

MECHANICAL & INDUSTRIAL ENGINEERING COLLOQUIUM

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EXPERIMENTAL EVALUATION OF EXPLOSION CHARACTERISTICS OF COMBUSTIBLE DUST CLOUDS

By

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Abstract

Statistics suggest that fire/explosion hazards exist in facilities or equipment that handle or process combustible dusts. A systematic approach to identifying dust cloud explosion hazards and taking measures to ensure safety generally involves understanding the explosion characteristics of the dust. Hence, testing to characterize the powder's fire and explosion properties is an essential step in identifying potential ignition sources, assessing the risk and consequences of igniting the dust cloud. The explosion characteristics of powders normally fall within one of two groups, i.e., "likelihood of an explosion (ignition sensitivity)" and "consequences of an explosion (explosion severity)". Safety from dust cloud explosions could include taking measures to avoid an explosion (explosion prevention) and/or designing facilities and equipment so that in the event of an explosion people and facilities are protected (explosion protection) from injury. The explosion characteristics also provide guidance regarding selection of the most appropriate *basis of safety*. Basic methodology for material characterization tests and significance and application of the test results will be discussed in this presentation.

Muhammad M. R. Qureshi, Ph.D., is a Process Safety Specialist at Chilworth Global He provides consulting services in dust explosion and electrostatic hazard assessment and conduct site-audits for identification and control of dust explosion hazards. He also supervises Chilworth's laboratory for conducting the standard and customized electrostatic tests. He received his Ph.D. degree in mechanical engineering from the New Jersey Institute of Technology (NJIT) in 2006. His background research includes phase interactions in multiphase flow, fluid mechanics, thermodynamics and computer aided engineering. He received the Excellence Award from NASA for his services in NASA's SHARP Student program in 2003. He is also the recipient of Best Presenter Award of the graduate student at New Jersey Institute of Technology. He is an "invited reviewer" for the Mechanics Research Communications on a regular basis. He is also a member of the American Society of Mechanical Engineering.

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