FILE NAME: Household Contact (HC)

DATE: 1938

DOC#: HC049

DOCUMENT DESCRIPTION: Government Report - Inspection Manual

UNITED STATES DEPARTMENT OF LABOR
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INSPECTION MANUAL

Suggested procedure for the enforcement of Safety and Health, Hours, Minimum Wage, Child Labor, Industrial Home Work, Wage Payment and Wage Collection Laws

Bulletin Number 20

UNITED STATES GOVERNMENT PRINTING OFFICE - - - - WASHINGTON - 1938

For sale by the Superintendent of Documents, Washington, D. C. - - - - Price 5¢ cents

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PREFATORY NOTE

It is recognized that this Manual is suggestive of what may be done by the States and that considerable work will be necessary by them to adapt its parts and procedures to fit their individual needs. The Manual committees urged the Division of Labor Standards to offer its services in giving more detailed information on any of the phases of inspection covered herein and in assisting the States in adapting the Manual to their use. The Division will gladly give such assistance when requested.

The loose-leaf form has been adopted to permit revisions to be readily incorporated. All pages have been dated in the folio line to indicate the date on which their contents were accepted. New or substitute pages, issued by the Division of Labor Standards, should be inserted in their proper places as indicated by the page numbers. The Division of Labor Standards is maintaining a file of the names and addresses of those to whom copies of the Manual have been issued, and in order to assure the prompt receipt of revisions, it will be necessary for the holders of these copies to keep the Division advised of any change in address.

2. SAFETY AND HEALTH

Although it is not the intent of this Manual to recommend safety and health standards, a description of inspection procedure must unavoidably suggest certain general minimum regulations. It will be necessary, of course, for the inspection division of each State to guide the inspector with more complete standards embodying any specific legal requirements peculiar to that State.

The inspector in his role of a safety adviser should make it his duty to advise each establishment in respect to any safety and health hazards regardless of whether or not there are any specific State statutes, rules, or regulations covering such hazards. In general, therefore, the procedure suggested here should be applicable in any State.

As stated under subsection A–1–d (see p. 25) no definite general order of inspection can be recommended since it will necessarily vary with each establishment, according to such factors as its size, nature of business, adequacy of records, and attitude of employer. Usually, in the case of inspection for safety and health, the inspector would first examine the appropriate records and then make the survey of the building itself, its physical structure, exits, and sanitary facilities, and then follow through with the inspection of the machinery, equipment, and processes in the order of the "flow sheet" or schedule of operations; that is, follow each process in its proper sequence from the time the raw materials are received to the storage of the finished goods.

a. Plant accident records.

(1) Adequacy.—The plant-accident records should be reviewed by the inspector with the employer. The employer should keep complete records of all accidents including a description of how each accident occurred, the type of accident, department, occupation, injury suffered, and disposition of case. First-aid cases or nondisabling injuries should be recorded and reviewed because the circumstances causing these, if not corrected, may produce more serious injuries. At the end of each month the plant management should summarize, study, and compare its accident experience in whatever detail meets its condition best.

(2) Frequency and severity rates.—In addition to recording the facts on each individual injury, it is essential that disabling injury records should be expressed in terms of frequency and severity rates in order to permit a comparison with the plant's record for previous periods and with the record of other similar plants and of the industry as a whole. The rates may be computed for 1 year or for any other period of time or for any particular job.

Frequency rate means the number of disabling injuries per million man-hours of exposure; expressed by the formula: Frequency rate equals $\frac{\text{Number disabling injuries} \times 1{,}000{,}000}{\text{Number of man-hours of exposure}}$.

For example, if 50 employees worked 500 hours each or a total of 25,000 hours, in any given period, and experienced 5 disabling injuries, the frequency rate would be $\frac{5{,}000{,}000}{25{,}000}$, or 200.

Severity rate means the total time charges, as the result of disabling injuries, per thousand man-hours of exposure; expressed by the formula: severity rate equals

$$\frac{\text{Total time charges} \times 1{,}000}{\text{Number of man-hours of exposure}}.$$

For example, if the 5 injuries, mentioned above, resulted in 200 days lost time, the severity rate would be $\frac{200{,}000}{25{,}000}$, or 8.

[Upon request, the Division of Labor Standards, United States Department of Labor, will furnish more complete information regarding the definition of these terms and the use of accident frequency and severity rates.]

(3) Reporting of injuries.—The inspector should note whether or not all injuries required

by law to be reported to the workmen's compensation agency have been reported and whether or not these have been investigated by the inspection division. The Manual Committee has recommended the obligatory reporting of industrial injuries and diseases to the proper State agency as a basic factor in the reduction of accidents. About one-half of the States now require reports of all such injuries. Nearly one-fourth of the States require the reporting of injuries causing disability of 1 day or more, and in the remaining States, the provision varies from the reporting of those causing disability of 2 days or more to 2 weeks or more.

(4) **Number of employees.**—Before proceeding with the inspection of the plant itself, the inspector should have a record of the number of male and female employees located on each floor in order to determine compliance with the requirements for the sanitary facilities and exits. (See Explanatory Statement accompanying Building Survey forms, p. 129.)

b. Posting requirements.

In addition to observing the required posting of the law, rules, or regulations the inspector should check, whenever the law requires it, the posting of elevator and boiler certificates, notice of coverage under the Workmen's Compensation Law and Unemployment Compensation Law, certificates of occupancy, smoking permits or smoking prohibited notices, certificates or licenses for the operation of special industries, such as bakeries and dry-cleaning and dyeing establishments and any other posting requirements. The inspector should record on his inspection report the nature of any violations of such posting laws.

c. Sanitation.

(1) **Housekeeping.**—(*a*) *Importance in preventing accidents.*—Housekeeping is a term applied to the general cleanliness and orderliness of the entire plant. It is an important factor in preventing accidents, both directly and indirectly. Unclean floors and materials not arranged in their proper places may cause a serious or fatal injury. Also, careless housekeeping practices make careless workers and thus indirectly may cause many other types of accidents.

Cleanliness and orderliness are vital both to the safety of the workers and to the efficiency of the plant.

(*b*) *Time, frequency, and method of cleaning.*—Work benches or work places are more usually kept clean for production reasons, but dust and dirt may be allowed to accumulate on the walls, the overhead beams and trusses, fixtures of different kinds, pipes, electrical conduits, and ventilators. The dirt may also accumulate in corners of rooms and in connection with discarded containers and wrappings and with the storage of materials.

Whenever possible it is recommended that cleaning should be done outside of regular working hours.

The frequency of cleaning should depend on the type of plant and nature of work performed. Daily cleaning of an entire plant may be absolutely necessary in some cases.

