

1961

**National
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Transactions**

VOL. 1

**GENERAL
SESSIONS**

and GENERAL INDEX OF ALL VOLUMES



**NATIONAL SAFETY COUNCIL
425 North Michigan Avenue
Chicago 11, Illinois**

**PLAINTIFF'S
EXHIBIT**

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National Safety C

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Advance Glove Mfg. Co., Detroit, Mich.

Work gloves.

Aetna Casualty & Surety Co., Hartford, Conn.

Safety educational aids and services including Aetna Drivotrainer.

Akron Brass Mfg. Co., Inc., Wooster, Ohio

Fire Hose Nozzles and accessories.

Alan Wood Steel Co., Conshohocken, Pa.

Abrasive rolled steel floor plate.

American Allsafe Co., Inc., Buffalo, N. Y.

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American Biltrite Rubber Co., Chelsea, Mass.

Rubber, composition and neoprene safety soles.

American Chain & Cable Co., Inc., Bridgeport, Conn.

Sling chains and sling chain assemblies, wire rope slings and assemble-your-own wire rope slings.

American Industrial Safety Equipment Co., Inc., Cleveland, Ohio

Face shields, goggles, gloves and mittens.

American LaFrance Corp., Elmira, N. Y.

Fire apparatus and fire fighting equipment.

American Optical Co., Southbridge, Mass.

Head, eye, respiratory protective devices; safety clothing, safety specialty products.

American Society of Safety Engineers, Chicago, Ill.

Society for the professional safety specialist.

Ampco Metal, Inc., Milwaukee, Wis.

Non-sparking, corrosion-resistant safety tools.

Ansul Chemical Co., Marinette, Wis.

Dry Chemical fire protective equipment.

Antrex Corp., Chicago, Ill.

Battery-powered public address megaphones, helmet radios, tape recorders.

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Safety hats, caps, face shields.

Atlas Safety Equipment Co., Inc., Brooklyn, N. Y.

Industrial Safety Belts, harnesses, and siraps.

Auto-Crat Mfg. Co., Los Angeles, Calif.

Safety belts, interceptor harnesses, babi-guard belts.

Bachrach Industrial Instrument Co., Pittsburgh, Pa.

Instruments for gas analysis and air measurement.

Bashlin, W. M. Co., Grove City, Pa.

Linemen's and industrial safety equipment.

Bauer Mfg. Co., Wooster, Ohio

Wood and aluminum safety ladders.

Bausch & Lomb Optical Co., Rochester, N. Y.

Safety glasses, ortho-raters and "Titan" safety frame.

Beam's Mfg. Co., Reading, Pa.

Auto safety belts.

Best's Safety Publication, New York, N. Y.

Publishers of "Safety Maintenance" magazine, "Best's Safety-Maintenance Directory" and "Your Safety News."

Bethlehem Steel Co., Bethlehem, Pa.

Wire Rope slings, standard and braided slings.

Brossard, Lester L. C., Chicago, Ill.

Traffic mirrors and traffic lane markers.

Browne, Stewart R. Mfg. Co., Inc., New York, N. Y.

Electrical safety equipment, explosion-proof and vapor-proof portable inspection lites, explosion-proof flashlites, grounding devices.

Buhrke, R. H. Co., Chicago, Ill.

Occupational safety equipment and products for construction and maintenance.

Bullard, E. D. Co., Sausalito, Calif.

Industrial safety equipment.

Bustin Steel Products, Inc., Dover, N. J.

Star tread material.

Campbell Chain Co., York, Pa.

Sling chains, welded and weldless chains.

Safety Exposition Exhibitors

Chance, A. B. Co., Centralia, Mo.

Hot line maintenance tools and line construction tools.

Charleston Rubber Co., Charleston, S. C.

Electrical worker's gloves, Bulldog wood safety clamps, red danger flags, plastic and fabric coated industrial aprons and sleeves.

Chemical Corp., The, Springfield, Mass.

Protective hand creams, cleaners and lotions.

Chicago Eye Shield Co., Chicago, Ill.

Head and eye protective equipment.

Chrysler Corp., Detroit, Mich.

Automobiles and trucks.

Clark, David Co., Inc., Worcester, Mass.

Safety Equipment, sound protector, space suits.

Clark, J. R. Co., Spring Park, Minn.

Industrial ladders.

Columbus-McKinnon Chain Corp., Tonawanda, N. Y.

Alloy steel sling chains.

Cornelius Co., Minneapolis, Minn.

Portable high pressure air compressors.

Davis Emergency Equipment Co., Inc., Newark, N. J.

Respiratory protection, combustible gas indicators, safety and first aid equipment.

Detex Watchclock Corp., Chicago, Ill.

Watchmen's clocks.

Diets, R. E. Co., Syracuse, N. Y.

Automotive lighting and safety equipment.

Dockson Corp., Detroit, Mich.

Welding helmets, face shields, cup and spectacle type goggles, respirators and eye savers.

Dow Corning Corp., Midland, Mich.

Sight saver cleaning stations, shoe saver, safety shoes.

Draeger Oxygen Apparatus Corp., New York, N. Y.

Safety equipment.

Eagle Mfg. Co., Wellsburg, W. Va.

Safety cans, oilers, oil and gasoline containers.

1961 National Safety Congress

Edmont Mfg. Co., Coshocton, Ohio

Coated fabric work gloves.

Electronic Specialties Co., Batavia, Ill.

Warning lights, barricades.

Elkhart Brass Mfg. Co., Inc., Elkhart, Ind.

Fire extinguishers, municipal and industrial brass goods.

Elliott Service Co., Inc., Mount Vernon, N. Y.

Accident prevention displays, safety conference programs, Supervisor's Weekly Bulletin, suggestion system, service.

Emerson, J. H. Co., Cambridge, Mass.

Resuscitators, inhalators and safety matting.

Encyclopedia Britannica, Inc., Chicago, Ill.

Technical reference service.

Falcon Alarm Co., Inc., Summit, N. J.

Automatic fire detectors and systems, audible safety signals.

Federal Sign & Signal Corp., Blue Island, Ill.

Sirens, warning lights, horns, bells and electronic sirens.

Fendall Co., Chicago, Ill.

Head and eye protection equipment.

Ferno Mfg. Co., Washington C. H., Ohio

Emergency folding stretchers and chairs.

Fibre-Metal Products Co., Chester, Pa.

Eye, Head, and face protection and welding accessories.

