PB84-153451

SAFETY INFORMATION PROFILE

Powered Hand Tools

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210-78-0130-0000

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Center for Disease Control
National Institute for Occupational Safety and Health
Division of Safety Research
Morgantown, West Virginia 26505

April, 1979

PREFACE

The information in this profile was prepared in accordance with the provisions of NIOSH Contract #210-78-0130-0000 and is only one of twenty-seven Industry Profiles prepared under the contract. The reader should understand that this study is not intended to be an in-depth analysis, but rather, a limited overview of the industry. Each individual profile was prepared by a Profile Manager utilizing approximately 45 hours of professional time. Each profile is a reflection of the available literature, and other information obtained from industry, government, and labor contacts. Information Profiles are primarily intended for use in determining future study needs, priorities and directions. From this preliminary study may come various in-depth studies such as criteria documents, technology assessments, epidemiological studies, etc.

Radian gratefully acknowledges the guidance and direction of Mr. Ted Pettit, Project Officer, and Ms. Pat Gussey, Assistant Project Officer. Radian also thanks the many industry labor and government officials who provided information and assistance on short notice.

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EXECUTIVE SUMMARY

The powered hand tools profile has developed information on hand held and supported tools utilized to mechanically accomplish work. Not included are hand held implements utilized in the transport of materials, such as spray painting and sandblasting. Equipment, hand operated and controlled, but not hand supported, was not included, but has similar hazards. Such equipment includes powered lawn mowers, wet floor scrubbers, wheeled concrete saws, and hand controlled walking rollers. These type items may or may not be included in other studies or statistical information.

Powered hand tools are utilized throughout the industrial sector. Extensive use is identified in assembly operations, metal fabrication, service organization and in the construction industry.

Hazards identified include contact with point of operation, parts and particles propelled, personnel falls, falling tools, kickbacks or reactive movements, electrical shock or electrocution, hose whipping, atmospheric contamination, excessive or continuous noise, and vibration.

The identified hazards are typically eliminated or mitigated by equipment design, operating techniques and available personnel protective equipment.

These are generally required by existing codes and/or standards. Judicious compliance with the existing codes, standards and recommendations will provide a high level of protection. One exception appears to be the problem of penetrating an energized electrical circuit. Presently there is no equipment available to prevent this limited hazard. Protection is afforded by adequate knowledge and partially by grounding of electrically powered equipment. Equipment powered by other sources is unprotected. A second exception appears to be back strains, associated principally with heavy pneumatic equipment.

Reported injuries associated with hand tools appear to have relatively high frequency, but typically fairly low severity. The statistical information available usually combines powered hand tools with all hand tools making accurate evaluations difficult. Future Supplemental Data Systems information (State statistics from industrial compensation reports) may provide a significant pool of data useful to the description of relative hazards associated with hand tools.

The Consumer Product Safety Commission is developing statistical information via the National Electronic Injury Surveillance System. Input for industrial injuries is minimal however this system could provide significant information.

No trends in use were identified in the literature search, however it is felt that expanded mechanization of some tasks is in process. For example, wagon drills, drill jumbos, mobile pavement breakers and impact type compactors are becoming common today. Other tasks may be experiencing similar trends.

There are both generalized and specific standard requirements for most powered hand tool operations. With supplementary information, and adequate equipment specifications, the powered hand tools hazards can be mitigated, but only with adequate commitments for employee education and rule enforcement (internally and/or externally).

POWERED HAND TOOLS

A. Standard Industrial Classification Included

This profile is intended to include information from all Standard Industrial Classifications. Information has been developed principally addressing Division D, Manufacturing, with the principal Powered Hand Tool utilization by industries included in SIC-37, Transportation Equipment Manufacturing; SIC-33 Primary Metals Industries; SIC-34 Fabricated Metal Products; SIC-35 Machinery, except Electrical; SIC-36 Electrical and Electrical Machine Equipment and Supplies. It should be noted that the maintenance departments of all SIC classifications may have some exposure to hazards of powered hand tools use. The Service Division, I, particularly SIC-73 Miscellaneous and Business Services; SIC-75 Automotive Repair Service and Garages; SIC-76 Miscellaneous Repair Services - all have extensive utilization of portable powered hand tools. Standard Industrial Classification Division B, Construction, is also an extensive user of powered portable hand tools.

B. Process Descriptions

The Accident Prevention Manual for Industrial Operations groups portable powered tools according to the power source. Electricity, compressed air and gasoline are the normal power sources for saws, drills and grinders. Hydraulically powered tools are primarily used for compression and extension work. Explosive (powder actuated) tools are used for penetration, cutting and compression tasks. Portable power tools present similar hazards as stationary machines of the same nature with the additional risks associated with their mobility or handling.(1)

The ILO Encyclopedia of Occupational Health and Safety indicates that pneumatic tools are a safer source of power, but they are not economically competitive with electricity.(4)

The Air-Powered Hand Tools Safety Data Sheet identifies types of tools and includes: (1) abrasive tools, e.g., grinders, sanders, buffers; (2) twisting, rotating and reciprocating tools, e.g., drills, screw drivers, wrenches, portable air motors, chain, circular and jig saws; and (3) percussion tools, e.g., chipping, scaling, riveting hammers, jack hammers, rock drills, and tampers.(3)

Explosive tools are used for stud mounting or mounting of brackets fixtures on various types of walls and surfaces associated with the construction industry. Penetrating work, using explosive actuated tools, would include piercers for furnace tapping, cable-cutting operations, splicing and attaching

terminal fittings to cable, removing rivets, tightening rivets, joining pipe and driving threaded fasteners into walls or surfaces.(2)

C. Potential Hazards

Typical injuries caused by portable power tools are burns, cuts and strains. Sources of injuries include electrical shock, particles in the eye, falls, fire, explosion of gases and falling tools.(1) Accidents, according to the ILO Encyclopedia of Occupational Health and Safety, resulting from power hand tools, range from slight to moderately serious accidents and are "almost always caused by careless use". They list the major hazards as tool ejection, tripping and inadvertent starting. The same source identified hazards for powder actuated tools (bolt guns and hammer-assist type): (1) careless handling of tools, (2) projectiles traveling into unsuitable target materials, (3) ricochets from a surface, from interior target materials, (4) projection of debris, from target material or old parts, e.g., cartridge cases, (5) unauthorized persons in firing zone, (6) pre and post firing, loading and unloading of misfires.(4)

The National Safety Council, Electric Hand Saws, Circular Blade Type, identifies common injury causes as contact with the blade, electrical shock (40% contact with energized parts, 60% burns by short circuiting), and tripping on the cord, losing balance while in use, dropping of the tool, injuring the operator or others and kickbacks.(5)

Hazards referenced in Air Powered Hand Tools include those associated with the air hose, tripping and/or the operator being influenced by hose movement caused by other activity in the area, separation of the hose, whipping and thrashing of a hose and air blasts resulting in particle projection.

Also included are hazards of excessive pressure causing failures, resulting from exceeding the design pressure of the line, system, hose or tools. Additional hazards are electrical shock, resulting from the tool penetration of electrical conduit or electrical lines that are not visible, the potential for creating sparks in explosive-type atmosphere. Identified also for self-rotating hammer drills, jack hammers, or sinker drills are falls due to steel breakage and falling equipment resulting in injuries to legs, feet and back strain. Pneumatic tampers, particularly the single butt type, which is typically designed without handles, has the hazard of arm and back strains as well as impacting the feet or legs.(3)

An additional problem is identified as inadequately secured, fixed, portable tools, such as hand tools mounted in a vice. Because of the vibration and continual operating pressures, there is a potential for the tool to fall, striking the feet or legs of the operator. Raynauds Syndrome is associated with long term use of vibrating equipment. The use of antifreeze or excessive lubrication in air systems can create atmospheric contamination, which may be a health hazard.(3, 7)

Portable grinders principally address the hazards of abrasive wheel disintegration resulting from excessive revolutions per minute or impacts while in motion. Also identified as hazards are improper mounting or application of abrasive wheels and the common hazard of tripping on cords or hoses.(6)

The following injury sources are a composite of the literature reviewed (1-10) and while these injury sources are not necessarily comprehensive, they do

give an indication of the interrelationship of the different power tool operations. Table 1 is compiled to show the typical power source for different operations or functions and the injury sources identified by individual operation/function and/or by the typical power supply.

Injury Sources

(1) Contact with point of operation

(2) Electrical shock associated with the principal power source

(3) Electrical shock associated with the work being performed other than the power source

(4) Falls, resulting from the power supply conveyor hose, or electrical cord, or other conveyance

(5) Falls associated with tool breakage

(6) Falling tools involving self or others

(7) Kickbacks or striking-type injuries

(8) Tool ejection/disengagement/disintegration

(9) Explosion or ignition

(10) Power conductor failures, hose, electrical cable

(11) Physical hazards, vibration, noise (industrial hygiene)

(12) Particles projected

(13) Atmospheric contaminations (industrial hygiene)

(14) Lubrication excesses (safety and/or industrial hygiene)

(15) Clothing/hair involvement

(16) Improper tool operations (over/under speed, excessive power)

(17) Power supply hazards (explosives - gasoline)

TABLE 1

POWERED HAND TOOL(1-10)

TYPICAL POWER SUPPLY/INJURY SOURCE

	Electric(5)	Pneumatic(3-7)	Powder(2)	Hydraulic(1)	Gasoline(1)	Injury Sources
Abrasive						
Grinder	x	x				7,8,11,12,13,15
Sander	x	x				7,8,11,15
Buffer	x	x				7,11,15
Rotating/Reprocating/Twisting						
Drills/augers	x	x		x	x	3,5,7,12,15
Screwdriver	x	x				7,15
Wrenchs	x	x				7,15
Motor Drives	x	x				5,7,15
Saws						
Circular	x	x				7,8,15,16
Jig/Saber	x	x				3,12
Band	x					8,12,15
Chain	x	x		x	x	5,7,8,10,12,15,16
Percussion						
Chipping/Sealing	x	x				5,8,10,12
Reviting/Busting	x	x	x			8,10,11,12
Jackhammers et al		x			x	3,5,8,10,12
Rock Drills	x	x			x	5,8,10,12,15
Tampers/Compactors		x			x	7,10,12
Penetrating/Driving	x	x	x			3,8,12
Cutting/Shering	x	x	x	x	x	3,8,12
Splicing/Terminal fittings/Cable		x	x			8,12
Injury Sources	1,2,4,6, 10,11	1,4,6,10, 11,13,14	1,6,9,13, 16,17	1,4,6,9, 10	1,6,9, 11,13,14, 17	

D. Existing Hazard Controls

All sources that were reviewed indicated that portable hand powered tools are relatively safe to use if the total system, chore, or work to be accomplished is well understood, and the tool is properly designed to accommodate the task. Operators must be properly educated regarding the tool, the job to be performed and must be trained in hazard recognition.

Utilizing the same injury sources identified in Part C the following summarizes many of the techniques and equipment found in the literature for mitigating or reducing the hazard.(1-10)

(1) Contact with Point of Operation

Donut-type and other handles or hand grips to prevent the hand from sliding off the tool are proposed. Various guards and/or enclosures to prevent contact with the point of operation and trigger guards to prevent inadvertent starting of the tool or operation are recommended. Personal protective equipment in the form of gloves or safety-toed shoes, shin guards, metatarsal guards are suggested for different tools and operations.

