

A Class Above...

In Productivity.

In Safety.

In Ease of Positioning and Movement.

In Ease of Installation.

In Designs, Capacities, and Spans.

It's no wonder more and more businesses like yours are choosing Gorbel. As an innovator and leader in the enclosed track work station crane industry, Gorbel provides a wide variety of overhead solutions. Our work station systems include ceiling mounted bridge cranes and monorails (both covered in this brochure), free standing work station bridge cranes, and work station jib cranes. And we're also a leading manufacturer of high-performance manual and motorized jib cranes. All this, plus quick delivery and the industry's best warranty.



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How to Apply Ergonomic Overhead Work Station Cranes

These questions and answers can help you determine which type of overhead work station crane best meets your needs.

What Type of Crane Is Most Appropriate?

- Bridge cranes cover rectangular areas, while jib cranes cover circular areas.
- Bridge cranes can be hung from the ceiling (see this brochure) or be floor supported (see the *Gorbel Free-Standing Work Station Crane* brochure). Jib cranes can be wall or pillar mounted and may require a special foundation (see the *Gorbel Work Station Jib Crane* brochure).
- An enclosed track work station bridge crane provides consistent ease of operation over the full range of movement.
- Jib cranes move more easily at the very end of the boom and are more difficult to move as the load approaches the pivot point.

Should the crane be manual or motorized?

Ease of movement and light weight are key features of enclosed track work station crane systems. In fact, manual work station cranes do the job faster than motorized cranes. If the operator cannot control the load throughout the operation (for instance, over a vat, pit, or other inaccessible area), then the crane should be motorized.

What type of suspension: ceiling mounted or free standing?

- With ceiling-mounted systems, supporting steel does not interfere with the handling operation. Ceiling-mounted systems require a building with an adequate overhead structure to hang the crane (see loading formula on page 4).
- Free-standing (floor-supported) systems do not put stress on the building's overhead structure. Installation is usually more straightforward, and these cranes are also easier to relocate in the future. These systems require a reinforced concrete floor of at least 6 inches.

What capacity, bridge length, and height?

The general rule is "less is more"

- *Keep capacities to a minimum.* Gorbel Work Station Cranes are designed with an adequate safety factor. If you "over-buy capacity," the operator will need to move extra bridge dead weight, which would not be a good ergonomic solution.
- *Keep bridge lengths to a minimum.* The less dead weight an operator has to move, the better. Short bridge lengths are better for higher-cycle production areas. Longer bridges are acceptable for lower-production cycle or maintenance areas.
- *Keep bridge heights to a minimum.* Keeping the height less than 14 feet is desirable because it makes it easier to control and position the load.

Can the operator safely move the load?

- A work cell should be designed so a task can be performed by 90% of the workers.
- A worker should not exceed 33% of his or her capacity; otherwise, the risk of chronic fatigue increases.
- To help determine if your worker can safely move the required loads, refer to the Ergonomic Study by Shealy and Stibitz ©1993, which is available through your Gorbel Dealer.

Enclosed Track Design Makes for Easy Movement and Long Life

Both the aluminum and steel Gorbel Work Station Crane Systems utilize enclosed track that is high in strength and low in weight. Major advantages:

- Enclosed track cranes are easier to move than traditional bridge cranes.
- The design virtually eliminates dirt and dust from the rolling surface, thus reducing wear on the wheels of the trolley and end trucks.
- The smooth running surface means lower rolling resistance.
- The low profile of the steel track allows the system to be installed where headroom is a problem.
- The low track weight reduces the applied forces exerted on the supporting structure.
- Long spans allow systems to be installed where hanging points are infrequent (up to 30 feet with the steel truss design).
- Four distinct sizes of track -- 250, 500, 1000, and 2000 series -- enable you to keep bridge weights and costs to a minimum.



The 2° taper of the running flange helps to center the trolley in the track for smooth, effortless movement of

TRUSSED STEEL TRACK:

Permits longer spans when frequent support points are not available.