Adequate precautions should be observed to prevent redistribution of dust into the plant atmosphere. The well-painted plant is conducive to good housekeeping. By painting the corners white, some establishments avoid the accumulation of dirt in such places and discourage the spitting of tobacco juice there. In some plants disposable cuspidors filled with sawdust and placed in convenient locations are provided.

(*c*) *Adequacy of waste disposal methods.*—The inspector should note the adequacy of the methods of disposal of factory wastes; that is, those materials rejected in the various steps of processing or manufacturing of a finished article. This is reflected by the housekeeping in and about the plant. Tidy and neat plants are free from accumulations of waste. Frequently plants will install adequate methods of disposal but fail to maintain these methods in a good state of repair. Attention should be given to the ultimate disposal of such waste to make sure that another hazard is not created.

(*d*) *Protection against insects and rodents.*—Adequate screening should be provided for all

service rooms, particularly lunch rooms and toilet and wash rooms.

In the case of all industries preparing or handling foodstuffs, the premises should be adequately screened and rat-proofed.

In the case of those industries located in mosquito-breeding territory, attention should be given to stagnant or open pools of water or open containers. Where these breeding places cannot be eliminated by drainage or covering during the mosquito-breeding season, the surface should be treated in a manner approved by the health authorities to prevent mosquito breeding.

(2) *Other housekeeping items subject to inspection.*—Racks or holders to keep tools when not in use should be provided to encourage good housekeeping. Aisles, floors, overhead platforms, and passageways, should be kept free of loose materials and articles. The painting of lines on the floor to define aisles and passageways is recommended. Holes and uneven or loose boards, and all dangerous projections such as nails and splinters should be eliminated from floors, stairways, and other walkway surfaces. The inspector should observe also whether materials are piled so that they will not fall easily or be displaced by vibrations or jolts.

(b) **Toilet facilities.**—(*a*) *Number, type, and location.*—Frequently States designate the number of toilets that should be furnished for a certain number of male and a certain number of female employees. An adequate number conveniently located and affording privacy not only for each sex but for each individual should be provided. Entrances should be plainly designated and properly screened. It is not unusual to find plants completely lacking in toilet facilities, or if not completely lacking, supplied only with the more primitive types such as the outdoor toilet. When located out of doors, it may mean that employees engaged in high-temperature processes must pass from a heated atmosphere out through cold weather in the winter time to these toilets. Where there are no contra-indications, employers should be encouraged to provide inside toilets. Usually each State or municipality has, if not a specification in the law, at least a recommendation as to the type of toilet with which the plant should be equipped. Toilets also may be too closely situated to eating facilities or, on the other hand, may be located so far away in the plant that a worker must leave his work for long periods of time in order to use them. It is important that washing facilities should be located contiguous to toilet rooms.

(*b*) *Illumination.*—Toilet rooms, of course, should be well illuminated, both by adequate window space and by proper artificial lighting. It is recommended that the walls should be well painted in a light color.

(*c*) *Ventilation.*—Adequate ventilation of toilets, either natural or mechanical, is necessary.

(*d*) *Adequate supplies.*—The necessary supplies for the toilet room should always be adequate.

(*e*) *Cleanliness and maintenance.*—The toilet room should be free from scraps of paper and should be cleaned regularly. Floors and base wall should be constructed of a material impervious to moisture and the seat traps and all plumbing facilities should be properly maintained.

(3) **Washing facilities.**—(*a*) *Adequate supplies.*—From the standpoint of personal hygiene there should always be adequate washing facilities. It is essential that employees in many industries handling certain types of materials, or engaged in certain processes, carefully wash their hands before handling food. It is necessary, of course, that there be an adequate supply of hot and cold water and plenty of soap and towels. The common towel is condemned. Paper towels are probably the best, as they are discarded immediately after use.

(*b*) *Arrangement.*—The arrangement of washing facilities is important in relation to convenience of use and ease of cleaning. Conveniently arranged washing facilities encourage their use. If properly arranged, wash basins will be in a light, airy room that permits ease of cleaning and maintenance of good housekeeping.

(*c*) *Shower baths.*—Certain types of processes require shower baths for the protection of the health of the workers. The shower baths and such accessories as false floors and mats should

be maintained in a clean condition with proper lighting to assure that there is good housekeeping.

The inspector should ascertain whether the employer has provided the necessary supervision to insure the use of these facilities.

(4) **Drinking facilities.**—(*a*) *Adequacy.*—Adequate drinking facilities should mean an abundance of cool, wholesome water from an approved source, so dispensed that there is a minimum chance of contamination.

Some plants maintain their own source of water for all purposes. If there are two sources, one for industrial purposes and another for drinking purposes, an opportunity is offered for cross connections in the supply lines. This condition is not altogether infrequent. If it exists, then the whole supply of drinking water may be contaminated. It is within the realm of factory inspectors to observe this possibility.

(*b*) *Cooling of water.*—Unless the water is of deep-well source, the drinking water is usually cooled in some manner, particularly during hot weather. The simplest method of cooling water, by placing a cake of ice in a water container, offers a possible means of contamination. The most modern method is the unit type of refrigerator. Other acceptable methods of cooling are to construct an ice jacket for the water tank or to allow the water to run through a coiled section of the supply pipe packed in ice.

(*c*) *Method of dispensing.*—The angle jet type of fountain has been designed to prevent the person's mouth from coming in contact with nozzle, and is the best type known to date. Open pails or tanks from which water must be dipped or poured should not be permitted. *The common drinking cup or dipper is unqualifiedly condemned.* Paper cups that are immediately destroyed after use are satisfactory.

(*d*) *Maintenance.*—Drinking facilities should be properly maintained with frequent cleaning. Repairing and adjusting should be done when necessary.

(5) **Eating facilities.**—(*a*) *Storing lunches.*—If the workers bring their lunches, it is obvious that there should be a proper place for storing lunches to avoid being harmfully contaminated.

(*b*) *Lunch room.*—Plants that dispense food may do so by means of lunch or "soup" wagons, lunch counters, or cafeterias. Frequently there is a space or a room designated by the plant authorities where the workers may eat their food. It is important that such room be properly screened. It is very undesirable in many instances that the workers carry their food to the benches and eat it in their workrooms. For example, in a plant in which there may be any processing of lead, the workers' health may be adversely affected by the contamination of their food with the lead.

(*c*) *Refuse disposal method.*—There should be covered receptacles in which the workers may place the residue of their lunches; such equipment should be cleaned regularly and maintained in a sanitary condition.