Fine Organics, Inc., Lodi, N. J.

High flash, low toxicity safety solvents.

Ford Motor Co., Dearborn, Mich.

Ford automobiles, featuring lifeguard steering wheels, sun visors, seat belts, instrument panel padding, and door latches.

Frommelt Industries, Dubuque, Iowa

Portable welding shields and protective heat cloth.

Fyrepel Products, Inc., Newark, Ohio

Aluminized glass cloth, heat protective clothing for industry and fire fighting.

Fyr-Fyter Div., Fyr-Fyter Co., Dayton, Ohio

Fire extinguishers, resuscitators and respirators.

Safety Exposition Exhibitors

General Fire Extinguisher Corp., Chicago, Ill.

Fire extinguishers and allied products.

Glendale Optical Co., Inc., Valley Stream, N. Y.

Chippers and welders goggles, face shields, safety spectacles.

The Globe Co., Products Division, Chicago, Ill.

Grip-Strut grating, stair tread materials.

Globe Safety Products, Inc., Dayton, Ohio

Resuscitation and breathing equipment.

Goodrich, B. F. Footwear & Flooring Co., Hood Rubber Co., Watertown, Mass.

Waterproof industrial footwear, hood waterproof industrial footwear, Hood industrial coated and unsupported gloves.

Granet Corp., The, Framingham, Mass.

Coated Fabric work gloves.

Grinnell Co., Inc., Providence, R. I.

Fixed pipe fire protection systems.

Gro-Cord Rubber Co., Lima, Ohio

Neoprene, rubber, composition soles and heels for safety footwear.

Halperin, A. E. Co., Inc., Boston, Mass.

First aid kits, safety equipment, burn-quel.

Haus of Krause Safety Shoes, Rockford, Mich.

Men's safety shoes for distributors serving industry.

Haws Drinking Faucet Co., Berkeley, Calif.

Emergency eyewash fountains, emergency showers and goggle wash fountains.

Hild Floor Machine Co., Inc., Chicago, Ill.

Explosion-proof vacuum cleaners and floor machines.

Hopfield Industrial Mfg. Co., San Rafael, Calif.

Fiber glass ladders, structural members.

Horizon Industries, Minneapolis, Minn.

Pre-measured toilet bowl cleaner in tablet form.

Hygiene Research, Inc., New York, N. Y.

Protective ointments and mistproofing cloth for goggles, welding masks, windshield.

Hy-Test Safety Shoe Div., International Shoe Co., St. Louis, Mo.

Safety footwear; also conductive and special types of atomic usage.

1961 National Safety Congress

Industrial Acoustics Co., Inc., New York, N. Y.

Audiometric examination room, technical publications and industrial hearing conservation programs.

Industrial Gloves Co., Danville, Ill.

Leather, asbestos, duck, wool, Woven-Gard, Permaproof, and aluminized duck and asbestos finger guards.

Institute of Industrial Launderers, Washington, D. C.

Industrial Launderers and cleaners.

Insto-Gas Corp., Detroit, Mich.

Torches and furnaces.

International Film Bureau, Inc., Chicago, Ill.

Safety films and film library supplies.

Interstate Rubber Products Corp., Los Angeles, Calif.

Safety trafficones for traffic control.

Iron Age Safety Shoe Div., H. Childs & Co., Inc., Pittsburgh, Pa.

Linemen's and women's leather and rubber industrial safety footwear.

Jackson Products Air Reduction Sales Co., Div. of Air Reduction Co., Inc., Warren, Mich.

Insulated electrode holders, cable connectors, face shields and goggles.

Jamieson Laboratories, Inc., Van Nuys, Calif.

Air filtration device for use in industry.

D. Jay Products, Inc., Newark, N. J.

Safety marking rope.

Jomac, Inc., Philadelphia, Pa.

Industrial clothing.

Jones & Co., Providence, R. I.

Full vision visor goggles.

Junkin Safety Appliance Co., Inc., Louisville, Ky.

Power press guards, grinding wheel shields, stretcher equipment.

Justrite Mfg. Co., Chicago, Ill.

Safety cans, oily waste cans, safety electric lanterns, flashlights and fire extinguishers.

Karel First Aid Supply Co., Chicago, Ill.

Industrial hospital equipment and medical supplies.

Keystone View Co., Meadville, Pa.

Occupational and driver vision test, lantern slide projectors.

Safety Exposition Exhibitors

Kidde, Walter & Co., Inc., Belleville, N. J.

Fire detecting and extinguishing equipment, ultrasonic burglar alarm.

Kimball Safety Products Co., Cleveland, Ohio

Personal protective devices for industrial workers.

Klein, Mathias & Sons, Chicago, Ill.

Linemen's safety equipment and tools.

Knapp Brothers Shoe Mfg. Corp., Brockton, Mass.

Safety Shoes.

Kunz, J. Glove Co., Chicago, Ill.

Linemen's, bridgemen's and welder's quality gloves.

Lawter Chemicals, Inc., Chicago, Ill.

Fluorescent safety colors.

Legge, Walter G. Co., Inc., Chicago, Ill.

Safety floor maintenance materials, conductive coating, static eliminators.

Lehigh Safety Shoe Co., Emmaus, Pa.

Leather and rubber safety footwear.

Liberty Mutual Ins. Co. of Boston

New survival car II.

Logan Emergency Showers, Inc., Glendale, Cal.

Emergency showers and decontamination showers.

Lynrus Finishing Co., Inc., Poughkeepsie, N. Y.

Flame-retardant fabrics.

McAn, Thom Safety Shoe Div., New York, N. Y.

Safety Shoes.

McDermott, Julian A. Corp., Ridgewood, N. Y.

Warning and safety lighting for municipal, industrial, utility and aviation use.

McKay Co., Pittsburgh, Pa.

Industrial chain, tire chains, arc welding electrodes, stainless and alloy wire.

Maico Electronics, Inc., Minneapolis, Minn.

Audiometers for industrial hearing testing.

Marsh & McLennan, Inc., Chicago, Ill.

Insurance broker and agencies.

1961 National Safety Congress

Martindale Electric Co., Cleveland, Ohio

Protective dust masks, eye protectors, face shields, safety electric test instruments.

Medical Supply Co., Rockford, Ill.

Flexible unit aid, snake bite first aid, burn first aid.

Metropolitan Life Insurance Co., New York, N. Y.

Useful materials for use in community health and safety programs.

