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REVIEW OF SECURITY AND SANITARY
MEASURES TO BE TAKEN IN A SUGAR FACTORY ✓

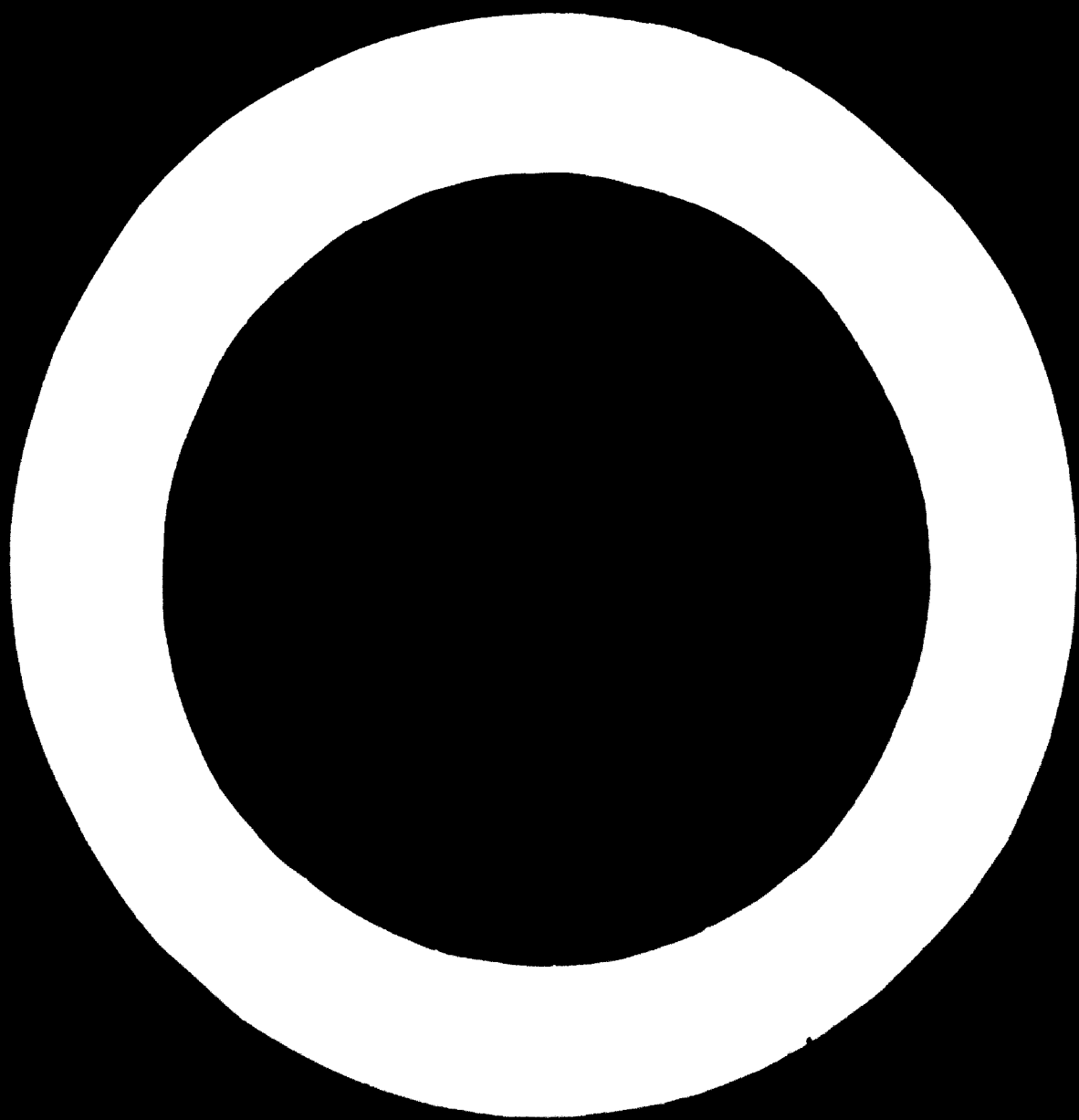
by

L. Novadba *

* Sugar technologist, Vienna, Austria

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1.

SECURITY AND SANITARY REQUIREMENT
OF A SUGAR FACTORY

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1. INTRODUCTION

The sugar factory is a working site where machines and equipment are operated by the workers for the purpose of sugar production from beet or cane.

Without the workers there is no possibility of a production; the workers are, therefore, of the same value as the machines. It is consequently necessary to care for the workers: Not only to pay them their correct wages but also to provide for them safe places to work in.

A safe and well-equipped working place should be guaranteed by the dispositions for the safety of the working places as well as for the safety of the workers. Attention to these dispositions should be paid not only during the work performed in the factory but already before the erection of the factory buildings.

On principle, the Factory Protection Law declares :

"The owner of a factory, the manager, the technical manager and the administration of the factory are fully responsible for the protection of the life and health of the workers as well as for the protection and maintenance of their working capacity during the working time."

Already at the time of the purchase of machines and equipment the project engineer should demand all those protective devices against accidents that are valid in this Country according to the Law. If the project engineer considers that these protective laws are insufficient from the standpoint of the latest knowledge, he should still follow them, but ought to apply also the most advanced techniques.

