Introduction to Overhead Material-Handling Equipment

Overhead Alliance Lecture Material
Topics to be Discussed

I. Introduction to Basic Material Handling Equipment (MHE)
   a. Conveyors
   b. Industrial trucks
   c. Overhead solutions
      i. Hoists
      ii. Cranes
      iii. Monorails

II. Benefits of Overhead MHE

III. The Overhead Alliance
Conveyors

• Move Uniform Loads,
• Continuously,
• Over a Fixed Path
Industrial Trucks

• Lifting/Moving Loads Intermittently,

• Over a Variable Path

Walking

Riding

Automated
Overhead Equipment

Hoists

Cranes

Monorails
Overhead Hoists

• For Vertical Lifting,

• Of Freely Suspended Loads,

• Using Wire, Rope, or Chain,

• Manual/Electric/Air Power
Overhead Cranes

• For Moving Loads,

• Lift Using Hoists,
  • Can be equipped with below the hook lifters including magnets and grabs

• Types: Bridge, Gantry, Jib,

• Full Control of Load
Overhead Cranes - Bridge

- Mounted Bridge (does not touch the floor),
- Spans over Work Area,
- 3 dimensional coverage,
- 2 types: Top Running Under Running
Overhead Cranes - Gantry

• Spans over Work Area,

• Types:

  **Floor supported** (shown) – Moves on casters for portability of lower capacity lifts, usually under 5T

  **Rail supported** – Moves along fixed rails for higher capacity lifts, usually over 5T.
Overhead Cranes - Jib

• Mounted Arm,

• Spans over Work Area,

• Mounting Types:
  • Base-mounted (shown)
  • Wall-mounted cantilever
  • Wall-mounted tie-rod
Overhead Monorails

• For Moving Loads,

• Continuously on Fixed Path,

• Manual or Powered Carriers,

• Single or Network of Tracks
## Choice Matrix for Material Transport Equipment

<table>
<thead>
<tr>
<th>Application</th>
<th>Floor-mounted</th>
<th>Overhead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed-path/continuous use</td>
<td>Conveyors</td>
<td>Monorails</td>
</tr>
<tr>
<td></td>
<td>Primary function: conveying</td>
<td>Primary function: positioning and conveying</td>
</tr>
<tr>
<td>Variable path/intermittent use</td>
<td>Industrial trucks</td>
<td>Cranes &amp; Hoists</td>
</tr>
<tr>
<td></td>
<td>Primary function: transporting</td>
<td>Primary function: transferring</td>
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</tbody>
</table>
Benefits of Overhead Equipment

- Safety
- Efficiency & Productivity
- Environmental
- Technological Value
Improving Safety

• Limits exposure to potential accidents caused by sharing travel path between pedestrians and materials.

• Limits the amount of manual handling, preventing physical injury.
Increasing Productivity & Efficiency

- Travel over or around obstacles
- Allows greater lifting height and vertical storage
- Frees-up floor space
- Reduces product handling and operator error
- Reduce damages to products, walls, and structural supports
Reducing Environmental Concerns

• Reduce air pollution caused by emissions
• Reduce pollution caused by fluid leakages
• No need for battery disposal or battery charge terminals
High Technological Value

• Advanced motor controls  Improvement of position control
• Material advancements in wire rope & chain  Extended life system and safe operations
• Electric motor technology  Better reliability and increased duty cycle
We’re really tight on floor space so industrial truck movers are not a good option. What do we do?

Let’s move our products and components using overhead lifting...
Oh, so that's what you meant by overhead lifting!
Key Takeaway Points

1. There are both floor-based and overhead material transport systems.
2. Conveyors and Industrial Trucks are the traditional floor-based.
3. Overhead material transport systems include hoists, cranes and monorails.
4. Benefits of overhead material transport systems include:
   - Improving Safety
   - Increasing Productivity & Efficiency
   - Reducing Environmental Concerns
   - High Technological Value
For more information:

www.overheadalliance.org
Appendices

A. Case Studies
   • Hoists
   • Cranes
   • Monorails

B. The Overhead Alliance
   • Crane Manufacturers Association of America (CMAA)
   • Hoist Manufacturers Institute (HMI)
   • Monorail Manufacturers Association, Inc. (MMA)
Selected Case Studies - Hoists

- Unique rail system allows quick hoist exchange
- University-Industry partnership studies auto worker ergonomic situation
- Heavy duty electric chain hoist operates over hot sulfuric acid
- Power station long lift wire rope hoist
- Vertical roller mill maintenance hoists lift up to 200 tons
- Hoist maintenance program reduces downtime

- Crane and hoist efficiently load metal press
- Hoist for critical nuclear weapon applications
- Simultaneously-controlled hoists handle long loads
- Electric hoist for railcar AC maintenance
- Electric chain hoist for low headroom application
Selected case studies - Cranes

- Cranes provide solution for major manufacturer of steam turbines
- ASRS crane facilitates enzyme blending and storage for biofuel manufacturers
- Gantry simplifies loading of large concrete panels
- Custom hoists for railroad car maintenance
- Coke-handling crane increases productivity and reduces downtime
- Improved remote controls solve service center problems
- Cranes service hyrdo-electric plant

- Wall-mounted jibs provide supplemental lifting for crane manufacturer
- Bridge crane with precise hook positioning lifts jet engines
Selected case studies - Monorails

- Sand distribution application
- Monorail reduces maintenance and increases safety in medical supply lab
- Hot metal carrying system for auto-pouring operation
- Tire manufacturer improves productivity
- Stainless steel rail in food plant
- Aerospace company solves die handling problem
CMAA

The Crane Manufacturers Association of America (CMAA) is an independent trade association incorporated in 1955. Member Companies, representing the industry leaders in the overhead crane industry, serve the US market from operations based in the United States, Canada, and Mexico. CMAA is recognized as the leading authority and the principal resource in the overhead traveling crane industry.
HMI

*The Hoist Manufacturers Institute (HMI)* members are the Industry’s leading suppliers of hoisting equipment including hand chain hoists, ratchet lever hoists, trolleys, air chain hoist, air wire rope hoists, electric chain hoists, and electric wire manufacturing and distribution sector. HMI operates through committees with programs and policies reviewed and adopted by the membership with representation from each member company. Its many activities include an active engineering committee. HMI is represented on a number of standards developing committees and actively supports the development and certification of safety standards by the ANSI consensus method.
MMA

The Monorail Manufacturers Association, Inc. (MMA) is an independent incorporated trade association affiliated with the Material Handling Industry. MMA Members produce the preponderance of patented and enclosed track underhung cranes and monorail systems. MMA operates through committees with programs and policies reviewed and adopted by the membership with representation from each member company. Its many activities include an active engineering committee. MMA is represented on a number of standards developing committees and actively supports the development and certification of safety standards by the ANSI consensus method.
Other Overhead Lifting Info Sources

- Cranes Today Magazine
- Hoist Magazine
- Industrial Lift and Hoist
- OCH Magazine
- Material Handling & Logistics Magazine
- Modern Materials Handling Magazine