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GENERAL SESSIONS

41st National Safety Congress

PLAINTIFF'S EXHIBIT

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NATIONAL SAFETY COUNCIL • 425 North Michigan Avenue • Chicago 11, Ill.

National
Safety Council

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EXHIBITION HALL, EXHIBITION HALL ANNEX,
SECOND AND THIRD FLOORS—CONRAD HILTON HOTEL

Alphabetical List of Exhibitors of Industrial and Public Safety Equipment

Acme Protection Equipment Co., Chicago, Ill.
Manufacturers—Industrial Gas Masks and Accessory Equipment.

Advance Glove Mfg. Co., Detroit, Mich.
Manufacturers—All Types of Work Gloves, Safety Gloves and Leather Safety Clothing.

Aetna Casualty & Surety Co., Hartford, Conn.
Accident Prevention, both on and off the job—Driver Training Device.

Alan Wood Steel Co., Conshohocken, Pa.
Manufacturers—AW Algrip Abrasive Rolled Steel Floor Plate.

Albina Engine & Machine Works, Portland, Ore.
Manufacturers—Swing Stage and Single Mechanical Stirrups.

American Abrasive Metals Co., Irvington, N. J.
Manufacturers and Distributors—Abrasive Metals, Paints, Coatings for Safe Walkway Surfaces.

American Chain & Cable Co., Inc., Bridgeport, Conn.
Manufacturers—Chains, Cable and Wire Rope of Various Kinds and Sizes; Steel and Malleable Castings; Brakes and Brake Controls; Cranes; Hoists; Valves and Fittings.

American-LaFrance-Foamite Corp., Elmira, N. Y.
Manufacturers—Fire Apparatus and Fire Fighting Equipment.

American Optical Co., Southbridge, Mass.
Manufacturers—Head, Eye and Respiratory Protective Devices; Safety Clothing and Safety Specialty Products.

Ampco Metal, Inc., Milwaukee, Wis.
Manufacturers—Safety Tools Fabricated from Ampco Metal, Ampco Beryllium-Copper and Monel.

Ansul Chemical Co. Fire Equipment Divn., Marinette, Wis.
Manufacturers and Distributors—Ansul Fire Extinguishing Equipment.

Arcadia Mfg. Co., Birmingham, Mich.
Manufacturers—Plastic Coated Gloves and Aprons for Industry.

Arnar-Stone Laboratories, Inc., Evanston, Ill.
Manufacturers—Burn Ointment and Skin Protective Products.

Audivox, Inc., Boston, Mass.
Manufacturers—Hearing Aids.

Bashlin, W. M. Co., Grove City, Pa.
Manufacturers—Linemen's Safety Equipment.

Bausch & Lomb Optical Co., Rochester, N. Y.
Manufacturers—Safety Glasses and Safety Eyewear for Every Occupational Requirement.

Best, Alfred M., Co., Inc., New York, N. Y.
Publishers—Safety Maintenance and Production; Best's Safety and Maintenance Directory.

Better Light Better Sight Bureau, New York, N. Y.
Demonstrating Importance of Proper Lighting to Industrial Accident Prevention.

Bil-Jax, Inc., Archbold, Ohio
Manufacturers—Tubular Steel Scaffolding and Equipment. Portable Steel Bleachers.

Bomgardner Mfg. Co., Cleveland, Ohio
Manufacturers—Ambulance and First Aid Equipment.

Brady, W. H., Co., Milwaukee, Wis.
Manufacturers—Self-Sticking Safety Signs Pipe Markers and Special Markers and Signs.

Breck, John H., Inc., Springfield, Mass.
Manufacturing Chemists—Industrial Hand Cleaner; Hair and Scalp Preparations.

Bristol-Myers Products Divn., New York, N. Y.
Manufacturers of Pharmaceuticals.

Browne, Stewart R., Mfg. Co., New York, N. Y.
Manufacturers—Electrical Safety Equipment, Flashlights, Explosive-Proof and Vapor-Proof Extension Lights.

Brulin & Co., Inc., Indianapolis, Ind.
Manufacturers—Floor Treatments, Cleaners, Disinfectants, Insecticides.

Buhrke, R. H., Co., Chicago, Ill.
Manufacturers—Safety Equipment for Construction and Maintenance.

Bullard, E. D., Co., San Francisco, Calif.
Manufacturers—Hard Boiled Caps and Hats, First Aid Kits, Belts, Hoods, Gas Masks, Air Purifiers, Bullard-Burnham Safety Hooks.

Bustin Firm-Grip Grating Corp., Dover, N. J.
Manufacturers—"All-Way" Non-Skid Grating Bars and Products.

Cambridge Rubber Co., Taneytown, Md.
Manufacturers—Vul-Cork and Vul-Cork Neoprene Soles and Heels.

Campro Sales Co., Canton, Ohio
Manufacturers—Saf-T-Line Markers.

Canfield Oil Co., Cleveland, Ohio
Manufacturers—Oil Absorbents.

Chance, A. B., Co., Centralia, Mo.
Manufacturers—Hot Line Maintenance Tools and Line Construction Tools.