Before the factory installations are made to function, the machines must be taken over and commissioned according to the valid standards. If, however, these set-ups are not as up-to-date as those of the highly industrialized countries one should have to adopt the better standards and make use of the latest technical progress. The project engineer must be familiar with all respective laws of the Country; he has

to study the laws and orders of the highly developed countries and choose the best of those for the projected factory.

The foregoing concerns the machines and the equipment. The same must hold good for the buildings as well. Already before starting to erect the buildings one should study all the laws of one's own Country and of all foreign countries; engage the architects; settle all necessary requirements for the purchase. Here, it is a question of properly planning the working places, the sanitary equipment, the locker-rooms, social halls, cafeterias, floorings, corridors, staircases, traffic roads, and similar necessities.

Both abovementioned requirements, i.e. for machines and for buildings, are incumbent upon the project engineers of any factory.

The project engineer, however, is not the only person responsible for the correct project. According to the laws and regulations the factory owner, too, represented by the factory manager, is responsible for the strict observation of all laws and regulations. He carries the full responsibility for the protection of the life and health of all factory workers while work is going on in the factory. The project engineer has the duty to plan the factory with a view to the protection against accidents, and thus, he will enable the factory manager to keep strictly to all the laws and regulations.

All requirements for the safety within the factory and for the sanitary equipment will be described in the following pages. I shall enumerate the duties of the factory owner, of the factory manager and also of the workers.

2. Security Requirements.

First there should be treated the general requirement for the buildings and the factory equipment in particular.

2.1.1. Exigencies for Buildings, Roads and other Constructions:

The exits are to be planned in such way as to render it possible for the workers to leave quickly their working places and the buildings. The covered way from every point of the working sites should not be more than 40 m distant. All exits have to be wide enough, at least 1.25 m, possibly equipped with folding-doors, which open out in the escape direction. In factories, not provided with a sufficient number of regular exits, emergency exist should be ordered.

All traffic roads must have a non-skid surface. The passages should be at least 1,20 m wide. The ramps for the traffic of the personnel must have an inclination of not more than 1 : 100.

The staircases in the buildings must be at least 1.25 m wide (for no more than 50 people). If the traffic becomes much heavier, the width of the staircases must be enlarged. Protection from fire must be the first concern of the planners and/or architects. Openings and countersunk portions in the floor or in the soil such as pits, shafts, channels should be protected so that neither people nor materials could fall in.

The ramps, platforms, passages or similar structures, situated by more than 1 m above the floor, must be protected by railings and base borders.

All staircases must be fixed at least on one side by a grasp-rail.

The traffic roads and floors should be built in some accident-free way, to be easily kept up, and well lightened.

2.1.2. Requirements for Machines and Factory Equipment.

The principal requirement says :

"All movable parts of the machines and factory equipment which

may cause accidents in the working area must be provided with safety covers. These safety devices must guarantee sufficient protection for all dangerous areas and must be permanently fixed. These devices, hindering the workers as little as possible, should be planned in the very design of the machines."

In the factory, only such fixtures, machines, conveyors and implements ought to be used as correspond by their design to the approved rules of modern technique and to the regulations for the prevention of accidents and to the safety which is envisaged. For the dangerous areas sufficient safety means should be provided. The safety devices should cover and protect the dangerous areas.

The electric equipment is to be installed and used according to the regulations of the electrical code. For the dangerous places, i.e. for damp and wet places, for fire and explosive places ought to apply very severe regulations. Where there is a possible danger of touching a high voltage equipment, there should be a suitable protection installed; for example, a protective insulation, grounding, zero-conduits etc. For pipings and fittings, suitable devices for the security of the workers should be installed. This must be specially done in places where hot fluids, vapors or gases are used. Where heat insulations are necessary, they ought to be made; where there is the danger of an overflow of hot combustibles or injurious materials, suitable safety measures must be taken.

The elevated places from where to run the machines and the equipment must be fitted with the corresponding safety devices. The working seats should be of such a shape and height that the worker could sit on them without any effort or complaint; moreover, any seat should have a back-rest.

Handtools should be suited to the respective use and should be kept in the best condition.

The machines, the fixtures and the equipment must be furnished with safety devices even if they are out of use for a certain length of time.

2.1.3. Directives for Working Operations.

All the necessary equipment for any working operations must be provided with efficient safety devices. The fixtures, the equipment, the conveying devices and the implements may be used in a way so that the workers, when cautiously handling their tools, will be exposed to the very least dangers; further, attention should also be paid to the fact that the workers may go ahead with their respective operation whilst sitting. If work has to be done in a standing position, a seat should be provided for the worker, close to his working place.

Dangerous work should be carried out only by such persons as are qualified for this kind of work. These dangerous kinds of work are those that will cause the diseases of the profession itself.

Working with power-driven machines, which is particularly dangerous, should be done only by the qualified personnel according to instructions.

For the lifting, carrying, and moving of loads, only people should be accepted who have the suitable physical abilities. For the moving of heavy loads the suitable equipment must be at the worker's disposal. To leave things under or on suspended loads shall be forbidden.

During earth-moving operations (such as trenches, pits, canals) the walls are to be protected by a slope. After a long period of rains these walls as well as the slopes should be examined as to steady equilibrium.

When working with poisonous or easily inflammable materials, the necessary safety devices should be available. It shall be forbidden to eat and to drink while working with poisonous and infectious materials.

Closed tanks may be heated only if and when there is some provision made against the formation of an inadmissible inner overpressure. Working with an open flame is forbidden on tanks where there are stored easily inflammable gases or liquids.