Meyer Machine, Inc., Red Wing, Minn.

Safety clamps.

Micro Switch, Div. of Minneapolis-Honeywell Regulator Co., Freeport, Ill.

Safety interlock switches and electric controls for power machines.

Milburn Co., Detroit 7, Mich.

Ply skin protective creams, ply garb safety and protective clothing, plygloves
plastic coated work gloves, ply waterless hand cleaner.

Miller Equipment Co., Inc., Franklin, Pa.

Linemen's safety belts, strap accessories and industrial safety belts.

Mine Safety Appliances Co., Pittsburgh, Pa.

Safety equipment for every industry.

Minnesota Mining & Mfg. Co., St. Paul, Minn.

Heat reflective "Scotchshield" brand chemical fabric used in protective clothing
for fire fighters and industries with heat problems.

Mobile Classroom Rental, Inc., Chicago, Ill.

Mobile classroom equipped with Drivo-trainers.

National Chemsearch Co., Chicago, Ill.

Safety solvents and other safety chemicals.

National Medical Supply Co., Chicago, Ill.

Industrial first aid supplies equipment and instruments.

Newco Mfg. Co., Inc., Kansas City, Mo.

Wire rope fittings, safety hooks, load protectors.

Notifier Corp., Lincoln, Neb.

Fire detection, sprinkler supervisory, watchman tour, municipal alarm systems.

Occupational Hazards, Cleveland, Ohio

Publishers.

Ohio Chemical & Surgical Equip. Co., Div. of Air Reduction Co., Inc., Madison, Wis.

Complete array of modified E & J life-saving resuscitative equipment.

Safety Exposition Exhibitors

Onox, Inc., San Francisco, Calif.

Onox, skin toughener and footmats for athlete's foot.

Osborn Mfg. Corp., Warsaw, Ind.

Safety pliers and tongs for feeding punch presses.

Oxygen Equipment & Service Co., Chicago, Ill.

Respiratory equipment.

Oxy-Gear, Inc., Chicago, Ill.

Portable emergency oxygen inhalator kits, controlled flow pure oxygen.

Pac-Kit Co., Greenwich, Conn.

Unit type first aid equipment.

Packwood, G. H. Mfg. Co., St. Louis, Mo.

Safety industrial skin cleaners and dispensers.

Patent Scaffolding Co., Inc., Chicago, Ill.

Wood, aluminum and magnesium safety ladders, suspended sectional steel tubular steel and aluminum scaffolding, sidewalk protection canopies, steel grandstands and fold-a-way scaffold.

Peck's Products Co., St. Louis, Mo.

Solvents, hand soaps.

Pioneer Rubber Co., Willard, Ohio

Gloves; all kinds, liquid proof.

Portable Light Co., Inc., New York, N. Y.

Vehicular and emergency searchlights, general alarm sirens.

Porto-Clinic Instruments, Inc., New York, N. Y.

Driver testing and training equipment and visual aids for driver and traffic safety.

Positive Safety Mfg. Co., Cleveland, Ohio

Power press guards.

Prairie State Products Co., Chicago, Ill.

Metal and electrical safety and directional signs.

Progress Industries, Inc., Warwick, R. I.

Safety goggles.

Protectoseal Co., Chicago, Ill.

Fire prevention equipment for flammable solvents.

Pulmosan Safety Equipment Corp., Brooklyn, N. Y.

Respirators, eye protection, helmets, protective clothing, asbestos and leather gloves.

1961 National Safety Congress

Racine Glove Co., Inc., Rio, Wis.

Gloves, apparel, protective equipment—leather, asbestos, and steel reinforced.

Radiator Specialty Co., Charlotte, N. C.

Safe-T-Cone rubber traffic guides.

Rhett Woodworking Safety Guards, Wilmington, N. C.

Jointer and shaper guards.

Rockwood Sprinkler Co., Worcester, Mass.

Automatic Fire protection systems; sprinklers, waterfog, fogfoam and foam.

Rose Mfg. Co., Denver 4, Colo.

Industrial safety equipment.

Safeguard Mfg. Co., Woodbury, Conn.

Modern press guards.

Safety Box Toe Co., Boston, Mass.

Safety steel toes.

Safety Clothing & Equipment Co., Cleveland, Ohio

Safety clothing and equipment for every type of industrial worker.

Safety First Products Co., Elmsford, N. Y.

Fire extinguishers.

Safety First Shoe Co., Inc., Holliston, Mass.

Safety steel toe shoes for men.

Safety Tower Ladder Div.; Air Space Device, Inc., Burbank, Calif.

Safety equipment for fixed ladders and scaffolds.

Salisbury, W. H. & Co., Chicago, Ill.

Linemen's rubber protective equipment.

Sarole, Inc., Linden, N. J.

Non-traumatic carrier.

Sawyer-Tower, Inc., Watertown, Mass.

All types of protective and safety clothing.

Scott Aviation Corp., Lancaster, N. Y.

Scott air-pak demand inhalator, demand respirator, hydro-pak.

Searjeant Metal Products, Inc., Mendon, N. J.

Punch press safety guards, controls and accessories.

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Safety Exposition Exhibitors

Seiberling Latex Products, New Bremen, Ohio
Rubber and neoprene industrial gloves.

Sellstrom Mfg. Co., Palatine, Ill.
Face and eye protection equipment.

Servus Rubber Co., Rock Island, Ill.
Rubber footwear of all types.

Speakman Company, Wilmington, Del.
Industrial emergency showers, eye-wash fountains.

Standard Safety Equipment Co., Palatine, Ill.
Industrial safety equipment.

Standard Signs, Inc., Cleveland, Ohio
Signs for industrial accident prevention.

Stephenson Corp., Red Bank, N. J.
Automatic resuscitation equipment and chemical breath test for intoxication.

Stonehouse Signs, Inc., Denver, Colo.
Industrial accident prevention signs.

Stop-Fire, Inc., Monmouth Junction, N. J.
Fire extinguishers.

Surety Rubber Co., Carrollton, Ohio
Personal protective equipment for industrial and electrical workers.

Switzer Brothers, Inc., Cleveland 3, Ohio
Fluorescent safety paint for high-visibility marking of hazards.

Swivelier Co., Inc., New York, N. Y.
Universally adjustable lighting equipment.

Taylor, S. G. Chain Co., Inc., Hammond, Ind.
Alloy steel sling chains and allied products including alloy steel drop forged hooks.