The trussed series uses the plain steel track profile but is enhanced for longer spans via a built-up truss design. This design increases the span, which decreases the need for frequent hangers. Model numbers start with: GLCS (for bridge cranes) and GLMS (for monorails) for spans up to 20 feet; GLCSL or GLMSL for spans up to 25 feet, and GLCSLX or GLMSLX for spans up to 30 feet.

Long spans translate into fewer runway support points, longer bridge lengths, and free-standing capabilities... just another reason why Gorbel Work Station Cranes are among the most versatile to apply and easiest to install in the industry.

ALUMINUM TRACK:

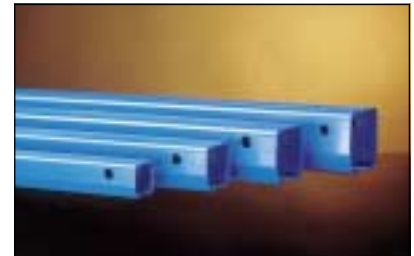
For use where lower bridge weight and easier movement are required.

The patented shape of Gorbel's aluminum enclosed track provides for low weight, unparalleled spanning capability, and effortless movement. The low weight (up to 44% less than trussed steel track) results in easier movement, which makes for safe, productive, ergonomic work cells. Runway spans up to 20 feet and bridge lengths up to 34 feet meet a wide range of applications. Model numbers start with AL (for bridge cranes) and ALM (for monorails).

PLAIN STEEL TRACK:

For use where frequent support points are available or where maximum headroom is required.

The standard hot-rolled steel track profile offers a low-weight to high-strength ratio. Model numbers start with GLC (for bridge cranes) and GLM (for monorails).



Plain Steel Track



Trussed Steel Track



Aluminum Track

Rigid Runways Provide for Superior Positioning of Loads

Gorbel Work Station Bridge Cranes are installed so that the runways are rigid. They do not move laterally or longitudinally. In addition, Gorbel's floating end trucks with horizontal wheels prevent binding. The combination of these design features results in unmatched ease of positioning and ease of movement. The bridge travels smoothly down the runways, and movement is unvarying along the way, no matter where a load is positioned on the bridge. This allows superior load positioning.

Another advantage of rigid runways is that they can be reinforced (Gorbel's trussed "S" series), so they are useful where long spans are required. This eliminates the need for expensive intermediate support stringers, and it lowers overall installation cost.

Mixed Capacity Bridge Crane Systems:

Reduced bridge dead weight equals better ergonomic solutions.

Mixed-capacity systems allow multiple lower capacity bridges to be used on higher capacity runways, provided the equivalent center loads (ECL) are verified at the factory to ensure that runways and hangers are not overloaded. For example, using Gorbel's mixed-capacity end trucks, four 500 lb. bridges (utilizing 500 series rail) can be hung from a 2000 lb. runway, allowing side-by-side use of *all four bridges* without overloading the system. By mixing bridges of various sizes and capacities, mixed-capacity systems offer reduced bridge dead weight, easier movement, and reduced cost.

What is meant by Rated Capacity?