(6) **Dressing rooms.**—(*a*) *Purpose.*—These rooms serve the purpose of storing extra clothing, street clothing, or working clothes, and provide a place for changing such clothing in privacy. Not only does adequate space for storing clothing contribute to the comfort of employees and good housekeeping in the plant, but in cases where industrial disease hazards are present the proper storage of clothing reduces the possibility of contamination. Certain processes require employees to wear work clothing during their hours of work. The materials they handle may be of a kind that may produce some industrial disease. Again, there are certain other instances where the contact of work clothes with street clothing will communicate to the latter the harmful substances that are accumulated on the work clothes during hours of employment.

(*b*) *Adequacy, lighting, ventilation, and cleanliness.*—A well-equipped dressing room is furnished with separate lockers for work clothes and street clothes; it is well ventilated, even though it may be necessary to put in mechanical ventilation; it is well illuminated, even though it may be necessary to install artificial lighting. Lastly, the lockers, rooms, and benches should all be maintained in a high degree of cleanliness.

Where work clothes become wet, provision should be made to dry them adequately before

the next shift. They should be so treated before placing them in the lockers.

(7) **Rest rooms.**—(*a*) *Purpose.*—Rest rooms provide places where persons who are ill or who feel the need of rest may lie down or receive necessary treatment. Such rooms vary greatly with the type of establishment. In a plant where there is a medical treatment room, a rest room usually adjoins it and is under the supervision of the nurse or doctor.

(*b*) *Adequate equipment, ventilation, lighting, and cleanliness.*—A properly equipped rest room contains cots or beds which are screened for privacy; it is properly ventilated; it may be darkened for the comfort of employees using it; it is clean and orderly. If there is no room especially equipped for treating workers who are ill, a first-aid kit may be installed in the rest room. In addition to cots or beds where workers may lie down, a well-equipped rest room has easy chairs for the use of workers during their relief periods or lunch hour.

d. Observation of occupational-disease hazards.

It is not to be expected that the average factory inspector is either a chemist or an industrial hygienist and therefore competent to appraise accurately atmospheric hazards or those pertaining to the use of solutions, solvents, and so forth. There are data available, however, which will give the inspector a very good idea of the hazards inherent in various processes. The Division of Labor Standards has pamphlets which provide data of this sort. By reading these carefully an inspector can readily secure a general knowledge of these processes. If an inspector has a general knowledge of the nature of the process and of the materials being used, he will be alert to note any objective signs or indications of possible hazards.

In the matter of atmospheric conditions, for instance, it should be remembered that, in general, any dust breathed in sufficient concentrations over an extended period of time is conducive to respiratory infections. Then again it should be recognized that the dust from starch, flour, grain, or wood is decidedly explosive and easily ignited in confined spaces.

Whenever an inspector observes dust, fumes, gases, or vapors arising from a particular process he should report the fact to his supervising officer with as much information as possible as to the nature of the process, materials used, temperature, and other pertinent factors. If the situation seems to warrant, the department head in most States will be able to secure an expert appraisal of the hazard through an industrial hygiene unit either in the labor department or in the State health department.

Whenever an inspection involves a process in which at least a potential hazard exists in respect of atmospheric conditions, solvents or solutions, or other harmful substances, care should be exercised to check the sickness and absence records of employees. These records will frequently indicate the presence of a hazard, even if there are no objective signs to point them out.

The following equipment or machines may constitute a hazard of this type and should always be carefully observed. This list is not intended to be complete but to point out generally recognized or potential hazards:

- Abrasive saws.
- Acid dipping and cleaning tanks.
- Aniline dye machines.
- Brass cupolas.
- Brass crucibles.
- Bronze-powdering machines.
- Buffing wheels.
- Crude alcohol manufacturing vats.
- Dry cleaning, degreasing, or other vats containing organic solvents.
- Dry-grinding wheels.
- Emery wheels.
- Galvanizing tanks.
- Gasoline, benzene, or alcohol-dipping or cleaning tanks.
- Japan or lacquer dipping tanks.
- Lead melting or treating furnaces, crucibles, or pots.
- Nitrating vats.
- Plating tanks.
- Rag-picking machines.
- Sandblasts.
- Solvent tank in rubber industry.
- Stone-cutting tools.
- Willowing machines.
- Wood-working machines

e. Ventilation.

(1) **Twofold purpose.**—The purpose of industrial ventilation is twofold: first, to remove the atmospheric contaminants from the breathing zone of the worker (an atmospheric contami-

nant is any material dispersed in the air in amounts in excess of those materials normally present, and if breathed in sufficient concentrations will cause harm); and second, to create a comfortable workroom atmosphere.

(2) Local ventilation.—In addition to good general ventilation, industrial ventilation for the purpose of removing atmospheric contaminants is further accomplished by *local* ventilation. Local ventilation refers to that type of ventilation which captures the injurious concentrations of harmful substances such as dusts, fumes, vapors, and gases at their source. The method of capture is accomplished by placing a hood around the greater portion of the grinding wheel, vat, tank, or furnace from which the atmospheric contaminants arise. The air may be removed from within the hoods either by natural ventilation, such as stacks, or by a power-driven suction unit.

(3) General ventilation.—The major purposes of the general ventilation system are to avoid stagnant air, excessive heat or cold, too rapid variations in temperature, excessive humidity or dryness, harmful drafts, and insufficient air supply. This, too, may be accomplished by stacks, overhead monitors equipped with louvers, power-driven blowers, or by window fans or similar methods. (See pp. 11–12 for use of instruments in testing adequacy of general ventilation system.)

(4) Approval of plans and specifications.—In several States, plans and specifications for the new installation of exhaust systems or for changes in existing equipment are required to be submitted for approval to the labor department. After the approval of the plans and subsequent installation of the system, the inspector makes an inspection and a test to determine its adequacy and compliance with the approved plans.

Approval of a system for industrial ventilation requires the services of experts. For approval not only must the velocity be measured but the atmosphere must be sampled and the sample analyzed to determine the effectiveness of the air velocity. After the proper velocity is established, the inspector may then measure the air flow from time to time to ascertain compliance with recommended values.

Once a system has been approved, the efficiency of operation depends chiefly upon maintenance. Employers may use the same type of instruments supplied to the inspectors to measure the efficiency of a ventilation system and as a guide for proper maintenance.

(5) Use of U-tube or other devices.—Certain States have prescribed by laws, rules or regulations, minimum values for air velocities in industrial ventilating systems. The duty of enforcing compliance with these values has been assigned to the factory inspectors. There are several devices that may be used by the inspectors for this purpose; e. g., U-tube, Pitot tube, anemometer and other patented devices. Each instrument has its own particular advantages.

f. Isolation and enclosure of hazardous processes.

(1) Processes that do not lend themselves to local ventilation or that produce atmospheric contaminants in insufficient quantities to do direct harm may be isolated so as to prevent contamination of the general atmosphere. If there are produced harmful quantities of harmful contaminants, those engaged in isolated processes must be adequately protected.

