

TRANSPORTATION & HANDLING OF RAW MATERIALS SUBJECT

PRINCIPLE OF MATERIALS HANDLING

BY

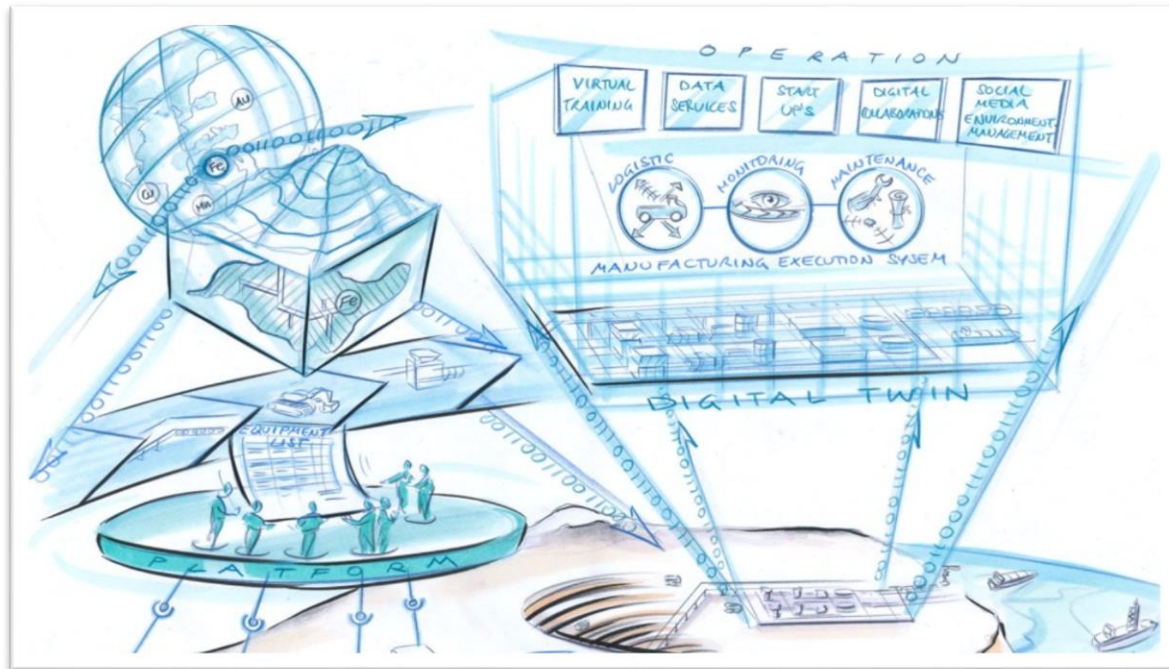
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CHAPTER-2

OUTLINE

- * Principles of M.H. system
- * A twenty set of M.H. Principles with suggestions



PRINCIPLE OF M.H.

DIFINITION

- * A prescribed rule or guide to accepted procedures, established through past experience, which is taken for granted or accepted as authoritative by practitioners.
- * A set of twenty principles of materials handling, (prepared by H.H.Hall(2)) is stated and briefly explained in this presentation.
- * Certain specific suggestions have also been added for carrying out the respective principles into practice.

1. PLANNING PRINCIPLE

* SUGGESTIONS

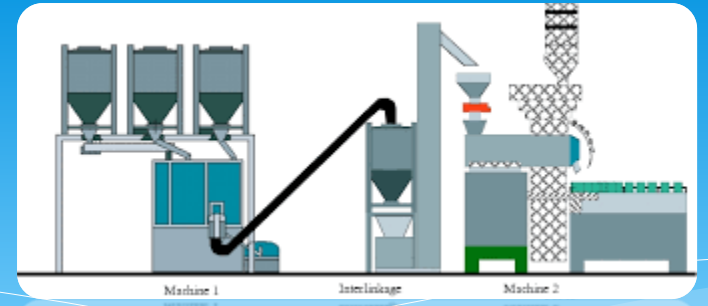
- Consider the plant **layout** before equipment.
- Plan correct **location** for materials supply and disposal. Plan for scrap removal.
- Assure adequate **storage space** at the workplace.
- Avoid **placing materials** directly on the floor. Place product on a pallet, skid etc. at the beginning of the process.
- Plan productive **operations** and **inspections** during material movement, if possible.