Tanks and pits may be entered after an order has been given by a respective and competent supervisor. Vessels with a stirrer-machine may be entered only after the stirrers have been switched off and the stillstand has been secured. Tanks and other apparatuses where poisonous, narcotized or dangerous gases, vapors or materials can collect, must be fitted with a manhole or must have a daylight opening of more than 600 mm. Suitable safety measures must be available for persons entering such apparatuses (such as ropes, blowers to blow in fresh air, etc.). Some supervising person must be present during the work at similar places. For people working in tanks, pipings and pits, ventilation must be provided when they are working with an open flame. The tanks for storing solid materials (silos), emptied from either bottom or side, should be entered only under supervision and with safety devices. During the work inside of tanks, pipings, pits and similar apparatuses the use of such lamps and utensils as can form explosive mixtures, is not allowed. For the illumination of these apparatuses where there is the possibility that inflammable gases may exist the use of suitable, explosion-proof electric fixtures has to be ordered.

In the storage-rooms the admissible load on the carrying parts of floors or ceilings should not be exceeded. Storage should be made in a way to hinder the load from falling down. Easily sliding materials must be loaded according to their slope angle. When loading barrels care should be taken to prevent them from freely rolling down.

Special steps should be taken when loading inflammable, poisonous or caustic materials. The storage place must be built so that an escape out of the rooms or places will be possible in any case. Such storage places should be distinctly

marked and the admission should be forbidden to anyone not competent to be there. The storage tanks with caustic and poisonous liquids should not be piled up, one above the other. It is forbidden to store the strong caustic and explosive materials above the working places, on roads, stair-cases, ramps and platforms. The storage places for compressed gases should be provided with efficient ventilation. Such tanks should be protected against the influences of both heat and frost.

The combustion effluents should escape through chimneys. The ventilation and vapor channels should be built similar in operation to chimneys.

Workers suffering from impairments, fainting attacks, fits of dizziness etc, must not be engaged to perform certain works.

Dangerous works should be given to perform only to suitable people.

2.2.1. safety Requirements, Safety Devices in General.

To accomplish the abovementioned aims it is necessary to follow the suitable safety devices. These aims will be treated in the following chapters.

Machines, implements, scaffoldings, ladders and apparatuses should be regularly checked as to their good functioning; they must be in working order, safe against accidents. Any shortcomings ought to be done away with immediately. All the security equipments, safety devices and provisions should be carefully handled and maintained in good order. In doing work which implies the danger of poisoning or burning, suitable protective devices must be applied.

During the work by which, according to experience, there is danger of injuring one's eyes, the worker must use suitable protective means. This is the case during work in dusty rooms and during the handling of liquids and vapors. The workers must wear protective glasses, protective screens or

protective caps.

During work in which an excessive noise may injure the hearing organs the workers must use suitable protective means.

When the breathing organs might be injured by inhaling dust, vapors or gases the workers should use suitable protective devices for their lungs.

Where there is danger of parts falling down, a protective cap should be used.

During work with hot and caustic-laden materials, suitable protective means should be used such as aprons, boots and gloves. Where there is more or less the danger of being burned - caustic burns or soaking wounds - the worker must have at his disposal suitable protective clothes.

If the workers has to do out-of-door work for a certain length of time in rainy weather he should wear water-repellent clothes. During work in places where there is the danger of parts or bits falling down or of the person falling down himself, (wells, tanks, pits etc) the worker should wear suitable safety-belts.

People engaged as attendants for servicing the machines should wear tight-fitting clothes. Loose-fitting garments may become dangerous for the wearer.

In places where easily combustible materials are stored (paper, wood, waste matter) smoking should be prohibited and open flames ought to be handled with great care. It is not allowed to store large quantities of combustible waste matter in the working places.

In every part of the factory the necessary number of fire extinguishers should be installed. If the danger of fire is extremely high, a special fire extinguishing equipment has to be installed.

For fire extinction in the electrical equipment, and in cases of inflammable liquids some special fire extinction

equipment must be used.

In factories or in parts of a factory where the workmen will be exposed to some major danger of fire a suitable alarm equipment should be installed so that the workers are immediately warned after the outbreak of a fire.

Rooms where dangerous gases and dust can form in some major concentration must have the proper ventilation; the entrance to such rooms may be allowed under supervision and when suitable protective measures have been taken in this respect.

When handling easily inflammable liquids, likewise when filling and cleaning the tanks, smoking and the use of open flames and light shall be forbidden.

Machines and equipment producing some extraordinary noise should be placed in separate rooms, away from the working places. Measures ought to be taken to eliminate this noise by the installation of protective devices against the noise.

Any working place should be supplied with fresh air whereas the used air ought to be removed.

Any working place must be supplied with the proper quantity of air, temperature, moisture and cleanliness.

The factory buildings and such equipment as is exposed by its height to the danger of lightning ought to be protected by grounded lightning conductors.

Scaffoldings and working ramps should be erected for construction and assembling jobs, that is, in accordance with the pertaining regulations (erection, use, and taking them apart).

When there is the danger of the presence of static electricity protective devices have to be installed so as to remove such danger.

Special provisions should be made for the use of pad.

isotopes. For the maintenance of the regulations, ruling protection against radiation, the responsible personnel should be appointed in every factory, consisting of well-trained persons. Warning boards should be put up. A special tank, protecting from rays, should be set up for radio-isotopes. This tanks ought to have its special place in the factory.

