The Ten Principles of Material Handling

The Key to Greater  Productivity, Customer Service, and Profitability

MATERIAL HANDLING INSTITUTE
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For Further Information on the Material Handling Institute Please Contact or Write:

Material Handling Institute
8720 Red Oak Blvd., Suite 201
Charlotte, NC 28217-3992

Phone: 704-676-1190
Fax: 704-676-1199
www.mhia.org

1 Planning Principle

All material handling should be the result of a deliberate plan where the needs, performance objectives and functional specification of the proposed methods are completely defined at the outset.

Definition: *A plan is a prescribed course of action that is defined in advance of implementation. In its simplest form a material handing plan defines the material (what) and the moves (when and where); together they define the method (how and who).*

Key Points:

- The plan should be developed in consultation between theplanner(s) and all who will use and benefit from the equipment to be employed.
- Success in planning large scale material handling projects generally requires a team approach involving suppliers, consultants when appropriate, and end user specialists from management, engineering, computer and information systems, finance and operations.
- The material handling plan should reflect the strategic objectives of the organization as well as the more immediate needs.
- The plan should document existing methods and problems, physical and economic constraints, and future requirements and goals.
- The plan should promote concurrent engineering of product, process design, process layout, and material handling methods, as opposed to independent and sequential design practices.

2 Standardization Principle

Material handling methods, equipment, controls and software should be standardized within the limits of achieving overall performance objectives and without sacrificing needed flexibility , modularity and throughput.anticipation of changing future requirements

Definition: *Standardization means less variety and customization in the methods and equipment employed.*

Key Points:

- The planner should select methods and equipment that can perform a variety of tasks under a variety of operating conditionsand in
- Standardization applies to sizes of containers and other load forming components as well as operating procedures and equipment.
- Standardization, flexibility and modularity must not be incompatible.

3 Work Principle

Material handling work should be minimized without sacrificing productivity or the level of service required of the operation.

Definition: *The measure of work is material handling flow (volume, weight or count per unit of time) multiplied by the distance moved.*

Key Points:

- Simplifying processes by reducing, combining, shortening or eliminating unnecessary moves will reduce work.
- Consider each pickup and set-down, or placing material in and out of storage, as distinct moves and components of the distance moved.
- Process methods, operation sequences and process/equipment layouts should be prepared that support the work minimization objective.
- Where possible, gravity should be used to move materials or to assist in their movement while respecting consideration of safety and the potential for product damage.
- The shortest distance between two points is a straight line

4 Ergonomic Principle

Human capabilities and limitations must be recognized and respected in the design of material handling tasks and equipment to ensure safe and effective operations.

Definition: *Ergonomics is the science that seeks to adapt work or working conditions to suit the abilities of the worker.*

Key Points:

- Equipment should be selected that eliminates repetitive and strenuous manual labor and which effectively interacts with human operators and users.
- The ergonomic principle embraces both physical and mental tasks.
- The material handling workplace and the equipment employed to assist in that work must be designed so they are safe for people

5 Unit Load Principle

Unit loads shall be appropriately sized and configured in a way which achieves the material flow and inventory objectives at each stage in the supply chain.

Definition: *A unit load is one that can be stored or moved as a single entity at one time, such as a pallet, container or tote, regardless of the number of individual items that make up the load.*

Key Points:

- Less effort and work is required to collect and move many individual items as a single load than to move many items one at a time.
- Load size and composition may change as material and product moves through stages of manufacturing and the resulting distribution channels.
- Large unit loads are common both pre and post manufacturing in the form of raw materials and finished goods.
- During manufacturing, smaller unit loads, including as few as one item, yield less in-process inventory and shorter item throughput times.
- Smaller unit loads are consistent with manufacturing strategies that embrace operating objectives such as flexibility, continuous flow and just-in-time delivery.
- Unit loads composed of a mix of different items are consistent with just-in-time and/or customized supply strategies so long as item selectivity is not compromised.

6 Space Utilization Principle

Effective and efficient use must be made of all available space.

Definition: *Space in material handling is three dimensional and therefore is counted as cubic space.*

Key Points:

- In work areas, cluttered and unorganized spaces and blocked aisles should be eliminated.
- In storage areas, the objective of maximizing storage density must be balanced against accessibility and selectivity.
- When transporting loads within a facility the use of overhead space should be considered as an option.

7 System Principle

Material movement and storage activities should be fully integrated to form a coordinated, operational system which spans receiving, inspection, storage, production, assembly, packaging, unitizing, order selection, shipping, transportation and the handling of returns.

Definition: *A system is a collection of interacting and/or interdependent entities that form a unified whole.*

Key Points:

- Systems integration should encompass the entire supply chain including reverse logistics. It should include suppliers, manufacturers, distributors and customers.
- Inventory levels should be minimized at all stages of production and distribution while respecting considerations of process variability and customer service.
- Information flow and physical material flow should be integrated and treated as concurrent activities
- Methods should be provided for easily identifying materials and products, for determining their location and status within facilities and within the supply chain and for controlling their movement.
- Customer requirements andregarding regarding quantity, quality, and on-time delivery should be met without exception. consitency and predictability, regarding quantity, quality, and on-time delivery should be met without exception.

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8 Automation Principle

Material handling operations should be mechanized and/or automated where feasible to improve operational efficiency, increase responsiveness, improve consistency and predictability,

Key Points:

- Pre-existing processes and methods should be simplified and/or re-engineered before any efforts at installing mechanized or automated systems.
- Computerized material handling systems should be considered where appropriate for effective integration of material flow and information management.
- Treat all interface issues as critical to successful automation, including equipment to equipment, equipment to load, equipment to operator, and control communications.
- All items expected to be handled automatically must have features that accommodate mechanized and automated handling.

9 Environmental Principle

Environmental impact and energy consumption should be considered as criteria when designing or selecting alternative equipment and material handling systems.

Definition: *Environmental consciousness stems from a desire not to waste natural resources and to predict and eliminate the possible negative effects of our daily actions on the environment.*

Key Points:

- Containers, pallets and other products used to form and protect unit loads should be designed for reusability when possible and/or biodegradability as appropriate.
- Systems design should accommodate the handling of spent dunnage, empty containers and other by-products of material handling.
- Materials specified as hazardous have special needs with regard to spill protection, combustibility and other risks.

10 Life Cycle Cost Principle

A thorough economic analysis should account for the entire life cycle of all material handling equipment and resulting systems.

Definition: *Life cycle costs include all cash flows that will occur between the time the first dollar is spent to plan or procure a new piece of equipment, or to put in place a new method, until that method and/or equipment is totally replaced.*

Key Points:

- Life cycle costs include capital investment, installation, setup and equipment programming, training, system testing and acceptance, operating (labor, utilities, etc.), maintenance and repair, reuse value, and ultimate disposal.
- A plan for preventive and predictive maintenance should be prepared for the equipment, and the estimated cost of maintenance and spare parts should be included in the economic analysis.
- A long-range plan for replacement of the equipment when it becomes obsolete should be prepared.
- Although measurable cost is a primary factor, it is certainly not the only factor in selecting among alternatives. Other factors of a strategic nature to the organization and which form the basis for competition in the market place should be considered and quantified whenever possible.

NOTES

MATERIAL HANDLING INSTITUTE

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