2. SYSTEM PRINCIPLE



- * **Integrate** as many handling activities as possible encompassing full scope of operations like receiving, storage, production, inspection, packaging, warehousing, shipping/transportation.
- * **Suggestions**
 - Integrate operations into handling systems like processing, inspection, packaging, ... etc.
 - Avoid/ minimize **intermediate storage**.
 - While designing a materials handling system, the practices/requirements of the suppliers, clients and transporters are to be considered.
 - Allow necessary flexibility considering **future requirements/emergencies**.

3. MATERIAL FLOW PRINCIPLE



- * Plan operations sequence and equipment arrangement to optimize material flow.
- * **Suggestions:**
 - Eliminate obstacles from material flow.
 - Plan material movement in a direct path (avoid backtracking, zig-zag movements etc.)
 - Keep related work areas close together.
 - Combine operations to reduce material movement.
 - Minimize movement between floors.

4. SIMPLIFICATION PRINCIPLE



- * Reduce, combine or eliminate unnecessary movement and/or equipment. It increases efficiency of materials handling.
- * **Suggestions:**
 - Apply principles of motions economy. Avoid unnecessary handling. Eliminate re-handling as much as possible.
 - Plan direct moves. Reduce or eliminate long, awkward or complicated moves.
 - Deliver materials at correct location first time.
 - Avoid use of variety of equipment types, sizes and makes.

5. GRAVITY PRINCIPLE



- * Utilize gravity to move material whenever practicable.

- * **Suggestions:**
 - Use roller conveyors, slides, chutes between equipment/processes.
 - Use ramps between varying work or floor levels.
 - Use sloping floor when materials movement by hand truck is mainly in one direction.
 - Use spiral chutes to feed machines at different floors.



Ramps



Ramps



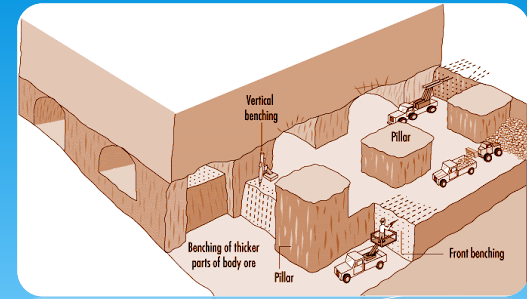
Spiral chute

6. SPACE UTILIZATION PRINCIPLE



- * Make optimum use of building volume.
- * **Suggestions:**
 - Space equipment/processes close together.
 - Eliminate or reduce temporary storage of materials.
 - Use racks to permit higher stacking.
 - Use stacking containers to permit stacking.
 - Exercise economic order quantities to reduce inventory.

7. UNIT SIZE PRINCIPLE



- * Increase quantity, size, weight of loads handled.

- * **Suggestions:**
 - Examine possibility of unitization of loads.
 - Use containers for unitization of loads.
 - Procure materials in larger units.
 - Design load size to make optimum use of handling equipment capacity.

8. SAFETY PRINCIPLE



- * Handling methods and handling equipment used must be safe.
- * **Suggestions:**
 - Provide adequate guards & safety devices on materials handling equipment.
 - Do not overload materials handling equipment.
 - Provide adequate shop lighting.
 - Provide good housekeeping.
 - Use mirror at aisle intersections.
 - Materials handling equipment operators should be properly trained.

9. MECHANIZATION/AUTOMATION PRINCIPLE



- * When appropriate, use mechanized or automatic materials handling equipment.
- * **Suggestions:**
 - Consider mechanized system in the following cases:
 - (a) Large quantities or volumes of materials,
 - (b) Repetitive movement,
 - (c) Long moves,
 - (d) Hazardous move/materials,
 - (e) Excess manual handling,
 - (f) Replacing large number of persons involved in handling,
 - (g) Heavy materials,
 - (h) Scrap removal,
 - Do not over mechanize.

10. EQUIPMENT SELECTION PRINCIPLE



Before selecting materials handling equipment, consider all aspects of materials handling, e.g., materials to be handled, moves to be made, methods to be utilized.

* **Suggestions:**

- Select versatile equipment.
- Select standardized equipment.
- Consider unitization of load for handling.
- Provide additional capacity based on future plan.
- Compare alternatives based on cost of handling.

11. STANDARDIZATION PRINCIPLE



Materials handling methods and equipment should be standardized to the extent possible.

* **Suggestions:**

- Use standardized containers.
- Purchase standard types and sizes of equipment.
- Use standard sizes of pallets to fit products, equipment and transport trucks.