(2) Electrical Shock Associated with the Principal Power Source

Machine frame grounding is a requirement in all cases except where double insulation is used. Ground fault circuit interrupters are required

under certain circumstances. Double-insulated electrical tools and low voltage electrical tools are all means of reducing the recognized hazards. Insulating platforms, rubber mats, and rubber gloves provide an additional factor of safety when tools are used in wet locations. The Department of Labor General Industry and Construction Standards recognize "... an assured equipment grounding conductor program..." as an alternative to ground fault circuit interrupters, as required by the National Electrical Code.

(3) Electrical Shock Associated with the Work Being Performed

No usable scheme was identified that would prevent drilling tools, penetrating tools or cutting tools, from penetrating concealed electrical conductors. See Paragraph M, Other Data.

(4) Falls Resulting from the Power Supply Conveyor Hose or Electrical Cords or Other Conveyance

Several of the referenced manuals, booklets, or articles identified the need to keep the conveyor, or the conductor off the floor and out of the way, so that it is not a hazard to other people and to prevent movement, or snagging by other equipment. Utilizing cable or hose retractors, self-coil hoses, cable and hose reels, utilizing only the required length of conductor to accomplish the work task and using floor channels or protective cleats were recommended.

(5) Falls Associated with Tool Breakage

These types of injuries are typically associated with large percussion tools that require extensive physical or manual control. Tool breakage results in the operator falling. The literature suggests that proper tool selection and maintenance, including sharpness, bevel, angle and hardness for the particular job be critically observed. Operator training and supplementary equipment supports, suspension or jacklegs, etc. are also means of reducing the hazards.

(6) Falling Tools Involving Self or Others

Tools not in operation or use should be secured, protected or supported in position. For overhead work it is suggested that equipment may be retained by lanyards or other tethering techniques. The supply cord or hose must be protected from movement or displacement resulting from nonrelated equipment or operations.

(7) Kickbacks or Striking Type Injuries

These hazards result from tool or material reacting to applied force instead of accomplishing the desired work, e.g., chainsaw blade kickback, the drill rotating when the bit binds, etc. Chainsaws are in the process of evolution, including anti-kickback design or devices. Cutter bar noise angle modifications, noise guards, suspension mounted brake devices

and modified chain design are improvements offered by various manufacturers of new equipment. Older devices include noseguards and cutter bar motion actuated chain brakes. Clamping of small pieces to prevent material rotation, proper selection of tools, proper operating techniques and non-locking power control switches or devices are identified as accident preventive requirements.

(8) Tool Ejections/Disengagement/Disintegration

Tool retainers, clips, springs or latches for pneumatic tools are required in most cases. Proper mounting of tools is required in all cases, and controlled testing before use is recommended. Abrasive stones and saw blades must have point of operation guards, designed to deflect projectiles from the operator, under most circumstances. Dead man or constant pressure controls and adherence to the abrasive wheels selection storage, mounting, testing and use requirements are requisites to prevent disintegration.

(9) Explosion or Ignition

Proper work permits, programs requiring atmospheric testing and appropriate tool selection are the principal means of reducing the hazard of explosions. Gasoline operated equipment that require refueling requires proper ventilation and bonding. Electrical equipment must be designed for and maintained in condition for use in hazardous atmospheres. Pneumatic tools can be made of non-sparking material in some cases.

(10) Power Conductor Failures (e.g., Hose and Electrical Cable)

Maintenance of the electrical cords including a regular program of inspection and testing is recommended. For air systems, retainers on connections, chain connections, shut-off valves on hose lines, installation of excess flow valves, and primarily, proper air line, electric line engineering and maintenance of the total system are recommended.

(11) Physical Hazards, Vibration, Noise

Gloves, insulating pads, other vibration isolation devices are recommended. When standard noise levels are being exceeded, isolation of people from exposure and muffling the air discharge is recommended.

(12) Particles Projected

Isolation of people in the operating area, proper positioning of people and necessary personal protective equipment should be utilized to reduce the hazard.

(13) Atmospheric Contamination

Oil mists must be regulated by ventilation, control of the amount of oil being applied and by maintaining automatic oilers. Carbon monoxide can be controlled with proper ventilation systems. Silica generation can be regulated by confinement, water sprays and ventilation. As a last resort personal protective equipment may be required.

(14) Lubrication Excesses

Properly engineered pneumatic lubrication system will reduce excessive oiling and the slip hazard resulting from excess lubrication as well as reducing the potential of dermatitis on the hands and legs. Further protection can be provided with aprons, gloves, or other personal protective equipment or techniques. Properly designed and maintained lubrication system are the best approach.

(15) Clothing - Hair Involvement

This is a hazard associated with all rotating equipment. Typical hazard controls are: Shortening the hair, bobbing the hair, wearing hair nets or otherwise confining it. Similar hazards are presented by loose and ragged clothing which should be prohibited.

(16) Improper Operation

Over and under speed, excessive power, improper maintenance of tools, equipment and utilizing improper power supplies must be controlled. Explosive powered equipment use dictates proper education and training regarding the selection of the appropriate standardized powder charge and tool usage.

(17) Power Supply Hazards - (Explosives - Gasoline)

Proper storage, handling and transfer techniques and/or regulations are available to eliminate hazards under normal circumstances. Techniques and procedures to prevent creating abnormal conditions must be adopted. Education and hazard awareness programs should be utilized to reduce creating abnormal conditions. Standards are available for storage and supply of normal explosive charges.

E. Accident and Illness Statistics

A search of the information available indicates that several states, under the Supplemental Data System of the Department of Labor are developing information from their industrial compensation records. States will use Standard Industry Classifications and the American National Standards Institute (ANSI) classifications. In addition, information may be tabulated using standard job classifications. The individual states input will not be comparable state to state, in as much as each state has individual requirements for reporting industrial accidents for compensation. We have been advised by the Department of Labor that the information from the participating states will be made available in the near future through NTIS in both microfiche and computer tape form. This has been an ongoing development program. Currently there are 27 states now participating, 26 will develop 1976 data; 1977 data, 30 states; 1978 data, 34 states; 1979, 36 states. In the 1976 reports it is estimated there will be 1,000,000 cases and the 1979 data is anticipated to include 2,000,000 cases. The information as provided by the states, will be made available with no changes by the Department of Labor. The information for 1976 has been provided to NTIS and it is a matter of their releasing the information after getting it cataloged and reproduced.(12) Appendix C shows the original NTIS information received. Inasmuch as this information was not available for this particular study, information was obtained from one or two states which did have sufficient detail to make some determinations as to types of accidents resulting from powered hand tools and industry segments where these accidents were occurring.

California information (8) - Hand tools ranked second in the construction segment with 16% of the injuries. Half of the tool-related mishaps were associated with "struck-by" accidents; a quarter resulted from strain or over exertion using a tool. Among the tools most often associated with injuries were hammers, saws, drills, wrenches and pneumatic tools. In the manufacturing segment, hand tools such as knives, wrenches, hammers and saws were associated with 9% of the total injuries.

In the trade classification, hand tools accounted for 9% of the injured. Most were "struck-by" accidents and almost half were caused by one hand tool, knives. Hand tools for the year 1975 were associated with 22,418 disabling injuries, 13 fatalities and of 22,405 non-fatal reports. In reducing this down to the powered hand tools, covered by this profile, the report total is 4,488 injuries, 5 fatalities and 4,483 non-fatal reports.

Table 2 Summary Information
California Work Injuries and Illnesses(8)

		Total	Fatal	Non-Fatal
Total Injury & Illness		259,652	662	258,990
Hand tools		22,418	13	22,405
Profile Tools*		4,488	5	4,483
Total Hand Tools	% of total reports	8.6	2.0	8.7
Profile Tools*	% of total reports	1.7	0.8	1.7
Profile Tools*	% of total tools	20.0	38.5	20.0

*Powered Hand Tools

Power saws accounted for two fatalities; sander, buffer; nozzle or hose accounted for one; and a power drill, N.E.C., one fatality. For hand tools reported by the accident type, "struck-by" or "striking-against" was the largest figure; "strain and over-exertion" is the next largest; and "foreign substance in the eye" is the third largest group for disabling injuries and illness. "Cuts, lacerations, punctures and abrasions" were the largest reported injury type; "strains, sprains, dislocations, hernias" was the second most reported. The third largest number of reports was "bruises, contusions". Both the reported accident type and the injury type are totals for all hand tools and do not present detail to isolate powered hand tools information.

Hand tools accidents and injuries in the manufacturing segment of the industry totaled 6,652, of which 9 were explosive-actuated hand tools, 292 were nozzles/hoses, 156 pneumatic tools and 293 power saws. In the construction area, eight explosive-actuated hand tool incidents were reported; 77 hoses/nozzle injuries; 241 pneumatic tools; and 347 power saw injuries. The balance of the 22,418 disabling occupational injuries were distrubuted between the seven other industry divisions. However, the majority of the reports were not related to powered hand tools. (See also Appendix A).(8)

Information developed from Utah State Industrial Commission under the Supplemental Data Systems reporting system, indicated that in 1976 power hand tools accounted for 418 cases. As would be expected, the leader by far was "craftsman and kindred workers", with over half of all such cases.

A distant second was laborers with 23%. The "power hand tools" percentage for "craftsmen, etc." was fully 76% higher than the overall case rate. The same report indicates that power hand tools ranked No. 10 as the source of injury, but only accounted for 2.9% of the injuries.(9)

In an attempt to develop useful information, the U.S. Consumer Products Safety Commission, Bureau of Epidemiology, was contacted and information was obtained.

Table 3 summarizes information extracted from the National Electronic Injury Surveillance System (NEISS) Estimate Ranks Table for 1977 and 1973. This information includes equipment that may be included in the portable powered hand tools profiles.(13)

Extracts of the 1977 and 1973 NEISS Reports are included in Appendix B1 and B2.

Table 3
Extracts from National Electronic Injury Surveillance System (NEISS)
1977 and 1973 (13)

Product #	1977 Rank	Product Description	1977 Estimate*	1977 Mean** Weighted Severity	1977 Number* Cases Reported	1973 Estimate*	1973 Mean** Weighted Severity	1973 Number* Cases Reported
		Home Workshop Apparatus Tools Attachments						
0837	4	Wires/Cords, not otherwise specified	20,422	23	653	---	---	---
0801	3	Power saws, not specified	21,458	34	787	27,983	49	1070
0832	15	Powered, Portable Circular Saws	5,991	45	182	2,192	45	77
0824	23	Power Saws, Portable, not circular, elect.	2,832	181	85	4,166	44	155
0853	44	Power-Actuated Tools - Powered by loaded cartridges	187	154	4	---	---	---
		Industrial Equipment						
2200		Industrial Equipment	322	17	16	500	29	30
			119 Hospitals Reported Data Bank 404,940 Total Estimate 9,390,740			199 Hospitals Reported Data Bank 315,156 Total Estimate 6,825,690		

*"Estimate" denotes the total number of product-related injuries estiamted to have been treated at hospital emergency departments in the contiguous United States. It is derived by inflating the actual number of injuries reported by the sample hospital emergency departments in the column labeled "Number Cases Reported".

