) have occurred during this period.

The new EN-689 also takes into consideration simultaneous exposure to several chemicals, and workshift durations higher than 8 hours. The informative annexes give recommendations to determine for example: sampling duration, statistical distribution of exposure measurements results and treatment of representative results lower than the limit of quantification (LoQ).

The new EN 689 is a helpful tool, especially when expertise/science/evidence does not help in the decisions to protect workers exposed to chemicals.

1717b REGULATORY ADVANCES IN CONTROLLING HAZARDOUS SUBSTANCES

Bridget Ginnity.

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The REACH and CLP Regulation have given rise to a rich source of information on chemicals and introduced new mechanisms for regulatory control of hazardous chemicals. Occupational health and hygiene practitioners (OHPs) can contribute to the regulatory decision making and can use the increased information and regulatory control to promote the safe use of chemicals in the workplace.

The registration element of REACH has received most attention to date and the final registration deadline under the REACH Regulation for chemical substances manufactured or imported into Europe is imminent, 31 st May 2018. The registration process generates an immense amount of information on the hazardous properties of substances and on how they can be used safely. Some of this information is provided with safety data sheets, such as DNELs (Derived No Effect Levels) and exposure scenarios. Much more information, including toxicological data, is available on the website of ECHA, the European Chemicals Agency.

REACH and the CLP Regulation provide for the regulatory control mechanisms of authorisation, restriction and harmonised classification and labelling. These mechanisms are intended to protect workers, consumers and the environment. OHPs can engage with these processes to ensure that decisions are made with reliable, up-to-date information on what is happening in the field. By knowing the regulatory status of chemicals used on site, OHPs can ensure regulatory compliance and promote the safe use of chemicals in their company.

1717c BIOLOGICAL MONITORING AND THE USE OF GUIDANCE VALUES IN ASSESSING OCCUPATIONAL EXPOSURES

Kate Jones.

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Biological monitoring is a useful tool for assessing systemic exposure, particularly for substances absorbed through the skin or where control of exposure relies on respiratory protection. Many organisations propose health-based guidance values (BMGVs) but recognise that there are no 'bright lines' between safe and unsafe levels and avoid the word 'limits'. Where a health-based BMGV is not possible, a non-occupational exposed background or reference value may be proposed. Exceeding such a reference value then indicates the likelihood of occupational exposure and possibly the need to review workplace controls. Great Britain (GB) has an alternative approach based on the 90th percentile value of biological monitoring data from workplaces following good occupational hygiene practice. It is not health-based and exceeding it simply indicates a need to review, and possibly improve controls.

This presentation will give an overview of biological monitoring, its role in occupational exposure assessment and the derivation and use of guidance values in interpreting results and determining future action.

1717d OCCUPATIONAL HEALTH & INDUSTRIAL HYGIENE PARTNERSHIP AT CORPORATE & SITE LEVEL

Michel Vangeel.

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A close partnership, collaboration and communication between Occupational Health and Industrial Hygiene is key. The outcome of the IH risk assessment should form the bases of the medical surveillance program. Work related health complaints reported at Occupational Health should be investigated by the IH department. Close communication at different levels is mandatory. In the first part of the presentation, the structure and partnership at Johnson and Johnson Corporate Level will be shared. In the second part, examples of collaboration at a J and J site (Janssen Campus Belgium) will be highlighted. Strong collaboration creates benefits on Corporate, Site, Departmental and Personal level.

927 AUDIT OF A FUEL DISTRIBUTOR COMPANY TANK TRUCK LOADING OPERATIONS IN THE STATE OF RIO GRANDE DO SUL/BRAZIL

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Introduction This case study presents the result of labour inspection intervention in one of the largest distribution terminal of petroleum-derived fuels in Brazil. The inspection

focused on tank trucker loading operations, which were made most of the time by the truck drivers themselves, exposing the drivers to petroleum-derived fuel compounds. This kind of activity should be done by the operators of the distribution terminal, not by the truck drivers. These drivers were submitted to activities of an ambiguous nature, without qualification, adequate training, and supervision. The goal of the intervention was to change the organisation of the work in the distribution terminal as a method of reducing respiratory exposure of the truck drivers to occupational health hazards.

Methods It is a prospective descriptive case study. The period covered refers to the beginning of the inspection in the year of 2012 up to 2017. It was analysed documents that the distribution terminal has presented to labours inspection.

