Hexavalent chromium, [Cr(VI)], is a chemical commonly used in the aviation industry as an anti-corrosive, despite its known association with respiratory cancer. OSHA requires an employer-run medical surveillance program for those occupationally exposed to Cr(VI) at levels above an average of 2.5 μg/m³ over an 8-hour shift.

There are 5 departments in the Cr(VI) medical surveillance program at Delta Air Lines.

One department, the Composite Shop made two modifications (shown below) in their sanding booth that appear to have decreased Cr(VI) levels in personal air samples.

**OBJECTIVES**

Objective 1
- Collect personal air samples while sanding
- Compare time-weighted averages (TWA) pre- and post-modifications

Objective 2
- Conduct industrial hygiene walkthrough and chemical inventory review
- Calculate geometric mean and standard deviation of sample TWAs

Objective 3
- Combine project results, observations to recommend next steps

**METHODS**

- Delta Air Lines, Inc.
- Josh Smith, MPH CIH
- Troy Schon, MS CSP CIH OHST
- Randy Chappelear, Steve Mack, and the employees of 384MSP
- Stefanie Sarnat and my classmates in EH 594

**RESULTS**

The TWA for samples taken after the sanding booth modification (green line) were, in general, lower than those sampled before the modification.

**DISCUSSION**

- Data suggests that the sanding booth modification had an effect on reducing the amount of Cr(VI) while the booth was in use.
- High TWAs for sanding were generally concentrated during summer months. Seasonality could be due to increase aircraft use in the summer.
- Several high exceedances for both sanding and priming were associated with cylindrical parts such as fan cowls and thrust reversers.
- However, the post-modification samples were collected while employees were sanding elevators, which are flat.
- Vacuum hose attachment in sanding booth is not consistently used.
  - There are no written procedures for use.
  - Employees complain about added weight to sander.
- Primer data had the highest standard deviation among the three tasks in the matrix, due to low sample size and high result variation.
- The results from the study were promising and suggested that improvements made in the sanding booth have had an impact of overall Cr(VI) exposure.
- Additional investigation of primer application should be done, as priming had the least amount of data and the highest average exposure levels.
- Due to the seriousness of long-term Cr(VI) exposure to human health, additional samples should be collected before considering the department for removal from the medical surveillance program.

**CONCLUSION**

- Generate a report for department leadership with recommendations for continued improvement to reduce Cr(VI) exposure.
- Identify areas, tasks, and processes vulnerable to high Cr(VI) levels and quantify long-term daily exposure.
- Explain the effect of the modifications on Cr(VI) levels in personal air samples taken in the sanding booth.