

Overhead Crane Selection and Information Guide

Welcome to Level Crane Systems' Crane Selection and Information Guide. This guide will help you make an informed decision by detailing the key types of overhead cranes we offer, including **Bridge Cranes, Gantry Cranes, Jib Cranes, Articulating Arms, and Monorails.**

Understanding the unique features, selection criteria, and application suitability of each crane type is crucial to ensuring that you select the best solution for your material handling needs.

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Overhead Crane Selection: What Type of Crane is Right for my Application?

1. Bridge Cranes

Bridge cranes are ideal for lifting and moving materials over large areas. They provide three-dimensional motion: lifting, traveling across the bridge, and moving along the runway. Bridge cranes can be either top-running or under-running and are commonly used in industrial settings like manufacturing, warehouses, and assembly lines.

Types of Bridge Cranes

- **Top Running Bridge Cranes:** Mounted on top of the runway beams, these cranes are typically used for heavy-duty lifting (from 1 to 150 tons). They are typically used to cover large areas and are frequently integrated into the structure of the buildings they are used in.
- **Under-Running Bridge Cranes:** Suspended from the ceiling or floor supported these cranes are typically suited for lighter capacity applications (¼ ton to 10 tons) and are available in manual or motorized variants depending on application requirements.

Selection Criteria for Bridge Cranes

- **Capacity:** Bridge cranes handle a wide range of lifting capacities, from 1 ton to over 150 tons. When selecting a crane, consider the weight of materials and equipment that needs to be handled.
- **Span and Coverage:** Span is determined by the distance between the crane's two runway beams. Larger spans allow for greater coverage and flexibility in large work areas.
- **Duty Cycle:** Choose a bridge crane based on how frequently it will be used (light, moderate, or heavy-duty applications). Heavy-duty cranes are designed for frequent lifting and are typically designed to handle higher weights.
- **Headroom Requirements:** Properly calculate the required hook height to ensure adequate headroom for your application, including necessary rigging and required clearances. Top-running cranes usually have better headroom over similar capacity under-running cranes.
- **Installation Location:** Bridge cranes can be floor-supported, by vertical columns, or ceiling-mounted in areas with available ceiling structures capable of supporting the crane.

2. Gantry Cranes

Gantry cranes are similar to bridge cranes but are supported by vertical legs, either at the floor or ceiling level. They can be motorized or portable, making them ideal for both permanent installations and temporary or mobile lifting needs.

Types of Gantry Cranes

- **Portable Gantry Cranes:** Lightweight and mobile, suitable for small-scale applications, prototyping and maintenance applications. They are easy to assemble, disassemble, and move around.
- **Motorized Gantry Cranes:** These offer powered travel and lifting, making them ideal for production settings where lifting is frequent and heavy loads are involved.
- **Single-Leg Gantries:** A hybrid design where one side of the crane is supported by a single vertical leg while the other is mounted on an elevated structure. These are useful when only one side needs access to open space.

Selection Criteria for Gantry Cranes

- **Capacity:** Gantry cranes range from light-duty (½ ton) to heavy-duty (up to 80 tons). The load capacity should match the materials you need to lift.
- **Portability:** Portable gantries offer mobility and flexibility, ideal for temporary use or in environments with limited space.
- **Span and Travel:** Motorized gantries offer large spans and can travel long distances, ideal for large-scale production operations.
- **Environmental Conditions:** Consider the conditions in which the crane will be used (indoors, outdoors, or in harsh environments). Ensure the crane is built to handle those conditions.

3. Jib Cranes

Jib cranes are versatile and space-efficient systems used for localized lifting. They are ideal for moving materials over a smaller radius in a specific work area and are commonly found in assembly lines, maintenance shops, and manufacturing environments.

Types of Jib Cranes

- **Freestanding Jib Cranes:** These are self-supporting cranes with a 360-degree rotation. They can be installed in any location with adequate floor space.
- **Wall-Mounted Jib Cranes:** These cranes are mounted on a wall or structure, offering up to 180-degree rotation. They are ideal when floor space is limited or for use in tight workspaces.
- **Mast-Style Jib Cranes:** Supported by both the floor and ceiling, these cranes provide higher lifting capacity and better structural support, making them suitable for heavy-duty tasks.
- **Workstation Jib Cranes:** Designed for light-duty, repetitive lifting, these cranes often feature an enclosed track and can be used for tasks like lifting components in and out of CNC machines or assembly lines.

Selection Criteria for Jib Cranes

- **Capacity:** Jib cranes can handle a wide range of loads, from 250 lbs. for workstation jibs to 15 tons for industrial applications.
- **Rotation:** Consider the rotation you need for your application. Freestanding jibs offer 360-degree rotation, while wall-mounted jibs typically provide 180-degree rotation.
- **Space and Floor Layout:** Wall-mounted jibs are ideal when floor space is at a premium, while freestanding jibs offer more flexibility in coverage.
- **Work Area:** Jib cranes are perfect for localized lifting and handling tasks in confined spaces, providing flexibility where traditional overhead cranes cannot fit.

