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MLM: Dust Explosion Potential Warning System JOHN FOSS, ALAN LAWRENZ, Michigan State University — A quite large range of materials, when dispersed as a dust cloud in air, can support an explosion. Empirically derived minimum explosive concentration (MEC) values are typically in the range: 30-80 grams/m^3; that is, nominally 2.5-8.3% of STP density. Currently, there is no field-deployable measurement system to determine the mass loading (grams/m^3) of airborne dust. Proof-of-concept measurements for the MSU Mass Loading Monitor (MLM) are reported. A charge of dusty air, ingested into a cylinder, is accelerated (a_p=ct) by a driving piston and partially (≈8%) discharged from the open end of the cylinder. The deformable control volume momentum equation can be integrated with respect to time to yield $\alpha_{()} - \beta_{()} = \gamma\rho_{()}$ where ( ) will indicate with (w) or without (w/o) dust. The pressure integral (α) and the shear integral (β) balance the momentum within the cylinder at the end of the smoke plus the integral of the momentum flux. The kinematic attributes of these terms are represented by γ. It will be shown how the mass loading ($\rho_w - \rho_{w/o}$) can be determined. A full length paper (The Mass Loading Monitor Fundamental Principles And Proof Of Concept) will be published in *Meas. Sci. and Tech.*

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