Steam boiler Plants must be built, supervised and operated according to the legal regulations. The running of such plants should be entrusted only to well qualified and reliable people.

Power-generating machines (excepting the electric motors) should, if possible at all, be installed on rooms of their own. These machines should be fitted with efficient regulating devices. The regular and orderly maintenance and the servicing of these engines should be entrusted only to reliable and trained professional people. For the operation of turbines only the qualified and well-trained personnel ought to be chosen.

Power Transmission Means. Belts, ropes or chain-drives should be enclosed. Mechanical equipment should be used for the change of belt-drives. The maintenance and servicing of the power transmission means should be entrusted only to reliable and professional persons.

Each power-driven machine ought to be put in and out of function by itself only.

Special provisions shall apply to the workshop machines such as power-saws, planing machines, milling and drilling machines, lathes, grinding machines, presses, hammers, pneumatic implement etc. In most cases the suppliers of these machines deliver the respective instructions for the operation of the machinery supplied by them.

For the rail equipment special regulations are in effect. These regulations are valid for earth-work, lines of rail, masts, signals, crossings, carriages; for the operation of loading, unloading and shunting work. A detailed enumeration

of all those valid regulations, rules and safety devices would by far exceed the scope of this report.

The pressure-testing and the examination for tightness of the tanks should always be done with cold water. Should these tests be carried out with air, gas or steam, particular dispositions will apply.

2.2.2. Safety Devices for the Sugar Factories.

For the machines and the equipment of a sugar factory all safety measures, listed in Chapter 2.2.1 will commonly apply. Apart therefrom special protective devices ought to be applied for some sugar factory equipment and machines.

For the steam vessel and the pressure tanks are valid the regulations for steam boilers; according to these regulations these vessels and tanks must be built, tested and operated. Before putting the whole into operation all parts ought to be tested and the result of these tests should be recorded in a proof-book. Such tests ought to be regularly carried through within certain periods of time.

The following equipment, listed here, will be needed in a sugar factory :

Boiler, evaporator, vacuum pan, pre-heater, condensate tank, pressure vessel, heating boiler and similar items.

The centrifugals must be examined before they are put into operation, at least once every year, by a clerk from the Steam Boiler Supervisor Office. The result of this examination must be registered in a proof-book. This examination is to be repeated on a regular time-schedule.

The Hoisting Machines and the Conveyors should be built and used according to special regulations. These machines are : Elevator, cranes, windlasses, pulleys, lifting ropes and similar equipment. Special care ought to be given to the back run of these machines in case of some failure in the power drive.

For the cranes is prescribed an examination by an official clerk prior to their being taken over. Annually repeated tests

are also required. The tests should be repeated every year also for windlasses, pulleys, elevators and lift ramps. These are the prescribed examinations. Their results must be entered in a proof-book.

For the traffic of vehicles in the factory yard the same regulations shall apply as for the road traffic. Sometimes stricter regulations must be applied in accordance with the heavier factory traffic. The safety provisions for the operation of vehicles must be handed in to all persons, particularly the regulations of coupling and uncoupling the trailers; unauthorized hitch-hiking shall be forbidden. The use of alcohol in particular shall be forbidden. The driving licences and similar items shall be carefully explained.

For apparatuses such as rotary filter, carbonation tank, vacuum pump, refrigerator, shaker, dryer, sifting plant, moreover for the diffusion plant, mill tandems, cane carrier and bagasse carrier the same safety prescriptions are in effect as those just mentioned in Chapter 2.2.2.

A special sugar factory unit is the sugar conveying, sugar storage and sugar bagging where a sugar dust explosion may occur. In these plants has to be established a specially well-fitted sugar dust exhaustion equipment which ought to prevent the danger of a dust explosion. The dangerous spots in these kinds of equipment are the delivery points, the elevators and the sifting machines. All such equipment must be protected against static electricity.

Special safety devices should be provided for the beet delivery equipment in the beet sugar factory. If the beet delivery is done in railway cars the unloading of the cars should be allowed only when these cars are at a standstill and when they have been secured against moving. Shunting and pulling by using the buffers is forbidden, as is also the crouching between buffers. The stocking channels of the flume channels are to be secured against a fall. The channels (flumes, Kiedinger channel) in the traffic area should be covered. The beet wheel must be covered up to a sufficient height above

the floor. The inserting device of the beet washing-machine ought to be protected against accidental inserting. The shears ought to be fitted with a device which allows for a safe truning of the knife-plate during the change of the knives. The grinding machines for the sharpening of the knives should be protected against dust by means of an efficient dust exhaustion.

Measures must be taken in the lime plant against materials sliding down. Equipment with dust-developing spots must be tightly covered and exhaustion-fans should be provided.

In the Cane Sugar Factories provisions should be made against fall so as to protect the workers. Feed tables, washing station for cane, cane carriers and cane cutters are particularly dangerous. Safety provisions are to be taken for the transport of cane to the factory.

The proper provisions of staircases, catwalks, ladders, railings and bridges are also very important from among all of the listed equipment. The same holds good for the bagasse carrier after the milling tandem as far as the boiler house and down to the bagasse storage.

2.3. Legal Measures and Control .

2.3.1. The factory owner is responsible for the observation of all protective devices in the working places. The control of all legal regulations concerning the safety of the workers will be enforced by the competent authorities or institutions which have been authorized thereto.