**"Mean Weighted Severity" is an average injury severity value, designed as a management tool, which is determined from three elements of information: imputed severity value, hospital weight, and estimated number of injuries. Based on the injury diagnosis, body part affected and disposition of the case, each injury reported is assigned one of the severity categories. 1-8

F. Exposure Levels

Industrial hygiene surveys have been conducted regarding the exposure levels of silica and noise for tools and equipment being surveyed by this profile.

G. Related Studies

See Appendix B1, B2 for information developed by the Consumer Product Safety Commission.

A "Machine Guarding - Assessment of Need" study includes an evaluation of existing standards (ANSI) in relation to safety of operating employees. In general most standards do not adequately address personnel safety, with principle emphasis on other aspects, including production and products.(11)

H. Industry Trends

(1) The Bursting or Breaking of Abrasive Wheels

"The analysis of Table 7 suggests that portable grinding machines are the potentially most dangerous with 85 per cent of the incidents causing injury." "Furthermore the injuries tended to be more severe than at fixed machines, and it is significant that both of the serious injuries reported were caused by the bursting of wheels mounted on portable grinding machines."(17)

"The future promises the wider use of abrasive wheels running at higher peripheral speeds. Wheels running at 100 metres per second are already in use and even higher speeds are contemplated. This may result in a reduction of the ratio of bursting speed to operating speed and a consequent reduction in the margin of safety. To insure that the accident trend continues on a downward path it is important that all those concerned with the storage, handling, mounting and guarding of abrasive wheels maintain a vigilant attitude." (17)

I. Existing Standards

(1) U.S. Department of Labor - Occupational Safety and Health Administration(16)

(a) 29 CFR 1910 General Industry Standards

o Subpart O - Machinery and Machine Guarding

.212 - General Requirements for all Machines

(a) Machine Guarding.

(1) Types of Guarding

One or more methods of machine guarding shall be provided to protect the operator and other employees in the machine area from hazards such as those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks. Examples of guarding methods are - barrier guards, two-hand tripping devices, electronic safety devices, etc.

(2) General requirements for machine guards

(3) Point of operation guarding

(iv) The following are some of the machine which usually require point of operation guarding

(h) Portable power tools

o Subpart P - Hand and Portable Powered Tool and Other Handheld Equipment

.241 - Definitions

.242 - Hand and Portable Powered Tools and Equipment, General

(a) General Requirements

.243 - Guarding of Portable Powered Tools

(a) Portable powered tools

(1) Portable circular saws

(2) Switches and controls

(3) Portable belt sanding machines

(4) Cracked saws

(5) Grounding

(b) Pneumatic Powered Tools and Hoses

(1) Tool retainer

(2) Air hose

(c) Portable abrasive wheels

(1) General requirements

(2) Cup wheels

(3) Vertical portable grinders

(4) Other portable grinders

(5) Mounting and inspection of abrasive wheels

(6) Excluded machinery

(d) Explosive actuated fastening tools

(1) General requirements

(2) Inspection maintenance and tool handling

(3) Requirements for loads and fasteners

(4) Operating requirements

- o Subpart S - Electrical
  - .309 (a) (b) Electrical Utilization Requirements
  - .309 (c) Ground Fault Protection (An exception to NEC which allows "...an assured equipment grounding conductor program...")

(b) 29 CFR 1926 - Construction Standards(16)

- o Subpart I - Tools Hand and Powered
  - .300 - General Requirements
    - (a) Condition of tools
    - (b) Guarding
    - (c) Personal Protective Equipment
    - (d) Switches
  - .301 - Handtools
  - .302 - Power - operated handtools
    - (a) Electric power - operated tools
    - (b) Pneumatic power tools
    - (c) Fuel powered tools
    - (d) Hydraulic power tools
    - (e) Powered actuated tools
  - .303 - Abrasive wheels and tools
    - (a) Power
    - (b) Guarding
    - (c) Use of abrasive wheels
    - (d) Other requirements
  - .304 - Woodworking Tools
    - (d) Guarding
    - (e) Personal protective equipment

(f) Other requirements

(Reference to and compliance with ANSI 01.1-1961 Safety Code for Woodworking Machinery)

- Subpart K - Electrical

.400 - General Requirements

(a) Requires compliance with ANSI C1-1971 National Electrical Code

(h) Ground Fault Protection

(Excepts Ground Fault Circuit Interruptors where "an assured equipment grounding conductor program" is implemented.)

- Subpart R - Steel Erection

.752 - Bolting, Riveting, Fitting-up, and Plumbing-up

(a) General Requirements

(2) Pneumatic hand tools

(3) Hose sections

- Subpart V - Power Transmission and Distribution

.951 - Tools and Protective Equipment

(f) Hand tools

(e) Liveline barehand work

(8) ... use only tools intended for live line bare hands work

(2) The following are examples of the scope of regulation imposed by states or other Federal Agencies..

(a) Department of Army, Corps of Engineers

General Safety Requirements(14) - Index listing of profile tools

Tools

Double insulated

Explosive actuated tools

General

Grinding

Grounding

Hand

Hot line

Nail and stapling

Non-sparking

Pneumatic

Power

Power saws

Woodworking machinery

(b) California General Industrial Safety Order(15)

Article 20 - Portable Powered and Hand Tools

3555 - Definition

3556 - Hand tools

3557 - Switches and Controls for portable tools

3558 - Portable power driven circular saws (Class A)

3559 - Pneumatic and power actuated tools

3560 - Portable Grinders

3561 - Portable Grinders

3562 - Jacks

3563 - Power lawn mowers

Article 28 - Miscellaneous Construction Equipment

1699 - Hand tools

1695 - Pneumatic tools

1697 - Weed burner pressure hoses

1704 - Pneumatic driver nails and staplers

1705 - Airless spray guns

1707 - Power operated hand tools

1708 - Jacks-lever and ratchet, screw and hydraulic

(c) The following NIOSH control numbers identify publications where states standards are referenced in the abstract or title:

Control NIOSH 000 72328

000 72340

(3) Consensus standards, referenced by U.S. Department of Labor - Occupational Safety and Health standards

American National Standards Institute (ANSI)

o 29 CFR 1910.241 (a)		ANSI A10.3 (1970) Safety Requirements
	.243 (d)	For Explosive Actuated Fastening Tools
	.241 (b) and .243 (c)	ANSI B7.1 (1970) Safety Code for the Use, Care, and Protection of Abrasive Wheels
	.308 and .309	ANSI C-2 1971 National Electrical Code

- o 29 CFR 1926.300 ANSI B15.1 - 1953 (R1958) Safety Code for Mechanical Power Transmission Apparatus
  - .302 ANSI A10.3 (1970) Safety Requirements for Explosion Actuated Fastening Tools
  - .303 ANSI B7.1 - 1970 Safety Code for the Use, Care and Protection of Abrasive Wheels
  - .304 ANSI O1.1-1961 Safety Code for Woodworking Machinery
  - .400 ANSI C2 1971 National Electrical Code

(4) Consensus Standards, non-referenced with potential value

ANSI Z 223.1 (NFPA54-1974) Fuel gas

ANSI B 11.9-1975 Construction, care, and use of grinding machines

ANSI B 154.1-1974 Construction, care and use of rivet setting equipment

ANSI B 173.1 1975 Nail Hammers

ANSI C 33.49 ANSI/UL45 May 1973 Portable Electric Tools

(5) Foreign Standards

The following NIOSH control numbers identify publications where foreign standards or regulations are referenced in their abstracts or titles:

Control NIOSH 000 15354

000 13692

000 13389

000 16094

000 19832

000 37878

000 38252

000 54285

000 68573

000 70224

J. Names of Industry Associations and Other Interested Parties

American National Standards Institute
1430 Broadway
New York, New York 10018

National Safety Council
425 North Michigan Avenue
Chicago, Illinois 60611

Power Actuated Tool Manufacturers Institute
331 Madison Avenue
New York, New York 10017

Underwriters' Laboratory Inc.
207 East Ohio Street
Chicago, Illinois 60611

Hand Tools Institute
3331 Madison Avenue
New York, New York 10017

United Saw Service Association
1900 Arch Street
Philadelphia, PA 19103

Chain Saw Manufacturers Association

Suite 403

1015 Eighteenth St., N.W.

Washington, D.C. 20036

National Association of Saw Shops

Industrial Saw and Knife Company

Box 6356

Richmond, Virginia 23230

Amalgamated Meat Cutters and Butcher Workmen of North America

2800 North Sheridan Rd.

Chicago, Illinois 20657

Communication Workers of America

1925 K Street, N.W.

Washington, D.C. 20006 (Affiliate AFL-CIO)

Industrial Unit Marine and Shipbuilding Workers of America

1126 16th Street, N.W.

Washington, D.C. 20036

International Association of Bridge, Structural

and Ornamental Iron Workers

1750 New York Avenue, N.W.

Washington, D.C. 20006

International Association of Machinists and Aerospace Workers
1300 Connecticut Avenue, N.W.
Washington, D.C. 20036

International Brotherhood of Boilermakers, Iron Shipbuilders,
Blacksmiths, Forgers, and Helpers
Eighth Avenue at State
Kansas City, Kansas 66101 (AFL-CIO Affiliate)

Laborers International Union of North America
905 16th Street, N.W.
Washington, D.C. 20006 (Affiliate AFL-CIO)

Oil, Chemical and Atomic Workers International Union
Box 2812
Denver, Colorado 80201 (Affiliate AFL-CIO)

Sheet Metal Workers International Association
1750 New York Avenue, N.W.
Washington, D.C. 20006 (AFL-CIO)

United Automobile, Aerospace and Agricultural Implement Workers Intl. Union
8000 East Jefferson Avenue
Detroit, Michigan 48214

United Brotherhood of Carpenters and Joiners of America
101 Constitution Avenue, N.W.
Washington, D.C. 20001 (Affiliate AFL-CIO)

K. Names and Addresses of Companies

(1) Large Companies

H.K. Porter Inc.
74 Bowling Street
Summerville, Massachusetts 02143

Black and Decker
701 E. Joppa Road, Dept. 3865
Townsend, Maryland 21204

Dayton Electric Manufacturing Co.
5959 West Howard Street, Dept. TR
Chicago, Illinois 60648

Skill Corporation
4801 West Patterson Avenue
Chicago, Illinois 60646

Milwaukee Electric Tool Corp.
13167 West Brisbane Road
Brookfield, Wisconsin 53005

Thor Power Tool Co., Stewart Warner Corporation
175 North State Street
Aurora, Illinois 60507

McCulloch Corporation
5400 Alla Road
P.O. Box 92180
Los Angeles, California 90009

Rockwell International Power Tool Division
662 North Lexington Avenue
Pittsburgh, Pennsylvania 15208

Homerite, Division of Textron Inc.
14401 Carrowinds Blvd.
Charlotte, N.C. 28217

Gardner-Denver Co.
333 Fulton Street
Grand Haven, Michigan 49417

(2) Small Companies

Mine Safety Appliance Co.
408 Penn Center Blvd.
Pittsburgh, Pennsylvania 15235

Simons Inc.
248 Worchester Street
Southbridge, Massachusetts 01550

Rev-E-Air Tool Company
1536 Granville Avenue, S.W.
Grand Rapids, Michigan 49509

Sioux Tools Inc.

