

Ceiling Mounted Workstation Steel Monorail Crane

This guide can be used to prepare a bid specification for the incorporation of a Ceiling Mounted Workstation Steel Monorail Crane into a competitive bid project or application.

***Each product specification is organized in three standard sections:**

SECTION 1 - GENERAL:

Includes product scope, references, performance requirements, applicable documents, quality assurances, product warranty information, and project conditions and handling practices.

SECTION 2 - PRODUCTS:

Includes a description of materials, products, and accessories to be incorporated into the project.

SECTION 3 - EXECUTION:

Includes provisions for product preparation, installation, field quality control, demonstrating and training, and protection.

***The specifier may need to edit this product specification to reflect the options and applications for a specific project. Notes to assist the specifier in editing this product specification are indicated in brackets. All notes and brackets should be deleted on the final draft.**

SECTION 1 – GENERAL

1.1 SCOPE

- A. Product:** Spanco Ceiling Mounted Workstation Monorail cranes travel on a dual runway mounted to an existing overhead structure. Overhead hanger assemblies, enclosed track, hoist trolley, festooning system, bumpers, and other accessories included.
- B. General Design Standards:** Spanco Cranes are designed in conformance with the following applicable standards:
 1. **Workstation Bridge Cranes:** AISC Steel Construction Manual, OSHA 1910.179, ANSI B30.11, AWS D1.1/D1.6, and MMA MH27.2.
- C. Standard Equipment Specifications:** List other specifications related to the product and application including options, accessories, and customizations [Mounting, Hoists, Electrical].
 1. Length: [Monorail length is determined by length of a specific area requiring coverage. Monorail length is up to 43 feet without splices.]
 2. Capacity: [The maximum weight of the application should not exceed design weight. Load weights should be predetermined to avoid buying unnecessary capacity. Bridge dead weight adds to the load the operator is moving.]

3. Height: [Keep trolley clevis height as low as possible to attain minimal resistance (with practical consideration given to minimal headroom requirements). Height is measured from the floor to the trolley clevis from which the hoist is suspended.]
4. Construction: Fabricated from ASTM A36 steel sections with finished ends and surfaces.

1.2 REFERENCES

List references referred to in this product specification. List by number and full title, and delete non-applicable references.

- A. **American Institute of Steel Construction (AISC):** Manual of Steel Construction, Part 5, Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts
- B. **American National Standards Institute (ANSI):** ANSI B30.11 – Monorails and Under-hung Cranes
- C. **American Society for Testing and Materials (ASTM) A36:** Carbon Structural Steel
- D. **American Society for Testing and Materials (ASTM) A325:** Structural Bolts, Steel, Heat Treated, 120/150 ksi Minimum Tensile Strength
- E. **American Society for Testing and Materials (ASTM) A490:** Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength
- F. **American Society for Testing and Materials (ASTM) B221:** Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube
- G. **American Welding Society (AWS) D1.1:** Structural Welding Code
- H. **American Welding Society (AWS) D1.1:** Certified Shop
- I. **Occupational Safety and Health Administration (OSHA) –** Specification 1910.179: Overhead and Gantry Cranes
- J. **CMAA Specifications 70 and 74:** Travelling Bridge Cranes
- K. **MMA Specification MH27.2:** Enclosed Track Under-hung Cranes and Monorail Systems
- L. **American Recovery and Reinvestment Act (ARRA):** Buy American Clause of May 2009

1.3 REQUIREMENTS

- A. **Coverage:** Crane shall provide coverage of rectangular area of size indicated on drawings and consist of:
 1. Overhead hanger assemblies (no support structures required in crane operating area).
 2. Rigid monorail track.
- B. **Modular, pre-engineered design:** Crane system shall be capable of expansion, disassembly, relocation, and the addition of multiple tracks, curves, slopes, switches to multiple spurs, turntables, interlocks, and entry/exit sections. .
 1. Crane shall be designed, fabricated, and installed in accordance with ANSI B30.11 and OSHA 1910.179.
- C. **Productivity Ratio:** Crane shall be designed to manually move load with maximum force of 1/100 load weight.
- D. **Deflection Guidelines:** All Workstation Bridge Crane models are designed with maximum deflection of 1/450.
- E. **Crane Operating Temperature:** 5 to 200 degrees F (-15 to 93 C)
- F. **Structural Design:** The crane's structural design is based on live load capacity plus 15 percent for hoist and trolley weight and 25 percent for impact.

Edit the following to reflect project structural design requirements. Contact Spanco, Inc. for assistance specifying cranes that will require seismic and other additional loads or cranes that will operate in high humidity or corrosive environments.