Tect, Inc., Northvale, N. J.
Vythene and other tecsolve safety solvents.

Titmus Optical Co., Inc., Petersburg, Va.
Safety eyewear, ophthalmic instruments, lenses, frames and sun wear.

1961 National Safety Congress

U-C-Lite Mfg. Co., Chicago, Ill.

Explosion-proof portable electric hand lamps and emergency lights.

Union Wire Rope Corp., Kansas City, Mo.

Wire rope slings, towlines.

United States Rubber Co., New York, N. Y.

Industrial safety clothing, safety footwear.

United States Safety Service Co., Kansas City, Mo.

Modern industrial eyewear, sold direct to user.

Wagner Sign Service, Inc., Chicago, Ill.

Wagner changeable copy displays.

Wamsutta/Pacific Industrial Fabrics, New York, N. Y.

"Safetex" flame retardant fabrics—durable to laundering—for safety clothing. Protective fabrics for industrial uses, made of various fibres.

Watchmocket Optical Co., Inc., Providence, R. I.

Plastic eye protection and safety signs.

Welsh Mfg. Co., Providence, R. I.

Safety goggles, lens, face shields and helmets.

West Side Iron Works, Inc., Grand Rapids, Mich.

Barricades, warning lights, safety vests.

Wheeler Protective Apparel, Inc., Chicago 10, Ill.

Industrial safety clothing for heat and abrasive hazards.

Williams Jewelry & Mfg. Co., Chicago, Ill.

Safety awards, badges and trophies.

Willson Products Div., Ray-O-Vac Co., Reading, Pa.

Industrial goggles, gas masks, helmets and respirators, and allied safety devices.

Wilson Rubber Co., Div. of Becton, Dickinson & Co., Canton, Ohio

Rubber and synthetic industrial gloves for every use.

Woolrich Woolen Mills, Woolrich, Pa.

Acid resistant industrial safety clothing.

Zenith Radio Corp., Hearing Aid Div., Chicago, Ill.

Diagnostic audiometers that also can be used for individual and group screening.

Safety Exposition Exhibitors

EDUCATIONAL EXHIBITORS

Chicago Police Dept., Education Section, Traffic Div.
Traffic safety display.

Inter-American Safety Council, Inc., New York, N. Y.
"The Safety Council serving Latin America."

National Society for the Prevention of Blindness, New York, N. Y.
Educational material on conservation of eyesight in industry.

Division of Accident Prevention, Public Health Service, Washington, D. C.
Accident prevention program & materials.

Recreation Shooting Safety Committee, National Safety Council, Chicago, Ill.
Recreational shooting safety program materials.

U. S. Forest Service, Washington, D. C.
Sinokey Bear—Forest Fire Prevention, and Forest Service Safety Materials.

1961

**National
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Transactions**

VOL. 3

**AUTOMOTIVE
and
MACHINE SHOP

POWER PRESS
and FORGING**



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425 North Michigan Avenue
Chicago 11, Illinois**

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**CEMENT,
QUARRY and
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**CHEMICAL
and
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LABOR SAFETY



NATIONAL SAFETY COUNCIL
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sensitization. They are inclined to ignore the warnings because in many cases the skin reactions do not appear until several months after a person has started working with the resin. Once a reaction has developed, they must exercise even greater care then required initially in order to prevent a recurrence.

High Energy Fuels

The race for missile supremacy and the conquering of space has confronted us with increased problems of exposure to high energy fuels and their decomposition products. Among these are hydrazine and the boranes—diborane, pentaborane and decaborane.

Hydrazine finds its use as a propellant fuel, either alone or with other compounds such as nitric acid, hydrogen peroxide or oxygen. It has a maximum allowable concentration of one (1) part per million, and in addition to the inhalation hazard, the material is absorbed through the skin. It is primarily a central nervous system stimulant causing excitement, convulsions and cyanosis.

Diborane is a gas at room temperature and has a maximum allowable concentration of 0.1 part per million. Inhalation produces congestion, edema and hemorrhage in the lungs. Its toxicity is comparable to that of phosgene.

Pentaborane is a volatile liquid with a tentative maximum allowable concentration

of 0.005 part per million; however, it is recommended that the exposure be kept as near to zero as is possible since no medical preventive or therapeutic agent has yet been developed for this compound.

Decaborane is a solid having a tentative maximum allowable concentration of 0.05 part per million. Both decaborane and pentaborane attack the central nervous system. Protection is best afforded by the use of air-supplied respirators or cartridge-type respirators that are specifically designed and designated for protection against these compounds.

In concluding this brief discussion, may I point out to you that the services of your local, state, and federal health agencies are always available to you. Should you desire information on the potential health hazard associated with any material or process to which you or your associates are exposed in your particular place of work, feel free to contact any one of them for assistance in evaluating the problem.

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OCCUPATIONAL HEALTH HAZARDS — MEDICAL ASPECTS

By HERBERT K. ABRAMS, M.D.

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I would like to quote from a famous writer his description of a "modern" community:

It was a town of red brick, or of brick that would have been red if the smoke and ashes had allowed it; but as matters stood it was a town of unnatural red and black like the painted face of a savage. It was a town of machinery and tall chimneys, out of which interminable serpents of smoke trailed themselves for ever and ever, and never got uncoiled. It had a black canal in it, and a river that ran purple with ill-smelling dye, and

vast piles of buildings full of windows where there was a rattling and a trembling all day long, and where the piston of the steam engine worked monotonously up and down, like the head of an elephant in a state of melancholy madness. It contained several large streets all very like one another, and many small streets still more like one another, inhabited by people equally like one another, who all went in and out at the same hours, with the same sound upon the same pavements, to do the same work, and to whom every day was the same as yesterday and tomorrow, and every year the counterpart of the last and the next. . . .

On every side, and as far as the eye could see into the heavy distance, tall chimneys, crowding on each other, and presenting that endless repetition of the same dull, ugly form, which is the horror of oppressive dreams, poured out their plague of smoke, obscured the light, and made foul the melancholy air. Strange engines spun and writhed like tortured creatures; clanking their iron chains, shrieking in their rapid whirl from time to time as though in torment unendurable, and making the ground tremble with their agonies. . . .¹

Before you try to guess which city this is, let me tell you. Charles Dickens wrote this in his book *Hard Times*, published in 1854, describing a typical city in England during the years of the industrial revolution (1760-1830). The description sounds too familiar for comfort to us in America in 1961, at a time when we are going through another industrial revolution: automation, atomic energy, space travel, and many powerful new chemicals. They are exciting developments. They offer a promise of a wonderful world of tomorrow. However, they also pose serious threats to our health and well-being, unless they are properly controlled.