2901 Floyd Blvd.

Sioux City, Iowa 51102

Omark Industries, Inc., Construction Fastening Operations

9701 S.E. McLaughlin Blvd.

Portland, Oregon 97222

Fixrammer Corporation

1401 Metals Drive

Charlotte, N.C. 28213

L. Summary Analysis of Data

Powered hand tools, hand held or supported, are designed to perform a mechanical task. Power sources include electric, pneumatic, hydraulic and explosive charges. Not considered in the profile are conveying implements such as sand blasting and spray painting. Mechanical tasks include (1) rotary: saws, sanding, nutrunners, drills, routers, grinders, etc. (2) vibration: sanders, compaction, etc. (3) percussion: drills, jackhammers, chippers, staplers, nailers, riveters, tampers, (4) explosive: cable cutters and/or splicers, rivets extraction or tightening, joining pipe, driving studs or fasteners into surfaces, penetration and metal forming.

Although frequency of injuries is relatively high the severity is reportedly fairly low, a more detailed evaluation by specific operation or power source may indicate specific areas that require additional study. The profile "Chain Saw Operations in the Logging Industry" developed under this contract, is an example of a specific study. Based on limited statistical information, power saw operations in the industrial groups of, construction, manufacturing, and agriculture may warrant specialized study. These three groups probably include about two-thirds of the powered hand saw related injuries.

The California Work Injuries and Illnesses 1975 report identifies "nozzle or hose" as the fifth most frequent source of injury and accounted for two fatal injuries. This is another area that may justify additional study.

There is adequate knowledge and sufficient rules and regulations to safely operate powered hand tools, except for, the infrequent electrocution resulting from unexpected tool penetration into a power conductor. Inadequate enforcement of the regulations and lack of utilization of existing knowledge are the major factors in powered hand tool accidents.

M. Other Data

An article "Removing Shock Hazards from Power Tools"(10) discusses electric shock and an electrocution hazards and considers such devices as: Baluns, crawbar circuits, ground fault interruptors, inverse ground-fault interruptors and hypothetical cable proximity sensors. It states that no single device can provide protection for all possible operating conditions. And that although potentially lethal products have a statistically low rate of shock incidence, the industry is reevaluating protective measures now in use. The likelihood is that future tools will utilize a combination of protective devices.

One abstract was received too late to incorporate into this profile. It may be of value for further research: Willoughby, Robert A., Safety Code for Portable Air Tools, "Abstract: A survey and review of the compressed Air and Gas Institutes, Safety Code and a brief commentary on its background and legislative status will be included. Highlights of safety requirements for air tools, drill, fastener driving tools and cutting tools will be presented. Emphasis will be placed on a separate but related safety requirement for designer, manufacturers, owners and operators."

An article, not received, which may have relevance to this study.

1086 D3
ACCESS: CIS 668-1972
AUTHOR:
CONTROL: NIOSH-00000902
DCN: 0000001086
PUBDATE: 71/10/00
REFER1: ACCIDENTS, NO. 89, PAGES 21-26, 1 REFERENCE
REFER2:
SOURCE:
SUBDATE:
TITLE: CARTRIDGE-OPERATED TOOLS

00NCH EXPLOSIVE-ACTUATED-EQUIPMENT, EXPLOSION-PROTECTION, EXPLOSION-PREVENTION, STANDARDS, SAFETY-PRECAUTIONS
65 REVIEW OF ACCIDENT CAUSES RESULTING FROM THE USE OF EXPLOSIVE-ACTUATED TOOLS AND THEIR CARTRIDGES. CASES CITED INCLUDE: PERSONS BEING STRUCK BY FLYING NAILS FROM THE DEVICES; A MISUSE OF CARTRIDGES IN BOMBS; INJURY OF OPERATORS BY SHATTERED CONCRETE FROM OVERCHARGED DEVICES; AND AN ACCIDENT CAUSED BY MISFIRING OF THE CARTRIDGE. DATA ARE GIVEN FOR STRENGTH OR EXPLOSIVE FORCE OF CARTRIDGES. ADDITIONAL TOPICS DISCUSSED INCLUDE: STANDARDS FOR USE OF CARTRIDGE-ACTUATED EQUIPMENT; SUGGESTIONS FOR CLOSER OBSERVANCE OF SAFETY PRECAUTIONS; AND SAFETY CODES IN HANDLING OF CARTRIDGES AND USE OF EQUIPMENT.

U.S. Department of Labor, Bureau of Labor Statistics, Washington, D.C., Subject: Microfiche of Supplementary Data System Tabulations for 1976, 1978, Theodore J. Colonka (See Appendix C).

REFERENCES AND SOURCES

1. Anon., Accident Prevention Manual for Industrial Operations, 7th Edition, National Safety Council, Chicago, Illinois.

2. Anon., Power Actuated Hand Tools, Safety Data Sheet 236, Revised, National Safety Council, Chicago, Illinois.

3. Anon., Air Powered Hand Tools, Safety Data Sheet 392, National Safety Council, Chicago, Illinois.

4. Anon., Occupational Health and Safety, International Labor Organization, McGraw-Hill Book Company, New York, New York.

5. Anon., Electric Hand Saws, Circular Blade Type, Safety Data Sheet 344, National Safety Council, Chicago, Illinois.

6. Anon., Portable Grinders, Safety Data Sheet 583, National Safety Council, Chicago, Illinois.

7. Anon., Airline Safety in the Plant, A Matter of Life and Limb, Factory Volume 9 No. 7, pp. 21, July 1976.

8. California Work Injuries and Illnesses 1975, August 1977, Department of Industrial Relations, Division of Labor Statistics and Research, San Francisco, California.

9. Jeppson, Lew E., Reportable Occupational Injuries and Illnesses in Utah For the Calendar Year 1976, Utah Occupational Safety and Health Division, Industrial Commission of Utah.

10. Gross, Tom, Removing Shock Hazards From Power Tools, Machine Design Volume 50, No. 3, February 9, 1978, pp. 98-101.

11. Machine Guarding - Assessment of Need, Bendix Corporation, Launch Support Division, Corporal Beach, Florida, NEW Publication No. (NIOSH) 75-173.

12. Personal communication with Mr. Lyle Schauer, Bureau of Labor Statistics, Office of Federal State Periodic Surveys.

13. Tabulation of Data from National Electronic Injury Surveillance System (NEISS) January 1 through December 31, 1973 and 1977. U.S. Consumer Product Safety Commission, Hazard Identification and Analysis, National Injury Information Clearing House.

14. Anon., General Safety Requirements, Department of Army, Corps of Engineers, U.S. Army.

15. Anon., General Industrial Safety Orders, State of California, California Administrative Code, Title 8, Industrial Relations, Chapter 4, Division of Industrial Safety.

16. Title 29 CFR Code of Federal Regulations, Part 1910, 1926, 1915, 1916, 1917, 1918, U.S. Department of Labor, Occupational Safety and Health.

17. Anon. Department of Employment Annual Report 1972, Cmnd 5398 (Microfiche 74-595).

APPENDIX

STATE OF CALIFORNIA
Edmund G. Brown Jr., *Governor*

AGRICULTURE AND SERVICES AGENCY
Leonard M. Grimes Jr., *Secretary*

APPENDIX A
(8 pages)

CALIFORNIA

WORK INJURIES AND ILLNESSES

1975

Prior reports in this annual series were titled
CALIFORNIA WORK INJURIES

DEPARTMENT OF INDUSTRIAL RELATIONS
Donald Vial, *Director*

DIVISION OF LABOR STATISTICS AND RESEARCH
Sara Behman, *Chief*

In cooperation with the
U. S. Department of Labor
Bureau of Labor Statistics

P. O. Box 603
San Francisco, California 94101

AUGUST 1977

CALIFORNIA WORK INJURIES AND ILLNESSES

INTRODUCTION

Work injuries and illnesses in industries covered by California's Workers' Compensation Act totaled 259,652 in 1975, a decline of about 9,500 injuries, or 3½ percent from the previous year.

During the same period, employment in industries covered by the Act taken as a group decreased only a fraction of a percent -- 0.2 percent. While it is difficult to determine how much of the decrease in injuries is recession-related, the depressed economy in 1975 would have some bearing on the injury count. In recessionary periods injuries tend to drop due to shorter workweeks, retention of more experienced workers on payrolls, and substantial employment declines in such high-hazard industries as construction and the lumber industry.

There was considerable variation among the major industry divisions in their work injury experience in 1975. Six of the nine major industries registered declines in injuries and illnesses: construction; manufacturing; transportation and utilities; agriculture; finance, insurance, and real estate; and mineral extraction. Injuries increased in three industry divisions -- trade, service, and State and local government. In the case of State and local government, the number of employee injuries rose dramatically.

Industry division	Percent change, 1974–75	
	Injuries	Employment
All industries	−3.5	−0.2
Agriculture	−8.7	−0.1
Mineral extraction	−0.8	+0.9
Construction	−19.0	−10.9
Manufacturing	−13.8	−6.1
Transportation, communication, and utilities[a]	−7.4	−1.7
Trade	+3.4	+0.9
Finance, insurance, and real estate	−1.5	+0.6
Service	+4.0	+2.5
State and local government[a]	+12.4	+5.8

[a] Injuries and illnesses to employees of publicly operated utilities are included under State and local government.

The largest decrease in injuries, 19 percent, was registered in construction. The drop in construction worker injuries was coupled with an employment decrease of nearly 11 percent.

There were substantial differences among the major segments of the construction industry in the year-to-year changes in both injuries and employment.

	Percent change, 1974–75	
	Injuries	Employment
General building contractors	−23.1	−8.0
Heavy construction contractors	−5.7	−13.7
Special trade contractors	−20.1	−11.3

The biggest drop in injuries (23 percent), which was registered among general building contractors, was combined with the smallest decline in employment (8 percent).

Heavy construction work; which registered a drop of 5.7 percent in injuries, recorded the largest decline in employment over the period -- 13.7 percent.

The three industries that recorded an increase in injuries over the period were State and local government (including publicly owned utilities) which increased 12 percent, service (up 4 percent), and trade (up 3.4 percent).

Within the public sector, injuries and employment increased in all levels of government:

ANALYSIS OF 1975 INJURIES AND ILLNESSES BY MAJOR INDUSTRY

Agriculture *(Table B)*

Disabling occupational injuries and illnesses among agricultural workers in California accounted for over 5 percent of total injuries reported in 1975.

Working surfaces (generally the ground outdoors) were associated with more lost-time injuries than any other agency -- 19 percent of the total.

Vehicles -- primarily tractors, trucks, and trailers -- accounted for 14 percent of the injuries; more than half of the accidents involved moving vehicles.

Twelve percent of the disabling injuries to farm workers were associated with hand tools. Knives, shears, saws, and shovels were most often implicated in the hand tool accidents. The largest number of workers were injured in "struck by" mishaps while handling tools.

Machine-related injuries amounted to 8 percent of the total. The agricultural implements most often involved in accidents were harvesters, mowers, and tillage equipment.

Cattle, horses, other animals and insects were implicated in almost 7 percent.

