OCCUPATIONAL HEALTH HAZARDS

Every individual who applies for employment with the Armstrong Cork Company, or any other company for that matter, expects, if accepted and given work, to be able to perform the duties assigned him without impairing his health or shortening his life expectancy. In accepting this individual as an employee the Company takes on the responsibility of providing this safe working environment. It obligates itself to provide a job free from any condition which conceivably could affect the employee's health.

Aside from this moral obligation of the employer there is also a legal responsibility to provide safe working conditions on jobs. Federal and most State laws are quite specific on this and leave little room for doubt. As an example, here is the wording of a part of the Health Code from one of the states in which we operate:

> "All dust, fumes, vapors, gases, fibers, fogs, mists, or other atmospheric impurities that, in connection with any process of manufacture or use, are created in, emitted into, or disseminated through areas where persons are employed, in such quantities as in the judgment of the Department would (or might) tend to injure the health of employees, shall be removed by means of suction devices at their point of origin or by other means acceptable to the Department.
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> "When required by the Department the employer shall have determinations made of the kind and amount of the atmospheric impurities from a sample taken under conditions and at a point or points indicated by the Department. This shall be performed by an analyst qualified for the purpose.
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> "The quantity of any impurities as shown by the determinations shall not be of an amount considered by the Department to be injurious to the health of employees."

Should an employee's health become impaired despite the precautions taken to protect him he must be paid compensation in most states. These occupational disease cases are frequently both serious and lasting in their effect. Recovery is often quite slow involving extensive medical costs and prolonged compensation payments.

Our first contact with the subject of occupational disease should occur during the preliminary or screening interview of each prospective job applicant. What was his specific occupation with his previous employers and might his duties have exposed him to some particular material or condition known to be dangerous to human health? Did he ever work for a mining company or in a foundry where he was exposed to silica bearing dusts? Or, perhaps his previous job was with a battery concern or a pigment and paint manufacturer where lead fumes and dust were prevalent. All of this may seem rather remote but we must not overlook the fact that individuals with an occupational health impairment due to a previous job can become real problem cases to a later employer.

Your friend and mine in preventing the development of a health hazard in the plant is your Plant Chief Chemist. Seek his guidance and cooperation in

making certain that hazardous materials which can affect the employee's health do not get unnoticed into the plant. Practically every material you use has been experimented with and tested by the Plant Chief Chemist before it was finally decided to include it as a part of a Process Specification. It is presumed that you are aware that each of these Process Specifications issued by your Plant Chief Chemist bears the following statement:

> "All fire and health hazards connected with the operation or operations covered by this specification have been checked and none is believed to exist except where specifically mentioned."

Never let him overlook this statement! Keep him well-reminded and always conscious of his responsibility in helping you protect the health of plant employees.

Your Plant Purchasing Department jointly with your Plant Chemist can also be a real help to you in preventing hazardous materials getting unnoticed into the plant. If you have a doubt about some specific material of chemical ask your Purchasing Department to secure a statement from the supplier as to whether or not it presents a health hazard and if so what precautions are necessary in its use. In fact this is standard procedure with some firms and most a necessity since some materials are sold under brand names with their chmical terminology well concealed. If you have a question on a certain raw material you use don't hesitate to request information on its possible hazards from the supplier.

Other members of your so-called health hazard staff can be your Plant Doctor, the Plant Nurse, or even your First Aid Men. These individuals may appear on the scene after the act but nevertheless they can be of help. When an employee first shows signs of a health impairment your Plant Doctor or the Plant Nurse will probably be the first person to notice the condition. Since this condition in most cases is in its early stages simply removing the individual from the exposure will oftentimes effect an immediate cure. Once they have recovered, however, be cautious in allowing these individuals to return to their former job. Often they may have become allergic, especially in dermatitis cases, and quickly become involved again. Their becoming the victim of a health impairment should also be your cue that something is wrong and a careful investigation is in order.

Many of the better firms today put warning labels on the outside of the packages of their materials which under certain conditions may represent either a fire or a health hazard. Look for these labels, they will help you determine the type of hazardous chemical contained in the package, its potential hazards and the precautions necessary in its handling. Their use is advocated by the Manufacturing Chemists Association and several States have enacted legislation requiring them. Quite a number of additional states are planning to pass the same laws and when this becomes general practice our problem in identifying dangerous materials will be considerably eased.