Charleston Rubber Co., Stark Industrial Park, Charleston, S. C.
Manufacturers—Lineman and Industrial Gloves, Sleeves, Aprons, Safety Devices.

Chemical Specialties, Inc., Springfield, Mass.
Manufacturers—Protective Hand Creams and Cleansers.

Chicago Eye Shield Co., Chicago, Ill.
Manufacturers—Head and Eye Protective Equipment.

Coca-Cola Co., New York, N. Y.
Manufacturers—Coca-Cola.

Columbus Glove Mfg. Co., Columbus, Ohio
Manufacturers—Coated Gloves and Aprons.

Columbus McKinnon Chain Corp., Tonawanda, N. Y.
Manufacturers—Alloy Steel Sling Chains.

C-O-Two Fire Equipment Co., Newark, N. J.
Manufacturers—Carbon Dioxide and Dry Chemical Extinguishers and Systems. Smoke Detectors.

Cunningham, M. E., Co., Pittsburgh, Pa.
Manufacturers—Safety Marking Tools.

Davis Emergency Equipment Co., Inc., Newark, N. J.
Manufacturers—Respiratory Protection, Combustible Gas Indicators, General Safety and First Aid Equipment.

Detex Watchclock Corp., New York, N. Y.
Manufacturers—Watchmen's Clocks.

Diamond Match Co., Springfield, Mass.
Manufacturers—Book Matches for Safety, Advertising and Sales Promotion Campaigns.

Diversey Corp., Chicago, Ill.
Manufacturers—Sanitation and Maintenance Chemicals.

Dockson Corp., Detroit, Mich.
Manufacturers—Goggles, Spectacles, Face Shields, Helmets. Distributors—Eyesaver, Respirators, Plastic Aprons.

Down Corning Corp., Midland, Mich.
Manufacturers—Sight Savers and Sight Saver Cleaning Stations.

Dunn Products, Chicago, Ill.
Manufacturers and Distributors—Protective Clothing for Industrial Workers Made from Asbestos, Leather, Rubber, Neoprene and Fire-Proofed Duck.

Eagle-Picher Sales Co., Cincinnati, Ohio
Producers—Eagle-Picher Industrial Floor-Dry No. 85. A heavy duty and anti-skid light reflecting absorbent for plant safety and maintenance.

E & J Mfg. Co., Burbank, Calif.
Manufacturers and Distributors—Automatic Oxygen Resuscitation and Inhalation Equipment.

Eastern Metals of Elmira, Inc., Elmira Heights, N. Y.
Manufacturers—Safety Signs and Devices.

Edmont Mfg. Co., Coshocton, Ohio
Manufacturers—Coated Fabric Work Gloves.

Elliott Service Co., Mt. Vernon, N. Y.
Publishers—Accident Prevention Displays; Safety Conference Programs; Supervisor's Weekly Bulletin; Bulletin Board Service.

Embosograf Corp. of America, New York, N. Y.
Manufacturers—Sign-Making Equipment, Safety Poster Displays, Directory Signs, Visual Aids.

Emerson, J. H., Co., Cambridge, Mass.
Manufacturers—Resuscitation Equipment.

Fairfield Glove Co., Fairfield, Iowa
Manufacturers—Industrial Gloves and Mittens.

Fendall Co., Chicago, Ill.
Manufacturers—Head and Eye Protection Equipment.

...nell System, Inc., Elkhart, Ind.
Manufacturers—Electric Scrubbing and Polishing Machines and Industrial Cleaning Agents.

Fireye Corporation, Boston, Mass.
Manufacturers—Electronic Flame Detection Equipment.

Franklin Research Co., Philadelphia, Pa.
Manufacturers—Anti-Slip Floor Maintenance Materials.

Frommelt Industries, Dubuque, Iowa
Manufacturers—Portable Welding Shield and Protective Heat Cloth.

Gamewell Co., Upper Newton Falls, Mass.
Manufacturers—Complete Industrial Fire Alarm and Watchmen's Reporting Systems.

General Detroit Corp., Detroit, Mich.
Manufacturers—General Quick Aid Fire-Extinguishers and Allied Items.

Globe Company, Chicago, Ill.
Manufacturers—Grip-Strut Grating.

Gro-Cord Rubber Co., Lima, Ohio.
Manufacturers—Gro-Cord, Raw-Cord and Neo-Cord Soles, Heels and Taps.

Haggard Stretcher Co., Medford, Ore.
Manufacturers—First Aid Stretcher.

Haws Drinking Faucet Co., Berkeley, Calif.
Manufacturers—Haws Emergency Eye-Wash Fountains and Showers.

Hewson, John Co., New York, N. Y.
Manufacturers—Takk High Speed Static Control Systems; High Voltage D. C. Insulation Testers and Staticators.

Hild Floor Machine Co., Chicago, Ill.
Manufacturers—Portable Vacuum Machines and Floor Scrubbing and Polishing Machines, for Plant and Office Cleaning and Maintenance.

Hillyard Chemical Co., St. Joseph, Mo.
Manufacturers—Safe, Economical Floor Treatments, Building Maintenance, Sanitation Products, Equipment and Materials.