Mineral extraction *(Table C)*

In mining, oil well drilling equipment -- such as drilling lines, tongs, and elevators -- and other hoisting apparatus were involved in 23 percent of the injuries. Most workers were injured when struck by or caught in the apparatus.

Working surfaces were associated with 18 percent of all disabling injuries. Most of the working surface accidents resulted from falls and slips.

Hand tools accounted for 12 percent of the total, and pipe, for 9 percent. In both cases, struck by and striking against accidents were most prevalent.

Construction *(Table D)*

Seven percent of the disabling injuries and illnesses in 1975 occurred in the construction industry.

The most common source of injury in construction was working surfaces (23 percent), the majority of which involved falls and slips. Nearly half were falls from scaffolds, ladders, roofs, and other elevated work areas in buildings under construction.

Hand tools ranked second with 16 percent of the injuries. Half of the tool-related mishaps were associated with struck by accidents and a quarter resulted from strain or overexertion in using the tool. Among the tools most often associated with injuries were hammers, saws, drills, wrenches, and pneumatic tools.

Lumber and plywood paneling was involved in 6 percent of the injuries in construction.

Manufacturing *(Table E)*

Twenty-seven percent of the injuries and illnesses in California during 1975 were sustained by employees of manufacturing companies.

More injuries were associated with machines (16 percent) than with any other single agency group. Most commonly involved were presses, power saws, grinders, lathes, drills, and cutters. Half of the machine-related injuries were caught in accidents and one-fourth involved struck by mishaps.

Working surfaces (primarily falls and slips) accounted for 15 percent of the injuries.

Eleven percent of the injuries among factory workers involved containers. Three out of every four container-related injuries were caused by strain or overexertion.

Hand tools, such as knives, wrenches, hammers, and saws were associated with 9 percent of the total; metal stock and stock parts were implicated in 7 percent.

Transportation, communication, and utilities *(Table F)*

Almost one out of every four injuries in the transportation and utilities sector was associated with vehicles, and half of these accidents involved a moving motor vehicle.

Working surfaces accounted for 20 percent of the total. Most involved slips and falls on the same level or while stepping on or off vehicles and other objects.

Seventeen percent of the disabled workers were injured by containers; most were strain or overexertion or struck by mishaps.

Trade *(Table G)*

One-fifth of the occupational injuries and illnesses in 1975 were to workers in wholesale and retail trade.

Working surfaces, mostly the floor and ground outdoors, were implicated in 19 percent of the total, and containers, in 18 percent. The bulk of the container-related accidents involved strain or overexertion.

Hand tools accounted for 9 percent of the injuries in the trade sector. Most were struck by accidents, and almost half were caused by a single hand tool — knives.

Finance, insurance, and real estate *(Table H)*

Nearly one-third of the injuries to employees in finance, insurance and real estate involved working surfaces (mainly falls and slips). The most common working surfaces involved the floor, ground outdoors, and stairs or steps.

Eleven percent involved vehicles (primarily moving motor vehicle accidents) and 9 percent, containers (primarily strains).

Service *(Table I)*

Workers employed in service industries in California accounted for 12 percent of disabling injuries and illnesses in 1975.

Working surfaces were involved in 23 percent of total injuries in services. Most of the working surface accidents were associated with falls or slips on the floor.

A "person other than the injured" was the second most common agency, with 14 percent of the injuries. Most were either strain or struck by accidents. The bulk of these accidents occurred in hospitals and were the result of patient handling.

State and local government *(Table J)*

Working surfaces were implicated in one out of every four disabling injuries to government workers.

Vehicles — mainly cars and trucks — accounted for 10 percent of the injuries. Half of these accidents involved a moving motor vehicle.

"Persons other than the injured" were implicated in almost 10 percent of the injuries, and more than half of these involved struck by accidents. Most of these accidents involved law enforcement personnel who were injured while apprehending or subduing suspects, and teachers or other public school employees who were injured by contact with unruly students or accidentally struck by students while participating in games and sports.

TABLE 4--AGENCY (DETAILED), DISABLING OCCUPATIONAL INJURIES AND ILLNESSES UNDER WORKERS' COMPENSATION
CALIFORNIA, 1975

Agency	Total	Fatal	Non-fatal
Total	259,652	662	258,990
Working surfaces	51,643	48	51,595
Floor	23,263	15	23,248
Ground--outdoors, n.e.c.	16,261	21	16,240
•Stair, step	4,963	1	4,962
Ramp, runway, elevated platform, gangplank	1,529	1	1,528
Running board, step, fender of stationary motor vehicle	1,403	-	1,403
Sidewalk, curb	1,324	1	1,323
Bed or back of stationary highway motor vehicle	860	-	860
Staging, scaffold	371	-	371
Road, street	325	-	325
Roof	231	-	231
Pole, tree, or other vertical working surface	141	-	141
Derrick, mast	15	1	14
Other elevated working surfaces	134	-	134
Working surfaces, n.e.c.	602	8	594
Working surfaces, type not stated	221	-	221
Containers	29,133	4	29,129
Box	13,403	-	13,403
Can	3,022	-	3,022
Bag, sack	2,565	-	2,565
Reel, roll	1,605	-	1,605
Barrel	999	1	998
Bottle	973	-	973
Drum	863	1	862
Pail, bucket	749	-	749
Bundle	672	-	672
Basket	439	-	439
Bale	433	1	432
Baggage	331	-	331
Keg	161	-	161
Other containers	1,106	1	1,105
Containers, type not stated	1,812	-	1,812
Vehicles	26,150	259	25,891
Automobile	6,264	57	6,207
Truck	5,862	107	5,755
Bus	1,275	2	1,273
Motorcycle	458	6	452
Motor scooter, motor bike	177	1	176
Highway motor vehicles, n.e.c.	185	-	185
High lift truck	2,799	11	2,788
Tractor	1,273	26	1,247
Motor vehicles other than highway, n.e.c.	771	1	770
Aircraft (except helicopter)	414	31	383
Helicopter	24	10	14
Railroad train, locomotive, etc.	222	2	220
Streetcar	118	2	116
Watercraft--power operated	81	-	81
Power operated vehicles, n.e.c.	16	-	16
Hand truck	3,447	3	3,444
Dolly	651	-	651
Wheelbarrow	278	-	278
Hand or foot industrial vehicle, n.e.c.	176	-	176
Trailer (uncoupled)	1,043	-	1,043
Bicycle	202	-	202
Vehicles, n.e.c.	414	-	414
Hand tools	22,418	13	22,405
Knife	4,727	-	4,727
Wrench	1,523	-	1,523
Hand hammer	1,309	-	1,309
Power saw	1,056	2	1,054
•Nozzle or hose	1,055	1	1,054
Shovel, spade	924	-	924
Pneumatic tools, n.e.c.	803	-	803
Bar	651	-	651
Scissors, shears	589	-	589
Grinder--power, portable	485	-	485
Power drill, n.e.c.	467	1	466
Jack	426	-	426
Hand tools--Continued			
Sledge hammer	384	1	383
Saw--hand operated or type not stated	379	-	379
Drill--hand operated or type not stated	375	-	375
Torch--blow or acetylene	375	4	371
Mop, broom	356	-	356
Screw driver	352	3	349
Box cutter	348	-	348
Welding tools	328	-	328
Stapler (including staple gun)	268	-	268
Razor, razor blade	263	-	263
Hook	216	-	216
Vacuum cleaner, carpet sweeper	214	-	214
Nailer	179	-	179
Spray gun, grease gun, spotting gun	178	-	178
Instrument, measuring or metering device	163	-	163
Chain, binder, tie-down bar	159	-	159
Brush, paint roller	142	-	142
Hoe	133	-	133
Pick	123	-	123
Axe	115	-	115
Sewer rod, plumber's snake	107	-	107
Chisel	106	-	106
Plier, pincers	106	-	106
Tire iron, tire tools	101	-	101
Paper cutter--hand operated	99	-	99
Grinder--hand operated	96	-	96
Sander, buffer--hand carried	95	1	94
Scraper	89	-	89
Pitchfork	87	-	87
Fire extinguisher	70	-	70
Needle	67	-	67
Tongs	63	-	63
Riveting gun	58	-	58
Rake (except hay)	57	-	57
Digger--post hole, soil auger	54	-	54
Hand tools, n.e.c.	1,173	-	1,173
Hand tools, type not stated	925	-	925
Machines	20,407	32	20,375
Power saw	2,231	1	2,230
Press	2,139	2	2,137
Grinder	1,366	1	1,365
Shear, slitter, slicer	1,354	-	1,354
Farm machinery implements	908	5	903
Lathe	670	1	669
Cutter	638	-	638
Lawn mower	627	-	627
Drill, borer	616	-	616
Office machine (except typewriter)	411	-	411
Mixer	410	1	409
Sewing machine	371	-	371
Washer	349	1	348
Buffer, polisher	295	-	295
Road grader, road roller, road oiler	281	6	275
Welder	263	1	262
Sander	231	-	231
Rolls	216	-	216
Wrapper	201	-	201
Floor polisher	198	-	198
Front end loader	193	5	188
Milling machine, gear cutter--metal	181	1	180
Filler, capper, stuffer	180	1	179
Sealer--carton, case	178	-	178
Automotive adjustment machinery	172	-	172
Mill	167	1	166
Molder	162	1	161
Hospital and laboratory mechanical apparatus	147	-	147
Brake--metal	130	-	130
Router	113	-	113
Winder, rewinder	112	-	112
Hog mill	107	-	107
Casting machine	93	-	93
Sandblast or other blasting machine	93	-	93

TABLE 12--DISABLING OCCUPATIONAL INJURIES AND ILLNESSES; UNDER WORKERS' COMPENSATION, ACCIDENT TYPE (MAJOR) BY AGENCY
CALIFORNIA, 1975

ACCIDENT TYPE	TOTAL	MA-CHINES	HOISTING APPARATUS, CONVEYORS, ELEVATORS	VEHICLES	HAND TOOLS	CHEMICALS, HOT, INJURIOUS SUBSTANCES	WORKING SURFACES	LADDERS	CON-TAINERS (FILLED OR UNFILLED)	LUMBER, LOGS, TREES	OTHER AGENCIES	AGENCY NOT STATED
TOTAL	259,652	20,407	4,241	26,150	22,418	13,725	51,643	1,696	29,133	5,020	81,841	3,378
STRUCK BY OR STRIKING AGAINST	68,460	5,290	1,721	6,069	13,391	71	2,127	354	5,964	2,361	30,988	124
CAUGHT IN OR BETWEEN	16,677	9,299	1,436	1,973	265	1	68	36	512	137	2,942	8
FALL OR SLIP	54,071	267	263	1,085	66	1	48,824	880	224	134	2,322	5
ACCIDENT INVOLVING MOVING MOTOR VEHICLE	11,850	-	-	11,850	-	-	-	-	-	-	-	-
STRAIN OR OVEREXERTION	73,628	3,585	762	4,464	5,800	40	605	422	22,220	2,000	33,134	596
CONTACT WITH TEMPERATURE EXTREME	6,022	294	7	385	393	3,500	4	-	20	-	1,410	9
CONTACT WITH RADIATION, CAUSTIC, TOXIC OR NOXIOUS SUBSTANCE	8,361	75	-	7	21	6,805	2	-	9	3	1,424	15
CONTACT WITH ELECTRIC CURRENT	585	88	16	15	67	3	1	1	1	-	392	1
EXPLOSION, FLAREBACK, ETC.	595	35	2	38	47	69	3	-	37	1	363	-
OTHER	16,670	1,455	32	244	2,356	3,230	3	1	133	379	8,817	20
BITE, STING (INCLUDING HUMAN BITE)	1,540	2	-	1	2	3	-	-	-	3	1,527	2
FOREIGN SUBSTANCE IN EYE	11,859	1,451	32	172	2,352	3,214	3	1	133	376	4,108	17
CARDIO-VASCULAR STRAIN OR DISEASE	1,720	-	-	-	-	-	-	-	-	-	1,720	-
PLANE, HELICOPTER CRASH	68	-	-	68	-	-	-	-	-	-	-	-
OTHER ACCIDENT, N.E.C.	1,483	2	-	3	2	13	-	-	-	-	1,462	1
ACCIDENT TYPE NOT STATED	2,733	19	2	20	12	5	6	2	13	5	49	2,600

FOR FOOTNOTE, SEE TABLE 8.
N.E.C.--NOT ELSEWHERE CLASSIFIED.