A further possibility for the correction of a health hazard is the substitution of a non-toxic material for one that is toxic. Do not accept too easily a statement that this is impossible. It may be difficult or even impractical in some cases but experience has shown that there are many formulas here equal quality can be maintained even though substitute chemicals take a place of others. Approach the problem by asking what could be done if it became impossible to secure a sufficient quantity of the material believed to

be dangerous to health. You may often find that a few questions can unearth some surprising possibilities in this connection. Perhaps the substitute may cost a little more but this can often be more than offset when weighed against the cost of exhaust ventilation or other means of control for the dangerous material.

Almost all of our operations which use a material in a finely-ground state, at some stage in the process combine this dust with a liquid such as an oil or water. Sometimes this procedure can be turned to advantage in helping to minimize a health hazard or to improve unpleasant working conditions. The dust can be wetted down by the oil or water or converted into an emulsion in a small area set aside just for this purpose. This small area or room usually can be exhausted much more cheaply and effectively than could a large one. Or again, the employee can wear a respirator while preparing this emulsion for later inclusion with the bulk batch. It may be possible to go even one step further and weigh off the emulsion to the exact amount required for each batch thereby in no way entailing an extra expense for the additional operation.

Many plants which use lead oxide or other equally hazardous materials in their processes have found a rather unique way of doing the job safely. Prior to actual usage in the process, the lead oxide is weighed off, packaged d sealed in a plio-film bag in an isolated room with all the necessary safe- ards. This measured quantity in the plio-film bag is then taken to the process operation where it is added to the batches with the container still unopened. Since the plio-film will readily dissolve under low heat it presents no problem in the process. Perhaps this procedure may be applicable to some particular process in your plant.

Next in order as a means of control for a health hazard is the exhausting of the dusts, vapors or fumes from the work area. Such an installation is usually a rather costly item if it is done properly. While the design and volume of air handled by an exhaust system can generally be left to the judgment of ventilating engineers we should still have an interest in its layout. Check the manner in which the toxic material is moved away from the breathing zone of the employee. Some very elaborate and expensive exhaust installations do a very poor job in this respect. This is primarily because they are moving the toxic materials from their point of origin past the employee's nose rather than away from his breathing zone. Where such a condition prevails good money has been spent with little or nothing gained.

In a poorly designed exhaust system there is also the problem of two or more fans having a battle between themselves. This may sound a bit ridiculous but it is a very important factor wherever several fans are in operation. For example, a fan in the South wall and another in the North wall pull in opposite directions. In almost every instance, midway between these two fans there is a zone of conflict where the air is practically dead and not moving in any particular direction. Several years ago in one of our plants we found an excellent illustration of such a condition. If one fan was shut down and the other left running the shut-down fan immediately started idling in a backward direction indicating an inward air movement. When a test was made of the solvent vapors in the room with both fans running, at the midway point we found an extremely high concentration. As a result of these tests both fans were put in the same wall and an almost miraculous improvement was noted in the removal f the vapors.

A final point in connection with exhaust systems has to do with their maintenance and operation. Too often it is found that ventilation installation has been made and then completely forgotten. Any installation of this nature must be given attention if maximum efficiency is expected. There is always the possibility of lint, dust, paint or condensate building up and clogging the duct work. Also, if the fan is discharging into a dust collector the screens may fill up and create back pressure if they are not rapped down regularly. The fan driving belts may also stretch resulting in excess shippage and a loss in air movement. Many things of this nature can happen and their prevention hinges on a regular thorough inspection program.

Just this year in one of our plants, a condition was observed which illustrated very well the next point. This has to do with the actions of the employee himself. In this particular instance the employee was dumping bags of wood pulp into a hopper of a nearby machine. This fellow happened to be just the reverse of a neat orderly worker. He threw the bags onto the hopper, dumped them too fast for its capacity and finished off by giving the empty bag a flip throwing a cloud of dust into the air. His machine was covered with dust and the man himself could have been mistaken for a pile of wood flour. This employee was overdue for a refresher course in job training. With just a reasonable amount of care he could have almost entirely eliminated the dust from this job.

The item of possible controls for health hazards has purposely been kept for the very last. This is because it should be your final resort when no other means of correction is possible. This means the use of dust respirators. They have a place in the control of occupational disease but let's recommend their use only as a last resort. If you do make such a recommendation, make certain the employee is given a real factual reason for their use when you ask him to wear one.