(2) In certain instances wherein local ventilation cannot be used and isolation is not practical, processes may be completely enclosed to prevent contamination of the atmosphere breathed by the workers.

g. Lighting.

While lighting is a highly technical subject, the basic requirements for good lighting are not difficult to understand, and inspectors with some information and training on this problem should be able to advise establishments on any needed improvements.

(1) Adequacy.—All workrooms, passageways, exits, stairways, storage places, and all other places where employees are obliged to go should be adequately lighted, either by natural or artificial means, so that a person may easily see any dangers with which he may come in contact. In addition, wherever necessary, the general illumination in workrooms should be supplemented at proper locations, according to the degree of fineness of the work or of the particular operation or process, to permit all opera-

be clearly visible. The ratio between and window areas should be noted. In the ratio in a modern daylight factory 5 to 1 and 3 to 1.

Advantages of good lighting.—A reduc- accidents because of better visibility, of the eyesight of the workers, in- production, and decreased spoilage are the advantages to be derived from good

Natural illumination.—Windows and sky- constitute the usual forms of natural or illumination. Although a plant may adequate window space to provide proper illumination, yet the glass may be so out of repair that there is insufficient tion. Glare from daylight should be by use of certain types of glass or shades. Modern plants use a nonglare type of glass.

painting of ceilings and walls in a light also helps greatly in providing proper tion.

Artificial illumination.—There are two types of artificial illumination—the gen- overhead, and the local or bench. The height, and spacing of the lights and of reflectors or shades control the or glare that may be created in the occupied by the worker. Shadows or contribute to eye fatigue and interfere clear vision. All reflectors and lamps, or general, should be kept clean, properly and maintained in a good state of The inspector should observe in par- whether or not the reflectors are im- tilted, rusted, or removed.

Maintenance.—A regular system of main- should be established by the manage- Foremen should be instructed to utilize light whenever the intensity of the is less than that of the artificial light. use of devices for testing the adequacy of lighting has been referred to on p. 12.)

Guarding.

Machinery.—(*a*) *Method of determining hazards.*—All dangerous moving parts of ma- should be guarded to prevent any person coming in contact with them. In order to determine the hazards involved in machines having a point of operation and to devise the best means of eliminating such hazards, it is necessary for the inspector to study the work done on each machine. The hazards may be due to faulty construction, improper or incomplete methods of guarding, or to carelessness on the part of employees. Poorly designed or constructed guards often introduce hazards or conditions worse than those which they are intended to remedy. Sufficient space should be provided around individual machines or process units to allow for normal operation, adjustment, ordinary repairs, and for materials supplied in process.

(The Division of Labor Standards has prepared a pamphlet, Some Rules for the Safeguarding of Hazardous Machinery, and a set of 56 illustrations showing various types of guards, railings, and other devices used for the protection of workers. A limited number of these are still available for State inspectors upon request.)

(*b*) *Cooperation of workers.*—The inspector should ascertain whether the foremen educate the workers to respect and to use the guards. The cooperation of the operators of machines is essential to protect not only the operators but others who may come in contact with the machines.

(*c*) *Tagging of unsafe machinery.*—In some States the inspector has been given the authority under the law to tag unsafe machinery and prohibit its use until the needed corrections have been made. Although this power has not been used frequently, it has been an effective device for use in the case of extremely dangerous conditions due to defective parts of a machine, or in case of conditions that have caused a serious accident and have not been corrected, or in the case of a persistent violation of an order to guard a machine.

(*d*) *Reports on machines newly installed and improperly guarded.*—Reports by inspectors on the names of manufacturers of machines that are found newly installed and improperly guarded, to be followed up by a letter from the inspection division to the manufacturer soliciting his cooperation in providing adequate guarding, is an effective method of controlling

machine hazards at their source. (See Form 9, p. 107.)

(2) Elevator hoistways.—Inspection of elevator machines, cables, and safety equipment is a highly specialized field and requires specially trained inspectors. However, inspection of elevator hoistways is not so technical and the regular factory inspector should be capable of examining these and recommending any needed corrections. The great majority of accidents classified as elevator accidents are due to improper guarding and maintenance of elevator hoistways.

Some points to be observed by an inspector in inspecting the elevator hoistway are proper lighting of landings, condition of floor at entrances, the shear hazard between elevator car floor and recesses and projections in hoistway, the doors or their contacts or interlocks, gates protecting entrances to hoistways, and enclosure of sides of elevator hoistway not used for entrance.

In some States plans and specifications for the construction or remodeling of elevators and elevator hoistways must be submitted to the State labor department for approval.

(See Forms 12a, b, c, d, and e, pp. 133–147.)

(3) Electrical apparatus and wiring.—The inspection should include the condition of all wiring in the plant, the type and condition of extension cords, enclosure of switches, motors, generators, and transformers and the provisions to prevent persons from coming in contact with live parts. There should be adequate guarding of all high voltage parts to permit entrance thereto only by proper employees, and all electrical installations, including portable hand tools, should be properly grounded.

(4) Other items subject to inspection.—(*a*) *Hand tools.*—Handles of hand tools should be securely attached, free from breaks or cracks, splinters, sharp edges, and roughness. The use of defective tools such as mushroomed chisels and wrenches with sprung jaws should be prohibited. Keen-edged tools to be safe should be kept sharp.

(*b*) *Railings and toeboards.*—Wall and floor openings, elevated platforms and runways, and other places from which objects or persons might fall should be protected properly with railings and toeboards.

(*c*) *Nonslip surfacing.*—Stairways, ramps, elevator landing platforms, and similar places where slipping may be especially hazardous should be provided with nonslip surface.

(*d*) *Ladders.*—Ladders should be firm and of substantial construction with rungs equally spaced and firmly fastened and with feet properly fitted to avoid slipping. Permanent ladders or stairways are always preferable to portable ladders and should be used whenever possible.

(*e*) *Seats.*—To guard against the harmful effects of fatigue, suitable seats should be provided for all workers whose duties can be performed in a sitting posture; height and back of seats should be adjustable to permit the position of the worker relative to the work to be substantially the same whether the worker is seated or standing. Foot rests should be provided also where necessary. Seats should be of strong construction and maintained in proper repair.

i. Personal protective equipment.

(1) Eye protection.—No one type of goggles is suitable for all classes of work; various types are now available to meet the need for protection of the eyes against dust, flying objects, splashes of acids or mists of a corrosive nature, and injurious light rays. Where the worker ordinarily wears glasses, the lenses of the goggles should be ground to prescription to meet this corrective requirement.