The following authorities are here concerned :

- 1) For the security provisions, security means and for the condition of the working places are competent the Labor Inspectors (security inspectors).
- 2) For the safety conditions of apparatuses such as pressure vessels, boilers, centrifuges, lifting equipment etc. are competent the Technical Supervisor Offices or

other technical authorities.

2.3.2. The labor inspectors of security inspectors are appointed by the Government or by the Ministry for the Control of Legal Regulations and security Provisions in the factories. These inspectors should help towards modernising the factories so as to improve the technical security equipment. They should take care of the correct arrangement of the working places, security devices as well as for the design and manufacture of machines, tools and other equipment according to an up-to-date experience in this regards.

Comprised in the sphere of activities of the inspectors is also the inquiry into accidents, material damages; moreover also the instruction of workers and factory safety inspectors.

2.3.3. The Technical Supervisor Office or technical authority will be competent for the supervision of machines and equipment in accordance with the safe operational conditions. Therefore, the task of this authority is to control all apparatuses and machines before they will be put into operation; further, to grant the licence for the operation and to control the work in its prescribed form.

This activity comprises the control of the following machines :

- a/ high pressure boiler, with superheater, feed water equipment, heater, furnaces
- b/ storage tanks of inflammable liquids
- c) pressure vessels such as, for instance, evaporator, pressure tanks, warm water tanks, steam storage tanks, pans
- d) closed vessel for compressed gases
- e/ lifting equipment
- f/ elevators
- g/ electric equipment
- h/ lightning protective equipment
- k/ centrifugals

- 1/ acetylene equipment
- 2/ excavators

All these apparatuses are to be inspected and the result of the examinations must be registered in proof-books. Deficiencies must be removed as soon as possible.

2.3.4. Beside the abovementioned authorities the factory will have to appoint a clerk who will be specially responsible for the security provisions. This person's title is Factory Operational Security Inspector and he ought to help the factory manager in regard to safety and to protective provisions.

These Factory Security Inspectors have the task to assist the Factory Manager in establishing the up-to-date security provisions, to elaborate technical directives and to instruct the workers to obey the regulations that have been issued.

2.3.5. The security provisions in the sugar factories are of a great importance and the function of the abovementioned authorities will guarantee the safety of the workers. Nevertheless, fatal accidents will occur time and again, for instance: With centrifugals, transport plants, steam boiler explosions, vehicles etc. The accident statistics of the chemical factories (sugar factories belong to the same class) show the following figures of death accidents (in the year 1975 : German Federal Republic) :

| | |
|------------------------------------|--------|
| Loads and Transport Equipment | 48.10% |
| Various Tools | 1.92% |
| Working Machines | 18.90% |
| Buildings, Scaffolding | 9.62% |
| Injurious Effects | 7.60% |
| Raw Materials | 5.77% |
| Conveyors | 4.49% |
| Power Generation | 4.49% |
| Inflammable and Explosive Material | 7.0% |

According to these statistics it is clear for the factory manager to which kind of equipment he has to pay special attention.

3. Sanitary Requirements

3.1. Requirement for the Erection of the Factory concerning the Sanitary equipment.

The factory should be erected according to the laws of the Country, laid down in the regulations of the Board of Works. These regulations prescribe the structure of the buildings, loads, arrangement of rooms, roads and of the sanitary equipment.

In the following pages the requirements for sanitary equipment will be treated.

The working places must be large enough so as to leave for any person a space of not less than 12 cubic metres, at least. Further, a floor space of not less than 2 sqm. Should this space be exposed to a possible contamination by dust, vapor or gas or by some toxic materials, or exposed to the influx of heat or bring about heavy working conditions, this working space should be enlarged to at least 15 cubic metres.

The clear height of the working place should be at least 3 metres. In case of this place being exposed to contamination by dust, vapor or gas, the clear height should be enlarged to over 3 m.

The floor of the working place should not lie under the level of the adjoining terrain for more than 1 metre, at the most. The working places may be installed in the basements only on condition that this is absolutely necessary for the good performance of work in the factory.

The storage places should have a sufficient clear height for the workmen working there, such height to be not less than 2 m.

Adjoining rooms to the working places which will be entered occasionally by the workmen (transmission channels, places under machines, ash channels, piping, tunnels etc) should be accessible without danger for the workers and ought to be ventilated.

Places with a prevailing extraordinary noise, with the development of dust, vapor or gas, should be separated from the normal working places.

The floor should be well constructed, without any unevenness, without slick or slippery parts on it and with an adequate inclination towards the drainage ditch.

The walls and ceilings must be smooth and easy to clean.

There must be the sufficient number of working places, all of them equally well illuminated by the light of the sun. Consequently, windows and skylights should be very well planned and arranged in this respect. The total surface of the windows and skylights must be at least one tenth of the floor surface of the room. All working places and traffic roads must be sufficiently lightened by artificial light sources.

In single factory departments where major dangers might possibly exist for the workmen an emergency lightening ought to be installed beside the normal sources of light.

Ventilation, heating and relative air moisture must be harmonised as much as possible with the other places among themselves so as to assure good working conditions in any part of the working site.

When special factory circumstances prevail (tropical climate, development of enormous heat) an air-conditioning plant should be installed.

Fresh air supply must be made available for any working place as also a proper exhaustion of used air.