Holland-Racine Shoes, Inc., Holland, Mich.
Manufacturers—McCoy Safety Toe Shoes.

Huntington Laboratories, Inc., Huntington, Ind.
Manufacturers—Sanitation and Cleaning Products; Floor Machines; Special Product Development.

Hygiene Research, Inc., New York, N. Y.
Manufacturers—Protective Creams for the Skin and Mistproofing Cloth for Goggles and Windshields.

Hy-Test Divn., International Shoe Co., St. Louis, Mo.
Manufacturers—Hy-Test Anchor Flange Steel Toe Safety Shoes.

Industrial Gloves Co., Danville, Ill.
Manufacturers—Steel-Grip Industrial Safety Apparel Hand—Arm—Leg—Body Protection.

Industrial Products Co., Philadelphia, Pa.
Manufacturers—IPCO Safety Equipment for All Industries.

Institute of Industrial Launderers, Washington, D. C.
A Complete Coverall and Wiping Cloth Service for Industrial Plants.

Insto-Gas Corp., Detroit, Mich.
Manufacturers—Underwriters and Factory Mutuals Approved Torches and Furnaces.

Interstate Rubber Products Corp., Los Angeles, Calif.
Manufacturers—Safety Trafficone System.

Iron Age Safety Shoes, H. Childs & Co., Inc., Pittsburgh, Pa.
Manufacturers—Complete Line Men's and Women's Leather and Rubber Industrial Safety Footwear.

Jones, C. Walker, Co., Philadelphia, Pa.
Manufacturers—Jomac Industrial Gloves and Knitted Specialties.

Jones & Co., Rumford. R. I.
Manufacturers—Full Vision Safety Visor Goggles.

Junkin Safety Appliance Co., Inc., Louisville, Ky.
Manufacturers—Junkin Interlocking Barrier Gate Guard; Swinging Die Closure; Electro-Lock Shield; Splint Type Stretcher, Stretcher Cabinets.

Justrite Mfg. Co., Chicago, Ill.
Manufacturers—Safety Cans; Oily Waste Cans; Safety Electric Lanterns; Flashlights and Fire Extinguishers.

Karel First Aid Supply Co., Chicago, Ill.
Distributors—Industrial Hospital Supplies and Equipment; Drugs, Dressings, Furniture, Instruments.

Kelley-Maborney Co., Louisville, Ky.
Manufacturers—Convoy Skid-Proof Enamel.

Keystone View Co., Meadville, Pa.
Manufacturers—Original Binocular Visual Screening Tests for Industry.

Kidde, Walter, & Co., Inc., Belleville, N. J.
Manufacturers—Fire Protection and Extinguishing Equipment.

Kimball Safety Products Co., Cleveland, Ohio
Manufacturers—A Complete Line of Personal Protection Equipment.

Klein, Mathias, & Sons, Chicago, Ill.
Manufacturers—Linemen's Tools and Equipment.

Knapp Brothers Shoe Mfg. Corp., Brockton, Mass.
Manufacturers—Knapp Saf-Test Shoes.

Kunz, J., Glove Co., Chicago, Ill.
Manufacturers—Linemen's, Bridgemen's and Welder's Quality Gloves.

Legge, Walter G., Co., Inc., New York, N. Y.
Manufacturers—Safety Floor Preparations; Conductive Floor Coating; Static Grounding Devices for Personnel.

Lehigh Safety Shoe Co., Allentown, Pa.
Manufacturers—Leather Safety Box Toe Shoes and Rubber Boots.

ıtfoot Schultz Co., New York, N. Y.
.anufacturers—Powdered, Liquid and Bar Soap Skin Cleansers and Dispensers.

Littell, F. J., Machine Co., Chicago, Ill.
Manufacturers—Punch Press Safety Equipment.

Logan Emergency Showers, Inc., Glendale, Calif.
Manufacturers—Functionally Designed Equipment for Shower Bathing.

Louisville Ladder Co., Louisville, Ky.
Manufacturers—Aluminum Ladders, Scaffold Products and Related Equipment.

Lowery Brothers, Chicago, Ill.
Wire Rope Splicing Service.

Luther Mfg. Co., Inc., Olean, N. Y.
Manufacturers—Power Press Guards.

MacWhyte Company, Kenosha, Wis.
Manufacturers—Wire Rope Slings, Wire Rope and Wire Rope Assemblies.

Maico Co., Inc., Minneapolis, Minn.
Manufacturers—Audiometers, Auditory Training Equipment, Stethetrons and Hearing Aids.

Marsh & McLennan, Inc., Chicago, Ill.
Insurance Brokers and Agencies.

Martindale Electric Co., Cleveland, Ohio.
Manufacturers—Martindale Protective Dust Mask and Electrical Testing Instruments.

ury-Young Co., Boston, Mass.
.anufacturers—Floor Maintenance Materials.

McAn, Thom, Safety Shoe Divn., Melville Shoe Corp., New York, N. Y.
Manufacturers and Distributors—Thom McAn Safety Shoes.

