tion process to reduce the ion current. This type of humidity effect is purely a gas-phase phenomenon and is repeatable for a given sensor design. Therefore, this effect theoretically can be compensated by a humidity sensor, but this is not practical for real-time monitoring due to the slow response of the humidity sensor. By contrast, when water vapor condenses in a PID sensor, the effect on response is in the opposite direction and not readily quantifiable. This effect is a result of current leakage across the sensor electrodes and always causes a drifting high reading. Practical solutions to overcoming the humidity effects include:

(1) Adjust the humidity of the calibration gas (typically dry) to that of the measurement environment by using a moisture exchange tube during span calibration.

(2) Dehumidify the sample to match the calibration gas humidity using a moisture exchange tube surrounded by drying agent or gas. In addition, this method can be used to prevent condensation in the sensor for highly humid samples.

(3) Use a humidity-filtering tube to prevent condensation in a PID when moving from a cool and dry to a hot and humid environment and dehumidify a humidified PID i [illegible] ty.

Podium 128. Engineering and Control Technologies

Papers 201–210

201.

DEVELOPMENT OF EVALUATION PROCEDURES FOR LOCAL EXHAUST VENTILATION FOR UNITED STATES POSTAL SERVICE MAIL PROCESSING MACHINERY. B. Beamer, K. Crouch, J. Topmiller, NIOSH, Cincinnati, OH.

National Institute for Occupational Safety and Health researchers have conducted engineering evaluations of new local exhaust ventilation systems installed on United States Postal Service automated mail sorting equipment by independent contractors. The local exhaust ventilation systems have been developed primarily as a partial response to the use of mail to transmit anthrax, and the resulting infection of postal employees. We describe here the development of a testing protocol to determine the effectiveness of the ventilation systems in containing potential emissions from mail during processing by the sorters. The protocol specifies the use of air velocity measurements and smoke release observations where mail emissions could escape to the workroom environment. Also, the protocol includes measurement of the capture efficiency of the local exhaust ventilation for potential emissions from the mail, using a tracer gas technique. The approach was useful in locating the few areas needing improvement, and in establishing the generally high (>98%) control efficiency of the installed local exhaust ventilation. The absolute error in determining the capture efficiency was less than 2% using this technique. Changes to the ventilation system, such as volumetric flow rate adjustments, could be evaluated relatively quickly, and with a high degree of confidence, based in part on a real-time display of the tracer gas capture efficiency, and on the visual evidence provided by smoke release. Time-dependent effects, such as the clearance rate of an instantaneous airborne release, could be observed easily and quantitatively using this protocol.

202.

CONCENTRATION SENSORS IMPROVE CONTAINMENT BY MEANS OF ACTIVE FEEDBACK CONTROL IN FUME HOOD APPLICATIONS WITH HOT OR COLD EXHAUST STREAMS. J. Rock, Texas A&M University, College Station, TX.

Containment ventilation associated with thermally hot exhaust from fume hoods and the buoyant forces associated with air at high temperatures pose special problems for a laboratory air flow controls designer, especially in hoods destined to contain highly toxic or radioactive materials. This paper discusses the history of hot process emissions control and includes some recent work done to simulate fume hoods subject to high internal heat loads. Data show the onset of turbulence in hood face velocity as the defining event in loss of containment. While this presentation offers several ways of eliminating outflow in hot hood applications, one especially promising means is emphasized. This recently-developed safety containment employs concentration sensors, located outside the fume hood or mounted in the user's breathing zone. Concentration signals and turbulence signals are both treated as error signals for the control loop, to change the hood exhaust air flow and adjust the sash position to enhance laboratory worker safety. Fume hood sash position, hood exhaust air flow, and laboratory supply air flow control features that respond in desired ways are presented, illustrated, and discussed.

203.

LABORATORY FUME HOOD PERFORMANCE TESTING: DISPELLING THE MISCONCEPTIONS. D. Hitchings, SAFELAB Corporation, Indianapolis, IN.