Work which causes an easy development of dust, vapor and gas should be performed as much as possible in closed apparatuses. If such performance is not possible, such kind of obnoxious material must be noiselessly exhausted.

Rooms where major quantities of vapors will develop must be fitted with a protective device against mist development (ventilation, double windows etc).

The working places should have heat installations so that an even temperature will reign all over the place.

In working places where the workmen will be permanently

exposed to an excessive heat, provisions against such heat should be aimed at or other working installations should eventually put there in function.

3.2. Requirement for Particular Arrangements

The scope of such particular installations and devices will here be discussed.

Each factory must be provided with a supply of drinking water for the workers. When people have to work, for instance, in great heat, a free supply of non-alcoholic beverages may be arranged.

Washing Arrangements. Every factory must have facilities for their workers as regards water for washing. The washing places should be subdivided in view of the two sexes. If needed, hot water must also be supplied. If and when workmen have to do their work under conditions of extreme dirt or when they have to handle caustic or poisonous materials or if they have to work in quantities of dust and in great heat, hot water should be available as well as soap and towels. Washing places and bathrooms ought to have a good ventilation and should be heated; normally, they would be in the nearness of the dressing-rooms.

Dressing-Rooms. Every worker should have for himself one locker (or locked room) for his suit. This box should be in the dressing-room itself and the dressing-rooms should be separate for the two sexes.

Day-rooms. In order to enjoy some rest in between work and for eating some food a room should be set apart for the factory people. This room must have tables and seats for the accommodation of the workmen. Further, facilities must be allowed also for warming or even for cooking one's food.

Living Spaces. Places for the workers to live in, must correspond to the pertaining regulations of the Board of Works.

Toilets. The workers should have at their disposal such toilets as correspond to the legal regulations. Separate toilets must be installed for men and women, distinctly marked as such, with separate entries for the two sexes. In the

toilets for men must also be available the facilities of the 'pissoir' .

The following table shows the number of toilets and other facilities for workers , men and women:

| | Facilities for | |
|--------------------|----------------|-----------|
| | m e n | w o m e n |
| W.C. | 15 | 15 |
| Piss Facilities | 15 | - |
| Shower | 6 | 6 |
| Bath | 6 | 6 |
| Locker for clothes | 1 | 1 |

First Aid. Every factory must have on its premises a First Aid Station for workmen who have been injured or have suddenly been taken ill. In emergency cases the injured man must be immediately taken to the doctor. Sufficient means must be available in every factory for the establishment of the First Aid Station. It will further be necessary to train the corresponding First Aid personnel.

Maintenance and Cleaning. All places in the factory, all buildings and objects should be kept in a clean and orderly state. Any part of the sanitary equipment should likewise be kept meticulously clean. According to requirements, this equipment must be disinfected.

For every working place in the factory the following rules shall always be respected :

- order
- cleanliness
- lights
- noise protection
- dust protection
- heat protection
- danger of fire
- explosion or noxer dust
- dressing-rooms
- sanitary facilities
- installation for dust-exhaustion
- fire fighting installation
- safety
- emergency exits

3.3. Legal Measures and Control.

The factory manager, responsible for the observance of all safety regulations and/or devices which have been discussed in the Chapters 2 & 3, shall likewise be held responsible for the maintenance of all sanitary installations. The control concerning such observance of regulations lies with the respective institutions and boards.

Here follow the institutions :

- 1/ For the working places regulations and for the sanitary regulations as well the Labor Inspectors Board or the Security Inspectors Board shall be responsible.
- 2/ For the control of the legal rules concerning the regulations of the Board of Works the respective Government or the Ministry Boards shall be responsible. These Boards ought to allow that a factory be planned and its design be made before the construction work is begun. When the building work has been finished they have to license the operation of the factory .

4. Additional Care and Treatment of the Employees.

In addition to the legal and ordered security provisions and sanitary facilities the factory management should envisage various forms of patronage and facilities for the workers. In this way the work to be done can become pleasant and even joyful.

Whilst working the worker must more or less subdue his want for food and drink. The factory management can cater for his necessities in this respect and can run a canteen or a kiosk for drinks and a snack-bar for food.

The workmen will become much more loyal to their factory when the management will place at their disposal sports grounds, swimming-pools, meeting rooms, and so forth, places where the workers may spend their free hours at will.

As for first aid, in a case of accident a first treatment shall be given. Later, the factory manager may have a doctor called for a regular visit to examine the health state of the worker in question.

Employment of children is legally forbidden. Employment of young people shall be allowed only in special cases, for instance as apprentices. Such employment, however, may be made only on condition that all pertaining legal regulations be strictly respected.

Valid legal regulations exist for workers who need help in cases of illness. Moreover, in special cases the factory manager may grant an allowance so as to promote the goodwill and the willingness of the worker concerned. Such allowances may also be granted towards the worker's old age pension when he has reached the retiring age.

The factory management may also make arrangements for the transport to school, and back, of the children of workers, and this would seem to form a part of the social duties of the factory owner.

All of it, allowances and expense by the management for the benefit of the workers, have become customary in the highly industrialised countries and have been recognised as a stimulus to the workers' morale.

5. Duties of the Workers and of the Factory Manager.

5.1. Behaviour of the Workers.

Every worker is under obligation to follow all security regulations, the ordered directives and instructions. The worker will have to make use of all equipment provided for the safety of his life and health, available in the factory. He ought to use and handle all of it carefully. Safety devices should not be either damaged or taken away.