4. Articulating Arms

Articulating arms are highly flexible lifting devices that offer exceptional precision and versatility in tight or congested spaces. These systems are typically used for ergonomic lifting, positioning materials, and handling complex tasks requiring high mobility.

Types of Articulating Arms

- **Horizontal Articulating Arms:** These arms rotate around a central pivot and offer movement across several axes. They are ideal for applications requiring precise material handling in tight spaces.
- **Parallel Articulating Arms:** These arms feature multiple parallel segments that work together to lift and lower materials with a high degree of precision. They can be equipped with pneumatic cylinders for smooth, controlled movement.
- **Torque Arms:** Designed for vertical lifting, torque arms prevent unwanted movement during lifts and are ideal for applications requiring precise control, such as tool balancing or lifting material in industrial settings.
- **Mast-Style Articulating Arms:** Similar to torque arms, but larger and designed to handle off-center loads. These arms are often suspended from a bridge crane for 360-degree movement.

Selection Criteria for Articulating Arms

- **Flexibility and Reach:** Articulating arms are ideal for tasks requiring significant flexibility and reach, allowing operators to handle loads around obstacles or in confined spaces.
- **Capacity:** Articulating arms are generally used for light to medium loads, with specialized models like torque arms and mast-style arms available for heavier lifting.
- **Precision:** These arms are ideal for applications requiring precise, ergonomic lifting with a high degree of control.
- **Work Environment:** Consider if you need to operate in tight spaces or if the crane must move around obstacles. Articulating arms excel in such environments.

5. Monorail Cranes

Monorail cranes are simple, cost-effective systems that use a single beam and hoist to move materials along a fixed path. They are ideal for light- to medium-duty applications and repetitive material handling tasks.

Types of Monorail Cranes

- **Overhead Monorail Cranes:** Fabricated of structural beam or patented track, these systems run along a beam mounted on the ceiling and are ideal for applications where material needs to be moved across a fixed path.
- **Enclosed Track Monorail Cranes:** Monorails with a closed, internally guided track. These are commonly used in workstation crane systems and are ideal for repetitive lifting tasks and lighter capacity lifting.

Selection Criteria for Monorail Cranes

- **Capacity:** Monorail cranes are generally best for lighter-duty applications, typically lifting up to 5 tons. Choose a system that can handle the materials you need to move.
- **Travel Path:** Monorail cranes operate along a fixed path, so their layout must fit the work area's structure. Consider the travel distance and how the crane will integrate into your workflow.
- **Space Efficiency:** Monorails are ideal for environments with high ceilings and limited floor space. Enclosed track monorails reduce maintenance and ensure smoother operation.
- **Repetitive Tasks:** Monorails are perfect for repetitive, linear material handling tasks, making them suitable for assembly lines, warehouses, and factories.

Key Considerations: Important Factors in Determining the Right Lifting Solution (All Cranes)

When selecting the right crane for your needs, consider the following factors:

Load Capacity

The first step in crane selection is to understand the maximum weight the crane will need to lift. Overhead cranes come in various load capacities, from light-duty units to heavy-duty industrial systems.

- **Light-duty cranes:** These systems are suitable for lifting smaller loads (e.g., up to 2 tons) and are ideal for applications like assembly, maintenance, and handling small parts.
- **Heavy-duty cranes:** Heavy-duty cranes, with capacities from 5 tons to 200 tons or more, are designed for handling large or extremely heavy loads in industrial settings such as steel mills, automotive manufacturing, and large-scale production facilities.

Ensure the crane you select has an adequate safety margin. It is recommended that your crane's rated capacity exceeds the maximum load you expect to lift to account for unexpected weight fluctuations and to avoid overloading the system.

Span and Coverage Area

The span refers to the distance between the crane's runway rails and its area of coverage. The size of your workspace and the areas where lifting and material transport will occur will influence this decision.

- **Longer spans:** Suitable for larger industrial facilities with wide production areas. These cranes require more extensive runway systems, like top running bridge cranes or gantry cranes, which can cover a broader range.
- **Compact spaces:** If you have limited space, an underhung bridge crane or a workstation crane could be the ideal choice since these cranes require less headroom and can operate efficiently in confined areas.

Consider your facility's layout and whether your crane needs to reach multiple areas or focus on specific zones.

Headroom and Installation Height

Your available headroom (distance from the floor to the ceiling) plays a critical role in crane selection. Cranes that require less overhead space will ensure optimal coverage and help you make the most of your facility's height.

- **Low headroom options:** If your ceiling height is limited, a low headroom top running crane, under-running bridge crane, or workstation crane might be necessary. These options maximize the use of space and still provide high lifting capabilities.
- **Standard headroom:** If headroom is not a major concern, standard bridge and hoists may be used, providing potential cost-savings over their low-headroom counterparts.