We must ask ourselves whether we are better prepared to meet these threats than the English were 150 years ago. Certainly, we are better prepared technically. In 1800, except in a few instances, little was known about the health aspects of exposure to chemicals, to ionizing radiation, or the effects of long hours of work, poor lighting and ventilation. Today, however, our technical knowledge is sufficient, so that we can say with assurance that we know how to use any chemical with safety. We know how to set up proper protective measures to make every job safe.

The big question is, "Are we utilizing this knowledge?"

Perhaps you who represent workers in industry know the answer better than I do. Let me give you only two examples that will help provide the answer. In Illinois, in 1958, there was found "a drug packaging plant where 103 employees were subjected to a full body fluoroscopic examination each day as they left the plant as a check against pilferage. During the examination, the entire body from the top of the head to the bottom of the shoes was exposed to ionizing radiation. The firm had practiced this procedure on all employees for some 12 years, but discontinued it when advised of the hazards in-

involved." I am quoting from the Report of the Atomic Power Investigating Commission to the 71st General Assembly, State of Illinois, March, 1959.²

In the same report, the study found that:

Gross contamination and excessive levels of radiation typify nearly all radium processing installations in Illinois included in the survey. These conditions result from a lack of adequate shielding of proper routing of materials, as well as poor housekeeping within the plant, as noted by the contaminated paper and rags littering the floors, the lack of local exhaust ventilation and presence of contamination in eating areas. In addition, it was noted that labels on containers of radium-luminous compounds do not contain information as to the quantity of radioactivity included. In all radium plants surveyed, little or no use was made of personnel monitoring devices, such as film badges and, therefore, there is no adequate record of radiation exposures received by working personnel.³

This was Illinois, 1958—thirty years after the tragedy of the girls who painted watch dials: they pointed the brushes containing radium paint with their lips, and later died of bone cancer.

The role of environment on health grows in importance as we gradually control the infectious disease agents that caused the plagues of old, and as the chemical and physical hazards of our industrial environment become ever more important determinants of our health and our diseases. A recent report of the Public Health Service made for the House committee on appropriations states: "After hearing the evidence, the members of the subcommittee concluded that the health hazards resulting from changes in the environment are far greater than is generally realized and that all levels of government, industries, and research and educational institutions need to step up their efforts to deal with the problem."⁴

The number of chemical materials man is being exposed to is increasing constantly. Over 600 chemicals are currently being added to food; over 600 million pounds of pesticides are used annually, in the United States. Approximately 500 new chemicals are introduced on the United States market each year.

The occupational environment is the basic element in our total environment. Our occupations largely determine how and where we as individuals will live, and, indirectly or directly, may actually influence our life expectancy and our mode of death. Our

industries, in addition to affecting the immediate eight-hour working environment, also largely account for the chemical and physical contaminants in the air we breathe, the water we drink, and in the food we eat.

One example will illustrate: recent studies show that people living in manufacturing areas experienced higher death rates than residents of non-manufacturing areas. The difference was greatest for cancer, and tuberculosis of the respiratory tract (mainly of the lungs), and for various forms of heart disease.¹

Air pollution was a major factor in causing this greater mortality, but socio-economic conditions also played an important role.

Occupational Diseases

Occupational disease hazards may be classified in various ways. For example, by the type of agent which causes the disease: chemicals, in the form of liquids, dusts, gases, fumes and vapors; physical agents, such as noise, ionizing radiation, abnormal temperatures and pressures, vibration, and physical strain; infectious disease agents, such as the germ that causes brucellosis in meat-packing house workers and farmers.

Or occupational diseases can be studied according to the part of the body affected or the kind of disease. For example, many toxic chemicals may attack the skin, causing an inflammation which we call dermatitis. These or other chemicals may affect the lungs, the liver, the kidneys, the bones, or various combinations of organs of the body, and, in many cases, the entire system.

Occupational diseases may be acute and temporary, or may be chronic and long-lasting. Brief exposures to certain chemicals may produce symptoms that are of short duration, and the individual recovers quickly. A good example of this is metal fume fever, arising from inhalation of the fumes produced when certain metals are heated to temperatures above the melting point. Among the metals which can cause this are zinc, copper, magnesium, cadmium, iron, manganese, and others.

More important, however, are the chronic diseases of industry. These are the diseases of relatively long duration arising usually from long-continued exposure to relatively small amounts of toxic chemicals.

Sometimes these diseases do not show symptoms until long after, in many cases years after, the exposure has stopped. A good example of this is beryllium, a metal which may result in serious and fatal lung disease up to 15 or more years after breathing the contaminated dust or fumes.

We must remember that diseases, like everything else affecting living things, cannot be put into rigid categories. Not all chronic occupational diseases need to result from long-continued exposure. Only a brief exposure to a large dose of ionizing radiation (X-ray or radioactive chemicals) may result in cancer. Similarly, a brief exposure to a sufficient dose of carbon tetrachloride may result in chronic kidney disease or liver disease. In other words, there are many variations and combinations of these conditions.

To attempt a detailed listing of all of the chemicals and metals which can cause disease would only be disturbing and confusing, and we would be in danger of not seeing the forest for the trees. Every industrial chemical is dangerous. It is merely a matter of determining how dangerous it is and establishing procedures for protecting against it. The time is past when "experts" can stand before a group of workers, or, for that matter, a group of physicians and scientists, and say without evidence that this or that chemical when absorbed into the body is harmless. I recall only a few years ago attending meetings of industrial physicians and being shown X-ray pictures of lungs of coal miners, black with inhaled coal dust, and being told that this dust was harmless. Yet, long before that time, British scientists had demonstrated that coal dust can cause disabling lung disease in miners. We in the United States were merely slow to accept the evidence.