No one ought to run the machines and to handle the equipment for which he is not duly qualified either in regard to its use or its maintenance. It shall be forbidden to take off clothes and place them near the machines. For such clothes, not immediately used, suitable places should be made available. Workers to whom the maintenance and functioning of machines has been entrusted must wear tight-fitting clothes. No one shall be allowed to rest and/or sleep in or near dangerous places. Drunken people must be made to leave their working places.

Working places where there exists the danger that workers may get the illness of the trade, should never be used as places where to eat and drink.

5.2. Duties of Workers.

The workers are under obligation to make use of all provisions for the safety of their life and health, in accordance with the regulations, and should obey at any time all given instructions.

Workers, before using the factory equipment, means and items of safety, are under obligation to check and see if this equipment is in the very best working order. If deficiencies have been ascertained, they ought to be at once reported. It is forbidden to the workers to damage or to remove the safety provisions from off the machines and equipment.

It is also forbidden to any worker that he should run machines which have not been entrusted to him for operation.

Every accident should immediately be reported to the factory management.

5.3. Duties of Employees and Factory Manager.

The factory owner and the factory manager should not only properly manage their factory from the point of view of technique and technology but should feel obliged to run the factory in a way which will guarantee the observance of all legal regulations for the safety of the workers. They will have to keep all working rooms, the factory equipment and the factory safety devices in excellent order. They will have to supply the workers with all protective means.

Measures must be taken in the factories for the instruction of the workers concerning the actual dangers; consequently the workers must be told how to use the protective means and how to keep them in a good working order. The workers' contradictory behaviour in regard to such regulations should not be tolerated.

Instructions ought to be given to the workers especially at the beginning of any new work and likewise at the assignment to some new job.

The factory manager should not allow drunken workers to stay at their working places.

The factory manager shall be obliged to have the written regulations posted in easily visible places, likewise also orders and security dispositions .

6. Duties of the Factory Owners during the Project Time and during the Operation of the Factory.

6.1. Duties during the Project Time.

The factory manager has to manage the factory in a way that all legal aims will be respected. Already at the time of the project it is advisable to study the Law of the Country. The result of such study should be told to the projecting engineer.

These legal aims, regulations and directives are as follows

- Environmental protecting regulations (flue gas, waste water, garbage)
- Public Traffic means (railways, roads)
- Public facilities (canals, electric lines, telephone)
- Regulations for the Erection of Buildings (regulations of the Board of Works)
- Regulations for Boilers and Pressure Tanks
- Regulations for Electric Equipment
- Legal Prescriptions for Radio Isotopes
- Claims of Labor Inspectors
- Claims of Accident Protection
- Claims of the Board of Sanitation
- Legal claims of Neighbours

Already in the planning stage of a new factory the competent authorities (Municipal Board, Country Board, Ministry) ought to be duly informed about the project and the permission to build the factory should be obtained. These Boards will then delegate a Commission, consisting of specialists and officials, to the site of the new factory. The gentlemen of the Boards will give their consent to the project, legal instructions for the construction of the buildings and will finally permit the erection of the envisaged factory. When all constructions have been finished, the members of the abovementioned Boards will come together again and check on it and see whether the new plant corresponds to the suggestions which had been made by the first Commission. Then only will the consent be granted for the operation of the new factory. Thus, the factory manager has obtained the official verification that his factory meets all legal regulations.

6.2. Duties during the Operational Performance of the Factory.

The factory owner is bound to maintain all factory places, factory equipment and means in strict observance with the legal conditions which, after all, must be permanently kept. Further, he is likewise under obligation to place at the worker's disposal all protective means and to keep them in absolute working-condition. Moreover, he is also obliged to see to it that his workmen be instructed about the possibility of protection against accidents. The workmen must be told that these instructions are permanently valid. Moreover, the factory owner is held not to allow any worker in his factory to trespass against these legal regulations.

The factory management, i.e. the factory manager and the managing clerks, are obliged to make all necessary working arrangements for the workmen so that all safety devices may be guaranteed.

The factory owner and the factory manager are personally fully responsible for the safety of the workmen during the working-hours in the factory.

The whole personnel, needed by the factory manager for the smooth functioning of work in the factory (engineers, technicians, foremen, supervisors) must, by necessity, be duly informed about all safety arrangements, and within their proper sphere of activity they will be held responsible for the security devices.

The factory manager should follow the order of the Labor Inspectors and should arrange for the necessary repair in case of defective equipment.

One of the duties of the factory owner is to arrange for all necessary insurances for his factory: Namely, insurances for buildings, materials, sugar, fuel oil, vehicles, various objects, and so forth.

Insurances shall comprise :

theft and burglary

room equipment

machine breakage

liability

vehicle liability

transport by sea

**all risks (global liability during the
erection of the factory)**

social insurance

accident insurance

**providence insurance (for the rise in value of
equipment)**

and similar items

7. Requirement for the Conditions of Machines and Equipment

Duties of the Factory's Projecting Engineer

7.1. Requirement for the Supplier.

Before purchasing machines, apparatuses and other equipment the projecting engineer should prescribe to supplier all legal regulations to which the envisaged items must correspond. All of them must be fitted with every necessary protective device in strict accordance with the Law of the Country. Such clause should never be omitted from the Purchase Contract. If the supplier does not meet this exigence he shall be bound to make up for it at some later date.