12. FLEXIBILITY PRINCIPLE

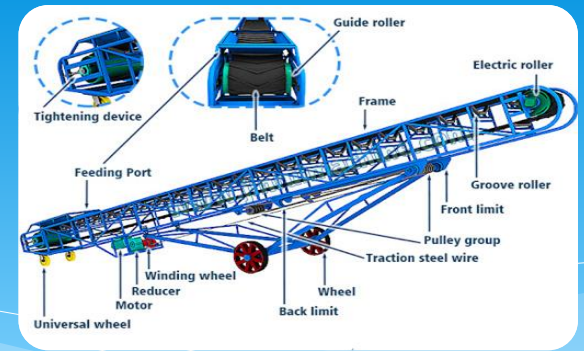


Use methods and equipment, which can perform different tasks and applications.

* Suggestions:

- Buy flexible equipment like Fork Lift Truck, and Conveyor etc.
- Use variable speed drives.
- Make use of attachment & accessories.
- Use four ways pallets, skids and containers.

13. DEAD-WEIGHT PRINCIPLE



* Reduce the dead-weight movement.

* Suggestions:

- Movable materials handling equipment should be made of lightweight materials like aluminum, magnesium etc.
- Use lightweight, pallets, skids, containers etc.
- Consider expendable pallets, containers etc.
- Select lightweight equipment for light load.

14. MOTION PRINCIPLE

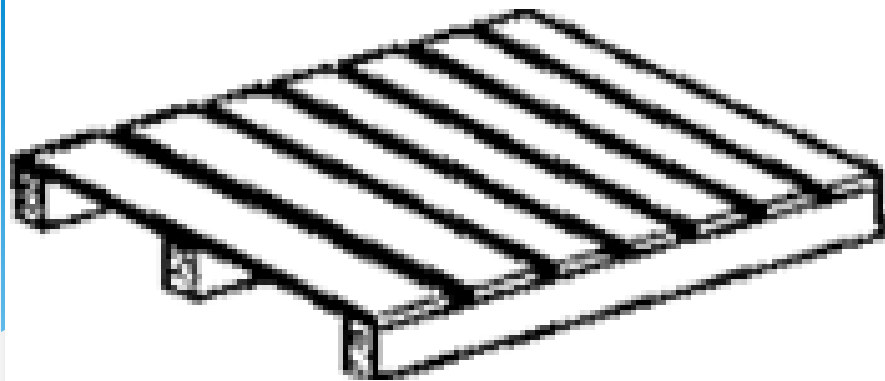


- * Stoppage of mobile equipment should be minimum.

- * **Suggestions:**
 - Reduce loading/unloading time.
 - Use mechanized loading/unloading equipment.
 - Plan materials movement
 - Use equipment where carrying device is attached to motive unit like platform-type trucks, trailers etc.
 - Use pallets, skids etc. to hasten loading/unloading.
 - Use devices like tipplers, bottom discharge containers etc.

Tipplers Devices

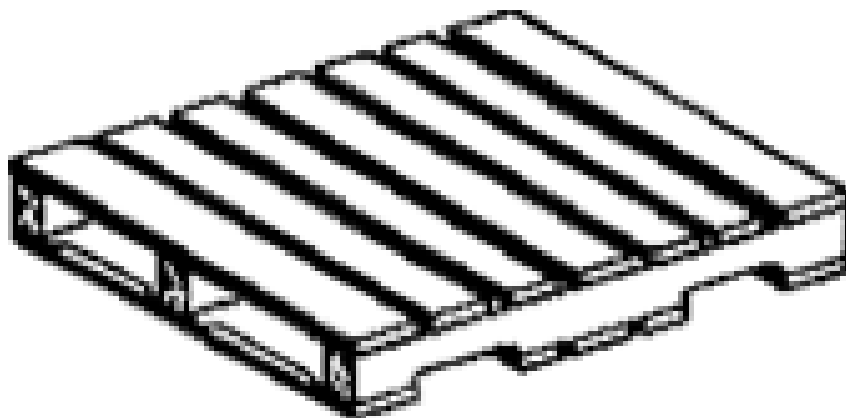




**Single
Face Pallet**



**Two Way,
Reversible, Flush Pallet**



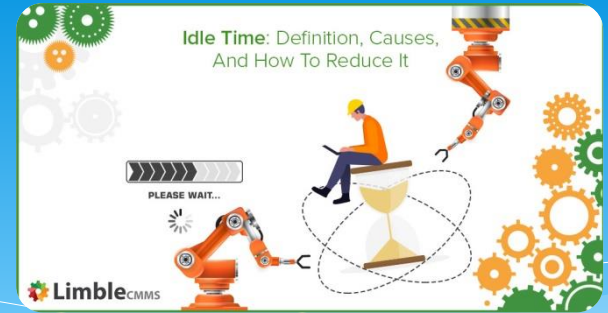
**Four Way,
Non-Reversible, Flush Pallet**