TABLE 13--DISABLING OCCUPATIONAL INJURIES AND ILLNESSES; UNDER WORKERS' COMPENSATION, NATURE OF INJURY (MAJOR) BY AGENCY
CALIFORNIA, 1975

NATURE OF INJURY	TOTAL	MA-CHINES	HOISTING APPARATUS, CONVEYORS, ELEVATORS	VEHICLES	HAND TOOLS	CHEMICALS, HOT, INJURIOUS SUBSTANCES	WORKING SURFACES	LADDERS	CON-TAINERS (FILLED OR UNFILLED)	LUMBER, LOGS, TREES	OTHER AGENCIES	AGENCY NOT STATED
TOTAL	259,652	20,407	4,241	26,150	22,418	13,725	51,643	1,696	29,133	5,020	81,841	3,378
AMPUTATIONS, LOSS OF, LOSS OF USE OF	776	479	59	73	57	2	7	1	9	1	78	10
BURNS AND SCALDS	8,240	375	19	461	464	5,468	18	1	39	5	1,375	15
CUTS, LACERATIONS, PUNCTURES, ABRASIONS	40,067	7,962	800	2,993	9,774	91	2,954	109	2,047	729	12,406	202
STRAINS, SPRAINS, DISLOCATIONS, HERNIAS	107,910	3,877	1,073	9,422	5,747	43	26,173	1,010	22,030	2,156	35,193	1,186
CRUSHING INJURIES	3,758	891	250	832	274	-	52	13	214	97	1,124	11
FRACTURES	16,833	1,378	482	2,482	767	5	5,957	98	808	382	4,397	77
OCCUPATIONAL DISEASES	10,164	220	21	230	220	4,721	273	9	287	44	3,979	160
BRUISES, CONTUSIONS	33,532	2,235	1,014	5,267	1,726	11	8,337	286	2,298	836	11,402	120
OTHER	16,612	1,628	82	724	2,563	3,350	433	8	252	432	7,093	47
NATURE OF INJURY NOT STATED	21,760	1,362	441	3,666	826	34	7,439	161	1,149	338	4,794	1,550

FOR FOOTNOTE, SEE TABLE 8.

TABLE 16--DISABLING OCCUPATIONAL INJURIES AND ILLNESSES, UNDER WORKERS' COMPENSATION, AGENCY BY INDUSTRY DIVISION
CALIFORNIA, 1975

AGENCY	FATAL	TOTAL	AGRI-CULTURE	MINERAL EXTRACTION	CON-STRUCTION	MANU-FACTURING	TRANSPOR-TATION COMMUNI-CATION, UTILITIES**	TRADE	FINANCE, INSURANCE, AND REAL ESTATE	SERVICE	STATE AND LOCAL GOVERN-MENT**	INDUSTRY NOT STATED
TOTAL	662	259,652	13,571	2,058	17,988	71,116	22,408	53,500	4,239	31,886	42,822	64
MACHINES	32	20,407	1,097	62	784	11,402	334	3,584	200	1,557	1,380	7
BUFFERS, POLISHERS	-	295	-	1	2	199	1	28	3	38	23	-
CUTTERS	-	657	16	-	33	400	6	141	5	31	25	-
DRILLS, BORERS	-	616	14	7	33	478	17	30	-	22	15	-
EARTHMOVING EQUIPMENT	11	474	41	14	137	51	60	23	6	26	116	-
FARM IMPLEMENTS	6	946	619	2	14	72	13	73	15	36	100	2
GRINDERS, ABRASIVE WHEELS	-	1,037	17	5	45	752	19	82	3	96	18	-
JOINTERS	-	66	1	-	4	46	-	6	1	3	5	-
LATHES	1	670	1	2	8	596	6	22	-	24	11	-
MIXERS	1	410	5	2	54	155	8	109	1	18	58	-
PRESSES	2	2,139	34	1	22	1,699	22	159	5	132	64	1
SAWS	1	2,231	11	3	138	1,250	18	613	7	101	89	1
SEWING MACHINES	-	371	-	1	2	308	-	36	-	17	7	-
SHEARS, SLITTERS, SLICERS	-	1,354	2	-	6	256	9	945	2	83	51	-
OTHER	10	9,141	336	24	286	5,140	155	1,317	152	930	798	3
HOISTING APPARATUS, CONVEYORS, ELEVATORS	24	4,241	157	466	306	1,911	289	657	24	258	173	-
ELEVATORS	1	441	10	10	33	87	37	81	18	92	73	-
HOISTING APPARATUS (EXCLUDING WELL DRILLING EQUIPMENT)	16	1,425	33	38	213	659	122	187	5	98	70	-
WELL DRILLING EQUIPMENT	3	475	1	411	31	10	4	5	-	8	5	-
CONVEYORS	4	1,900	113	7	29	1,155	126	384	1	60	25	-
VEHICLES	259	26,150	1,941	146	972	4,469	5,135	5,868	462	2,817	4,338	2
MOTOR VEHICLES, HIGHWAY	173	14,221	676	95	560	1,306	3,265	3,029	337	1,719	3,234	-
MOTOR VEHICLES, OTHER THAN HIGHWAY	38	4,843	849	23	193	1,603	465	1,178	26	238	268	-
OTHER POWER-OPERATED VEHICLES	45	875	31	11	2	196	455	76	6	50	47	1
INDUSTRIAL VEHICLES, HAND OR FOOT OPERATED	3	4,552	124	10	151	1,098	652	1,380	80	559	498	-
OTHER	-	1,659	261	7	66	266	298	205	13	251	291	1
HAND TOOLS	13	22,418	1,635	257	2,847	6,652	1,150	4,992	240	1,985	2,652	8
AXES, PICKS	-	238	22	1	43	25	15	11	3	16	101	1
BARS	-	651	37	11	75	244	65	105	7	32	75	-
DRILLS	1	842	12	7	212	322	28	100	9	83	69	-
EXPLOSIVE HAND TOOLS	-	22	-	-	8	9	-	1	2	1	1	-
HAMMERS	1	1,693	92	28	466	499	98	211	21	138	140	-
JACKS	-	426	32	8	57	78	33	120	2	65	31	-
KNIVES	-	4,727	335	5	128	1,346	55	2,357	19	313	168	1
NOZZLES, HOSES	1	1,055	53	18	77	292	90	125	4	44	352	-
PNEUMATIC TOOLS	-	803	16	10	241	156	91	50	9	49	181	-
POWER SAWS	2	1,056	132	3	347	293	17	58	23	67	112	4
HAND SAWS	-	379	50	-	90	105	6	44	4	22	58	-
SCISSORS, SHEARS	-	589	213	1	34	174	13	51	12	30	61	-
SHOVELS, SPADES	-	924	165	12	164	166	73	25	16	58	245	-
TORCHES	4	375	19	9	44	123	25	87	1	50	17	-
WELDING TOOLS	-	328	14	5	30	199	14	23	-	32	11	-
WRENCHES	-	1,523	69	82	158	553	129	273	8	130	121	-
OTHER	4	6,787	374	57	673	2,068	398	1,351	100	855	909	2

CHEMICALS, HOT, INJURIOUS SUBSTANCES	29	13,725	905	131	1,055	4,609	682	2,543	130	1,687	1,983	-
CHEMICALS	18	2,948	158	32	119	1,405	180	360	25	357	312	-
HOT SUBSTANCES	6	3,338	79	29	320	897	100	1,195	28	411	279	-
DUSTS	4	893	69	15	117	302	79	114	9	82	106	-
RADIATIONS	-	965	56	30	126	495	37	87	3	90	41	-
FOODS	-	409	58	-	-	114	4	165	2	42	24	-
POISONOUS PLANTS	-	866	145	6	71	14	78	21	11	69	451	-
OTHER INJURIOUS SUBSTANCES	1	4,306	340	19	302	1,382	204	601	52	636	770	-
WORKING SURFACES	48	51,643	2,518	364	4,145	10,464	4,553	9,963	1,297	7,346	10,980	13
RAMPS, RUNWAYS, PLATFORMS	1	1,529	42	18	77	463	262	294	14	162	197	-
STAGING, SCAFFOLDS	-	371	2	2	221	42	8	10	6	26	54	-
STAIRS, STEPS	1	4,963	38	31	192	967	324	890	310	893	1,316	2
ROOFS	-	231	3	2	120	30	2	10	1	12	51	-
FLOORS	15	23,263	384	80	1,042	5,998	972	6,014	506	4,160	4,104	3
SIDEWALKS, ROADS, STREETS	1	1,649	19	4	70	136	217	214	97	232	658	2
GROUND	21	16,261	1,877	172	2,115	2,240	1,935	1,971	336	1,622	3,987	6
OTHER ELEVATED WORKING SURFACES	1	2,553	121	33	175	347	745	451	15	159	507	-
OTHER	8	823	32	22	133	241	88	109	12	80	106	-
LADDERS	-	1,696	164	4	261	353	157	247	28	145	337	-
CONTAINERS	4	29,133	1,092	65	895	8,149	3,736	9,551	371	2,242	3,026	6
LUMBER, LOGS, TREES	6	5,020	486	19	1,150	1,682	182	655	40	253	550	3
OTHER AGENCIES	247	81,841	3,435	524	5,288	20,525	5,899	14,788	1,405	13,069	16,893	15
BOILERS, PRESSURE VESSELS	3	693	25	6	117	165	55	131	1	108	85	-
PUMPS, PRIME MOVERS	1	891	49	30	137	228	76	182	16	85	88	-
ELECTRICAL APPARATUS	12	1,673	37	11	194	526	212	249	27	201	216	-
FLYING PARTICLES, UNASSIGNED	-	2,098	163	12	195	782	196	318	16	170	245	1
ANIMALS, INSECTS	5	2,586	910	8	73	279	246	212	49	331	478	-
MOTION OR PRESSURE	-	2,841	97	17	174	633	236	469	50	415	750	-
ENVIRONMENTAL CONDITIONS	2	948	55	4	33	105	366	59	12	51	263	-
ATHLETIC EQUIPMENT	-	1,054	4	-	4	67	21	38	14	212	694	-
DITCHES, TRENCHES, EXCAVATIONS	3	487	57	4	131	66	84	22	6	41	76	-
DOORS, GATES	2	3,363	83	11	157	558	285	733	105	593	838	-
FURNITURE	2	8,120	59	9	157	1,366	607	1,460	338	1,803	2,320	1
METAL STOCK PARTS, ETC.	-	9,680	232	89	958	5,329	534	1,492	25	644	376	1
OVENS, FURNACES, STOVES, ETC.	2	1,394	20	4	159	302	58	566	24	137	124	-
PERSON INJURED (COLLAPSE, HEART FAILURE, ETC.)	111	2,826	54	11	89	300	242	295	83	307	1,442	3
PERSON OTHER THAN INJURED	75	10,351	41	5	31	251	444	915	134	4,378	4,152	-
PIPE	9	2,874	369	183	655	871	205	203	16	146	225	1
MISCELLANEOUS AGENCIES	20	29,962	1,180	120	2,024	8,697	2,032	7,444	489	3,447	4,521	8
AGENCY NOT STATED	-	3,378	141	20	285	900	291	652	42	527	510	10

FOR FOOTNOTES, SEE TABLE 8.