Evaluate your facility's ceiling height and clearance to ensure the crane will operate within your available space without interference.

Duty Cycle (Usage Frequency)

Understanding how often and how intensely the crane will be used is critical to choosing the right crane system. Duty cycle refers to the frequency and load at which the crane will operate.

- **Light Duty:** For occasional or low-intensity lifting operations (e.g., less than 2 hours per day), light-duty cranes such as workstation cranes or small jib cranes are ideal.
- **Medium Duty:** For moderate lifting operations (e.g., 3-5 hours per day), single girder bridge cranes or motorized gantry cranes can provide the necessary durability and performance.
- **Heavy Duty:** For continuous and high-intensity use (e.g., more than 6 hours per day), you may require a double-girder top running crane or a freestanding gantry crane, which are designed for prolonged, high-capacity operations.

Selecting the correct duty cycle ensures that your crane is optimized for the work environment, preventing overuse, and extending the system's lifespan.

Environmental Conditions

Crane systems must be adapted to the specific environment in which they will operate. Environmental factors such as temperature extremes, corrosive elements, dust, moisture, and the presence of hazardous materials can affect the crane's performance and lifespan.

- **Harsh environments:** If the crane will be used in a corrosive, extreme- temperature, or hazardous environment (e.g., chemical plants, outdoor sites, or steel mills), it may require corrosion-resistant coatings, weatherproof enclosures, or specialized materials.
- **Clean environments:** For clean room environments like semiconductor manufacturing, the crane may need to be made from non-contaminating materials and have sealed components to minimize the risk of contamination.

Carefully evaluate the working environment and ensure the crane is designed to withstand the conditions it will encounter.

Crane Control Options

The type of crane control system will determine how operators interact with the crane. The control system you choose can impact operator efficiency, safety, and comfort.

- **Push-button pendant controls:** Common in basic operations, where the operator stands near the crane to control its motion. Ideal for small-scale operations and light-duty tasks.
- **Radio controls:** Radio frequency controls provide operators with the ability to control the crane from a distance, enhancing safety by keeping operators away from the load and the lifting area. This option is ideal for larger facilities or applications requiring precise maneuvering.
- **Cab-controlled cranes:** Used for large or complex lifting operations, where the operator stays within a dedicated crane cabin to control the crane's movement. These cranes are typically found in heavy-duty industrial applications.

Consider how your operators will interact with the crane and whether distance, precision, or complex motions will be required.

Power Supply and Electrical Considerations

Crane systems require a power supply to operate, and you will need to decide whether the crane will be manually powered or electrically powered.

- **Electric cranes:** Most modern cranes are electrically powered and can come with options for variable speed drives (VFDs), which enable better control of speed and acceleration and improve energy efficiency.
- **Manual cranes:** For lighter loads or more budget-conscious applications, manual systems like chain hoists or manual jib cranes may be suitable, though they come with more physical demand for operators.

Ensure your facility has the electrical infrastructure needed for an electric crane or select a manual crane system if power availability is limited.

Safety Features

Safety is paramount in crane operation. Always ensure the crane you select adheres to the highest safety standards, as defined by OSHA and industry best practices. Key safety features to consider:

- **Overload protection:** Prevents lifting beyond the crane's rated capacity, avoiding overloading and ensuring safety.
- **Emergency stop buttons:** Allows operators to quickly stop the crane in the event of an emergency.
- **Limit switches:** Prevents the hoist or trolley from moving beyond safe operational limits.
- **Anti-sway systems:** Helps stabilize the load during movement, preventing dangerous swinging or swaying, which is particularly important for heavy or oversized loads.

Regularly maintain safety systems and ensure that operators are trained in crane safety and operation protocols.

Maintenance and Downtime

A reliable crane system requires ongoing maintenance to ensure smooth and safe operations. The level of maintenance needed will vary by crane type.

- **Low-maintenance cranes:** Systems like enclosed track cranes or workstation cranes tend to have fewer maintenance requirements and are ideal in operations where minimizing downtime is a priority.
- **High-maintenance cranes:** Heavy-duty cranes such as top-running cranes and gantry cranes may require more frequent servicing due to their size and the intensity of their usage. These cranes often involve more complex components and larger systems, which need periodic inspection and maintenance.

Next Steps

Selecting the right overhead crane is a critical decision that impacts your operation's efficiency, safety, and long-term success. By understanding the key benefits of each crane type, you're better equipped to choose a solution that aligns with your facility layout, application demands, and operating environment.

We hope this guide has provided valuable insights to help you evaluate and narrow down the best crane options for your needs.

For personalized support, call Level Crane Systems at 1-800-517-7247 to speak directly with one of our experienced crane specialists. We're here to help you make a confident, informed decision—and to ensure your next crane system is a perfect fit for your operation.