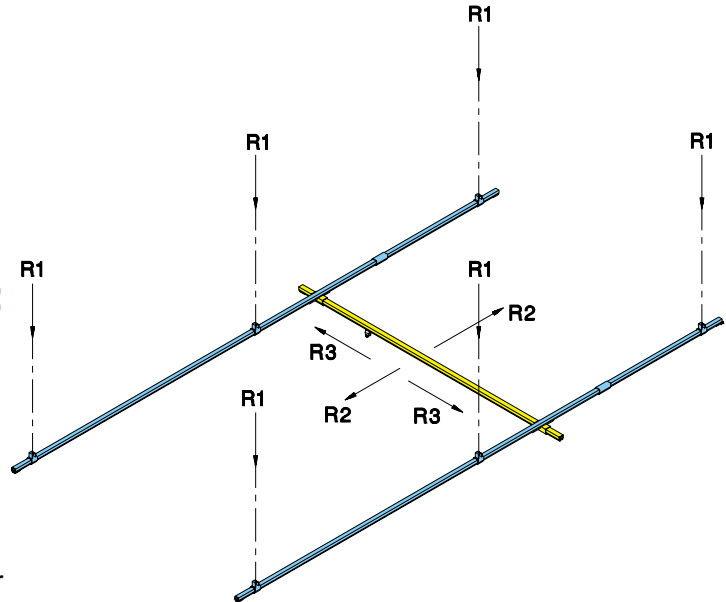
The rated capacity is the live load that can be lifted by the crane system. The design load for the crane system is based on the rated capacity plus 15% for the weight of the hoist and trolley (capacity x 1.15) and an additional 25% for impact (capacity x 1.25) for a total design of capacity x 1.4 (Note, 25% impact factor is good for hoist speeds up to 50 f.p.m.). For example, a 1000 lb. Gorbel crane allows you to pick up a 1000 lb. load, provided the hoist weighs 150 lb. or less and the hoist speed is less than 50 feet per minute.

Design load for deflection calculations is based on the rated capacity plus 15% for the weight of the hoist and trolley (capacity x 1.15). *Under no conditions should the crane be loaded beyond its rated capacity.* Gorbel Work Station Cranes meet or exceed the ANSI B30.11 specifications for underhung bridge cranes.

Calculating Applied Forces to the Supporting Structure

This illustration shows the relative position and the direction of forces that a ceiling-mounted bridge crane applies to its supporting structure. *Before installing any crane system, it's critical that you determine whether your building will safely support the loads.*

Loads applied to the support structure can be determined using the following formulas, where:



R1 = vertical load applied by support hanger (lb.)

R2 = longitudinal load applied by movement of the crane to each runway (lb.)

R3 = lateral force applied by movement of the trolley and load to each runway (lb.)

L1 = distance between support centers (ft.)

(NOTE: If there are only 2 supports/runway, L1= L1 x 0.5)

L4 = bridge span: center line distance between runways (ft.)

P = live load capacity (lb.)

1.4 = design factor (see description below) which includes 25% for impact and 15% for assumed hoist and trolley weight

W = weight per foot of runway (lb./ft.) See page 14.

w = weight per foot of bridge (lb./ft.) See page 14.

$$R1 = 1.4 \times P + \frac{(W \times L1) + (w \times L4)}{2}$$

$$R2 = \left((1.15 \times P) + \frac{(w \times L4)}{2} \right) \times .10$$

$$R3 = 1.15 \times P \times .20$$

WARNING: Equipment described in this brochure is not designed for, and should not be used for, lifting, supporting, or transporting humans. Failure to comply with any one of the limitations noted can result in serious bodily injury and/or property damage.

Anatomy of a Work Station Crane

1 HOIST TROLLEYS

Gorbel's hoist trolleys provide the connection between the lifting device and the bridge. The trolleys are designed for effortless movement along the bridge. The stamped body fits most rigid hook or eye lifting devices.

- Wheels are tapered to match the 2° taper of the track. This reduces rolling resistance and wheel wear. Wheels contain ball bearings that are sealed and lubricated for life.
- Trolleys are designed to operate in temperatures from +5°F to +200°F.
- All trolleys meet or exceed the ANSI B30.11 specification for underhung bridge cranes.

2 END TRUCKS

Gorbel end trucks provide the connection between the bridge and runways. They are designed for effortless movement along the runway.

- Wheels are tapered to match the 2° taper of the track, which reduces rolling resistance and wheel wear. Wheels contain ball bearings that are sealed and lubricated for life.
- Two horizontal wheels center the end truck within the runway which prevents binding of the bridge. As a result, the position of the load on the bridge has little effect on the amount of force needed to move the bridge along the runway.
- Any slight runway track misalignment is taken up by the bridge floating in one end truck, while the other end truck is firmly clamped to the bridge.
- All end trucks meet or exceed the ANSI B30.11 specification for underhung bridge cranes.