Result The organisation of the work at the distribution terminal changed radically. The truck drivers are not doing any operation at the terminal anymore. The distribution terminal hired new operators, modified the distribution process and yet built an occupational medical centre for their workers and for the truck drivers as a preventive measure of health.

Conclusion This case showed that is possible for Brazilians Petroleum-derived fuel distribution companies to change their work organisation and improve their environment minimising the exposure of truck drivers to occupational health hazards such as benzene.

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ELIMINATION, REDUCTION, AND CONTROL OF HEXAVALENT CHROMIUM RESPIRATORY EXPOSURE: A BRAZILIAN CASE

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Introduction Hot dip galvanising is a method that prevents corrosion by a metallurgical bond between zinc and steel. In this industrial process, cooling and passivation baths of galvanised steel may use hexavalent chromium compounds. Cr(VI) is classified by the International Agency for Research on Cancer as Group 1 – carcinogenic to humans – and its use is restricted in most developed countries. Despite its toxicity, Brazilian regulations still allow this hazardous chemical use. Thus, the development of effective control and protection rely on the understanding of occupational risks, as this paper proposes.

Method This is a descriptive quantitative cross-section case report of an industrial process: the passivation stage of galvanization. Brazilian labour inspection assigned a prohibition notice of the passivation as it was conducted, since any measures of occupational hygiene had been taken into account. Its participatory action procedure ends up preventing uncontrolled occupational exposure to Cr(VI). Secondary data source as official reports, notifications, chemical process protocols and registers from October/2016 to June/2017 have been analysed.

Results Before the administrative prohibition, Cr(VI) concentration in the cooling tank was 5%; it has been eliminated. Passivation tank used to operate with 11% of Cr(VI) at 50°C; a trial is still ongoing to adjust the concentration. The company was authorised to perform tests from 0002 to 5% at 40°C. In this meanwhile, a satisfactory quality of galvanization was reached with a reduction of 98,84% in concentration. A

ventilation system was designed to attend occupational hygiene requisites and the respiratory individual protection is effective for Cr(VI) manipulation.

Conclusion Attending the hierarchy of prevention and control measures, strategies to minimise hazards were developed, as follows: volatilisation reduction due to process, temperature and concentration modifications; ventilation system and changes in respiratory protection practices. The replacement of Cr(VI) is currently under study.

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PHYSIOLOGICAL EFFECTS OF WEARING POWERED AIR-PURIFYING RESPIRATORS WITH DIFFERENT BLOWER SYSTEM

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Introduction Inhalation resistance of respirators may induce additional burden for workers breathing. Powered air-purifying respirators (PAPR) are considered to reduce this burden by assisting inhalation with powered fan. While there are mainly two types of blower system; breath response type and constant air flow type, no study has been conducted to clarify the difference of their physiological effects as far as we searched. We conducted this study to elucidate the physiological effects of wearing different types of PAPR by measuring physiological parameters and the microclimate inside the PAPRs.

Methods Eight healthy males participated in the study. They took a 40 minutes-exercise with ergometer at 20, 30, 40% and 50% VO₂max while wearing three types of masks;

- half mask facepiece with breath response type (BR-PAPR),
- half mask facepiece with constant air flow type (CF-PAPR) and
- mask of expiration gas analyzer (control).

We continuously measured their auditory canal temperature (t_{ac}), heart rate (HR) and SpO₂. We also measured the microclimates (temperature, humidity, O₂, CO₂) inside the two PAPRs. Their subjective symptoms were also surveyed. Statistical analysis was performed by IBM SPSS Statistics22.0.

Result There were few differences in the trend of t_{ac} , HR and SpO₂ among the masks. SpO₂ gradually declined but remained within normal level. The temperature and humidity inside masks were higher in BR-PAPR. During inhalation period, the proportion of time which O₂ concentration became lower than 18% or which CO₂ concentration exceeds 3% inside the respirators were lower in CF-PAPR. The participants' perception of hotness or humidity coincided with the microclimates.

Discussion BR-PAPR is known for the better durability of battery compared with CF-PAPR. There were few differences in physiological parameters among those respirators. However, with respect to the microclimate inside respirators, CF-PAPR was better than the BR-PAPR, hence it may affect comfort of the workers.