Crane shall be designed to withstand:

1. Crane and hoist dead load
2. Live load capacity equal to net rated hook load
3. Inertia forces from crane and load movement

1.4 DOCUMENTS

A. Submittal Procedures

1. Product data is included for crane and all accessories. Product data provides capacities, performance, standard operations, and applied forces to foundation.
2. Shop drawings that outline crane configuration, dimensions, construction, and installation details.
3. Manufacturer's Warranty
4. Manufacturer's Installation Instructions
5. Manufacturer's Operation and Maintenance Manual

1.5 QUALITY ASSURANCE

- A.** Standard cranes shall be designed, fabricated, and installed in accordance with ANSI B30.11, MH27.2, OSHA 1910.179, and IBC. Spanco, Inc. assures the safety and quality of all systems when installed and maintained according to their Installation and Maintenance Manual. All standard Spanco Workstation Monorail Cranes are designed to withstand the worst seismic condition in the U.S. or as defined by the IBC.
1. Applications where cranes will be used in potentially hazardous environments or explosive environments require special consideration. As per the International Building Code, these special conditions must be disclosed prior to placing an order.
 2. Application where cranes will be used in essential facilities like fire departments, military buildings, or communications buildings, or at locations closer than 15km to known seismic sources require special consideration. As per the International Building Code, these special conditions must be disclosed prior to placing an order.
 3. Custom cranes (cranes modified over and above the standard dimensions or capacities shown within our standard Spanco literature) may need modification to conform to Seismic 4 Uniform Building Code due to the customized and non-standard nature of these designs.
- B.** If different specifications are required, alternate specifications need to be requested before the order is placed. Crane modifications may be required at additional cost to conform to specifications other than IBC and ASNI.
- C. Manufacturer's Qualifications:** A company with more than 30 years of experience successfully designing and manufacturing cranes and material handling solutions for numerous industries
- D. Installer's Qualification:** A company that is acceptable to the crane manufacturer and with five years of experience assembling and installing cranes for multiple applications. Installer should be able to:
1. Perform welding using certified operators in accordance with AWS D1.1. (Welding not required for standard installation.)

2. Bolt connections in accordance with torque tightening procedures specified in AISC Manual, Part 5.
3. Clearly label crane with rated load capacity with label visible from floor level and loading position.
4. Perform OSHA Load Test Certification.

1.6 **WARRANTY**

A. Manufacturer's Warranty: Included on manufacturer's standard form and outlines the manufacturer's agreement to repair or replace assemblies and components that fail in materials and/or execution within warranty period from date of substantial completion.

1. Warranty covers ten (10) years or 20 thousand (20,000) hours for manual push-pull workstation monorail crane products to cover defects in materials and execution.
2. Warranty covers two (2) years or 4,000 hours for motorized tractor products.

1.7 **CONDITIONS/ DELIVERY, STORAGE, HANDLING**

A. Project Conditions

1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results.
2. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Delivery, Storage, and Handling

1. Store products in manufacturer's packaging until ready for installation.
2. Store and dispose of solvent-based materials in accordance with requirements of local authorities.

SECTION 2 – PRODUCT

2.1 ACCEPTABLE MANUFACTURERS

A. Spanco, Inc.

604 Hemlock Road, Morgantown, PA 19543; 800-869-2080; www.spanco.com

2.2 CEILING MOUNTED WORKSTATION STEEL MONORAIL CRANE

[Spanco Ceiling Mounted Workstation Steel Monorail Cranes are available in capacities ranging from 250 to 4000 pounds and overall monorail piece lengths up to 43 feet—or longer if spliced together,]

A. Models: The following are Ceiling Mounted Workstation Steel Monorail Cranes manufactured by Spanco, Inc. [Specifier may need to choose an acceptable model based on the list below.]

1. Model MP: Cranes with plain enclosed steel track monorail supported at six feet (1.8 m) or nine feet (2.7 m).
2. Model MT: Cranes with trussed steel monorail supported at 20 feet (6 m) maximum as manufactured by Spanco, Inc.
3. Model MT: Cranes with trussed steel monorail supported at 20 to 25 feet (6 m to 7.6 m) maximum as manufactured by Spanco, Inc.
4. Model MT: Cranes with trussed steel monorail supported at 25 feet to 30 feet (7.6 m to 9.1 m) maximum as manufactured by Spanco, Inc.