Diseases of the Lung

The respiratory system (lungs, bronchi, and larynx) is the most frequent site of chronic diseases caused by industrial poisons. For a long time, we have recognized that silica dust, as it is inhaled by the metal miner, the foundry worker, the pottery worker, the tunnel digger and others, causes a disabling and often fatal disease called 'silicosis.' Similarly, we know that asbestos dust causes a serious lung disease called

'asbestosis.' And, there is a lung disease found in workers in the manufacture of alumina abrasives, called 'Shaver's disease' (after Dr. Shaver who described it). The dust has high concentrations of alumina and silica. Diatomaceous earth, a form of free silica, similarly causes serious lung disease. And there is byssinosis, resulting from the inhalation of cotton dust. Until a handful of years ago, some of the experts insisted that many dusts when inhaled into the lungs were inert; that is, they produced no effect on the body. However, as we learn more, we find that these so-called "nuisance" dusts are also capable of causing disease. For example, talc, corundum, feldspar, graphite, porcelain, barite, cement, mica, slate, kaolin, and many others.

Even farmers, as well as grain handlers in the holds of ships, suffer from a respiratory disability when inhaling large amounts of grain dust. They develop chronic bronchitis with shortness of breath, cough, etc. Chronic bronchitis can result from inhalation of irritating dusts, fumes and gases: for example; phosphorus chloride and other volatile chloride compounds, acid fumes, phosgene, nitrous gases, aldehydes, solvents and other chemicals.

One of the leading toxicologists in the country, Dr. Herbert Stokinger, of the Public Health Service, points out that:

... our experience with occupational lung diseases makes it difficult to escape the conclusion that all dusts, irrespective of their nature, if breathed in sufficient quantity and for sufficient time, may cause profound damage to the lung, and emphasizes the desirability of the physician's obtaining an accurate and thorough history on individuals suspected of pulmonary disease.⁴

Other Chronic Diseases

Let me discuss a few more of the chronic disease hazards, since these are the chief occupational health problems of the present day. The chlorinated hydrocarbons, such as carbon tetrachloride, represent a large group of chemicals used in industry. These can damage the liver and the kidneys. The chemicals known as aromatic amines, represented by beta naphthylamine, used in the manufacture of dye and other commodities, have been proven to cause cancer of the urinary bladder. The central nervous system—that is, the brain and spinal cord—can be affected by many chemicals. Tetraethyl lead causes severe brain disease called encephalopathy. Manganese, one of the im-

portant industrial metals, causes a disease that is remarkably similar to multiple sclerosis. Carbon disulphide may cause severe nervous system effects, affecting the nerves, muscles, and brain.

Serious and sometimes fatal blood diseases may be caused by exposure to benzol. Of course, we know that ionizing radiation in any form—whether through exposure to X-rays or radioactive chemicals—may cause fatal blood diseases as well as various types of cancer. The bones can be affected by exposure to radioactive chemicals, fluorides, phosphorous, and other chemicals. Cadmium affects the lungs and kidneys.

The heart may be affected by the metal known as antimony, and possibly by nitroglycerin, and there have been a number of reports that the heart may also be affected by brucellosis infection, which occurs among slaughter house workers and farmers.

Nitroglycerin and related chemicals used in the manufacture of dynamite and other explosives make an interesting story and illustrate some of the problems in occupational medicine. Workers have been exposed to this group of chemicals for many years. They have known for many years the severe headaches this chemical causes. For years, also, we have heard reports of sudden deaths among workers exposed to nitroglycerin. We do know that this chemical has a powerful effect on the body. It causes profound reduction in blood pressure, severe headaches, palpitation of the heart, nausea and vomiting, fainting, dizziness, and other symptoms. It can also cause skin inflammation. Whether it can cause heart disease is disputed. Even though we have known this chemical for many years, there has been insufficient investigation of the health hazards, and inadequate preventive measures.

Cancer

Occupational cancer is one of our most serious problems. It also provides us with a remarkable opportunity to study cancer in general. The first breakthrough in the mystery of cancer came with the discovery of an occupational cancer. In 1775, in England, Dr. Percival Pott called attention to soot as a cause of cancer of the scrotum in chimney sweeps. These were little boys who climbed into the chimneys to clean them out. Years after working in this

occupation, they died of cancer of the scrotum, which was traced to the soot which penetrated their clothing. Similarly, for years we have known that an excessive number of uranium miners in Europe have died of lung cancer. (Recent studies in our own uranium mines reveal dangerously high exposures.)

Since then numerous other chemicals, in addition to ionizing radiation, have been demonstrated to be capable of causing, or contributing to the development of, cancer in various parts of the body. Some examples are beta naphthylamine, which I mentioned earlier, causing cancer of the urinary bladder, coal tars which can cause cancer of the skin, chromates which cause cancer of the lung, and many others. Recent studies have focused suspicion of lung cancer hazards in the work of welders, sheet metal workers and other metal workers.

Skin Diseases

Skin diseases are, as you know, the most frequent type of occupational disease which we see. Most of them result from direct irritation by chemical or physical agents. A smaller number result from an allergic reaction to a chemical. Almost any chemical contact can result in dermatitis. Many of the new chemicals are causing skin troubles. For example, the epoxy resins: These materials are being widely used in electronics, automobiles, pattern-making, die-casting, aircraft, and other trades—for surface coatings and paints, molding compounds, various plastics, and electrical insulation. Another group of chemicals which causes skin disease are the chromates. Chrome ulcerations of the skin are well known. The chlorinated hydrocarbons also may cause skin diseases. One of them is called 'chlor-acne' because it resembles acne. Machinists and metal workers often get a dermatitis from cutting oils. Coal tars produce skin changes, some of which may turn into cancer. There are a host of others too numerous to mention.

Protection

These are only a few examples of the occupational disease hazards arising from contact with chemicals. The alert worker will become acquainted with the materials he is handling and the process he is using, so that he can help to protect himself and his fellows. If he should suffer excessive

exposure to some harmful material, he will know what to tell the doctor who examines him. The alert doctor will be able to correlate the occupational history with the physical findings and symptoms and decide whether the patient is suffering from an occupational disease.

Very few occupational diseases produce such characteristic symptoms that they can be readily identified as an occupational disease. After all, the body can react to harmful stimuli only in a limited number of ways. For example, a worker may have severe pains in his abdomen. These might be caused by appendicitis or by lead poisoning. Leukemia may result from unknown causes or from exposure to X-rays. A person suffering a certain type of paralysis may have multiple sclerosis, a disease of as yet unknown cause, or it could be manganese poisoning. The person who has a cough, shortness of breath, and is losing weight, may have tuberculosis, silicosis, berylliosis or cancer of the lungs. A history including occupational history and a thorough examination is the only way of telling those conditions apart.