3 FESTOON GLIDERS

Festoon gliders are used to support flat cable along the runway and bridge, and they are standard on runways of 63 feet or less. No tools are required to attach the festooning to the gliders.

4 FESTOON TROLLEYS

Gorbel festoon trolleys (optional) are used to support flat cable or air hose along the runway or bridge. The trolleys have four wheels and a pivoting festoon saddle support. They are ideally suited for long runways (greater than 63 feet) or with round cable or air hose. With runways or monorails greater than 63 feet or with an all aluminum system, festoon trolleys are standard. Special festoon trolleys for vacuum hose are also available.



5 FESTOON CLAMPS

Festoon clamps anchor the festooning at the start of the runway and bridge. They also prevent the festoon gliders from exiting the track and they can provide a redundant stop for the end trucks and trolley.



6 END STOP BUMPERS

High-impact molded end stop bumpers are provided on all runways, monorails, and bridges to prevent the end trucks and trolley from exiting the track. The bumpers are bolted to the track to physically limit the travel of the end truck and trolley.



7 UNIVERSAL BUMPERS (not shown on pg. 5)

A universal bumper can be used as a secondary end stop, either internally or externally.



8 STACK SECTIONS

A stack section at one end of a runway serves as an extension that allows festoon carriers to be stored on the end of the runway without reducing crane coverage.



9 FLAT CABLE AND/OR AIR HOSE

A flat cable festooning system is included in all Gorbel Work Station Bridge Cranes and monorails. Plenty of cable is provided for 3 foot loops on the runway or monorail and 1 foot 6 inch loops on the bridge.

Optional air hose is also available and is supported by optional festoon trolleys. Gorbel Work Station Cranes can utilize optional conductor bar electrification, but this results in an increase up to 40% of the amount of effort required to move the system.

10 HANGER ASSEMBLIES

Each Gobel Work Station Bridge Crane or monorail is provided with the number of standard hanger assemblies listed, based on the maximum "L1" spacing shown in this brochure. Sway bracing is required on all systems, except flush-mounted systems. Sway bracing kits are not included in the crane kit (see *Sway Brace Fitting* caption on this page).

Standard Hangers for Plain Steel Track

Standard hangers for plain steel track, with a 20 inch threaded rod (B7 alloy), are included with each assembly. The threaded rod can be field cut to custom lengths as required. An optional 72 inch rod can also be supplied. Two beam clips are bolted to the upper hanger bracket and are clamped to the supporting structure. The upper hanger brackets are adjustable for flange widths from 1 to 10 inches.



Standard Hanger - Plain Steel Track

Standard Hangers for Trussed Steel Track

Standard hangers for trussed steel track, with a 20 inch threaded rod (B7 alloy), are included with each assembly. The threaded rod can be field cut to custom lengths as required. An optional 72 inch rod can also be supplied. Two beam clips are bolted to the upper hanger bracket and are clamped to the supporting structure. The upper hanger brackets are adjustable for flange widths from 1 to 10 inches.



Standard Hanger - Trussed Steel Track

Standard Hangers for Aluminum Track

Standard hangers for aluminum track, with a 20 inch threaded rod (B7 alloy), are included with each assembly. The threaded rod can be field cut to custom lengths as required. An optional 72 inch rod can also be supplied. Two beam clips are bolted to the upper hanger bracket and are clamped to the supporting structure. The upper hanger brackets are adjustable for flange widths from 1 to 10 inches.