McDermott, Julian A., Corp., Corona, L. I., N. Y.
Manufacturers—Warning and Safety Lights for Municipal, Industrial, Utility and Aviation Use.

McDonald, B. F., Co., Los Angeles, Calif.
Manufacturers and Distributors—Industrial Safety Appliances and Clothing.

Medical Supply Co., Rockford, Ill.
Manufacturers—Flexible Unit First Aid, Snake Bite First Aid, Burn First Aid.

Melflex Products Co., Inc., Akron, Ohio
Manufacturers—Flooring Materials, Treads and Standing Mats.

Metal Arts Co., Inc., Rochester, N. Y.
Manufacturers—Safety Award Lapel Emblems, Rings, Badges, Trophies, Plaques.

Metropolitan Life Insurance Co., New York, N. Y.
Educational Publications and Materials Dealing with Safety.

Micro Switch, Divn. Minneapolis Honeywell Co., Freeport, Ill.
Manufacturers—MICRO Trip-Electric Clutch Control for Power Machines.

Milburn Co., Detroit, Mich.
Manufacturers—Ply Protective Creams, Ply Garb Plastic Clothing, Ply Gloves, Plastic Work Gloves.

ller Equipment Co., Inc., Franklin, Pa.
Manufacturers—Linemen's and Industrial Safety Belts.

Mine Safety Appliances Co., Pittsburgh, Pa.
Manufacturers—Safety Equipment for Every Industry.

National Bureau of Standards, Washington, D. C.

National Safety Council, Chicago, Ill.

National Society for the Prevention of Blindness, Inc., New York, N. Y.
Educational Material on Conservation and Utilization of Eyesight in Industry.

Newman Mfg. & Sales Co., Kansas City, Mo.
Manufacturers—Newco Combination Wire Rope Clamp and Thimble.

Occupational Hazards, Inc., Cleveland, Ohio.
Representatives: Irving B. Hexter, Edwin M. Joseph, Harry E. Burwasser, Publishers.

Oil-Dri Corp. of America, Chicago, Ill.
Manufacturers—Oil-Dri Absorbents and Non-Slip Paint.

Onox, Inc., San Francisco, Calif.
Distributors—Onox Skin-Toughener for Athlete's Foot.

Orthopedic Equipment Co., Bourbon, Ind.
Manufacturers—Litters, Emergency Splints, First Aid Kits, Conn Tourniquets, Fracture Equipment.

Osborn Mfg. Corp., Warsaw, Ind.
Manufacturers—Safety Pliers and Tongs for Feeding Punch Presses.

Pac-Kit Company, Greenwich, Conn.
Manufacturers—First Aid Equipment.

Packwood, G. H., Mfg. Co., St. Louis, Mo.
Manufacturers—"Pax" Safety Industrial Skin Cleansers and Dispensers.

Parker Sweeper Co., Springfield, Ohio.
Manufacturers—Industrial Floor Sweepers.

Patent Scaffolding Co., Inc., Chicago, Ill.
Manufacturers—Gold Medal Wood and Magnesium Safety Ladders, Suspended Sectional Tubular Steel and Aluminum Scaffolding, Sidewalk Protection Canopies, Steel Grandstands.

Pennsylvania Optical Co., Reading, Pa.
Manufacturers—Head and Eye Protective Equipment.

Permamix Corp., Chicago, Ill.
Distributors—Industrial Floor Patching Material (PERMAMIX).

Porto-Clinic Instruments, Inc., New York, N. Y.
Manufacturers-Distributors—Driver Testing and Training Equipment, Glare Recovery and Night Vision Equipment, Magnetic Traffic Boards, Stopping Distance Meters, Cardoon Systems, Auto Drive Visual Set, and other Driver Safety Aids.

Positive Safety Mfg. Co., Cleveland, Ohio.
Manufacturers—Power Press Guards.

Powder Actuated Tool Manufacturers' Institute, New York, N. Y.
Association of Manufacturers.

Prairie State Products Co., Chicago, Ill.
Manufacturers—Metal Safety Signs, Electrical Exit and Directional Signs.

Protectoseal Co., Chicago, Ill.
Manufacturers—Fire Prevention Equipment for Flammable Solvents.

Pulmosan Safety Equipment Corp., Brooklyn, N. Y.
Manufacturers—Industrial Safety Equipment.

Pyrene Mfg. Co., Newark, N. Y.
Manufacturers—Diversified Approved Fire Extinguishers, Recharges, Air Foam, Playpipes, Systems.

Racine Glove Co., Inc., Rio, Wis.
Manufacturers—Gloves, Apparel, Protective Equipment, Leather, Asbestos and Steel Reinforced.

Randolph Laboratories, Inc., Chicago, Ill.
Manufacturers—Dioxide Fire Extinguishers.

Reece Wooden Sole Shoe Co., Columbus, Nebr.
"[illegible] Rocker" Wooden Sole Safety Footwear.

Riegel Textile Corp., New York, N. Y.
Manufacturers—Work Gloves and Mittens.

[illegible]twood Sprinkler Co., Worcester, Mass.
[illegible]anufacturers—Automatic Fire Protection Systems; Sprinklers, WaterFog, FogFoam, and Foam.