Face velocity alone continues to be the most widely used method of hood testing despite the volume of evidence showing that face velocity alone correlates poorly with hood containment. This paper describes the deficiencies in traditional face velocity measurement and the relationship of face velocity to containment. Effective alternatives to face velocity testing will de outlined as well as a guide to specifiying hood testing to be performed by outside consultants.

204.

MEASUREMENTS OF ORGANIC VAPORS IN AN EXHAUST DUCT FROM A FLUID BED DRYER. J. Park, Abbott Laboratories, North Chicago, IL; M. Puskar, Abbott Laboratories, Abbott Park, IL.

The Fluid Bed Dryer (FBD) is a process equipment widely used in the pharmaceutical industry to dry powder or granulated material. However using fluid bed drying process with flammable, solvent-laden product is inherently hazardous. The use of air as the fluidizing medium with a flammable solvent atmosphere results in a potentially explosive atmosphere in the exhaust duct. FBD safety hazards can be mitigated by controlling the flammable vapor concentration thus maintaining the exhaust concentration below lower explosive limits (LELs). This study was designed to characterize vapor concentrations within an exhaust duct during a FBD operation.

MIRAN® 1A Gas Analyzer was adopted as a real-time analytical method and a series of laboratory validations was performed. MIRAN® was challenged at percent levels of solvent concentrations, which were significantly higher than the traditional application of MIRAN®. Also, a high-volume vacuum pump was employed to improve response time. The MIRAN® system was configured for isopropyl alcohol, ethanol, and acetone, and calibrated with good linearity up to 200% LEL. With the high-volume pump, a response time (t_{90}) of 5 sec was attained. The calibrated MIRAN® was tested using a dynamic test atmosphere generation system and demonstrated good agreement (<10% difference) with results from a traditional charcoal/GC method.

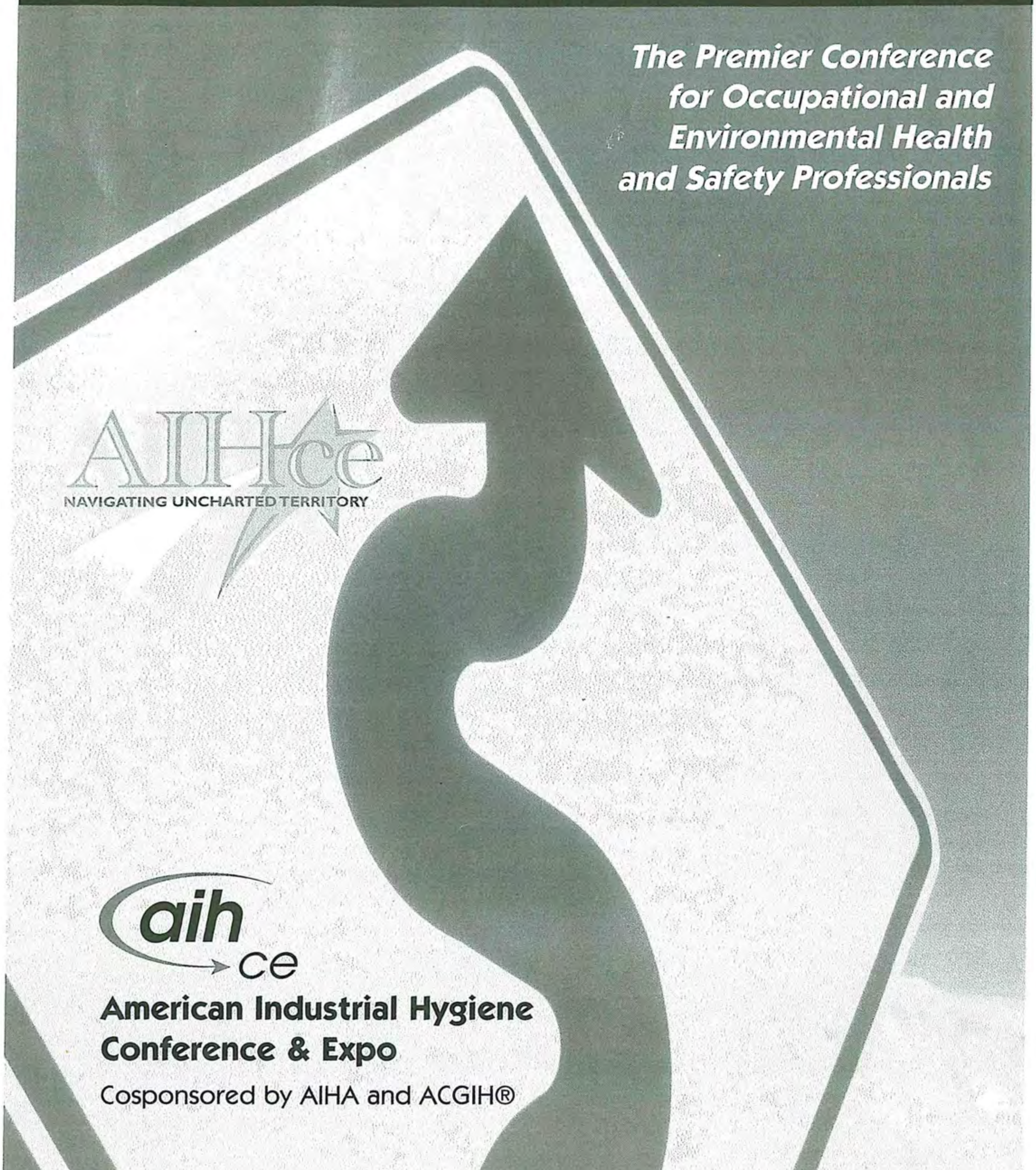
MIRAN® with the high-volume pump was installed at an exhaust duct. During measurement, using the MIRAN®, the test air was collected simultaneously in Tedlar® bags with a vacuum case. The analysis of the Tedlar® bags provided information on the composition of the solvent mixture used during the FBD operation. The vapor concentration profile generated from this study was used for designing a safer FBD system.