Standard Hanger - Aluminum Track

SWAY BRACING FITTING

(not supplied as standard)

Sway bracing is required on all systems except flush mounted systems to provide for a rigid-mount runway that allows the end truck to move freely. The fittings permit easy sway bracing with 1 inch standard steel pipe (pipe supplied by others). The flange is drilled to accept a 5/8 inch bolt (bolt by others) with two U-bolts (furnished). *These optional fittings are not supplied as standard with crane kits.*



Sway Bracing Fitting

FLUSH-MOUNTED HANGERS - PARALLEL MOUNT

An optional ceiling-support bracket, with beam clips, can be provided for plain track series that require flush mounting. With this bracket, the track is mounted underneath, **parallel** to the supporting steel. Two beam clips are bolted to the hanger bracket and are clamped to the supporting structure. When using this style, care should be taken to determine if the bridge has adequate overhead clearance. *Note: to order this bracket, the flange width of the supporting structure must be supplied.*

FLUSH-MOUNTED HANGERS - PERPENDICULAR MOUNT

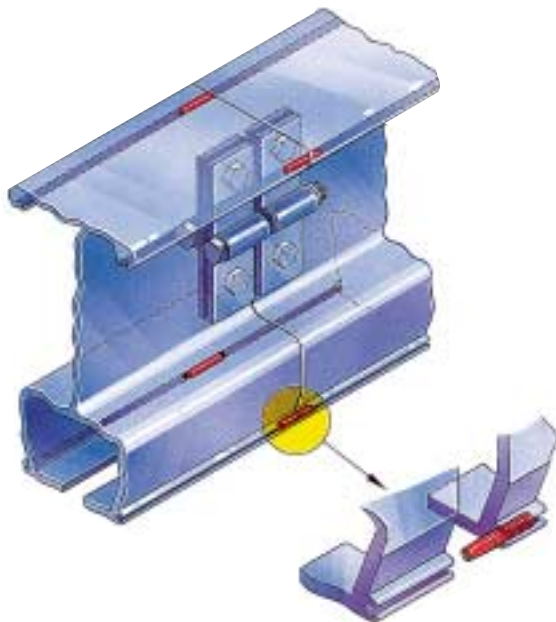
An optional ceiling-support bracket, with beam clips, can be provided for plain track series that require flush mounting. With this bracket, the track is mounted underneath, **perpendicular** to the supporting steel. Four beam clips are bolted to the hanger bracket and are clamped to the supporting structure. When using this style, care should be taken to determine if the bridge has adequate overhead clearance. *Note: to order this bracket, the flange width of the supporting structure must be supplied.*



Flush-Mounted Hangers - Parallel



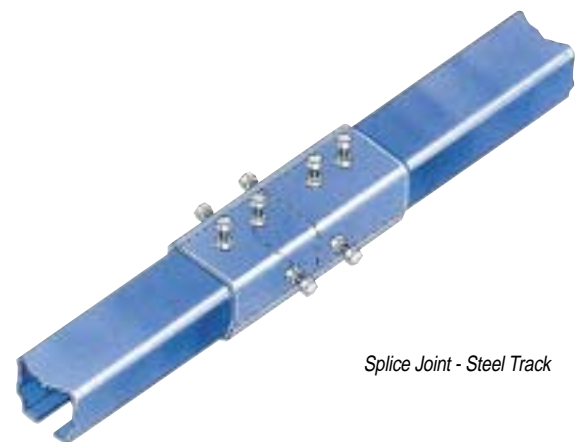
Flush-Mounted Hangers - Perpendicular



Splice Joint - Aluminum Track

SPLICE JOINTS FOR ALUMINUM TRACK

Patented splice joints for aluminum track allow for precision alignment. The aluminum track is extruded with four patented alignment slots. Four precision-ground pins are provided to accurately align runway sections, which provides for a smoother transition of wheels over the splice joint than is possible with bolted connections. In addition, clamp fasteners attach to the vertical web of the track to pull the track together and keep it from separating.



Splice Joint - Steel Track

SPLICE JOINTS FOR STEEL TRACK

A splice joint is used to join track sections together and enable the installer to quickly and properly align the joined sections of track. Adjusting bolts are provided on the splice joint for leveling and aligning.