Prevention

All occupational diseases are preventable. If we were doing our job right, we would have nothing to talk about today. The fact is that unknown numbers of people are suffering from a great variety of occupational diseases because we are not adequately protecting against them. What are the protective measures which we should follow?

(1) *Education:* Employees should be given adequate training for their jobs, so that they understand the process, know the materials they are handling, and, therefore, can protect themselves and other workers from injury.

Key employees should be instructed in first aid. Management and labor both have responsibilities here. Shop health and safety committees can help in the health education of workers. *There is no substitute for knowledge.*

(2) *Protection of the environment:* This means from the air of harmful dusts, fumes, gases, vapors. This is accomplished by means of engineering measures, such as exhaust ventilation, enclosure of hazardous processes, wetting down methods for suppression of

dusts, and substitution of less harmful for dangerous materials. Good lighting and reduction of noise, etc. are other environmental problems that the engineer can help to solve.

Only when engineering measures are not possible should respirators or other personal protective devices be depended on for protection against inhaling of harmful materials.

(3) *Good housekeeping and sanitary place of work:* This means a clean place of work, free of dirt and dust, and accident hazards. There should be adequate toilet, washing, shower, locker and eating facilities. Hand washing alone can often prevent dermatitis and other diseases. All containers of chemicals should be properly labeled.

(4) *Personal protective devices:* Whenever necessary, management should supply workers with respirators for protection against noxious dusts, fumes and gases in the air; suitable gloves and work clothing for protection from harmful chemicals; hard-topped shoes and hats for protection from falling objects; safety goggles, etc.

(5) *Medical protection:* This includes first aid facilities and a medical department. Every worker should have a periodic physical examination, not for the purpose of disqualifying him for work, but for the purpose of detecting disease early so that prompt measures can be taken to protect his health. The physician has an ethical obligation to inform the worker or his family of any finding important to his health.

In addition to first aid and medical care for work injuries, all workers and their families should have access to modern medical care. Unions throughout the nation are obtaining such care through collective bargaining. Union health centers and other plans, such as Health Insurance Plan of Greater New York and the cooperative health plans, are attempting to bring good care, including preventive medicine, to working people.

(6) *Plant health and safety committees:* Every place of work should have a committee of representatives of the workers concerned with the health protection of the men and women in the plant. This committee should have authority to make periodic inspections of the plant and make recommendations to management. The com-

mittee should meet regularly with the plant physician, the nursing staff, the plant safety and industrial hygiene engineers, and with other representatives of management to discuss health and safety problems and to plan programs of education of the workers in these problems.

(7) *Government safety and industrial hygiene agencies:* These agencies should be called upon for help, whenever the union believes that management is not adequately providing health and safety measures in any particular problem.

How We Are Doing Our Job

How well are we doing in protecting our workers? Let me cite a few facts. The prevalence and incidence of occupational diseases in the United States is unknown, because in many states there is no reporting of occupational diseases. And, in those states where there is reporting, it is incomplete and not uniform. Moreover, we know that numerous occupational diseases are not recognized because of medical ignorance, deficiency in medical education, deficiencies in workmen's compensation laws and health and safety laws.

Health services in many private industrial plants are inadequate, and most workers are employed in small plants where such services are not provided. According to the Public Health Service, 90 per cent of the labor force is not receiving proper industrial hygiene and health services.

The governmental agencies, federal, state and local, which are charged with responsibility for protecting the health of workers, are for the most part grossly inadequate in their resources and services. They suffer from lack of funds, personnel and even from lack of authority. At least seven of our states have no occupational health units in their health or labor departments, and in all of the state occupational health agencies in the entire country, there are less than 40 physicians employed. There is no uniformity of industrial health codes and standards, and the states differ in the hazards regulated and in their regulations for the same hazards.

There is a serious and growing shortage of physicians and other health personnel both in and out of industry. Dr. Harold J. Magnuson, Chief of the Division of Occupational Health of the U. S. Public Health

Service, estimates that by 1970, industry will need 4800 physicians, but is expected to have only 2900; while 35,000 industrial nurses will be needed, but only 26,000 are expected; and 3400 industrial hygienists will be needed, but only 1600 are expected.

Workmen's Compensation

Good workmen's compensation laws are basic to the health of industrial workers. Without strong workmen's compensation laws, it is difficult to see how we can ever have really effective implementation of our industrial health measures. The fact is that although the workmen's compensation laws are the earliest form of social legislation in the United States, they are in almost all cases hopelessly behind the times. They are inadequate in their provisions for compensation, for medical care and rehabilitation, and most of them have not been brought up to date to permit equitable recognition and compensation for the injuries inflicted by radiation and chemical hazards which cause chronic diseases, usually after long latent periods between exposure and the first symptoms of disease.

Two states still have no occupational disease coverage. Nineteen state laws cover only specified diseases. Most of the laws exclude farm work, domestic work and casual employment. In over half the states, employees in small establishments which have less than a specified number of employees are excluded, and in 12 states the laws apply mainly to a list of "hazardous" employments. Many white collar workers are today excluded from the workmen's compensation laws.

Research

The level of our research in occupational health is correspondingly low. Research is largely in the hands of private industry, and it is guided substantially by the economic needs of the particular industry. Even where research is done in universities, much of this is subsidized for special needs by private industry. Governmental agencies sporadically have made excellent contributions, but their resources are chronically inadequate. There is an urgent need for a system of research and consultation facilities in various parts of the country where workers and employers alike can go for scientific solutions to their problems.

Hope for the Future

Last year, a subcommittee of the House committee on appropriations under Congressman Fogarty conducted hearings on these problems. These are published in a "Report on Environmental Health Problems," available through the Government Printing Office.⁸ It is interesting reading. These hearings raised hope that better appropriations would be made to the Public Health Service and other agencies for an expansion of services in the environmental health field.

In the meantime, there is a dangerous vacuum in the supervision of hazards from ionizing radiation as differences prevail among the interested agencies, AEC, U. S. Public Health Service and the states, over jurisdiction in this field. At the moment, controls in this field are a patchwork with good programs in a few states like New York and California, but poor or almost non-existent programs in most others.

The implications of all this should be obvious. Occupational health and workmen's compensation vitally and directly affect the health and life of working people. Yet the unions so far, for the most part, seem to be apathetic about this. Now that unions are deeply involved in health insurance, for the care of non-occupational diseases, perhaps there will be a resurgence of interest in the environmental factors which affect our health.

