

Installation - From Conception to Completion

So here we are...you've done all of your research, decided on the type of crane you need for your facility, selected a manufacturer to partner with, signed an agreement, and cut the deposit check. So what happens next? Installation.



It can feel like there are so many moving pieces and parts during the course of a crane installation including:

- The timeline of the overhead crane installation—including steps that take place between a signed purchase order, and the day that the installers roll up to your facility with your crane on their trucks
- The communications that take place between your team and the overhead crane installers prior to installation
- What the installers need to know about your facility or construction site prior to installation

Whether this is your first time going through an overhead crane installation, or you've gone through multiple crane installations, we hope you can learn something to help keep your next install on schedule, within budget, and keep your workers safe.

What Occurs Before the Installation of an Overhead Crane System?

Any special considerations for an overhead crane installation actually begin during the quotation process. During that process, the overhead crane installer will review generic drawings of the crane equipment and review blueprints or building floor plans to give their best estimate of what it will take to install an overhead crane in the customer's facility.



In the quote, the crane installer will provide a window or time frame that they think they'll need to complete the crane installation. This can range anywhere from 2-10 business days, to a longer time period for more extensive or complex crane installations. This estimated installation window will be consecutive working days—once they've brought the cranes, trucks, materials, and all installation equipment on-site, they can't break up their time, or stop and re-start the installation, without significant increases to cost of the crane installation.

Once a purchase order is received, the overhead crane manufacturer will begin building and assembling the crane itself—a process that can take anywhere from 2 to 12 months. About a month out from the expected completion date, the installer will reach out to the customer or general contractor to establish contact with the necessary parties.

During this initial contact the following will be established:

- Introductions between the installers and the general contractor, or staff who will be involved during installation
- Set up a time to come out and perform an analysis of the job site or facility
- Agree on an anticipated installation date. Know that this is a fluid process and the date can change due to production schedules and/or construction delays.
- Set up a weekly status call to determine if the project is still on track. This helps to keep an open line of communication so any issues or challenges can be addressed that may affect the installation time frame

Before an overhead crane can be installed, the installer will want to visit and analyze the proposed building or job site to get their bearings, understand the layout, and identify any potential hazards or obstacles.

While they're on site, they'll consider and evaluate the following things:

- Scope of work
- Installation area
- Identify potential hazards
- Details for existing runways or new construction runways

Keep reading, as we'll break down what each of these means, as well as provide you with some additional considerations to make sure that your overhead crane installation goes as smoothly as possible.



Evaluate the Scope of Work

Once you've signed an agreement to purchase an overhead crane, the installer will receive a copy of the purchase order. Once they receive the purchase order, your overhead crane installer will contact you and arrange to come to the job site and meet with your team. This meeting typically involves a Maintenance Supervisor or Plant Manager for an installation at an existing facility, or a General Contractor at a new construction site.

The installers will want to review any signed approval drawings and building prints to get an understanding of the space that they'll be working in, as well as the span and length of the runway structure that the overhead crane will be utilizing.

They'll also begin compiling a list of equipment and materials that will need to be brought on site for installation. This can include:

- Semi-trucks, trailers, and flatbeds
- Mobile installation cranes to lift the bridge and runway beams
- Generators
- Scissor lifts
- Personal fall protection equipment and other personal protection equipment (PPE)

The crane installer also wants to identify where they can access the building to bring in their equipment and materials. The cranes will be loaded onto flatbed trailers and hauled onto the site, so they will need free and clear access for trucks, mobile cranes, and personnel to move freely in and out of the facility without disruption.

Working with the General Contractor or Production team at the facility, the installer will want a clear picture of the timeline for the overhead crane installation. They'll need to know what production or construction issues may occur that could cause a delay in scheduling the crane installation.



Review the Area Where the Crane Will be Installed

During their site visit, the overhead crane installers will spend a good amount of their time reviewing the area where the crane will actually be installed. On a new construction project, they'll start roping off the area to give the General Contractor an understanding of the area that they will need to be cleared out during the crane installation process.