- B. Construction:** Fabricated from ASTM A36 steel sections with finished ends and surfaces.
- C. Design Factors:** Spanco Monorail Cranes have a design factor of 15 percent of the allowable capacity for hoist weight and 25 percent of the allowable capacity for impact. This design provides a margin to allow for variations in material properties, operating conditions, and design assumptions. No crane should ever be loaded beyond its rated capacity.
- D. Service Factor:** All Spanco Workstation Monorail Cranes are designed for frequent usage (Class C Normal/Industrial service) as defined:
1. System or equipment is used where operational time is up to 100 percent of the work period and lifted load is at 50 percent or below rated capacity
 2. System or equipment is used where operational time is less than 50 percent of the work period and lifted load is greater than 50 percent of rated capacity.
 3. Applications involving vacuums, magnets, and other high impact lifters are considered severe usage and require special design considerations. Please contact Spanco, Inc. for special design pricing.
 4. Consult Spanco, Inc. for usage other than moderate and all instances of high cycle rates or high impact applications such as high speed air or electric hoists, vacuum lifters, or magnets.
- E. Hanger Assemblies:** Includes hanger assemblies required for suspending monorail from overhead steel beam support structure.
1. Assemblies equipped with upper hanger bracket adjustable for mounting from 2 ¼ inches to 8 inches (57 mm to 203 mm) flange width and flange thickness below 7/16 inch. Two beam clips included.
 2. Two-piece hangers suspending runways below support beams shall consist of upper hanger bracket with beam clips and lower runway bracket connected with threaded B7 alloy steel rod. Twelve-inch (304 mm) rods for field cutting included.
 3. Hangers for flush mounting plain enclosed steel track monorail are one-piece assembly designed for monorail either parallel or perpendicular to support beams.
- F. Sway Bracing:** All systems with drop rod hangers must be laterally and longitudinally braced. Sway bracing furnished by others.
- G. Monorail (MT):** Vertical truss fabricated from square steel tubes and enclosed steel track.
1. Track: Enclosed, cold formed, steel box track that serves as bottom cord of monorail and permits end trucks and festoon carriers to ride on lower inside flanges. Fabricate lower running flanges with flat surface. Sloped flanges not permitted.
 2. Splice Joint: Includes truss splice plates, channel-shaped track splice joint, bolts, lock washers, and nuts for joining monorail sections.
- H. Monorail (MP):** Enclosed, cold formed, steel box track that permits hoist trolley and festoon carriers to ride along monorail.
1. Fabricated lower running flanges with flat surfaces. Sloped flanges not permitted.
 2. Splice Joint: Includes channel-shaped track splice joint with bolts, lock washers, and nuts for joining monorail sections.
- I. Festoon Stack Section:** Includes enclosed track extension to account for stacking festoon carriers at end of monorail.
- J. Hoist Trolley:** Rigid-body trolley designed to ride inside enclosed track of monorail and to carry hoist and load. Articulating trolleys are not acceptable.
1. Construction: Two-piece stamped steel body with two wheels on each side and tapered clevis positioning hoist hook at center of trolley so load weight is evenly distributed to all trolley wheels. Removable clevis pin (type and size determined by manufacturer for specified capacity) included. Trolleys with non-removable clevis pins are not acceptable. Holes provided in body for mechanical connections.

2. Wheels: Removable, self-centering wheels with sealed lifetime lubricated bearings. Vertical wheels shall be flat to match track profile. Non-removable or tapered wheels are not acceptable. Polyamide wheel material provided by Spanco, Inc. Steel wheels are optional.
 3. Drop Lugs: Included on both sides of trolley to limit trolley in the event of wheel, axle, or load bar failure.
 4. Designed for hook attachment of hoist.
- K. End Stops:** Molded composite, resilient bumper installed in monorail and bridge tracks to prevent end trucks, hoist trolley, and festoon carriers from rolling out of track. Bolt stops without energy absorbing bumper are not acceptable.

2.3 SYSTEM OPTIONS

***The following options are available for Spanco Ceiling Mounted Workstation Monorail Cranes.** [Select required options from the following, or contact Spanco, Inc. if other types of accessories are required.]

A. Track Curves

1. Curve radius permits operation of carrier without binding.
2. Intermediate support locations determined by total trolley load.
3. Curve track sections formed to match adjoining track sections.

B. Manual Track Switches

1. Track switch design provides for movable inner frame that operates freely from one throw position to another. Throw positions are locked into position using a positive locking pin into receiver blocks.
2. Switches maintain alignment of incoming tracks and switch tracks with a maximum gap of 3/16 inch between adjacent ends of load-carrying flanges. Vertical misalignment not to exceed 1/16 inch.
3. Stops provided to protect the end of incoming track when switch track is set against it. Stops resist impact forces of fully loaded carrier traveling at normal walking speed (or at 50 percent of full load speed if carrier is motor propelled). Stops also prevent carrier (or trolley) from running off of a movable track misaligned with an incoming track.
4. Inner and outer switch frames are fixture assembled and made of structural weldments.