APPENDIX B
(7 pages)

TABULATION OF DATA

from

NATIONAL ELECTRONIC INJURY SURVEILLANCE SYSTEM (NEISS)

January 1 through December 31
1977

For Further Information:

U.S. Consumer Product Safety Commission
Hazard Identification and Analysis
National Injury Information Clearinghouse
Washington, D.C. 20207
Telephone: (301) 492-6424

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INTRODUCTION

The Tabulation of Data for the 12-month period, January 1-December 31, 1977, is based on product-related injuries reported from a probability sample of 119 hospital emergency departments participating in the National Electronic Injury Surveillance System (NEISS). This sample represents all hospital emergency departments in the contiguous United States. It should be noted that no cause and effect relationship between the product and the injury is claimed--the data merely report the involvement of the product in the injury.

Products are grouped in general categories such as "General Household Appliances" and "Sports and Recreational Equipment." The "Product Number" is a coded number assigned to specific products, the first two digits indicating the general category and the last two digits indicating the specific product or products within the general category. It should be noted that the general category "Sports and Recreational Equipment" incorporates both the 1200 and 3200 series.

This publication includes the estimated number of injuries, shown in the column labeled "Estimate." Within the general categories, specific products are listed according to the magnitude of this estimate. "Estimate" denotes the total number of product-related injuries estimated to have been treated at hospital emergency departments in the contiguous United States. It is derived by inflating the actual number of injuries reported by the sample hospital emergency departments in the column labeled "Number Cases Reported." The inflation factor or sample weight of each hospital is determined by that hospital's probability of being selected.

Care should be exercised when considering the precision and the accuracy of the estimates. Since these estimates are derived from a sample rather than from a complete census of emergency department visits, they are subject to sampling error. Other nonsampling errors include the underreporting of injuries and coding errors. Moreover, since the NEISS sample collects data for approximately 1,000 product categories, estimates for those product categories are not equally precise. Estimates of injuries that are uniformly distributed across the contiguous United States tend to be more precise than those that occur only in localized geographical areas. The existence of the "not otherwise specified" (NOS) codes provides categories for injuries where more specific information cannot be obtained. However, this affects the accuracy of the estimates for the specific codes. Therefore, estimates for the specific categories should be considered in conjunction with the corresponding NOS categories.

"Mean Weighted Severity" is an average injury severity value, designed as a management tool, which is determined from three elements of information: imputed severity value, hospital weight, and estimated number of injuries. Based on the injury diagnosis, body part affected, and disposition of the case, each injury reported is assigned to one of the severity categories shown on the next page:

Severity Category	Example of Injuries in Each Category	Severity Value*
1	Mild injuries to small areas (sprained foot)	10
2	Contusion to lower trunk; dislocated arm, hand puncture, non-hospitalized poisoning	12
3	Arm fracture, sprained neck	17
4	Finger crushing, head laceration, punctured eye	31
5	Concussion, fractured neck, ingested foreign object	81
6	Amputation, anoxia, arm crushing, hospitalized poisoning	340
7	All hospitalized category 6's	2,516
8	All deaths	2,516

*Incomplete or otherwise not acceptable data are assigned a severity value of 0 and are not included in calculations of mean severity.

For each injury, the mathematical value assigned to its severity category is multiplied by the sample weight of the hospital from which that injury was reported. These values are summed within product codes and then divided by the estimated number of injuries for that code.

Mean severity is primarily useful in comparing severity of injury among different products. A mean severity of 17 or less generally indicates low severity; a range from 18 to 81 usually implies moderate severity; and a mean severity over 81 implies high severity.

The severity index, although based on subjective judgment, is a valuable management tool for considering priorities among products. It should be noted that the same sampling error considerations which apply to the estimate also apply to this index, further confounded by the application of severity values.

To assist other federal agencies, data are collected on some products, mainly those in categories 1900 through 2700, even though they may be beyond the scope of the Commission's mandate.

U.S. CONSUMER PRODUCT SAFETY COMMISSION
National Injury Information Clearinghouse
Hazard Identification and Analysis

NATIONAL ELECTRONIC INJURY SURVEILLANCE SYSTEM (NEISS)*

JAN. 1, 1977 - DEC. 31, 1977

ESTIMATE RANK

PRODUCT #	PRODUCT DESCRIPTION	ESTIMATE	MEAN WEIGHTED SEVERITY	NUMBER CASES REPORTED
	HOME WORKSHOP APPARATUS, TOOLS, AND ATTACHMENTS.			
0827	HAMMERS.	39,106	18	1,541
0845	SAWS, NOT OTHERWISE SPECIFIED	23,252	42	781
0801	POWER SAWS, NOT SPECIFIED.	21,458	34	787
0837	WIRES/CORDS, NOT OTHERWISE SPECIFIED	20,422	23	653
0810	WORKSHOP MANUAL TOOLS OR ACCESSORIES.	19,883	22	779
0828	SCREWDRIVERS.	14,044	15	501
0814	HOISTS, LIFTS, JACKS AND CHAINS.	13,349	51	551
0821	AUTOMOTIVE TOOLS AND ACCESSORIES.	8,621	24	325
0830	MANUAL SAWS.	8,599	18	210
0849	BATTERIES, WET CELL	8,275	210	329
0847	DRILLS, NOT OTHERWISE SPECIFIED	8,167	15	257
0852	ROPE AND STRING	8,136	77	306
0851	BATTERIES, NOT OTHERWISE SPECIFIED	7,524	159	257
0848	WELDING EQUIPMENT, NOT OTHERWISE SPECIFIED	6,175	205	207
0832	POWERED, PORTABLE CIRCULAR SAWS	5,991	45	182
0846	CHAINS, NOT OTHERWISE SPECIFIED	5,825	31	202
0842	BAND SAWS	4,906	20	153
0841	BENCH SAWS	4,753	92	163
0836	KNIVES, REPLACEABLE BLADE, E.G., RUG CUTTERS, ETC.	4,253	14	188
0802	POWER DRILLS.	4,177	40	131
0835	TOOL BOX/TOOL KIT	4,002	23	154
0806	POWER GRINDERS.	3,296	13	104
0824	POWER SAWS, PORTABLE, NOT CIRCULAR, ELECTRIC	2,832	181	85
0819	SEPARATE ELECTRIC MOTORS.	2,171	19	33
0854	WORKSHOP FURNISHINGS: SAW HORSES, TOOL RACKS,	1,907	20	80
0803	POWER SANDERS.	1,796	38	81
0811	TORCHES,SOLDERING,CUTTING,WELDING,UNPOWERED	1,710	153	57
0809	OTHER PORTABLE AND STATIONARY POWER TOOLS.	1,588	45	49
0807	POWER JOINTERS.	1,503	255	33
0834	WORKSHOP STAPLER, HEAVY DUTY	1,346	13	48
0805	POWER LATHES.	1,064	14	34
0838	BATTERY CHARGER, WET CELL	850	135	47
0823	AIR COMPRESSORS, SEPARATE.	785	35	26
0813	SOLDERING GUNS AND IRONS.	665	124	29
0804	POWER ROUTERS.	602	45	23
0844	POWER HACK SAWS	508	26	25
0843	RADIAL ARM SAWS	497	184	20

US CONSUMER PRODUCT SAFETY COMMISSION/BUREAU OF EPIDEMIOLOGY FEB. 15, 1978
*119 HOSPITALS REPORTED
DATA BANK 404,940
TOTAL ESTIMATE 9,390,740

NATIONAL ELECTRONIC INJURY SURVEILLANCE SYSTEM (NEISS)*

JAN. 1, 1977 - DEC. 31, 1977

ESTIMATE RANK

PRODUCT #	PRODUCT DESCRIPTION	ESTIMATE	MEAN WEIGHTED SEVERITY	NUMBER CASES REPORTED
0826	POWER DRILL ATTACHMENTS.	474	16	19
0833	WORKSHOP COMPOUNDS/CHEMICALS	466	123	27
0820	INTERNAL COMBUSTION ENGINES FOR HOUSEHOLD USE	441	51	18
0840	BATTERY CHARGER, NOT OTHERWISE SPECIFIED	434	58	17
0822	PAINT SPRAYERS.	328	19	17
0812	WELDING EQUIPMENT, ELECTRIC.	297	186	14
0853	POWER-ACTIVATED TOOLS - POWERED BY LOADED CARTRIDGES	187	154	4
0808	POWER SHAPERS.	147	391	7
0818	EXTENSION WORK LIGHTS AND CONTINUOUS USE FLOOD LIGHTS.	134	33	3
0829	MANUAL DRILLS.	117	12	8
0850	BATTERIES, DRY CELL	110	144	9
0815	TEST EQUIPMENT, VOLTAGE TESTERS	66	15	5
0839	BATTERY CHARGER/ENERGIZER, DRY CELL	16	81	1
		267,255		9,579

US CONSUMER PRODUCT SAFETY COMMISSION/BUREAU OF EPIDEMIOLOGY FEB. 15, 1978
*119 HOSPITALS REPORTED
DATA BANK 404,940
TOTAL ESTIMATE 9,390,740

NATIONAL ELECTRONIC INJURY SURVEILLANCE SYSTEM (NEISS)*

JAN. 1, 1977 - DEC. 31, 1977

ESTIMATE RANK

PRODUCT #	PRODUCT DESCRIPTION	ESTIMATE	MEAN WEIGHTED SEVERITY	NUMBER CASES REPORTED
	INDUSTRIAL EQUIPMENT.			
2200	INDUSTRIAL EQUIPMENT.	322 322	17	16 16

US CONSUMER PRODUCT SAFETY COMMISSION/BUREAU OF EPIDEMIOLOGY
#119 HOSPITALS REPORTED
DATA BANK 404,940
TOTAL ESTIMATE 9,390,740

FEB. 15, 1978

APPENDIX B2
(3 pages)

TABULATION OF DATA

from

NATIONAL ELECTRONIC INJURY SURVEILLANCE SYSTEM (NEISS)

January 1 through December 31
1973

For Further Information:

U.S. Consumer Product Safety Commission
Hazard Identification and Analysis
National Injury Information Clearinghouse
Washington, D.C. 20207
Telephone: (301) 492-6424

NATIONAL ELECTRONIC INJURY SURVEILLANCE SYSTEM (NEISS)

JAN. 1, 1973 - DEC. 31, 1973

ESTIMATE RANK

PRODUCT #	PRODUCT DESCRIPTION	ESTIMATE	MEAN WEIGHTED SEVERITY	NUMBER CASES REPORTED
	HOME WORKSHOP APPARATUS, TOOLS, AND ATTACHMENTS.			
0801	POWER SAWS, NOT SPECIFIED.	27,983	49	1,070
0827	HAMMERS.	26,456	20	1,135
0810	WORKSHOP MANUAL TOOLS OR ACCESSORIES.	16,559	56	724
0830	MANUAL SAWS.	14,007	13	503
0828	SCREWDRIVERS.	11,273	15	447
0821	AUTOMOTIVE TOOLS AND ACCESSORIES.	8,883	20	294
0814	HOISTS, LIFTS, JACKS AND CHAINS.	8,698	25	347
0800	HOME WORKSHOP APPARATUS, TOOLS, AND ATTACHMENTS.	6,500	20	187
0817	BATTERIES.	6,344	219	225
0802	POWER DRILLS.	5,311	133	233
0825	POWER SAWS, STATIONARY.	5,239	57	146
→0824	POWER SAWS, PORTABLE, NOT CIRCULAR, ELECTRIC	→4,166	→ 44	→155
0812	WELDING EQUIPMENT, ELECTRIC.	4,060	223	112
0806	POWER GRINDERS.	2,619	17	76
0835	TOOL BOX/TOOL KIT	2,254	22	94
0803	POWER SANDERS.	2,209	19	71
→0832	POWERED, PORTABLE CIRCULAR SAWS	→2,192	→ 45	→77
0829	MANUAL DRILLS.	1,232	13	50
0811	TORCHES,SOLDERING,CUTTING,WELDING,UNPOWERED	1,110	92	60
—0809	OTHER PORTABLE AND STATIONARY POWER TOOLS.	—1,100	—31	—45
0819	SEPARATE ELECTRIC MOTORS.	874	28	32
0831	WELDING EQUIPMENT, FUEL POWERED.	690	203	34
0805	POWER LATHES.	624	17	24
0826	POWER DRILL ATTACHMENTS.	614	13	21
0823	AIR COMPRESSORS, SEPARATE.	586	14	16
0834	WORKSHOP STAPLER, HEAVY DUTY	427	47	21
0822	PAINT SPRAYERS.	401	36	14
0807	POWER JOINTERS.	399	218	17
0813	SOLDERING GUNS AND IRONS.	360	26	19
0820	INTERNAL COMBUSTION ENGINES FOR HOUSEHOLD USE	271	74	14
0833	WORKSHOP COMPOUNDS/CHEMICALS	234	86	12
0808	POWER SHAPERS.	186	238	5
0818	EXTENSION WORK LIGHTS AND CONTINUOUS USE FLOOD LIGHTS.	160	37	4
0815	TEST EQUIPMENT, VOLTAGE TESTERS	71	12	3
0804	POWER ROUTERS.	64	76	4
0816	BATTERY CHARGERS.	61	106	5
		163,633		6,298

US CONSUMER PRODUCT SAFETY COMMISSION/HAZARD IDENTIFICATION & ANALYSIS OCT. 15, 1977
#119 HOSPITALS REPORTED
DATA BANK 315,156
TOTAL ESTIMATE 6,825,690

NATIONAL ELECTRONIC INJURY SURVEILLANCE SYSTEM (NEISS)*

JAN. 1, 1973 - DEC. 31, 1973

ESTIMATE RANK

PRODUCT #	PRODUCT DESCRIPTION	ESTIMATE	MEAN WEIGHTED SEVERITY	NUMBER CASES REPORTED
	INDUSTRIAL EQUIPMENT.			
2200	INDUSTRIAL EQUIPMENT.	500 500	29	30 30

95

US CONSUMER PRODUCT SAFETY COMMISSION/ HAZARD IDENTIFICATION & ANALYSIS
#119 HOSPITALS REPORTED
DATA BANK 315,156
TOTAL ESTIMATE 6,825,690

OCT. 15, 1977

APPENDIX C
(4 pages)

U.S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS
WASHINGTON, D.C. 20212

DATE: January 12, 1979
REPLY TO ATTN OF: BH

SUBJECT: Microfiche of Supplementary Data System Tabulations for 1976

TO: Persons Interested in Availability of Data from the Supplementary Data System

Supplementary Data System (SDS) tabulations with 1976 data from seven States are now available from the National Technical Information Service (NTIS). In the near future, tabulations with 1976 data from an additional 18 States are expected to be available from NTIS.

The SDS is a Federal-State cooperative program which provides occupational injury and illness data derived from records in State workers' compensation agencies. It is the first major effort to standardize State information for some degree of comparability. The data, unique in amount and detail, provide analysts with opportunities for extensive research on many different levels. However, the SDS is not a comprehensive survey of occupational injuries and illnesses. State workers' compensation laws and administrative practices vary, preventing estimation of National totals. Data, therefore, are available only by State. Differences between State legal requirements and administrative practices must be considered before making any inter-State comparisons.

The number of tabulations varies by State. The attached table identifies the tabulations available for each State.

Tabulations may be viewed and excerpted in the Office of Occupational Safety and Health Statistics, Room C-4311, New Department of Labor Building, 200 Constitution Avenue, N.W., Washington, D.C. 20210, or in any of the Bureau's Regional Offices. Regional Offices addresses and phone numbers are:

Region I-Boston
1603-A Federal Office Building
Boston, Massachusetts 02203
Phone: 617--223-4533

Region II-New York
1515 Broadway
New York, New York 10036
Phone: 212--399-5915

Region III-Philadelphia
Post Office Box 13309
Philadelphia, Pennsylvania 19101
Phone: 215--596-1162

Region IV-Atlanta
1371 Peachtree Street, N.E.
Atlanta, Georgia 30309
Phone: 404--881-3660

Persons Interested in Availability of Data from the Supplementary Data System--2

Region V-Chicago
9th Floor Federal Office Building
230 South Dearborn Street
Chicago, Illinois 60604
Phone: 312--353-7253

Region VI-Dallas
555 Griffin Square Bldg.
2nd Floor
Dallas, Texas 75202
Phone: 214--767-6954

Regions VII and VIII-Kansas City and Denver
Federal Office Building
911 Walnut Street
Kansas City, Missouri 64106
Phone: 816--374-3685

Regions IX and X-San Francisco and Seattle
450 Golden Gate Avenue
Box 36017
San Francisco, California 94102
Phone: 415--556-8980

Because of their large volume, tabulations are available for sale only in microfiche. Orders for microfiche should be sent to National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161. The price of the tabulations is $3.00 for each State. When ordering, please specify the NTIS Accession Numbers which are included in the attached table.

Further information will be sent to you as 1976 tabulations from other States become available. Tabulations with 1977 data will begin to become available in mid-March.

Maurice Brenahan, for

THEODORE J. GOLONKA
Assistant Commissioner
for Occupational Safety
and Health Statistics

Attachment.

SUPPLEMENTARY DATA SYSTEM STANDARD TABULATIONS AVAILABLE BY STATE

These items are available only in microfiche and may be purchased from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161. Cost is $3.00 for each State. Orders should specify the NTIS Accession Number. Check or money order should be made payable to NTIS.

State	NTIS Accession Number	Tabulation Number (See list of descriptive titles on page 2.)																									
		101	102	103	104	121	122	123	123	125	126	201	202	203	204	210	211	212	213	214	215	300	400	501	502	503	504
Colo.	PB-288 431	X	X	X	X							X	X	X	X		X		X			X		X	X	X	X
Del.	PB-288 430	X	X	X	X							X	X	X	X	X	X		X	X		X	X	X	X	X	X
Iowa	PB-288 634	X	X	X	X							X	X	X	X	X						X		X	X	X	X
N.J.	PB-288 631	X	X	X	X							X	X	X	X	X								X	X	X	X
N. Mex.	PB-288 633	X	X	X	X							X	X	X	X	X	X			X	X	X	X	X	X	X	X
Vt.	PB-287 385	X	X	X	X							X	X	X	X	X	X							X	X	X	X
Wyo.	PB-288 232	X	X	X	X							X	X	X	X		X	X	X			X		X	X	X	X

SUPPLEMENTARY DATA SYSTEM STANDARD TABULATIONS, 1976-77

Number	Descriptive Title
101.	Nature of Injury or Illness: Number and Percent Distribution of Cases.
102.	Part of Body Affected: Number and Percent Distribution of Cases.
103.	Source of Injury or Illness: Number and Percent Distribution of Cases.
104.	Type of Accident or Exposure: Number and Percent Distribution of Cases.
121.	Nature of Injury or Illness: Number and Percent Distribution of Cases, by Indemnity Compensation and Medical Payments.
122.	Part of Body Affected: Number and Percent Distribution of Cases, by Indemnity Compensation and Medical Payments.
123.	Source of Injury or Illness: Number and Percent Distribution of Cases, by Indemnity Compensation and Medical Payments.
124.	Type of Accident or Exposure: Number and Percent Distribution of Cases, by Indemnity Compensation and Medical Payments.
125.	Indemnity Compensation and Medical Payments: Number of Cases and Total Payments, by Industry.
126.	Indemnity Compensation and Medical Payments: Number of Cases and Average Payments, by Extent of Disability.
201.	Nature of Injury or Illness: Number and Percent Distribution of Cases, by Industry.
202.	Part of Body Affected: Number and Percent Distribution of Cases, by Industry.
203.	Source of Injury or Illness: Number and Percent Distribution of Cases, by Industry.
204.	Type of Accident or Exposure: Number and Percent Distribution of Cases, by Industry.
210.	Month of Occurrence of Injury or Illness Cases: Number and Percent Distribution of Cases, by Industry.
211.	Day of Week of Occurrence of Injury or Illness Cases: Number and Percent Distribution of Cases, by Industry.
212.	Hour of Shift During Which Injury Cases Occurred: Number and Percent Distribution of Cases, by Industry.
213.	Duration of Employment of Injured or Ill Workers: Number and Percent Distribution of Cases, by Industry.
214.	Weekly Wages of Injured or Ill Workers: Number and Percent Distribution of Cases, by Industry.
215.	Extent of Disability of Injured or Ill Workers: Number and Percent Distribution of Cases, by Industry.
300.	Occupation and Age of Injured or Ill Workers: Number of Cases.
400.	Work Fatalities Within Major Industry Divisions: Number of Cases, by Nature of Injury or Illness and Type of Accident or Exposure.
501.	Nature of Injury or Illness by Part of Body Affected: Number and Percent Distribution of Cases.
502.	Nature of Injury or Illness by Source of Injury or Illness: Number and Percent Distribution of Cases.
503.	Nature of Injury or Illness by Type of Accident or Exposure: Number and Percent Distribution of Cases.
504.	Type of Accident or Exposure by Source of Injury or Illness: Number and Percent Distribution of Cases.

NOTE: All tabulations generated both for All Workers and for Women.