There is at this time and probably will continue to be certain materials used, handled or processed in Company plants which present potential health hazards. Perhaps a brief explanation of some of them and the controls necessary for their safe use will be of interest.

One of the health hazards somewhat general to our Company plants is from those materials which contain silica. This is rather an extensive list; Asbestos, Barytes, Clays, Dicalite, Feldspar, Grog, Kaolin, Limestone, Magnesia, Soapstone, Slate Flour, Sand, Serpentine, Tolonite, Talc and many of the pigments. The clays and slate flours probably being among the highest in silica content and most generally used.

The effect of silica on the human body is somewhat insidious in that it is a slow accumulative process involving anywhere from a ten to twenty year exposure before the employee may develop a silicotic condition in his lungs. Medical authorities state that this occurs in three progressive stages:

First Stage: The disease at this stage produces no disability and does no appreciable harm. The affected man can carry on his activities as well as ever and if removed from the exposure will show no further development.

Second Stage: Respiration is affected. The victim may be bothered by labored breathing.

Third Stage: This stage may develop from the second even if the victim has been removed from the causitive dusty atmosphere. Labored breathing becomes severe and the man is particularly susceptible to tuberculosis followed by complete disability and eventually death.

Silicosis can be detected by means of chest x-rays. However, the x-ray alone should not be the sole determining factor in diagnosing silicosis. It must be related to the man's occupational and medical history before any definite conclusion is reached. Even this is subject to error at times although this can be minimized somewhat by having suspected films checked by a medical specialist with considerable experience in silicosis diagnosis.

The most ideal control measure for a silica containing material is, of course, to purchase it in bulk form in carload lots. From the car it can be conveyed by vacuum to elevated closed tanks and then fed by gravity in closed piping to the process where it is used.

Some of our raw materials do not lend themselves to this sort of an arrangement because of the small quantity used or the cost factor. It is then necessary to buy the material in packaged form and hand feed it into the processes. This manner of handling invariably generates considerable dust which must be controlled in order to protect employees. The usual method of doing this is by the installation of an exhaust system with pick-up inlets at each point where the hazardous material is handled. Your company has spent several hundred thousand dollars during the past fifteen years for installations of this nature.

One of these silica bearing materials, asbestos, also presents another potential health hazard namely—asbestosis. Its effect on the human lung is not too different from that of silica and eventually it will probably lose its identity as a distinct pulmonary affliction and be included under the heading of silicosis. It is diagnosed much in the same manner as silicosis and the corrective measures where a dust condition exists are parallel to that of silica bearing materials. There, therefore, seems little need to go into further details on the subject of asbestosis.

Outside of the oil companies and perhaps the paint manufacturers, it is doubtful whether there is any one industry today that uses as many different solvents and in as large a quantity as we do. You can name almost any solvent and we use it somewhere in one of our Company processes.

Practically all of these solvents present a potential health hazard in that most of them have a destructive effect on the blood, kidneys, liver, heart, and the nervous system. They are also one of the leading causes of dermatitis due to their tendency to dissolve the natural protective skin oils and to irritate as well.

Solvents affect the human body primarily due to the inhalation of their vapors. Since human blood has the affinity of absorbing solvent vapors some four hundred times faster than it will take on oxygen it can readily be understood why even low concentrations can be dangerous. Because of this it is usually the blood which is first affected in that the white and red cell count is lowered and its hemoglobin or coagulation character changed radically. This is one of the first symptoms which the medical profession looks for when solvent poisoning is suspected. If this change in the blood is detected in its early

stages the removal of the afflicted employee from the exposure usually effects a quick recovery.

Two solvents, benzol and carbon tetrachloride, have been found to present a somewhat greater hazard than most of the others. As a result there has been considerable agitation on the part of industrial hygiene authorities to eliminate their use wherever possible. Due to this action benzol is used to a much lesser extent than it was a few years ago. More recently a similar campaign was started in regards to the carbon tetrachloride and some progress has already been made. Our Company has gone along with these moves and benzol is practically non-existent in other than laboratory work. Progress has also been made in reducing the use of the carbon tetrachloride by substituting some of the newer so-called safety solvents for cleaning purposes.

A solvent exposure can be controlled by exhausting the vapors from their point of release directly to the outdoors. As was mentioned earlier this should be done by pulling the vapors away from the employee rather than past or across his breathing zone. Some benefit can also be attained by keeping the exposed surface of the solvent to its minimum requirements and by keeping all containers covered whenever possible.