It is important to know that goggles designed for welders and others exposed to injurious light rays must have a type of glass which gives adequate protection against both the visible and invisible rays. The color of the lenses in itself does not assure this protection.

In some occupations, such as welding, protection against burns on the exposed skin is necessary in addition to the protection for the eyes. For this purpose shields, masks, and helmets should be provided.

All eye-protective equipment should be maintained in a high state of repair. There should be no cracked lenses, and lenses should be kept clean.

(2) **Respiratory protection.**—It is important to note that respirators are not a substitute for adequate ventilation but are valuable where more effective means of control cannot be applied. They also are used to supplement general measures. Their use should be considered effective only for relatively short exposures. It cannot be emphasized too much that the nature of the atmospheric contaminant should be known before respirators are selected. Certain atmospheric contaminants may be absorbed through the skin in harmful quantities; therefore respirators do not always suffice.

It is also important to know that particular types of respirators are used for particular types of atmospheric contaminants and that no universal type exists which will meet all practical needs. All respirators should carry the approval of the United States Bureau of Mines for the particular atmospheric contamination.

Since respirators are worn in contact with the face it is necessary to sterilize them frequently in order to maintain them in a hygienic condition. Further, it is necessary to inspect them regularly and to replace the protective elements at sufficiently frequent periods so that the worker will be adequately protected when exposed to the injurious concentrations of harmful substances.

A filter type respirator provides protection against certain forms of dust but is of no value against fumes and gases. Cartridge-type respirators are useful only in cases of light injurious concentrations of harmful substances.

Gas masks with cannisters for protection under various industrial conditions are highly effective against certain fumes, gases, and dusts. However, sometimes they do not afford sufficient protection in cases of high concentration of acid gases or of organic vapors. When cannister masks are used, inspectors should note whether adequate rules have been adopted regarding the recording of the time cannisters have been in use, since the effectiveness of the absorbent used in cannisters is limited by the actual time that it has been in use.

The hose mask is the most effective protection in cases of high concentration of acid gases or of organic vapors. Hose masks may include a helmet covering the head and shoulders, such as the sandblaster's helmet, or may be provided with a face piece similar to the cannister gas mask. It is important to note whether the air supplied to the hose mask is taken from a source of clean fresh air and properly filtered.

(3) **Protective clothing.**—Protective clothing for the body, arms, and legs should be provided wherever needed. Such clothing may include suits, coats, or aprons made of such materials as asbestos, chrome tanned leather, fire-proof duck, plain duck, or rubber, depending upon the nature of the hazards. The inspector should discourage the wearing of homemade burlap aprons, particularly around machines or where they are apt to become soaked with oil.

Suitable gloves should be provided for the protection of the hands when handling hot or injurious materials, rough or sharp objects, acids, corrosive substances, or electrical apparatus. The type of material for the glove and its construction will depend on the nature of the work and the materials to be handled. Sleeves and arm protectors may also be needed to provide proper protection.

For the protection of the legs there are various types of leggings made of the same materials as used for body garments. Leggings for use when working with molten metal should be designed so that they can be removed instantly in case of an emergency. It is also important that they should fit over the shoe tops to protect the instep and heel and should be free from all projections such as buckles and clasps.

For the protection of the feet, safety shoes, spats, rubber boots, and metal footguards have been developed.

Safety belts are used by window washers, bridge workers, structural steel workers, oil-field workers, and in many other occupations requiring work at any height above the ground.

Safety hats have become standard equipment in the construction and mining industries and in other industries where heads are subject to the hazard of falling objects.

Employees should be instructed to refrain from the use of such wearing apparel as high-heeled shoes, long sleeves, neckties, open jackets, long cuffs on overalls, or other loose clothing, whenever it may constitute a hazard to the type of work performed. Adequate

protective devices, such as close-fitting caps should be worn by women whose duties bring them into proximity with moving parts of machines. Finger rings may catch on the moving parts of a machine and cause a serious accident.

(4) **Maintenance and inspection.**—The safest method of maintenance and inspection of personal protective equipment by any plant is to establish a frequent routine servicing of any such items furnished the worker. One person should be designated to take full responsibility for correct maintenance of personal protective equipment. His efficiency should be checked frequently. If such a service is not maintained, then it is the duty of the immediate superior, usually the foreman, to see that the worker maintains his equipment in a high state of efficiency and repair.

j. Fire protection.

(1) **Fire extinguishers.**—The inspector should note the date when extinguishers were charged last (soda-acid fire extinguishers should be recharged at least annually) and whether they are kept in operable condition and protected from freezing. Fire extinguishers should be conveniently located, and access to them should be free from all obstructions. The inspector should ascertain whether the proper type of extinguisher has been provided.

(2) **Fire alarms and sprinkling systems.**—Plans and specifications of fire-alarm signal and sprinkling systems should be examined by specialists of the inspection division. The inspector should ascertain how often the systems are tested.

(3) **Fire drills.**—Some States require that in buildings of three or more stories, fire drills must be held periodically to avoid panic in event of fire. The inspector should inquire as to the frequency of such drills and the time required to empty the building. If in doubt about their effectiveness, he should arrange with the management to call a drill, observing the result.

(4) **Smoking.**—Smoking should be prohibited in all places where smoking constitutes a hazard. The inspector should observe and record any violations of prohibited smoking rules or regulations.

In some States smoking is absolutely prohibited in all work places unless a specific smoking permit has been granted by the labor department.

(5) **Storage of flammable and combustible materials.**—Flammable and combustible materials should be stored in separate buildings or rooms of fire-resistive construction. Discarded material of an inflammable nature should be placed in self-closing metal containers which should be emptied at least once daily.

(6) **Exits.**—(*a*) The number, type, and location of exits should be such as to enable all employees to escape from the building in a short space of time in order to avoid panic for any cause.

As a minimum requirement at least two exits remote from each other should be provided from each floor, and additional exits should be required when either the floor area or the number of occupants per floor make it necessary.

The following types of exits are recognized:

1. Stairs in fire- and smoke-proof towers.
2. Interior stairs enclosed in partitions of fireproof or fire-resisting material.
3. Horizontal exits through fire walls or by means of fireproof bridges to adjoining building.
4. Interior, unenclosed stairways.
5. Exterior steel screened stairways.
6. Fire escapes.

(*b*) The inspector should observe the condition of the exits, particularly to make certain that they are in good repair and that all aisles and passageways are unobstructed. Doors should be so arranged as to be readily openable from the inside at all times without the use of a key while anyone is employed in the building; when it is desirable to arrange doors so as to prevent unauthorized entrance to the building, they should be equipped with approved panic bolts on the inside.