The supplier shall furnish his machines with such safety devices as correspond to the Law of the Country; if, however, these legal regulations are contradictory to the regulations of another Country he will have to adapt his machines so that they correspond to the legal regulations of that other Country. On principle, however, any machine and any piece of equipment must be protected against accidents with up-to-date and most perfect safety devices.

7.2. Duties of the Projecting Engineer.

The task of the projecting engineer of a sugar factory is to see strictly to it that the construction work of that factory will meet all valid legal regulations of the Country concerned. He will have to plan not only the best technical equipment, the best technology, but he will have to plan, moreover, all machines and equipment for the smooth functioning of work in that factory.

During the stages of planning, building, extending or altering the places in the factory all dispositions, ruling the safety of the places and the sanitary equipment, must be fulfilled. Moreover, all aims envisaged by the legal regulation must likewise be met with.

In the preceding chapters all requirements of safety and

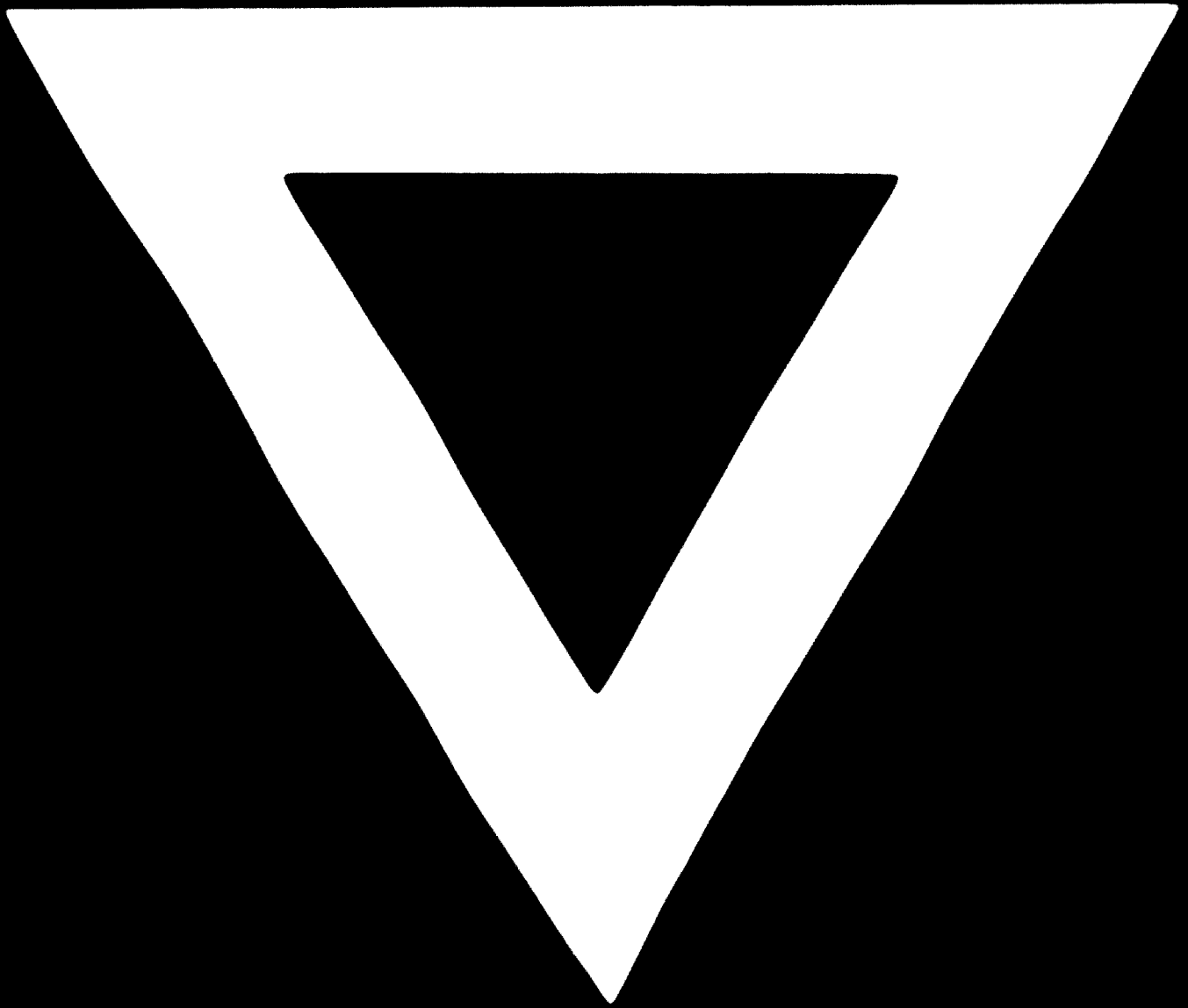
sanitation have been fully discussed in all necessary details as far as the workmen are concerned. Further, all legal controls, examinations and regulations have been fully specified (in Chapter 6.1.) .

Now, it must remain the task of the projecting engineer to get well acquainted with all these regulations and their aims. He will be under obligation to consult the experts and to prescribe to the suppliers of machines and buildings all legal regulations.

If the abovementioned aims, envisaging the safe performance of work in the factory, will be carefully and deliberately followed, the finished factory will certainly meet any legal regulations so that the factory manager, in his turn, will be in a position to accomplish all his work with his full responsibility.

Kenneth





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