

Slides 1 - 3

This case study takes place in a small company manufacturing polyurethane gaskets, seals and coated metal parts. The delegates are to assume that they have been contracted by the company to look at health & safety after a recent inspection by the authorities.

The company employs ten people, four in the office and six in the factory. An occupational health provider visits once per year and has not reported any problems.

The manufacturing process is as follows:

- Weighing a known quantity of hardener
- Mixing the hardener with a known quantity of resin
- Mixing & degassing
- Pouring the mixture into heated moulds
- Leaving to cure overnight
- Getting the articles out of the moulds and trimming

Slide 4

The process uses a hardener and a resin, which are mixed and reacted to form the polyurethane. The hardener is a suspect carcinogen and has a skin notation, indicating that it can be absorbed into the body through the skin. It is purchased in pellet form prior to being melted so there is little dust and the substance is not volatile. The resin contains di-isocyanates, which are respiratory and skin sensitisers; some of them are volatile.

Slide 5

Historical data provided shows that no hardener has been detected in air samples and that the isocyanate levels are below the occupational exposure limit. Occupational health data indicates no cases of occupational asthma and one case of dermatitis however staff turnover is roughly three people per year.

Slides 6 – 10

These slides show the factory as the delegates see it during their site visit. Various aspects of the process are shown including weighing and heating of the hardener, pouring the hardener, mixing the hardener with the resin, pouring the reaction mixture into moulds and examples of the various PPE provided.

Slide 11

The delegates (as the visiting occupational hygienist) take some monitoring samples during their visit and these are the results. Personal inhalation exposures for isocyanates are less than the occupational exposure limit but there is a legal requirement for levels to be as low as reasonably practicable. Urine data show that about half the samples are positive for isocyanate breakdown products and some samples exceed the guidance value. Because the samples are analysed for the breakdown product, it is not clear if the exposures are due to inhalation of isocyanate or skin absorption of the

breakdown product. This is an issue from a control point of view – if exposure is by inhalation of isocyanate then better control is needed to prevent risk of asthma; if exposure is by dermal absorption of breakdown product then better control of dermal exposure is needed to prevent carcinogen & skin sensitiser risks.

Slide 12

Now that you have presented the data to the group, the delegates should discuss their thoughts and what they would recommend as a hygienist. The group can either split up into small teams or a whole audience discussion can take place.

Questions that should be put to the delegates:

- 1. Do processes look well controlled?**
- 2. Is LEV provided? Is it appropriate and well maintained?**
- 3. Is PPE provided, appropriate and properly used?**
- 4. Could control be easily improved?**
- 5. Are monitoring results of concern?**
- 6. What future testing requirements would you recommend?**
- 7. What medical surveillance requirements would you recommend?**
- 8. Could health effects have been missed due to the high staff turnover?**

Slides 13 – 15

Some example responses to the questions above. Just from the photos it is clear that housekeeping could be improved and good occupational hygiene practice is not in place. Monitoring results show that there is exposure and some results (urine) show that levels exceed guidance values. Isocyanates and carcinogens need to be controlled to as low as reasonably practicable so improvements need to be made.

Slide 16

Conclude with some next steps.