205.

CRITICAL HAZARD ANALYSIS PROCESS FOR ADDING CHEMICAL TO STEAM SYSTEM. C. Moody, A. Streifel, M. Nagel, University of Minnesota, Minneapolis, MN.

Situation. The University of Minnesota generates 1.5 billion pounds of steam per year for its Minneapolis Campus. The steam condensate creates a corrosion problem which has caused extensive degradation of condensate pipes. Two anti-corrosion amines, morpholine and cyclohexylamine, were proposed to be added to the central steam system. The steam is used to provide heat for the campus, for humidification of air, and for equipment heating in laboratories and kitchens. Previous studies have indicated that when these chemicals are added to steam in excessive quantities,

AIHce 2003 ABSTRACTS



The Premier Conference for Occupational and Environmental Health and Safety Professionals

AIHce
NAVIGATING UNCHARTED TERRITORY

aih ce

American Industrial Hygiene Conference & Expo

Cosponsored by AIHA and ACGIH®

May 10–15, 2003, Dallas Convention Center, Dallas, Texas

PROMOTING EXCELLENCE

MAY 8-13, 2004
ATLANTA, GA

Plan to present an abstract in Atlanta, Georgia!

Obtain a 2004 Call for Presentations, Contact AIHA's Customer Services at (703) 849-8888; fax (703) 207-3561

All submissions will be made on-line.
Watch the AIHA homepage for the opening announcement!

Schedule for the 2004 AIHce

October 7, 2003	Deadline all AIHce submissions.
October 29, 2003	PCC Meeting I.
November 24, 2003	Session Arrangers Finalize Podiums
December 3, 2003	PCC Meeting II.
Mid December 2003	Accept/reject e-mail notice to each submitter.
January 2004	AIHce Advance Program mailed.

Mark Your Calendar!

AIHce 2004
May 8–13
Atlanta, Georgia

For more information, contact AIHA's Customer Services at
2700 Prosperity Avenue, Suite 250, Fairfax, VA 22031
(703) 849-8888; fax (703) 207-3561

Visit the AIHce on the Internet (http://www.aiha.org/aihce.htm)

Submissions must be received electronically by October 7, 2003.