

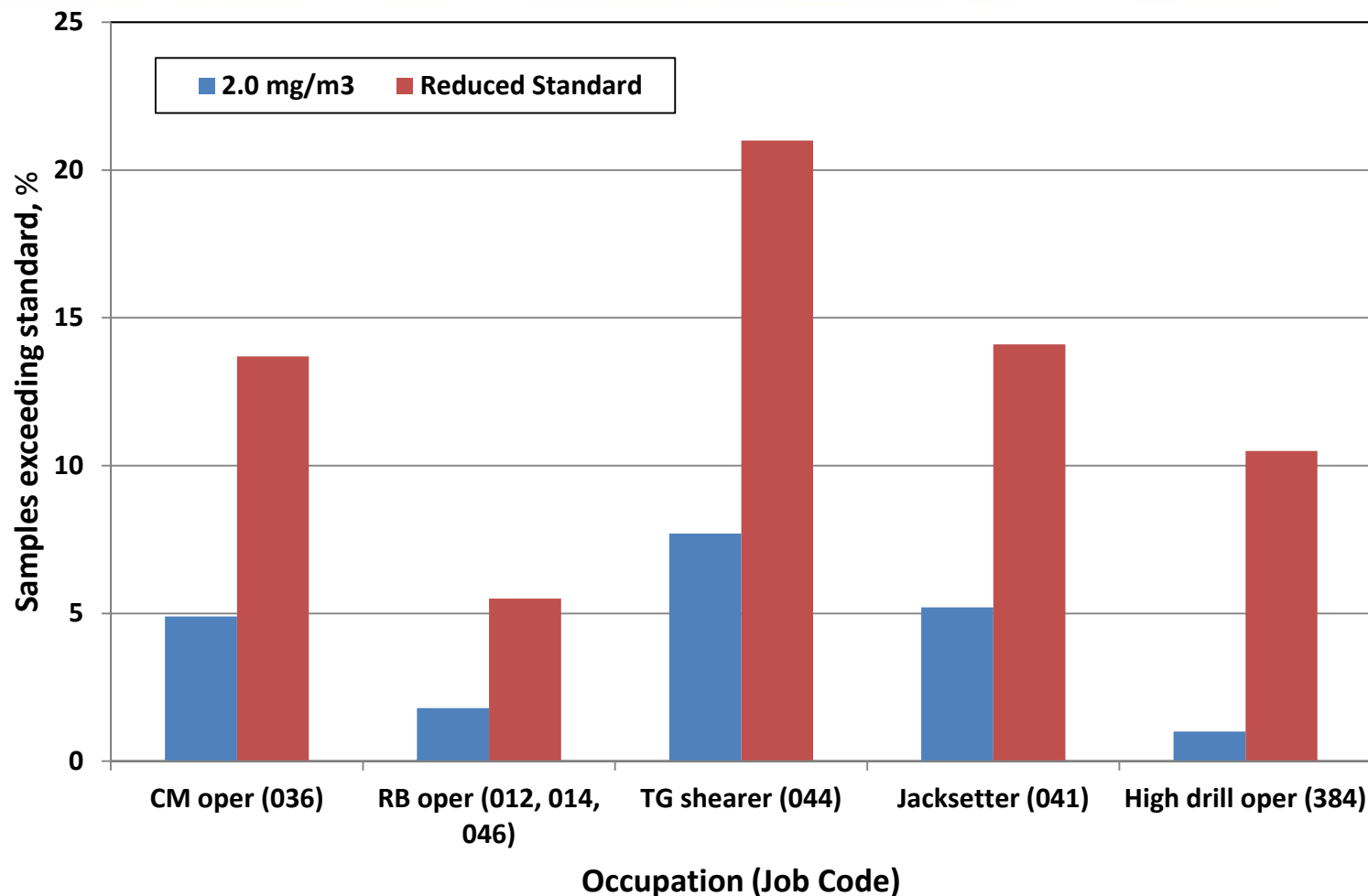
VENTILATION AND DUST CONTROL

Jay Colinet – Senior Scientist

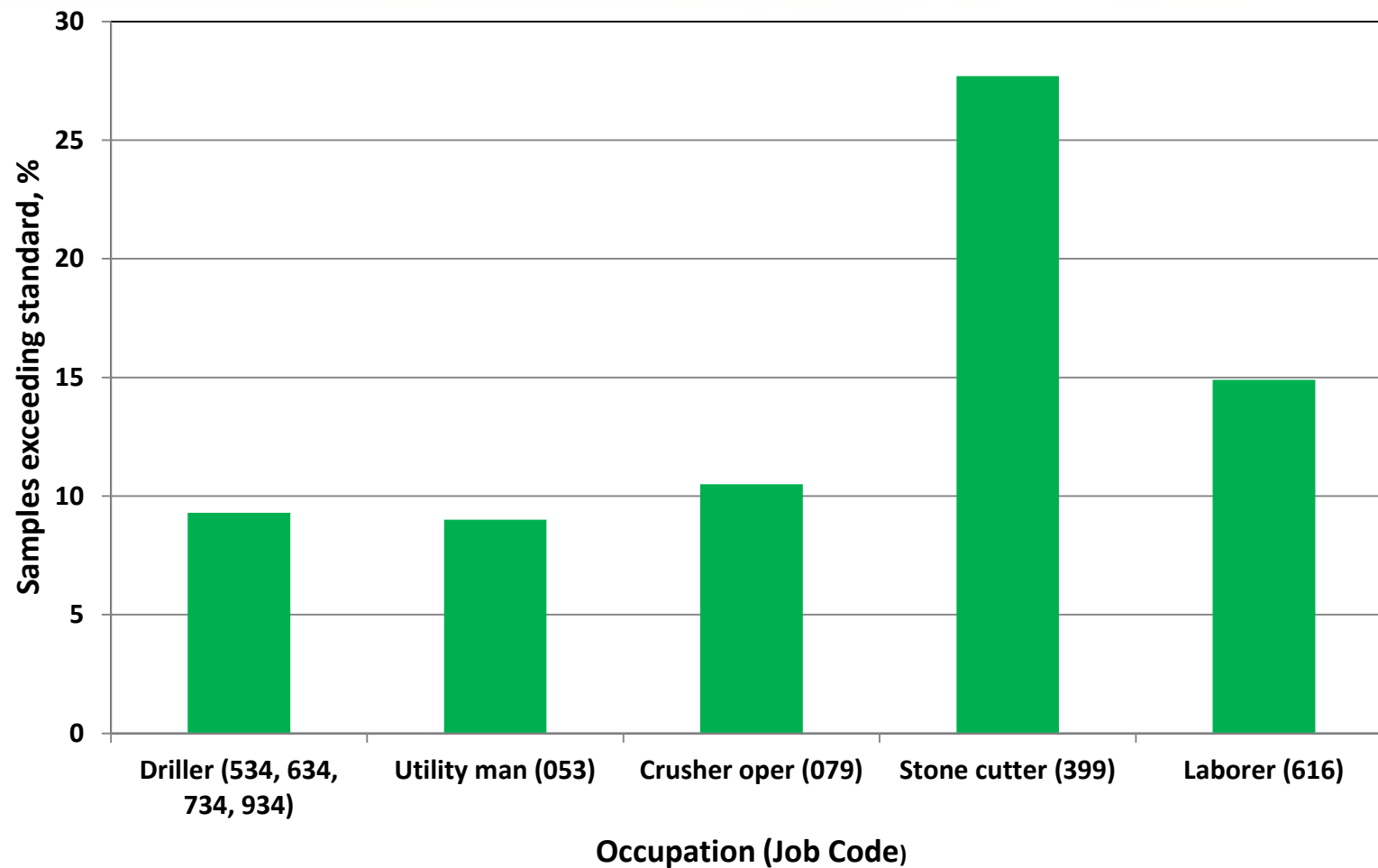
Alpha Foundation Research Meeting
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MSHA coal inspector samples (2008-2011) greater than the applicable dust standard



MSHA MNM inspector samples (2008-2011) greater than the applicable dust standard



Ongoing NIOSH research – longwall mining

- 1) Tailgate-side shearer sprays
- 2) Traveling water curtain with shield sprays
- 3) Shearer scrubber
- 4) Foam application



Ongoing NIOSH research – continuous mining operations

- 1) Analysis of redirected scrubber exhaust
- 2) Improve dust suppression techniques on continuous miners (water sprays)
- 3) Evaluation of a mobile stand-alone scrubber
- 4) Evaluation of dust controls for mining crosscuts
- 5) Evaluate dust levels in 20-foot cuts with and without a scrubber



Ongoing NIOSH research – metal/nonmetal mining industry

- 1) Develop guidelines for using filtration systems on enclosed cabs
- 2) Identify dust sources and controls for mobile workers (Helmet CAM)
- 3) Best practices for bag filling operations
- 4) Optimize filtration and pressurization systems for operator's compartments and control rooms
- 5) Develop silica controls for stone polishers and cutters in the dimension stone industry



Ongoing NIOSH research – surface mining

- 1) Angle drill shroud testing
- 2) Compressor management system testing
- 3) Small-drill shroud evaluation
- 4) Worker dust exposure identification (Helmet CAM)
- 5) Algorithm for haul road wetting



Ongoing NIOSH research – particulate measurement

- 1) Silica monitoring in coal mining (PDM and end-of-shift instrument)
- 2) Silica monitoring in non-coal mines (direct reading instrument for silica)