Rose Mfg. Co., Denver, Colo.
Manufacturers—Safe-Hi Line of Safety Equipment.

Safety Box Toe Co., Boston, Mass.
Manufacturers—Safety Steel Box Toes.

Safety Clothing & Equipment Co., Cleveland, Ohio
Manufacturers—Safety Clothing and Equipment for Every Type Industrial Worker.

Safety First Products Corp., Elmsford, N. Y.
Manufacturers and Distributors—Dry Chemical Fire Equipment.

Safety First Shoe Co., Holliston, Mass.
Manufacturers—Safety Steel Toe Shoes for Men.

Safety Tower Ladder Co., Burbank, Calif.
Distributors—Tower Ladder Safety Device and Safety Lifeline Lock.

Safway Steel Products, Inc., Milwaukee, Wis.
Manufacturers—Steel Scaffolds and Overhead Maintenance Equipment.

Salisbury, W. H., & Co., Chicago, Ill.
Manufacturers—Linemen's Rubber Protective Equipment.

Sani-Mist, Inc., Philadelphia, Pa.
Manufacturers—Athlete's Foot Preventive.

[illegible]ader's, A., Son, Brooklyn, N. Y.
[illegible]anufacturers—Pneumatic Press Controls, Valves, Cylinders and Associated Products.

Scientific Industrial Supply Co., Chicago, Ill.
Manufacturers—Gloves, Clothing and General Safety Equipment.

Scott Aviation Corp., Lancaster, N. Y.
Manufacturers—Scott Air-Pak, Demand Inhalator, Demand Respirator.

Sellstrom Mfg. Co., Chicago, Ill.
Manufacturers—Face and Eye Protection Equipment.

Sentry Shoe Co., Nashville, Tenn.
Manufacturers—Safety Toe Shoes.

Sonotone Corp., Elmsford, N. Y.
Manufacturers—Hearing Aids and Hearing Test Equipment (Audiometers).

Standard Safety Equipment Co., Chicago, Ill.
Manufacturers and Distributors—Industrial Safety Equipment.

Steel Scaffolding Co., Inc., Brooklyn, N. Y.
Manufacturers—"Trouble Saver" Steel Scaffolding.

Stepan Chemical Co., Chicago, Ill.
Manufacturers and Distributors—Dermatologically Correct Industrial Skin Cleansers.

Stephenson Corp., Red Bank, N. J.
Manufacturers—Resuscitation Equipment and Chemical Tests for the Determination of Intoxication.

Stonehouse Signs, Inc., Denver, Colo.
Manufacturers—Steel Accident Prevention Signs.

[illegible]p-Fire, Inc., Brooklyn, N. Y.
Manufacturers—Fire Extinguishers.

Surety Rubber Co., Carrollton, Ohio
Manufacturers—Rubber Gloves and Linemen's Equipment.

Surty Mfg. Co., Inc., Chicago, Ill.
[illegible]—Safety Guards and Materials.

Taylor, S. G., Chain Co., Hammond, Ind.
Manufacturers—Taylor Made Alloy Steel Sling Chains and Tayco Safety Hooks.

Tennant, G. H., Co., Minneapolis, Minn.
Manufacturers—Heavy Duty Industrial Floor Machines, Power Sweepers, and Supplies.

Timmins Splint Co., Omaha, Nebr.
Manufacturers—Emergency All-Purpose Splints.

Treesdale Laboratories and Textile Processing Co., Inc., Pittsburgh, Pa.
Manufacturers—Safety Clothing, Chemical Flameproofing, Mildew Proofing and Water Proofing Compounds.

Trinal, Inc., Chicago, Ill.
Manufacturers—"Safeet" Protection for the Metatarsal Arch.

U-C-Lite Mfg. Co., Chicago, Ill.
Manufacturers—Portable Electric Hand Lamps and Emergency Lights.

Union Wire Rope Corp., Kansas City, Mo.
Manufacturers—Wire Rope, "Tuffy" Slings and "Tuffy" Towlines.

U. S. Industrial Glove Corp., Detroit, Mich.
Reconditioning Work Gloves.

United States Safety Service Co., Kansas City, Mo.
Manufacturers—Industrial Goggles, Protective Hats, Faceshields, Welding Helmets. Impregnated Salt Tablets and Allied Safety Equipment.

Vestal, Inc., St. Louis, Mo.
Manufacturers—Slip Resistant Floor Wax, Liquid Skin Degerming Soap, Floor Cleaners, Disinfectants, Floor Machines.

Wagner Sign Service, Inc., Chicago, Ill.
Manufacturers—Signs—Changeable Copy; Enduronamel Panels; Translucent Plastic Letters.

Wash-Rite Co., Inc., Indianapolis, Ind.
Cleansers—Processors Gloves, Aprons, and Protective Clothing. Distributors—Gloves, Aprons.

Watchemoket Optical Co., Inc., Providence, R. I.
Manufacturers—"Eye-Savers" Plastic Eye Protection and Plasi-Glow Safety Signs.