**Two Way,
Single Wing Pallet**



15. IDLE TIME PRINCIPLE



Reduce idle or unproductive time of both materials handling equipment and manpower.

Additional suggestions for “manpower” are:

- Deliver materials at proper rate so that operators are not idle for materials.
- Combine jobs i.e. one man handles two or more machines or jobs.

16. MAINTENANCE PRINCIPLE



- * Do schedule maintenance and repair work of all materials handling equipment to minimize outage.
- * **Suggestions:**
 - Training.
 - Follow maintenance procedures.
 - Do repair/maintenance to avoid breakdowns.
 - Establish preventive maintenance program.
 - Maintain adequate spares.
 - Avoid over loading of materials handling equipment.

17. OBSOLESCENCE PRINCIPLE

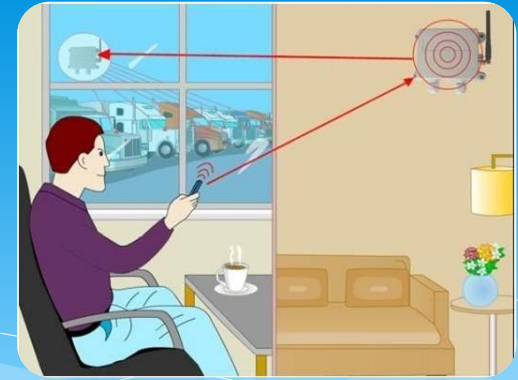


Replace obsolete handling methods and equipment by more efficient methods or equipment to improve operations.

* **Suggestions:**

- Rent or lease new equipment to tryout.
- Keep up-to-date as to what is new in the market through books, journals, expositions, factory visits, conference, manufacturers' representatives etc.

18. CONTROL PRINCIPLE



Use materials handling equipment to improve production & inventory control and order handling.

* **Suggestions:**

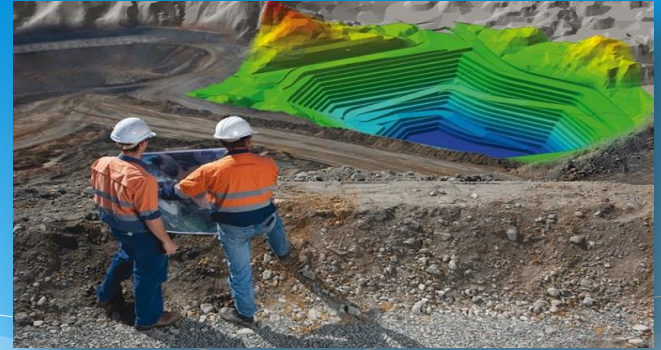
- Move materials in batches.
- Use containers with wire mesh for visual checking/counting.
- Synchronize materials handling with production.
- Coordinate materials handling program with purchasing and production.

19. CAPACITY PRINCIPLE



- * Use Materials Handling so that full production capacity can be achieved.
- * **Suggestions:**
 - Use mechanical handling systems for uniform flow of materials.
 - Make full use of building volume.
 - Change size, shape of unit load to utilize space, equipment and manpower.
 - Use outdoor or rented storage space, when necessary.

20. PERFORMANCE PRINCIPLE



- * Select materials handling systems with higher efficiency, measured in terms of expenses per unit load handled.
- * **Suggestions:**
 - Select common, convenient, standard equipment.
 - Use versatile equipment.

Summary

1. Twenty Principles play a guide rules in materials handling
2. Planning, Control, System, Safety, Time, and maintenance are most important principles in M.H.
3. Make handling distance as short as possible
4. Reduce the time spent at terminal points of a route as short as possible
5. Use simple patterns of material flow
6. Minimize time spent on transport empty by changing speed in return route
7. Use gravity, use a cheaper power source



Thank You