The crane installers will also identify any equipment or machinery that needs to be moved out of the way so that their trucks and equipment can get onto the grounds of the facility, set up a staging area, and have free and clear ground access to the site.

During this site visit, the installers hope to speak with as many sub-contractors as possible, so they understand what the timeline is for construction and what other work might be going on around them during the install.

They'll need to consider the timing and installation windows of other items like:

- Electric and gas line installation
- Concrete or other masonry work being performed
- Overhead light fixtures
- Duct work / roofing work
- Plumbing

For a crane going into an existing building structure, they'll rope off or mark the area that they will be using for the installation. Typically, they have other sub-contractors spray or mark load ratings on the floor and structural supports so they can identify those once all of the equipment and trucks arrive.

The crane installer also makes note of any obstacles they may need to maneuver around and takes pictures of the building layout to share with their team so that they can develop an action plan.

Some of these obstacles may include:

- Identifying the type of flooring (concrete, dirt, etc.) and also understanding the load requirements for bringing in heavy-duty equipment and trucks
- Identifying load requirements for structural support beams for existing runways
- What equipment or machinery will be operational during the installation process and what employees, if any, will be working near or around the area?



Identify Potential Hazards

The overhead crane installer will need to identify any and all potential hazards so that they can plan and prepare their team accordingly. Different types of hazards may require specialized protection (PPE) for their team, specialized permits, and other special considerations to make sure that the crane installation is performed safely.

These are the types of hazards that an overhead crane installer will look to identify prior to the overhead crane installation:

- **Energy Sources** – overhead electrical or gas lines, power/conductor bars, lighting fixtures, etc.
- **Traffic Sources** – forklifts, manlifts, trucks and semis, personal vehicles, pedestrian walking paths, foot traffic, etc.
- **Environment** – presence of excessive heat, hot metals, chemicals, etc.
- **Working at Heights** – anything over 4 feet, ladders, scaffolding requires proper fall protection
- **Hazardous Energy** – identify any equipment requiring lock-out/tag-out per OSHA 1910.147
- Any additional hazards identified by the customer or installer



Review Details for the Crane's Runway System

Whether the overhead crane installer is building a new runway system, or utilizing an existing runway system, the installer will want to plan accordingly to make sure that the crane installation goes smoothly.

For an existing system, the installer will want to verify the span measurement per the approval drawing. They will also inspect the runway beams and any type of electrification system to make sure that everything is in proper alignment. A runway system that is out of alignment can cause operation problems and cause premature wear on the components of an overhead crane.

For a new installation of a runway system, the installer will review all approval drawings and specifications, verify measurements and support loading ratings, and also identify any process lines, machinery, or other items that may

interfere with installation. The installer will also need to verify that the crane will be able to pull power from the building and all electrical work will be complete prior to the scheduled install date.



Commit to the Installation Date

As you get closer to the actual installation date, phone calls and conversations with the installers will become more frequent—possibly even occurring daily. Everyone will want to be on the same page so that any changes in scheduling, staffing, or production can be communicated so that adjustments can be made to the scheduled crane installation time frame.

Once you get within an agreed-upon window prior to the scheduled installation date, everything begins moving full speed ahead in order to coordinate the logistics, transportation, and scheduling of workers, material, and equipment.

Some overhead crane manufacturers require 30 days change notice to the scheduled install date, and other manufacturers may only require 7 days prior to make any changes to the scheduled install date. Make sure that you have a clear understanding of the “point of no return” for your overhead crane installation. Once the process gets rolling, there’s really no way to stop it as the crane and installation equipment is probably en route to your facility.

Also, consider all of the different people that will be involved in the installation process and all of the effort involved to coordinate their schedules:

- Truck drivers
- Mechanical installers and mechanical assemblers
- Riggers, who will do the majority of the unloading and setting up of equipment
- Crane operators
- Electrical specialists
- Crane technicians

Your agreement or contract with the installer will specify that if any type of delay occurs within that 7-30 day cancellation window, you will incur significant charges related to paying employee wages, and rental of equipment. It is so important that you keep in constant communication with the crane installer and notify them immediately of any issues or concerns that could delay their installation time frame.

