

Industrial Facilities Design



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What is Industrial Facilities Design?

- The process of planning and creating a facility to maximize efficiency and safety.

Why is it Important?

- It directly impacts productivity, operational costs, and worker safety.
- Helps align the facility with the company's strategic long-term goals.

What are Design Principles?

- Definition: Core guiding concepts that shape the planning and layout of an industrial facility.

What are Design Principles?

- Purpose: To ensure the final design is not just a building, but a high-performing asset that supports business goals.

What are Design Principles?

- Impact: A well-designed facility improves productivity, reduces costs, and enhances safety.

Principles of Industrial Facilities Design

- Safety and Ergonomics
- Efficiency and Workflow
- Flexibility and Adaptability
- Sustainability and Environmental Impact
- Compliance and Regulations

Safety and Ergonomics

What is Safety?

- It's about protecting employees from hazards and preventing accidents through physical safeguards, clear procedures, and a robust safety culture.

Safety and Ergonomics

What is Ergonomics?

- It's the science of designing the workplace to fit the worker.
- The goal is to maximize efficiency by minimizing physical and mental strain, thereby reducing the risk of injury.

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Safety and Ergonomics

The Interconnection:

- A safe facility is one where workers are not exposed to hazards, and an ergonomic facility is one where the work itself doesn't cause harm.
- These two principles are inseparable.

Physical Safety: Traffic and Walkway Design

Hazard Identification:

- **The first step in a safe design is to systematically identify all potential physical hazards.**
- **This includes high-traffic zones, moving machinery, chemical storage areas, and elevated work surfaces.**

Physical Safety: Traffic and Walkway Design

Separation of Traffic:

- **To prevent collisions and accidents, you must separate pedestrian walkways from vehicle traffic (e.g., forklifts, pallet jacks).**
- **This includes high-traffic zones, moving machinery, chemical storage areas, and elevated work surfaces.**

Physical Safety: Traffic and Walkway Design

Walkway Design:

- **Ensure walkways are wide enough for safe passage, even when employees are carrying items.**
- **Keep all walkways clear of obstructions, trip hazards, and stored materials.**

Physical Safety: Machine Guarding & Controls

Machine Guarding:

- **All equipment with moving parts, such as belts, gears, shafts, and blades, must be equipped with proper machine guards.**
- **These guards prevent workers from making contact with hazardous components during operation.**

Physical Safety: Machine Guarding & Controls

Safety Interlocks:

- **Use safety interlocks to automatically shut down machinery when a guard is opened or removed. This ensures the equipment cannot be operated in an unsafe state.**

Physical Safety: Machine Guarding & Controls

Emergency Stop Buttons:

- **Strategically place easily accessible and clearly marked emergency stop buttons throughout the facility. All employees must be trained on their location and proper use.**

Physical Safety : Fall Prevention

Fall Prevention is a Priority:

- Falls are one of the most common causes of serious industrial injuries.**

Physical Safety : Fall Prevention

Guardrails and Barriers:

- **Install guardrails on all elevated platforms, mezzanines, stairs, and along the edges of pits or floor openings.**
- **The rails should be designed to withstand significant force.**

Physical Safety : Fall Prevention

Safe Flooring:

- Use anti-slip flooring materials, especially in areas prone to spills, like production lines, kitchens, or cleaning stations.
- Design floors to be easy to clean and maintain, reducing the build-up of slippery substances.

Physical Safety : Fall Prevention

Clear Edges:

- Clearly mark the edges of all platforms and steps with high-contrast safety tape or paint to improve visibility.

Physical Safety : Hazard Management

Chemical Storage:

- **Designate specific, well-ventilated areas for the storage of chemicals.**
- **These zones should have spill containment systems and emergency eyewash showers.**
- **Proper labeling is critical to ensure all personnel can identify hazardous materials.**

Physical Safety : Hazard Management

Noise Control:

- **High-decibel noise from machinery can cause permanent hearing damage and interfere with communication, increasing the risk of accidents.**

Physical Safety : Hazard Management

Emergency Exits:

- **The design must include not only clear emergency exits but also a designated assembly point outside the building.**
- **This is where all personnel gather during an evacuation to be accounted for.**
- **The path to this assembly point should be free of potential bottlenecks.**

Physical Safety : Hazard Management

Fire Safety:

- Integrate fire detection and suppression systems (e.g., sprinklers, smoke detectors) into the building's design.
- All fire extinguishers should be highly visible and easily accessible.
- The layout must ensure that fire department access routes are unobstructed.

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