16—Industrial Buildings and Plant Layout

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Design for Safety

Efficiency and safety in industrial operations can be greatly increased by careful planning of the location, design, and layout of a new plant or of an existing one in which major alterations are to be made Numerous accidents, occupational diseases, explosions, and fires are preventable if suitable measures are taken right from the earliest planning stages

Buildings, equipment, and processes

Major factors determining the size, shape, and type of buildings and structures are the nature of the processes and materials, maintenance, mechanical handling equipment, and working conditions These can vary greatly

Catastrophes resulting in large loss of life and heavy property damage often are due to inadequate planning-stage consideration of the physical and chemical properties of dangerous substances and their processing methods

High-hazard processes should be located in small isolated buildings of limited occupancy, or in areas cut off by fire-resistant materials appropriate to the hazard involved Buildings can be designed so that internal explosions will produce minimum damage and minimum broken glass Lower-hazard operations can justify larger units

Even less serious injuries resulting from poor housekeeping facilities and congestion of workplaces can be reduced substantially by preplanning for safety Layout of equipment and buildings so that production lines do not cross and so that operators have enough working space saves time, increases production, and helps prevent accidents

Personnel facilities, such as lunch rooms and medical, safety, and disaster services, are essential for reasons of health and treatment of injuries They can be planned and located for maximum effectiveness

Codes and standards

The policy of modern companies is to have their safety, health, and fire departments review and check plans and specifications for new or remodeled plants This saves costly alterations and installations that must be made after a plant is in operation in the event of failure to meet local and state requirements covering fire, accident, and health hazards

Most ordinances and state laws require that authorized persons approve the means of both normal and emergency egress from buildings In some states, plans for the installation of emergency lighting, fire alarm, and automatic sprinkler systems must be satisfactory to the authorities Also, in certain states, exhaust and ventilating installations must be approved

Many local codes require means of controlling air-polluting industrial contaminants, smoke and vapors Disposal of raw wastes into public streams and waterways is also being controlled by federal and local statute The Environmental Protection Agency, set up under the Clean Air Act of 1970, has set certain emission standards and these should be checked to determine that one isn't in violation

The voluntary safety codes developed by various organizations establish standards for certain structures and equipment Specifications for the construction of floor and wall openings and railings, for example, are given in American National Standard A12 1, *Safety Code for Floor and Wall Openings, Railings, and Toe Boards* Proper electric wiring and electrical installations are covered in the *National Electrical Code,* issued by the National Fire Protection Association