Load Test Your Newly Installed Crane System

Once the crane has been erected and installation is complete, the crane will need to be started up and load-tested to make sure everything is in working order. A third-party testing company may be brought in to perform the test and ensure that the crane will operate safely and productively.



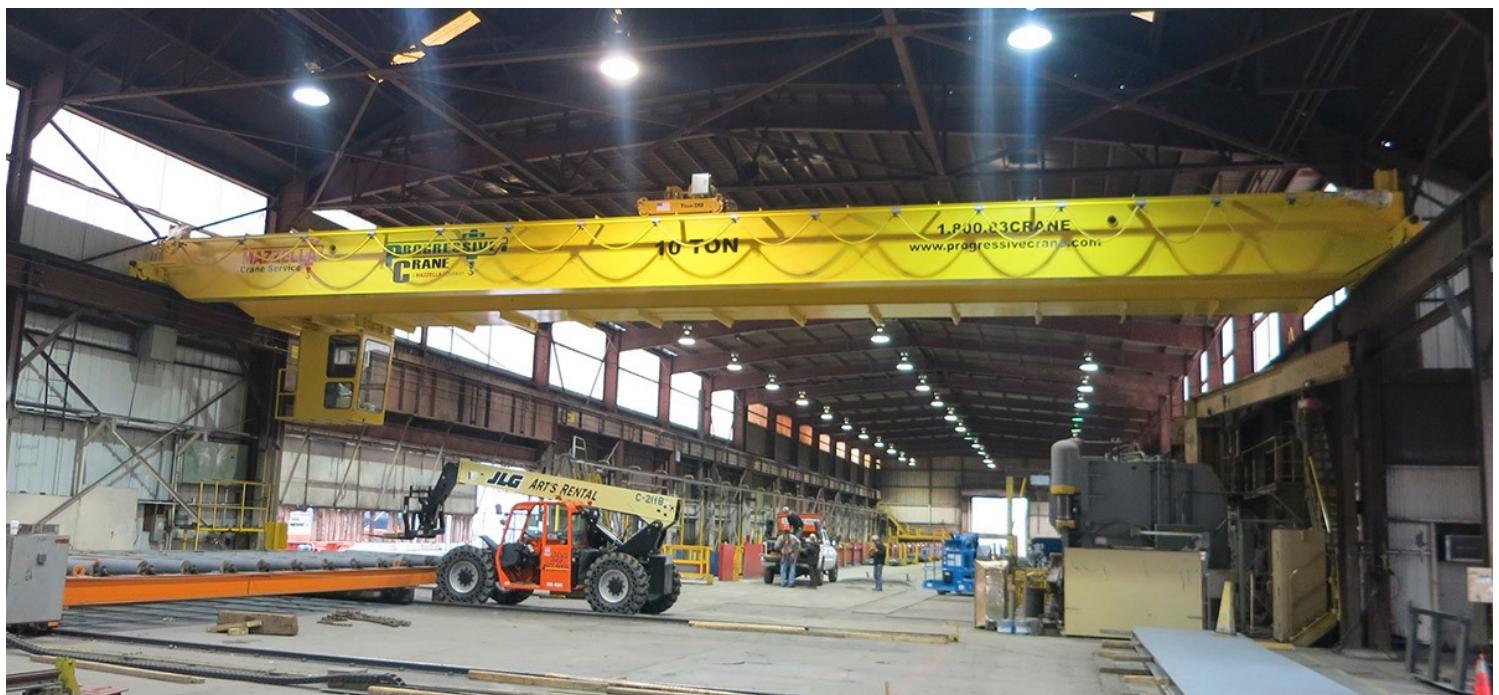
Per OSHA 1910.179 Overhead & Gantry Cranes Regulations, your new crane system will need to have two operational tests, plus a rated load test performed prior to initial use:

- Testing of the hoist operation up and down; trolley travel; bridge travel; limit switches and locking and safety devices
- Testing of the trip setting of the hoist limit switches to make sure the actuating mechanism of the limit switch is functioning properly
- Load test the crane at no more than 125% of the rated load and keep test reports on file where readily accessible

The load testing of the crane can be performed with a variety of materials including concrete, steel, or water weight bags.