A few unions have begun to help themselves. Some have negotiated clauses in their collective bargaining agreements embodying a number of the preventive measures I outlined earlier, and have also asserted the union's right to bring expert consultants into the plant.

The United Auto Workers has a department of occupational health, staffed by two experts in safety and industrial hygiene. The International Association of Machinists has a medical consultant. The International Chemical Workers' Union also has a medical consultant and recently appointed a staff safety man. These people can be of great help to workers in providing them with expert knowledge and honest information. Obviously, however, every union cannot and should not hire its own corps of experts and set up its own research laboratories. We are dealing with big social problems, and they must be met socially.

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STANDARD

**METALS
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**MINING
INDUSTRY**



**NATIONAL SAFETY COUNCIL
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PREVIEW OF SLIDE-SCRIPT ON UNDERGROUND HAULAGE SAFETY

By HERBERT A. WENDEL

Chairman, Bureau of Safety
The Anaconda Company
Butte, Mont.

The initial reception and response to the first Script-Slide production by the Visual Education Committee in 1959, "Safety in Open Pit Operations," indicated the need for additional similar Mining Section service projects. During 1961 the Visual Education Committee has been quite active and has accomplished the following objectives:

1. Produced a Script-Slide series of 101 colored 35 mm slides with a suggested script on Underground Haulage Safety.
2. Submitted a series of 12 posters to the National Safety Council for consideration in producing a series of posters for the Mining Section's Falls of Ground Campaign in 1962.
3. Recommended changes on the series of four Accident Preventers, used in the previous Falls of Ground Campaign, to produce a new series for the 1962 campaign.
4. Submitted pictures and posters to the Newsletter editor.
5. Sent a questionnaire to Mining Section member organizations to determine future visual education needs.
6. Developed and produced a Script-Slide program for the 1962 Falls of Ground campaign.
7. Cooperated with other Mining Section committees on committee projects.

Active members of the Visual Education Committee during 1961 were: H. A. Wendel—Chairman; A. W. Ness—American Smelting and Refining Company, Salt Lake City; Fred Pearson—Noranda Mines Ltd., Noranda, Quebec; Melvin Taylor—Compania Minera de Cananea, S.A., de C.V., Cananea, Sonora, Mexico, and Morgan Wadsworth—American Metals Climax, Climax, Colorado.

The Script-Slide program on Underground Haulage Safety consists of a total of 101 colored 35 mm slides. This type of visual education material allows a mine organization to use or delete any slides not appli-

cable and makes it convenient to separate the slides into a series of shorter presentations. The script may also be altered or changed as desired.

The National Safety Council plans again to have several sets of this program available for free use by member organizations on a request basis as a Council service. Duplicate sets of slides were available immediately following the preview at the 1961 National Safety Congress.

SUGGESTED SCRIPT FOR SOUND-SLIDE PROJECT ON UNDERGROUND HAULAGE SAFETY

1: Safety in underground haulage concerns everyone who works in an underground mine. Because heavy equipment—motors, cars and trucks—are operated in narrow tunnels, often at considerable speeds, there naturally are a number of hazards we must know about and guard against.

As in all places where safety is important we can avoid or eliminate the hazards if we know what they are and where danger exists.

This series of pictures we are presenting today show some of these dangers and how accidents and possible injuries can be prevented. Not only motor crews are involved in haulage safety but also everyone who works on the level, especially along or near haulage ways.

You will notice that the pictures show different types of haulage equipment, some with trolley locomotives and others with battery powered locomotives. Some of the men pictured are wearing safety glasses in addition to hard hats and safety shoes as some operations require all employees on surface and underground to wear safety glasses.

And, although some of the equipment may look strange to you the same hazards exist here at our operations and result in the same kind of accidents and injuries.

particular job. General safety programs will not suffice as conditions on one project are foreign to conditions on the other.

While progress is the most important part of every project, progress without safety is foolhardy and safety without claim supervision is too costly. In many cases the humane element is lacking and the injured man becomes a compensation number.

We firmly believe that it is very essential that every man injured should know that management is interested in his getting better and back on the job. We make it our business to see every man who has a lost time accident to inform him of his compensation rights and our help. We consider this an important element in safety work.

Over the years we have found it necessary to attend compensation hearings on all serious and phony cases. We not only help to save thousands of dollars but do a great

deal to straighten out cases that could hang on indefinitely, because we feel that usually the injured man never gets enough to compensate him for a real serious injury and usually we can suggest to the carrier that certain procedures be waived and the man be given additional help. We also invite the compensation personnel to the job so that they may get a first-hand picture of the entire operation.

Each month we get out a bulletin in which we give our progress figures at each location and we discuss each lost time accident, also listing our frequency and severity records. This keeps every man on the job informed as to why they should work safely and to prove to them that they are personally the losers every time they get hurt, bringing home to them that they cannot afford to have an accident. It also makes them feel that they are an important part of the job.

SAFETY ASPECTS ON THE USE OF MECHANICAL RAISE CLIMBERS

By LEONARD P. COLVIN

Asst. Research Engineer, The Anaconda Company, Butte, Mont.

Mining companies are intensely interested in new equipment to help increase production, lower costs, and improve working conditions. The mechanical raise climber contributes to all three goals. Properly used, it will increase production, cut costs and has a number of important safety aspects which are the subject of this discussion.

The raise climber is an elevator that eliminates timbering while driving a raise. It facilitates the movement of men and materials safely to and from the working face and provides a platform to make work at the face easier and safer.

An extensive time study of Butte raise climbing operations showed that a greater percentage of the mining cycle is spent in effecting the direct advancement of the raise, with much work required in our conventional raises being eliminated. As a result, the raise climber has cut the mining cycle time required to less than half. Lifting large

timbers, installing bulkheads, drill stagings, lining chutes and climbing ladders are elements not present in climber-driven raises.

While the raise climber does away with many of the usual hazards of raising, others in connection with the climber operation have developed. Proper ventilation of climber raises; the correct design of storage room for the climber and equipment; and the type of mucking or raise chute lay-out are of prime consideration in the prevention of accidents.

The climber is considered an elevator and should be maintained as one. Miners and maintenance men must be trained to follow a daily and weekly lubrication and inspection schedule. Daily testing and inspection of the safety brakes is essential.

Through experience we have added and changed some mechanical features of our raise climbers. Raise climber manufacturers are also constantly trying to improve the

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