Potential research – longwall mining

- Shield dust control
- Face spalling
- Lower profile scrubbers for crusher/stageloader
- Integrated scrubber on shearer
- Physical barriers/sprays along face to separate ventilating airflow



Potential research – continuous mining

- Improved cutting (drum, bit designs) with consideration for rock extraction
- Increased dust capture with flooded-bed scrubbers
 - Optimized scrubber inlet design (higher coal seams)
 - Higher capacity scrubbers
- Improved face ventilation systems
 - Brattice designs/application methods to maximize airflow
 - Auxiliary fans
- Improved performance of roof bolter dry dust collectors
 - Pressure drop sensors
 - Inline filters to protect “clean” air discharge
 - Inlets on ATRS



Potential research – surface mining

- Monitoring systems for dust collectors on highwall drills
 - Integrity of enclosed cabs (positive pressure)
 - Collector performance
- Monitoring system for haul road moisture
- CFD analysis of haul trucks to reduce emissions from haul roads (skirting around tires)



Potential research – MNM mining

- Air monitoring system for baghouse discharge to allow for recycling of “clean” air into plants
- Automated wash down systems for plant housekeeping
- Mobile dust collectors and/or filtration units
- Dust controls for underground crushers



Potential research - general

- Real-time, person-wearable silica monitor
- Automated dust sensors that can be used to activate control technologies (belt lines/transfer points)
- Wetting agent impact on silica dust/mixed dust
- Utilization of particle charging characteristics to enhance dust capture
- Innovative cutting technologies (high pressure water)



Thank you!

Questions?

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