Waverly Petroleum Products Co., Philadelphia, Pa.
Manufacturers—Oil and Grease Absorbents.

Welsh Mfg. Co., Providence, R. I.
Manufacturers—Safety Goggles, Lens, Faceshields and Helmets.

West Disinfecting Co., Long Island City, N. Y.
Manufacturers—Products for the Promotion of Industrial Health and Sanitation.

Wheeler Protective Apparel, Inc., Chicago, Ill.
Manufacturers—Industrial Safety Clothing for Heat and Abrasive Hazards.

Wilkins Co., Inc., Cortland, N. Y.
Manufacturers—K-Lens-M Products; Goggle Stations, Lens Cleaner, Anti-Fogging Liquid, Lens Tissue.

Williams Jewelry & Mfg. Co., Chicago, Ill.
Manufacturers—Safety Awards, Badges and Trophies.

Wilson Products, Inc., Reading, Pa.
Manufacturers—Industrial Goggles, Gas Masks, Helmets and Respirators, and Allied Safety Devices.

Winko-Matic Signal Co., Lorain, Ohio.
Manufacturers—Activating Signals for Traffic Warning Signs; Illuminated Directional Control Signs. Distributors—Highway Warning Signs; Traffic Marking Paint.

Wolverine Shoe & Tanning Corp., Rockford, Mich.
Manufacturers—Industrial Safety Shoes.

Wyandotte Chemicals Corp., Wyandotte, Mich.
Manufacturers—All-Purpose Floor Absorbent and Industrial Cleaning Compounds.

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*Committee Advisor and Past General Chairman

Checking Performance of Process Exhaust Systems

By W. G. HAZARD
Dir., Industrial Hygiene, Owens-Illinois Glass Co., Toledo, Ohio

Some two-and-a-half years ago the Health Maintenance Committee of this section undertook to develop a data sheet on the maintenance of local exhaust systems. The job is now about completed, with the help of the whole committee, and your program chairman has asked that we give you a preview of it.

Purpose

The purpose of the data sheet is somewhat different from that of most articles that have appeared on exhaust systems. What's made this possible has been the timely appearance in the last few years of outstanding books on the technical design of exhaust systems. Among these publications are:

1. *Manual of Industrial Ventilation* (1952)
   American Conference of Governmental Industrial Hygienists
2. *Industrial Health Engineering* (1947)
   A. D. Brandt
3. *Industrial Hygiene and Toxicology* (1948)
   Frank A. Patty, Ed. (Chapter 10—Ventilation, by W. N. Witheridge)
4. *Exhaust Hoods* (1952)
   J. M. DallaValle
5. *Accident Prevention Manual* (1951)
   National Safety Council (Chapter 21—Industrial Health Engineering)
6. *Ventilation*
   W. C. L. Hemeon
7. *Industrial Dusts* (2d edition)
   Phillip Drinker and T. F. Hatch

   To be published
8. Design data published by numerous manufacturers, such as American Blower Corporation, American Air Filter Company, Buffalo Forge Company, Westinghouse, and others.

The first design and technical maintenance of exhaust systems falls in the lap of the plant maintenance or engineering department, and the above books handle thes aspects thoroughly. Little has been writte however, directly for the safety engineer What are *his* responsibilities? What is *h* role, when the engineering phases are handle by the plant engineer?

This data sheet is written for the safet engineer. It does not cover detailed desig instrumentation or maintenance. It contain only such background principles, and com ments on popular fallacies, as are needed fc the safety man to work profitably with th engineer and department supervisor.

What Can Safety Engineer Do About Exhaust Systems?

1. *Air samples:* Exhaust systems that ar meant to control a health hazard succeed c fail according to how well they keep the a contamination in the workroom below dar gerous levels. Usually this can be dete mined only by air samples and analyses tha actually measure the amount of the harmfu agent in the air. Method used varies accor ing to whether the material is silica dus or other toxic dust; vapor, as from a solve or degreaser; fume, as from welding; ga or even hot air—for the latter can be classe as a contaminant, and exhausted to the ou doors.

When the plant has no full-time industri hygienist, as most plants do not, the safet engineer should arrange for these tests. The are his responsibility rather than that of th plant engineering department.

Such tests are *not* needed when the cor taminant is not harmful, as with wood dus lime, coal, and other nontoxic materials.

2. *Plan:* For existing exhaust systems th safety engineer should get a simple sketc of the layout. This need not be a workin blueprint, or even to scale. An example of simple line drawing is given in the dat sheet. All that needs to be shown is th order in which branches come off the mai ducts, diameters of all ducts, arrangement o fan and collector, size of fan and moto and if possible, overall rate of air flow an static pressure as specified by the designe of the system.

FORM 1—Safety Engineer's Inspection Report

Test point	Condition of hood and branch (Battered? removed? plugged? repair?)	Static press. (inches water) Originally	Checked
A		2.1	
B		2.0	
C		2.5	
D		2.0	
E		1.9	
F		2.1	
G		2.2	
H		5.0	
J		8.0	
Filter resistance (J)-(H)		3.0	

Material collected since last check _____ lbs. Hours of operation _____ Interval between reg. shakings _____ hrs.
Comments of men, and Your comments (use back, if necessary): _____

3. *Test holes:* In each branch, near the hoods, at the collector intake, and at the fan intake, the safety engineer should have simple test holes, about ¼" in diameter, drilled. These should be numbered serially with paint or tags, and on his sketch of the piping he should mark the approximate location of each hole, with its number.