(*c*) All exits should be indicated by "exit" signs or such other means as may be required by law or regulations. Fire doors at openings to stair enclosures should be self-closing and should not, under any circumstances, be permitted to be wedged or otherwise fastened open.

fire doors at horizontal exits should be arranged to close automatically in case of fire; the closing devices should be subject to frequent inspection.

(c) All doors, except sliding fire doors at horizontal exits, should open in the direction of exit.

(See also Explanatory Statement to Accompany Building Survey forms, p. 129.)

k. First-aid facilities.

(1) **Adequacy.**—Suitable first-aid equipment should be provided by employers free of expense to the workers and available for use in case of injury. The inspectors should determine the adequacy of the first-aid facilities on the basis of two factors; that is, the type of hazards and the number of people exposed to the hazards. In all cases it is important that the use of hospital facilities should be prearranged. Where the State law specifies the contents of first-aid kits for establishments of a certain size, and for certain types of industries, the inspector should examine the contents for compliance with such specifications. The kit or cabinet should be kept clean and located near running hot and cold water in an easily accessible space where the first-aid may be administered with a reasonable amount of privacy.

The following is a suggested list of minimum requirements for a first-aid kit:

INSTRUMENTS

1 pair scissors.
1 pair thumb forceps.
1 tourniquet.
1 graduated medicine glass.

DRUGS

2 ounces aromatic spirits of ammonia.
2 tubes sterile borated petroleum jelly.
2 ounces powdered boracic acid.
2 ounces tincture iodine U. S. P. (ampoules preferred).
Bicarbonate of sodium tablets, 5 grains.
3 collapsible tubes of bicarbonate of sodium, 3 percent.
2 ounces 1 percent solution of picric acid.
2 ounces castor oil.

DRESSINGS

Wooden tongue depressors.
1 dozen assorted sizes sterile gauze bandages.
1 spool adhesive plaster—1 inch by 5 yards.
3 one-half ounce packages of absorbent cotton.
3 one-yard packages of sterile gauze.
Splints of assorted sizes for fractures.

MISCELLANEOUS

Ice bag.
Hot-water bottle.
Soap and nail brush.
Instantaneous coffee.

(2) **Full or part-time physician, nurse, or trained attendant.**—The inspector should ascertain whether or not there is a full or part-time physician, nurse, or trained attendant available. The term "trained" should imply a first-aid training equivalent to that furnished by the American National Red Cross or United States Bureau of Mines. Each establishment should have at least one trained attendant to apply first-aid to injured workers and to have charge of maintenance of first-aid equipment.

(3) **Prompt treatment.**—Employers should require all employees to apply promptly for first-aid treatment for all injuries sustained at work. Infection or blood poisoning resulting from slight injuries such as minor cuts and abrasions have caused many deaths.

l. Safety organization and education.

(1) **Importance and extent.**—The importance of plant safety organization and education cannot be overemphasized when it is realized that at least 90 percent of all industrial accidents are preventable. In order to effect any substantial reduction in accidents, the plant management must be interested in a continuous safety program. The successful promotion of safe practices in any establishment requires that it be considered as an everyday job. It is essential, therefore, for the inspector to sell the idea of such a program to the highest person in authority in each plant.

The following recommendations are not to be considered as representing a complete safety program but merely as suggestive. The extent of the safety program for any establishment should depend, of course, on its size and nature of business. A State labor department should be prepared to assist any establishment in forming a safety organization and in planning a safety education program. (Upon request, the

Division of Labor Standards, U. S. Department of Labor, will furnish more complete information as to the experience of the various States in these activities and offer suggestions as to such programs.)

(2) **Safety personnel.**—The need for plant safety directors, engineers, or inspectors in any establishment to devote full or part-time to safety work will vary widely according to the hazards involved. A full-time safety engineer may be necessary for as few as 50 men engaged in occupations such as building demolition work, or for as many as 1,000 employees in a textile plant or other low-hazard industry. The inspector should study the accident record and the hazards of the work and recommend whatever addition in safety personnel the condition may warrant. Aside from the moral and humanitarian considerations involved, employers have both a direct and an indirect financial incentive to provide proper methods of supervision and adequate physical safeguards.

As a direct cost to the employer, the rates for compensation insurance are usually modified in the case of manufacturing plants on the basis of two factors:

(*a*) The physical safeguarding condition of the plant in relation to the average condition in the industry.

(*b*) The past experience in accident cost of the plant in relation to the average for its industry.

In the case of nonmanufacturing establishments, only the latter basis is used. Thus, it is possible for a plant to save in direct cost as much as one-half by adopting the most effective methods for safeguarding the health and safety of its workers.

The employer's indirect cost of accidents has been estimated to average at least four times the direct cost of compensation and medical aid. Indirect costs include:

(*a*) Lost time of injured employee.

(*b*) Time lost by other employees in assisting injured employee at time of accident, or due to loss of morale.

(*c*) Time lost by foremen, supervisors, or executives in assisting injured employee, in investigating cause of accident, in training new employee to replace injured employee, and in attending hearings.

(*d*) Cost due to injury to machine or to other property or to spoilage of material, or to nonproductivity of machine.

(3) **Shop safety committees.**—When backed by the cooperation of the management, a safety committee composed of manager, foreman, or someone in authority and several representatives of workers has proved to be a most effective method of reducing accidents. The functions of such a committee should include the responsibility for periodic inspections of the plant, review and approval of inspection reports, analysis of causes of accidents for the purpose of submitting recommendations to prevent recurrence of similar accidents, instructing new employees or workers transferred to unaccustomed tasks as to the hazards of their work, and promoting the education of all employees in safety practices. The committee should meet at least monthly and keep a written record of the number and nature of its recommendations, the number carried out, the number incompleted, and the number not acted upon. The members of the committee should be selected from the various departments and should be changed at regular intervals.

(4) **Safety meetings, conferences, and schools.**—Plant safety meetings attended by all employees or, if practicable, by employees of a particular department should be held at least semiannually. The State inspector should be ready and willing to take full advantage of every opportunity to address these meetings. Small group safety meetings addressed by the foreman are also recommended. The safety program of an individual plant may be supplemented effectively by safety conferences and schools sponsored by the State labor department with the assistance of other interested official State and city agencies, and such agencies as organized labor groups, manufacturers' and trade associations, civic clubs, and safety organizations. The schools may be open to the public as a whole, at which general messages on safety are presented, or may be restricted to specialized industry or occupational groups, open only to "key men," such as the safety men, superintendents, and foremen, or may consist of a combination of these two plans with a general school open to all groups, coordinated with special group conference meetings.