Installing an Overhead Crane in an Existing Facility

When it comes down to it, installing an overhead crane system into an existing building structure is a completely different process than installing a crane into a new construction facility. With a new construction installation, the building's support structure, layout, plumbing, electrical/lighting, HVAC and duct work can all be designed so that they don't interfere with the installation and operation of an overhead crane. The installation window can be more flexible because you don't have to worry about affecting production.



Unfortunately, most crane installations don't occur in a brand new facility with a flexible installation timeframe and a blank slate to design and build the structure around the crane itself. In most cases, the design and engineering team has to retrofit an overhead crane and its support structure into a space that wasn't originally designed for a crane system. To further complicate things, production is already up and running with employees moving about and machinery and other equipment in operation—all creating obstacles for getting installation equipment and materials into the building.

Unique Considerations for Designing and Installing an Overhead Crane in an Existing Building Structure

In this section, we'll discuss how the following factors can affect the timeline and the success of a crane installation:

- Production
- Free and clear access to the building and installation site
- Delivery dates
- Machinery and special equipment required for installation
- Safety programs and requirements



Production

If you ask any overhead crane manufacturer what the most important consideration is for installing an overhead crane in an existing building, they'll tell you that it all comes down to production. The customer's Production and Operations teams absolutely need to be on-board with the agreed-upon installation window and time frame.

Because the crane is being installed in a facility where production is already operational, the installation will typically be scheduled during a total or partial production shutdown. It's ideal for the installers to not have to worry about other machinery or equipment that might be running, or to have to worry about employees being near or in the area where the installers will be working. This increases the efficiency of the installation and also the safety for both the installers and the customer's employees.

However, it's understandable that not all customers are willing to totally shut down their production. To prevent any disruption in production, installers can be flexible and schedule installations during weekends, 2nd or 3rd shifts, or during holiday breaks. These types of installations typically come at a higher rate than the standard hourly rate because the installers are working non-traditional hours and may have to run continual shifts to complete the installation during the desired time frame.



Free and Clear Access to the Building and Installation Site

Prior to the installation, the installers will visit the customer's facility and perform a Job Site Overview (JSO). During their visit, they may rope off or mark the area where the overhead crane system will be installed and they'll also get an understanding of the building layout. Most importantly, they need to come away with an understanding of where and how they can bring their trucks and equipment into the facility—including access to doorways and ramps that they can utilize.

Will the equipment and machinery need to travel through areas where production is running? Will production shut down? Is installation occurring in a part of the building that isn't in use yet? The installers need a clear understanding of what obstacles or machinery they need to maneuver around, and what employees, if any, will be working in those areas.

During the JSO, they also need to have an understanding of the load requirements for certain parts of the building, including:

- Structural support beams
- Roofing
- Foundation and flooring (concrete, dirt, gravel, etc.)
- Any existing runway structures

These load surveys need to be performed by a third-party civil or structural engineer and are the responsibility of the customer to coordinate and facilitate prior to the installation.



Delivery Dates

During the overhead crane quotation process, the Project Manager or Sales Engineer will work with their team to determine how quickly they can source the components, get them ordered, and have them delivered based on the customer's specifications.

The biggest contributing factor to whether the crane installation can happen during the customer's preferred timeline is how quickly the main components—including the hoist, trolley, and end trucks—can get approved and how fast the supplier can ship them. Your crane company can work with their vendors to expedite or rush delivery, but those expedited fees will get passed on to the customer.



Machinery and Special Equipment Required for Crane Installation

Overhead crane installers typically bring their own equipment, or rental equipment, on-site for an installation, but can use a customer's generators, welding equipment, man lifts, Lull material lifts, or forklifts if it presents a cost-savings opportunity to the customer. However, if an agreement is reached where the installers will use the customer's

equipment, the installers require exclusive use and the customer will have to agree to forfeit use of the equipment for the duration of the installation.

Each job is unique and requires its own set of equipment and machinery to lift the runway beams, bridge girders, and hoist up into the air and into their final position.