4. *Portable U-tube:* He should then equip himself with a U-tube or water manometer. After connecting one leg of the manometer to a piece of rubber tubing, he can hold the other end of the tubing over each test hole in order and measure the static pressure or suction.

If the system is new, he should see that the plant engineering department "balances" the air flow from each branch—which means that the correct amount of air flow, as called for by the designer, is passing through each branch. If the contaminant is a health hazard, air samples, taken after balancing the system, will tell the safety engineer whether control of the air pollution has in fact been established. From then on, assuming no changes are made in the hoods, piping or process, he can be assured that the equipment is continuing to work right, if rechecks at the test holes give him the same static pressure readings as the initial ones.

Rechecks with the U-tube should be made regularly, probably at intervals of not over a month. He should have a mimeographed form to record permanently the current readings, so they can be compared with the initial readings. These suction rechecks make it unnecessary to take frequent air samples.

Certain other defects, which can be checked merely by looking should be noted: bent or battered hoods, new branches that may have been added, changes in the process, etc.

5. *Meaning of U-tube readings:* Knowing what the static pressures were when the system was properly balanced, changes from these values show if and where trouble develops.

For example: The increased reading in the first branch, with other readings remaining normal, shows something is plugging that branch between the test hole and hood.

A decreased reading in the branch would mean there is some obstruction farther up the branch, that is, between the test hole and the main duct or header.

Decreased readings in several branches and near normal readings would result if the header was partially plugged in branches nearer the dust collector when the header leading to the collector becomes plugged. There will be increased readings on both sides of the collector.

A partly plugged arrester would result in a decreased reading upstream and an increased reading downstream.

Decreased fan capacity due to slipping fan belt, dirty or worn blades, disjointed pipe between fan and arrester, or an open clean-out door would give the decreased suction readings throughout the system.

Thus relative changes in readings at different test holes can be used to track down the trouble.

Certain absolute values are important too. For example, although suction at a hood is

no guarantee that the hood will control the contaminant, still some state codes do require that a certain minimum negative pressure be present, often 2" water gauge. The safety engineer should have a copy of codes applying to exhaust systems (usually administered by the state labor department). He should see that their suction requirements are met.

6. *Repair orders:* When maintenance work is needed, the safety engineer should see that the proper work orders are processed, following whatever is his plant's usual procedure for this.

Role of Plant Engineer

Some may think monthly inspections of exhaust system performance, including measuring the static pressure, are more the responsibility of the plant engineer than of the safety engineer. Experience has shown, however, that unless the safety man takes this equipment under his wing, it will often be neglected. This happens for two reasons: first, most local exhaust systems are not *production* equipment; if they were they would be assured of regular care. Second, while they are a collection of sheet metal, fans, motors and other mechanical devices, which are engineering in nature, their basic purpose is to improve the comfort or safeguard the health of the *people* on the job. This aspect is definitely the worry of the safety man, and only indirectly of the plant engineer.

The fact is, a system can be mechanically OK, in that the piping is tight and well supported, the fan is properly chosen, the bearings are well greased, the motor is not overloaded, etc., and yet the system is a failure. It's a failure because it does not succeed in making the air safe which the men breathe. This is the "proof of the pudding"—and the safety engineer (or industrial hygienist) is in the best position, through his air samples and other tests, to see that the equipment does really clean up the workroom air.

There are of course, certain inspections that the plant engineer should make, just as he would with any other moving machinery. On regular schedule he must lubricate the fan and motors, check rapping mechanism of the filter, inspect the latter for leaky bags, check any motor-driven dampers, etc.—and repair them, when necessary.

Facts and Fallacies for Safety Engineer to Remember

Production people and even engineers have misconceptions sometimes, for which safety engineers should be on guard. Here are a few:

1. *Performance Guarantee:* Since the safety engineer is concerned with unsafe work conditions, he should do all he can to see that the purchasing department, when placing an order for a local exhaust system, has a performance guarantee written in.

2. *Adding Hoods:* Many a first-class exhaust system is made ineffective by the hit-or-miss adding of new hoods in later years. Be sure the plant engineer checks the system to see it will handle the extra load.

3. *Makeup Air:* Getting makeup air, tempered in winter, into a room is sometimes a more perplexing problem than the exhaust system itself. Be sure this problem is solved beforehand.

4. *Explain to Employees:* The man on the job must understand the reasons for the exhaust system, and how to operate it, if it is to give him full protection. The safety engineer can assist the supervisor in giving this explanation. Better yet, consult the men before the final design is agreed on—so there will be the least amount of interference with his work from hoods, enclosures, etc.

5. *Smoke Tubes:* One of the handiest gadgets the safety engineer can have is a smoke tube (available commercially) to show the path of air currents as they enter the hoods. With it he can often convince the operator of the importance of baffles, closeness of hood to dust source, etc.