(5) **State-wide accident-prevention contests.**—In some States, the labor departments have sponsored an annual safety contest in which all establishments in the State having a certain minimum total number of man-hours of exposure per year are eligible to compete. Each establishment entering the contest agrees to submit to the labor department at the end of the year a certified copy of its accident experience and number of man-hours exposure for the past year. The labor department then computes the frequency and severity rates for each establishment and for each industrial group. Usually there are three types of awards, one for the plants making a perfect record, one for plants having a lower frequency rate than the average for that particular group, and the other for those establishments which have improved their record. Employers generally have displayed a great deal of interest in these contests and have given them much credit for a reduction of the accidents in their establishments.

(6) **Safety bulletins and literature.**—Bulletin boards suitably located should be provided for the purpose of posting of safety bulletins, orders, rules, and other safety information. The safety bulletins, such as those supplied by safety organizations, homemade bulletins, photographs and cartoons, should be changed frequently. Exhibits of unsafe equipment, broken goggles, and unsafe tools are effective. Safety literature, such as notices or slogans on pay envelopes, clockcards, or shop correspondence, should be utilized whenever possible. It is suggested that State labor departments prepare suitable safety pamphlets and posters for free distribution whenever possible. (The Division of Labor Standards of the U. S. Department of Labor has published a series of industrial health and safety leaflets. Several State labor departments have reprinted a number of these leaflets or have prepared leaflets of their own for distribution to employers and workers.)

LANATORY STATEMENT TO ACCOMPANY FORM 10, THE INDUSTRIAL HEALTH HAZARD DATA REPORT

PURPOSE OF THIS FORM

An examination of this form and of the suggested draft of a Regular Inspection Report form (Form 1, p. 71) and of the Building Survey forms (see Forms 11a, 11b, 11c, pp. 123–128) oses certain duplications. The latter two types of forms are chiefly designed to be used in the cement of existing regulations, whereas this form is intended to provide a systematic method ing present industrial health hazards for use by an industrial hygiene unit in appraising them conducting its research work. Thus, the broader scope and more detailed coverage of Form 10 such overlapping unavoidable.

However, for the purpose of eliminating any unnecessary writing on the part of the inspector thus conserving as much as possible his time for actual inspection and educational work, it is ested that those items included on this form, which are also included on the standard forms the Regular Inspection Report and the Building Survey Report, might be filled out by the e staff.

The steady increase in the number of State laws granting compensation to workers suffering bility from an unhealthful occupational environment has added to the importance and need egular general inspections for health hazards. Occupational disease compensation laws are narily accompanied by regulatory measures to prevent the occurrence of such diseases and minate occupational disease hazards. The initial step in securing these regulatory measures survey the existence of such hazards. The direct contact that the factory inspector experi- with industry conditions qualifies him as the best agent for the collection of this necessary a. By submitting these reports to the industrial hygiene unit, it will make it possible for such nit to obtain a general picture of the presence and extent of any industrial health hazards in State and will enable it to guide its research work accordingly. The regulatory measures ld be based upon the results of such research work.

It should be emphasized that the form has been designed to permit its use by inspectors who had no specialized training in occupational disease hazards.

In summary, this form has been prepared for the two following major purposes:

(1) To furnish the industrial hygiene unit with the necessary information as to the location, ntity, and nature of existing occupational disease hazards for use as a guide in its research rk and subsequent development of codes regulating such hazards; and

(2) To act as an educational device for the inspectors, their supervisors, and the personnel interested agencies.

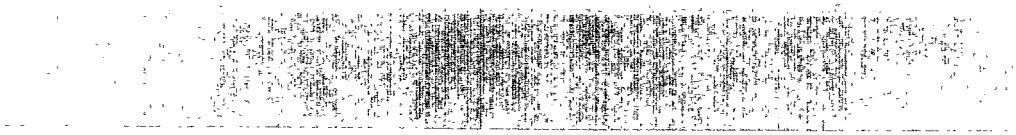
INSTRUCTIONS

Rather than give a detailed list of all possible answers to each item in the form, the following brief discussion sented for the purpose of supplying the inspector with a guide as to the type of information required. The lanatory Statements to accompany the Regular Inspection Report form and the Building Survey Report ms should be read in conjunction with this Explanatory Statement.

Whenever appropriate, it is suggested that a check (√) may be used to signify that the inspector's answer "Yes" to the item, and a dash (—) may be used to indicate that the item is not applicable. If the answer is o," write in "No." Thus, by providing that every item be answered on each report the supervisor will be able determine whether or not the inspector has made a complete survey.

It is also suggested that in the case of those items which require rating by the inspector, the following symbols be used:

A=Excellent. C=Fair.
B=Good. D=Poor.



measure the method of disposal. Liquids may be taken away in sewers or may be carried to nearby streams deposited upon open areas for evaporation. Solids may be conveyed from the plant by continuous carrier ..., or placed in boxes and cans designated for that purpose and later hauled away. Solid waste and sludges ... stored in the neighborhood of the plant for future disposition, which may be in the form of hauling to ..., further processing for byproducts, or for future sale as a byproduct itself. Some plants merely allow their ... to be piled in dumps in the neighboring vicinity. A good example of these are the culm heaps near mines. ...dequacy of the method of disposal of waste is reflected in the housekeeping in and about the plant. Tidy ...nt plants are free from accumulations of waste in or about the plant. Frequently, with good intentions, ... will install adequate methods of disposal but do not maintain these methods in a good state of repair, with ...sult that the housekeeping of the plant is of a low order.

12. Eating facilities.—This item refers both to the method of dispensing the workers' food, if it is supplied ... plant, and to places where workers may eat the food that they bring. If the workers bring their lunches, it is ...s that there should be a proper place of storage, where the food will not be harmfully contaminated either ...teria or by any materials about the plant that might react harmfully to the workers. Plants that dispense ... may do so by such means as lunch or "soup" wagons, lunch counters, and cafeterias. Frequently, there is a ... or a room designated by the plant authorities where the workers may eat their food. It is very undesirable ...y instances that the workers carry their food to the benches and eat it in their workrooms. For example, in ...t in which there may be any processing of lead, the workers' health may be adversely affected by the con...tion of their food with the lead. There should be covered receptacles in which the workers may place the ... of their lunches. A room or area designated for the eating of lunches should be kept clean.