Employees who handle or work with either solvents or oils should be watched carefully for evidences of dermatitis. This applies particularly to new employees since some persons are more susceptible than others. Blondes for example frequently being more sensitive in this respect than are brunettes. Some protection can, however, be provided through the use of one of the hand creams presently on the market.

Certain of our Company plants use lead oxide while others use litharge in one or more of their processes. We also use a considerable quantity of pigments some of which contain lead. While the lead content of these pigments is quite low, they do nevertheless present a possible exposure.

Up to this time, to the best of our knowledge, we have not had a case of lead poisoning among the many employees who have handled the pigments. We did, however, have one mild case in the handling of litharge which was largely brought about by the individual's flagrant disregard of a few simple rules.

There are several manifestations of lead absorption:

a. There may be a disturbance of the digestive system in the form of a lack of appetite, constipation, vague abdominal discomfort, and in a more advanced case severe abdominal pains.

b. Pain and stiffness in joints, bones and muscles.

c. General weakness, loss of weight, and pallor.

d. Loss of strength in the fingers, hands and forearms, and inability to use them in a normal manner.

e. A so-called lead line on the gums.

Every employee who handles lead or lead containing materials should be watched carefully for evidence of these impairments. Should you suspect an employee of being involved discuss the case with your Plant Doctor at once and be guided by his advice.

While the pigments we use do contain lead it is in such a small quantity that no serious hazard is presented. There are, however, certain precautions which should be taken by the men who handle them.

a. Lunches should not be stored on the job or eaten without first washing the hands and face.

b. The men who weigh or measure off the batch quantities should exercise reasonable care in handling the pigments so as to avoid stirring up excessive dust.

c. If possible the weighing off of the batch quantities should be done at or near an exhaust system inlet.

In those locations where lead oxide or litharge is handled the precautions must be much more stringent.

a. The weighing off of the batch quantities should either be done outside or directly in front of an exhaust system inlet.

b. Wherever possible, the quantity necessary for a shift run should be prepared by one man at the beginning or prior to the start of the shift so that when he has completed the job he can immediately wash his hands and face. Particular attention should be given to the removal of deposits under the finger nails by the use of a hand brush.

c. The measured quantity for each batch should be placed in a plio-film bag so as to permit its being added to the process without further direct contact with the lead.

d. A rubberized apron should be worn by the employee so as to minimize the accumulation of lead on his work clothing.

e. The use of an approved type of respirator should be mandatory to prevent the inhalation of the lead dust.

f. Under no condition should the employee be permitted to eat food while he is weighing off or before he has washed his hands and face. The same provisions apply to chewing tobacco, snuff and smoking.

g. Foods, chewing tobacco or candy should not be stored in the work area or carried in the clothing of the workman.

h. The dust respirator worn by the employee should be dismantled at least weekly and all parts, other than the filter, thoroughly scrubbed with soap and water.

i. Excellent housekeeping should be maintained in the work area. A vacuum system to clean up the spilled dust is preferable. If not available a sweeping compound or moist sawdust can be used.

We have covered only a very few of the materials used in Company Plants ch present a potential health hazard. There are many more of them perhaps not

so general or used in as great a quantity. It is our job to know these materials, satisfy ourselves they must be used and when there is no other alternative make sure that proper precautions are in effect for the protection of employees. We must be certain of this by having dust counts and vapor concentrations taken at regular intervals just to be sure that we are not exceeding the maximum allowable concentration for some particular material. The employee too should be given chest x-rays, blood counts and urine analyses where indicated as a further precaution and to detect a possible impairment while still in its corrective stage.

You are not alone in this vigil for the protection of your plant employees. Consult your Plant Chemist or the Plant Doctor at any time. Should there be a question on a certain chemical ask its supplier for information or you may write the National Safety Council, the Industrial Hygiene Division of the U. S. Public Health Service, the Travelers Insurance Company, our Research and Development Center, or to the Company Safety Director. Should you desire dust counts or vapor concentration readings taken on a certain operation, that too can be arranged. In some states your State Public Health Service will do it for you free of charge. If you are covered for compensation insurance by the Travelers, they will be more than glad to make these tests. There are, ...ever, some locations where neither of these services are available in which ...t a consulting service will be necessary. At least find out what can be done ...you have a problem of this nature.

Armstrong Cork Company
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