6. *Fallacy of Heavy Vapor:* Because some vapors like benzol, trichlorethylene, carbon tetrachloride, and the like are heavier than air, many people think downdraft ventilation or hoods at floor level are a must. The fallacy is that vapors coming from a process do not persist for long in an undiluted state. They are soon mixed with air, by random wind and convection currents. Once mixed, they don't normally settle out to form a heavy, concentrated layer at the floor.

A concentration of 1000 ppm of benzene is 25 times the maximum allowable limit, by health standards. It is far more concentrated than would be permitted in any workroom.

Yet, this mixture is only 0.17 per cent heavier than air, even though *pure* benzene vapor is *three* times heavier than air. Thus ratio of weight of air to weight of the benzene-air mixture is only 100 to 100.17. There could never be any sinking or stratifying of this 1000 ppm mixture. A side or back hood would be just as effective as a downdraft hood.

7. Fallacy of "Sucking" the Contaminant Into Hood: Because people can feel air *blowing out* of an air line some feet away from the end of the pipe, they think that dust-laden air can be *sucked into* an exhaust hood from several feet away. This is not true. Air can be sucked only one-thirtieth of the distance it can be blown. In *exhausting*, the air velocity has fallen to 10 per cent at a distance of only *one* pipe diameter out from the end of the pipe; in *blowing*, this 10 per cent figure is reached some *30* diameters out from the end of the pipe. Suppose for example, we have a six-inch pipe sucking air in so the pipe velocity is 4000 feet per minute. Only six inches out from the "sucking" end of the pipe the velocity will be a mere 400 feet per minute—hardly enough to feel. But at the blowing end, this 400 fpm velocity will not be reached until you go 30 diameters, or 15 feet away from the pipe end.

This misunderstanding also crops up when installing propeller fans in walls or windows to provide ventilation. Such fans are incapable of withdrawing air directly from any operation in the center of the room, or in fact, from any area more than a foot or two from the fan. Beyond that they act only by diluting the room air by drawing in masses of makeup air through doors and windows.

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to do this, we will find that additional lation at the state level and additional legislation at the federal level will be passed which eventually will place the formulation and investment of safety measures in the hands of the government. Needless to reiterate, this legislation need not and should not be enacted.

Enforcement of Safety Practices in Heavy Construction

By JAMES G. McFARLAND
Safety Eng., American Bridge Div., U. S. Steel Corp., Pittsburgh, Pa.

Since safety, in operations as well as construction, has become a "must," the American Bridge Division of the U. S. Steel Corporation, fully aware of the growing needs of a growing organization, has carefully chosen full-time safety engineers for their various projects, from the ranks of experienced men in the field of construction.

This method of appointment has resulted in radical changes in the operating methods of the organization, in relation to safety. It is well to bear in mind that in steel erec- the safety program varies, depending n the type of bridge or building to be erected. For example, sometimes we use a "hi-line" in erecting a bridge, or a traveler, and sometimes a derrick car, and then we have different types of false-work. *General Safety Rules* apply to all types of construction, but where different hazards exist that are not in the normal course of certain types of construction, then the safety program must be geared to that particular operation.

When constructing a tiered building with a guy derrick, in a congested area, you will find that we are overburdened with sidewalk superintendents; therefore, we are confronted with the problem of protecting this curious public from possible injury.

Actually, our safety program begins the moment the plans for the job start to materialize in the drafting rooms, because here it is decided what equipment is to be used, and how it will be utilized to the best advantage for the desired results, and for the safety of the men on the job. So you can see that a safety program starts, not in the field, but at top management level.

Let us assume that our organization has been awarded the contract. The first man to move out to the new site is a representative of the casualty department, for the purpose of making medical arrangements. Upon his arrival at the new project, he first determines the location of the nearest hospital, then arranges for ambulance service. His next step is to arrange for the services of an eye doctor, and a surgeon. You will note here that I specified a surgeon, and, if possible, one with experience in industrial accidents. There are two reasons for this: first, the injured man's family is anxious to know that he has the best available care, and by choosing a reputable surgeon, we are able to assure his people that everything humanly possible is being done for the breadwinner of the family. Secondly we wish to build up good relations with our employees, and by assuring them that their safety is our business, they will know that a safe job is a good job.

In order to bring home to you some concrete examples of education and enforcement in safety in all its phases, I would like to dwell briefly on my experiences during the erection of the Fairless Works at Morrisville, Pennsylvania, during the past two-and-one-half years.

When that job first started, we had over 200,000 tons to erect. We actually have erected even more. For the sake of mobility, we broke that figure down into seven separate units, with a superintendent in charge of each unit. In order to man these various units, we had over 64 pieces of erection equipment, including guy derricks, travelers, Manitowocs, crawler cranes and truck cranes, and so forth. We had over 1,200 men, including 97 foremen, to keep the job rolling and to man the equipment.

The task of equipping over 1,200 men with safety equipment can be quite a job. The method we used proved to be a most effective one. Every man who was employed by the American Bridge Division, after being signed up, was sent through the safety engi-

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