13. Drinking facilities.—This item covers the kind of water and the method of dispensing it. Some plants ...in their own source of water supply for all purposes. Others maintain their own source of water supply ...dustrial purposes only, and yet again, some plants depend upon the city or local community's source of supply ...l purposes. The latter source of water supply is usually controlled by health authorities, which would more ... guarantee the quality of drinking water supply. If there are two sources, one for industrial purposes and ...er for drinking purposes, an opportunity is offered for cross connections in the supply lines. This condition ... altogether infrequent. If it exists, then the whole supply of drinking water may be contaminated. It is ...outside the realm of factory inspectors to observe this possibility. Unless the water is of deep-well source, ...rinking water is usually cooled in some manner, particularly during hot weather. The simplest way of cooling ..., by placing a cake of ice in a water container, offers a possible means of contamination. Adequate drinking ...ities should provide a source of cool, wholesome water that is properly dispensed, with a minimum chance ...ontamination. The most modern method is the unit type refrigerator with an angle jet. The angle jet has ... designed for the purpose of insuring the least possible contamination of water at the place it is dispensed, ... is the best type known to date. Paper cups that are immediately destroyed after use are satisfactory. ...*common drinking cup or dipper is unqualifiedly condemned.*

13. Dressing rooms.—These rooms serve the purpose of storing extra clothing, street clothing, or working ...hes, and provide a place for changing such clothing. The storage of these clothes in the proper manner reduces ... possibility of contamination. Certain processes require employees to wear work clothing during their hours ... work. The materials they handle may be of a kind that may produce some industrial disease. Again, there are ...ain other instances where the contact of work clothes with street clothing will communicate to the latter the ...mful substances that are accumulated on the work clothes during hours of employment. A well-equipped ...sing room is furnished with separate lockers for work clothes and street clothes; it is well ventilated, even ...ugh it may be necessary to put in forced draft; it is well illuminated, even though it may be necessary to install ...ficial lighting. Lastly, the lockers, rooms, and benches should all be maintained in a high degree of cleanliness. ... Where work clothes become wet, provisions should be made to dry them adequately before the next shift. ...y should be so treated before placing them in the lockers.

14. Washing facilities.—It is essential that employees in many industries handling certain types of materials, ...engaged in certain processes, carefully wash their hands before handling food. In any event, from the stand...t of personal hygiene there should always be adequate washing facilities. It is necessary, of course, that there ... an adequate supply of hot and cold water, plenty of soap and towels. *The common towel is condemned.* Paper ...wels are probably the best, as they are discarded immediately after use. Sometimes employees furnish their ...n towels and allow them to become very soiled before they are laundered. In some instances the companies ...rnish fabric towels and replace them with clean ones periodically. The arrangement of the washing facilities ... important in relation to convenience of use and ease of cleaning. Conveniently arranged washing facilities ...ourage their use. If properly arranged, wash basins will be in a light, airy room that permits ease of cleaning ... maintenance of good housekeeping.

Certain types of processes require shower baths for the protection of the health of the workers. The shower ...ths and such accessories as false floors and mats should be maintained in a clean condition with proper lighting

to assure that there is good housekeeping The inspector should note whether the employer has provided the necessary supervision to insure the use of these facilities.

15. Toilet facilities.—It is not unusual to find plants completely lacking in toilet facilities, or if not completely lacking, supplied only with the more primitive types, such as the outdoor toilet. Usually each State or municipality has, if not a specification in the law, at least a recommendation as to the type of toilet with which the plant should be equipped. Frequently, States designate the number of toilets that should be furnished for a certain number of male and a certain number of female employees. Toilet rooms, of course, should be well illuminated, but may be found to be illuminated only by small windows or by very inadequate artificial lighting. The ventilation of toilets is necessary, and methods of ventilation may vary all the way from a window being open at the top to a special line from an air-conditioning unit in the plant. Toilets sometimes are located out-of-doors, so that employees engaged in high temperature processes must pass from a heated atmosphere out through cold weather in the winter time to these toilets. Again, toilets may be too closely situated to eating facilities, or, on the other hand, may be isolated so far away in the plant that a worker must leave his work for long periods of time in order to use them. The necessary supplies accompanying a toilet should always be adequate. The general cleanliness of a toilet reflects upon the general attitude of the plant. The toilet should be free from scraps of paper, should be clean, well painted, and the air should be clean and wholesome.

16. Housekeeping.—This is a term applied to the general cleanliness and orderliness of the whole plant. Work benches or work places are more usually given attention in this respect for production reasons, but dust and dirt may be allowed to accumulate on the walls, the overhead beams and trusses, fixtures of different kinds, pipes, electrical conduits, and ventilators. The dirt may also accumulate in corners of rooms and in connection with discarded containers and wrappings and with the storage of materials. There are several methods of cleaning these places, such as sweeping, washing, and vacuum cleaning. Cleaning may be done periodically, each day, week, or month. Adequate precautions must be observed to prevent redistribution of dust into the plant atmosphere. Sweeping during working hours is not recommended, but nevertheless is sometimes carried out with the aid of sweeping compounds or while the floor is damp.

17. Protection against insects and rodents.—Adequate screening should be provided for all service rooms, particularly lunch rooms and toilet and wash rooms.

In the case of all industries preparing or handling foodstuffs, the premises should be adequately screened and rat-proofed.

In the case of those industries located in mosquito-breeding territory, attention should be given to stagnant or open pools of water or open containers. Where these breeding places cannot be eliminated by drainage or covering during the mosquito-breeding season, the surface should be treated in a manner approved by the health authorities to prevent mosquito breeding

18. Remarks.—Amplify, if necessary, any of the above items under "Plant sanitation."

C. Illumination

19. Natural.—Windows and skylights constitute the usual forms of natural illumination. The window area (including skylights) may be expressed in terms of square feet. The precise measurement is not necessary, but a reasonable estimate will suffice. Although a plant may have adequate natural illumination through window glass, yet the glass may be so dirty or so out of repair that there is insufficient illumination. Glare from daylight should be prevented by use of certain types of glass or window shades. Modern plants use a nonglare diffusing type of glass. The older type plants use clear window glass. There may be various combinations of these two glasses used. The "adequacy" of the natural illumination should be expressed by either "Yes" or "No," based on the inspector's general impression, which he receives by observing, as stated above, the area of windows and skylights, their cleanliness and state of repair, and type of glass used.

20. Artificial.—There are two major types of artificial illumination—the general or overhead, and the local or bench. The overhead or general type may be direct, semidirect, semindirect, and indirect illumination; the bench type may be simple drop cords or the more modern type of "daylight" local illumination fixture The distribution refers mainly to the number and location of each type that is found in the plant. The location of the light controls, in a great measure, the shadows or glare that they create in the area occupied by the worker. Shadows or glare contribute to eye fatigue and interfere with clear vision. All reflectors and lamps, local or general, should be kept clean, free from dirt, and should be maintained in a good state of repair. Some points to observe with respect to the latter are whether or not the reflectors are improperly tilted, rusted, or removed. The "adequacy" of the artificial illumination is again, as in the case of natural illumination, the general impression received by the inspector, based on the above factors.

21. Remarks.—Amplify, if necessary, any of the above items under "Illumination."