Often times, the materials required for installation need to be lifted up and over existing equipment on the production floor, lowered down into a pit, raised up into a mezzanine. In some extreme cases, we've even cut a small hole into the roof to allow the hook block to drop through the opening to achieve greater lifting headroom.

Some of the pieces of equipment that an overhead crane installer may use, include:

- Carry deck cranes
- Mobile cranes with operators
- Existing overhead cranes in the facility
- Man lifts—boom lifts and scissor lifts
- Lull material handlers
- Versa Lifts / Tri-Lifters
- Ladders and scaffolding

Another thing to keep in mind is that you'll need to reserve an area on your property where the installers can stage their equipment when not in use. They'll need a place to park flatbeds and trailers, as well as keep their mobile cranes, scissor lifts, and the support structure beams. These can be kept on open land, in a reserved area of the parking lot, or in an empty area of the building if the entry doors and building space allows it.

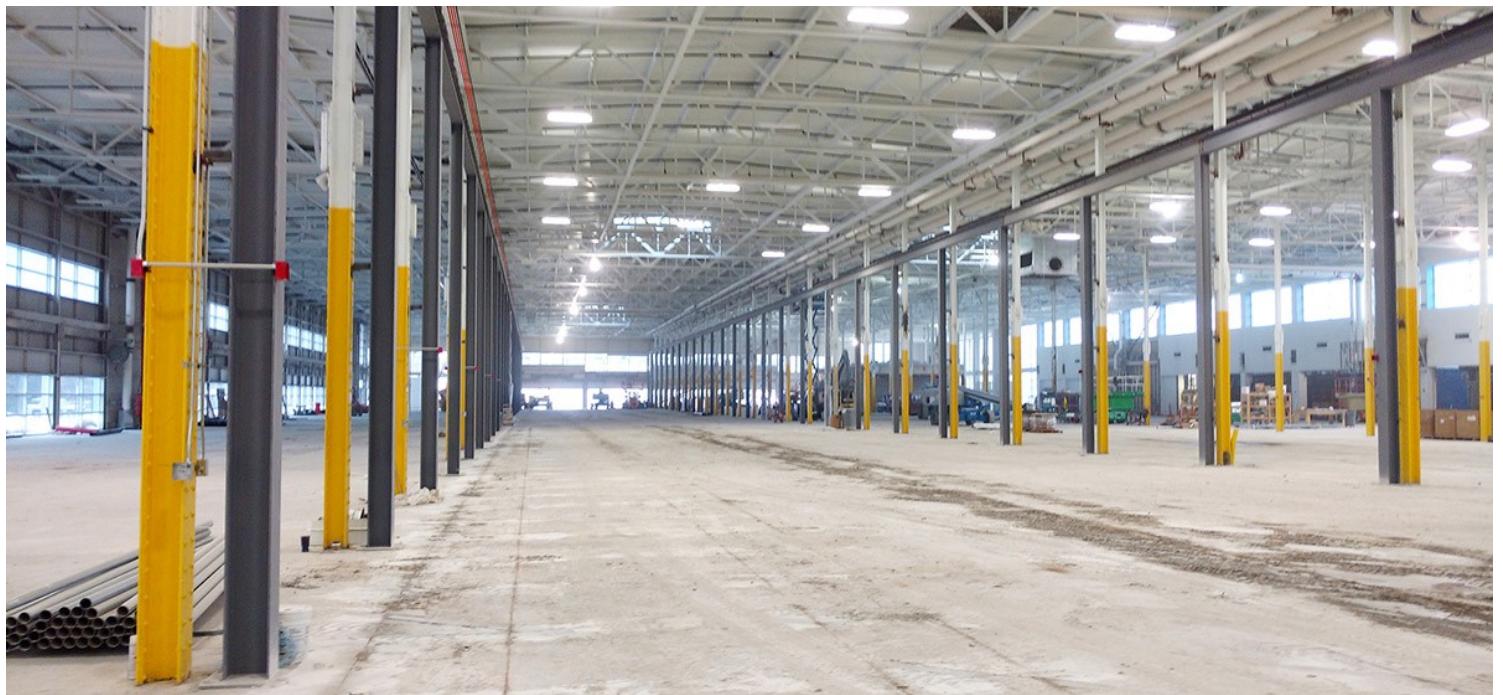


Safety Programs and Compliance

Some facilities require contractors and vendors to have site-specific safety training, perform a background check, take drug tests, or have certified operator cards to use forklifts or man lifts. If your job site has these requirements, make sure the installers are aware so any unplanned delays don't affect the timing and cost of the installation. In some cases, like where a background check is required, this process needs to be started several weeks in advance to ensure completion before the installation begins.

