

## Bulk Handling Methods Emphasized In Fertilizer Plant Safety

CHICAGO.—Judging from the amount of attention they received in the fertilizer section of the 41st National Safety Congress here Oct. 19 to 23, it appears that bulk handling methods in fertilizer plants are the chief sources of the fertilizer industry's accidents. A major portion of the technical program of the fertilizer section was given over to discussion of accidents in the handling of finished materials, rather than in the chemical processing involved, and a highlight of the program was an in-plant demonstration of a recently developed method for "blasting" stockpiles of caked fertilizers without the use of explosives.

The blasting demonstration was supervised by G. M. Henry of Cardox Corp., with bulk-stored fertilizers at the Chicago Heights plant of International Minerals & Chemical as subject. Before several score of safety-conscious fertilizer plant men, Henry showed how the Cardox system, which uses compressed carbon dioxide as energy source, safely dislodges

large quantities of solidified fertilizer from curing and storage piles or bins.

To loosen such materials as caked superphosphates, for example, a hole is drilled into the pile face and the Cardox tube, 2 to 2.5 inches in diameter, about 4 feet long, and made of chromemolybdenum steel capable of withstanding internal pressures up to 40,000 pounds per square inch, is inserted and tamped into the hole. The forward end of the tube is perforated to allow the escaping carbon dioxide charge to enter the fertilizer pile. A charge cap on the rear end of the tube holds a charge valve and electric terminals for connecting the firing cable to the heater element. When current is applied to the terminals, heat is generated within the charging cap and the carbon dioxide is instantly gasified. The pressure which develops ruptures a soft steel disk at a predetermined pressure, releasing the gas into the fertilizer pile to loosen and tumble the material forward on to the loading floor. The tube is recovered and recharged for

repeated use. Recharging of tubes can be handled in the user's plant with only a moderate capital investment.

As demonstrated at IMC's plant, a dull "thud" may be the only audible report, and many times the sound cannot be heard outside the immediate building. Since the gas used is completely inert, the system may be used with complete safety in the frequently dusty atmosphere of a fertilizer plant. The U. S. Bureau of Mines, according to Henry, has approved the system as permissible for use in gassy and dusty atmospheres; under emergency conditions, in fact, a filled Cardox tube itself may be employed as a fire extinguisher to put out oil, grease, solvent, or electrical fires.

**Case Histories.** Materials handling mishaps accounted for the majority of lost-time or fatal injuries described in a "case history" panel discussion in the fertilizer section. In this session, plant safety directors and superintendents described actual accidents within their plants, explaining how and why each accident occurred and describing steps taken to eliminate the possibility of a recurrence. While each accident in the series actually occurred within a fertilizer plant, all happened in situations or with equipment that might be found in any industrial plant. Personal characteristics contributing to the accidents ran the gamut from lethargy to inattentiveness, ignorance of dangers involved, and in one unusual case, overzealousness on the part of an employee. Open discussion, led by John E. Smith of Spencer Chemical, pointed to the necessity for constant repetition of safety rules and for more personal and individualized attention to safety training.

Workman tamps Cardox tube into face of superphosphate fertilizer pile, preparatory to blasting with expanding carbon dioxide



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