What Structural Considerations Affect the Design of the Crane?

A bridge crane can be supported by the roof/ceiling, a freestanding support system, or can be tied back to the existing building supports. In an existing building structure, you have to have a clear understanding of the load ratings for the roof, concrete and foundation, and existing building supports.



A third-party should come in to provide a structural survey—you may need independent surveys of the:

- Concrete or flooring to determine load ratings
- Roof load ratings
- Existing structural support load ratings

To make sure the building is structurally sound to support an overhead crane system, it's the customer's responsibility to have their building surveyed by a third-party, or by their own building engineers, prior to the installation.

A crane installer may be able to help coordinate the effort, but they will not perform the surveys or load ratings themselves. The results of these ratings can determine if the crane is supported from the roof, is a free-standing design, or can be tied back to existing supports.

The deadweight of the crane, or the loads on the structure which remain fixed even when the crane is not performing a lift, need to be considered. Ceiling beams, flooring, and support beams can be reinforced with internal bracing, or can be totally redesigned to spread the load between multiple points versus a single point.

Clearance space around the area that the crane will be installed in will also affect the design and specifications of the crane. If there's low headroom in the facility, then the crane may have to be designed to be under running vs a top running design. If the crane needs to lift material high into the air, then a top running double girder design would be ideal. If hook approach on either end of the bridge is a factor, then a single girder bridge design will allow your trolley the most travel across the bridge to take advantage of the full span of the crane system.

Lastly, the installers will need to have a clear understanding of the building's voltage supply. The customer will need to confirm whether the building is equipped with a 230V or 460V electrical supply. This voltage needs to be determined prior to ordering any components such as hoists or end trucks.

Testing the New Overhead Crane System

Once the overhead crane installation is complete, the installers will test the functionality of the new overhead crane system and also perform a rated load test.

OSHA 1910.179 Overhead & Gantry Cranes Regulations states that:

1. Prior to initial use all new and altered cranes shall be tested to insure compliance with this section including the following functions:
 - Hoisting and lowering
 - Trolley travel
 - Bridge travel
 - Limit switches, locking and safety devices
2. The trip setting of hoist limit switches shall be determined by tests with an empty hook traveling in increasing speeds up to the maximum speed. The actuating mechanism of the limit switch shall be located so that it will trip the switch, under all conditions, in sufficient time to prevent contact of the hook or hook block with any part of the trolley.



Test loads shall not be less than 100 percent, or more than 125 percent, of the rated load unless otherwise recommended by the manufacturer. These test reports shall be placed on file where readily available to appointed personnel. Overhead cranes can be tested using water weights or by using loads on-site. Load testing is included with any installation or crane upgrade or modernization.

Lastly, once the overhead crane equipment has been tested for proper functionality, the installers will provide training to the operators and end-users on their new equipment. Training can range from a couple of hours to a couple of days—it all depends on the customer's requirements. Most of the time, the training requirements will be written into the project specifications, so the length and thoroughness of training will be agreed-upon prior to installation.

Training can be as simple as walking one operator through the basic motion controls of the crane, or it could be more in-depth focusing on troubleshooting maintenance issues for individual components and understanding and identifying diagnostics and fault codes.

Wrapping it up

As you can see, successfully installing an overhead crane into an existing building structure requires active involvement from the customer's production and operations departments, third-party engineers and surveyors, project managers, equipment suppliers, and installation technicians. With all of these moving pieces and parts, you'll want to select a reputable and experienced overhead crane manufacturer to partner with for your overhead crane design and installation.