C. Tractor Drives

1. Crane and hoist trolley can be motorized.
2. 208 to 575 volts, three phase, 60 hertz, electric operation, air driven also available.
3. Standard speeds from 34 F.P.M. to 75 F.P.M. Other speeds available.

D. Festoon Assemblies

1. Includes length of cable and/or air hose to supply lifting device. Supply shall be festooned along boom.
2. Festoon Trolleys: Four wheeled trolleys with pivoting saddle and applicable attachment to support service run on boom and allowing festooning as hoist trolley travels. Festoon gliders are not acceptable.
3. Festoon Clamp: Steel clamp assembly attached to track to prevent festoon trolleys and gliders from exiting track.

2.4 SYSTEM COMPONENTS

A. End Stop Bumper for Enclosed Track System

1. End stops are equipped with resilient rubber bumpers to increase impact resistance and are through bolted to the enclosed track.
 2. Standard on all enclosed track systems.
- B. Cable/Hose Trolley for Enclosed Track System**
1. Standard on all Workstation Monorail Crane kits.
 2. Utilized for conveying the power supply flat cable or round air hose.
 3. Four wheels insure easy movement.
 4. Pivoting clevis provides swiveling action for flat cable or air hose.
 5. Maximum 3/8-inch air hose on standard trolley.
- C. Festoon Section for Enclosed Track System**
1. Furnished for end of one monorail to allow stack-up of cable/hose trolleys.
 2. Through-bolted to monorail track profile. Festoon trolleys pass under through-bolt into festoon section.
 3. Standard on all Workstation Monorail Crane systems.
- D. Hoist Trolley for Enclosed Track System**
1. Fabricated from precision cut steel plate.
 2. Equipped with large diameter polyamide wheels with anti-friction ball bearings to ensure smooth and easy movement (steel wheels optional).
 3. Bronze wheels and rollers are available for “spark proof” applications.
 4. Zinc chromate plated finish.
- E. Cable/Hose Clamps for Enclosed Track System**
1. Fitted at one end of monorail to hold cable or hose.
 2. Flat cable 4 wire #14 A.W.G. supplied standard on all systems.
 3. 3/8-inch air hose optional.
- F. Vacuum Hose Trolley for Enclosed Track System**
1. Special free moving trolleys with kick-up rollers and Velcro straps are provided to festoon vacuum hose on vacuum lifter applications.
- G. Hanger Assembly for Enclosed Track System**
1. All ceiling mounted workstations are provided with drop type hanger assembly that includes adjustable beam clamp 12-inch hanger rod and appropriate clamp, or flush type hanger assembly for attachment to overhead building beams.
 2. Hangers are of appropriate size and numbers for selected system.
- H. Flat Cable Festooning Systems (four wires #14 A.W.G.) for Enclosed Track**
1. Supplied with all monorail crane systems.
 2. Optional, various sized air hoses available.
 3. Festoon loops are 36 feet for monorails.
- I. Enclosed Track Monorail for Enclosed Track System**
1. Trussed track available in four profiles and fifteen standard trusses with capacities ranging from 250 to 4,000 pounds.
 2. Standard maximum support centers of 20, 25, and 30 feet.
- J. Track Splice Assemblies for Enclosed Track System**
1. Slide over track profile to insure proper alignment.
 2. Trussed track splice assembly bolts through top chord to prevent joints from separating.
- K. Universal Bumper (optional) for Enclosed Track System**
1. Frictionally clamped to track opening to buffer between multiple tracks.
 2. Do not use as end stop.
- L. Threaded Rod Hanger Assembly – Plain Track Monorail**
1. Standard Hanger assembly for plain track systems includes:

- a. Adjustable roof beam clamp providing secure fit to beam. Flange widths range from two inches to eight inches.
- b. Standard 12-inch hanger rod (longer as required).
- c. Plain track support bracket.

M. Threaded Rod Hanger Assembly – Trussed Track Monorail

1. Standard hanger assembly for trussed track systems includes:
 - a. Adjustable beam clamp providing secure fit to beam. Flange widths range from two inches to eight inches.
 - b. Standard 12-inch hanger rod (longer as required).
 - c. Trussed track support bracket.

N. Sway Bracing

1. Required on all tie rod supported systems to ensure maximum Monorail rigidity.
2. Sway brace clip attaches to standard rod and track clamp. Fits one-inch diameter, schedule 40 Pipe at a 45-degree angle.
3. One-inch pipe supplied by others.

O. Flush Clamp-Cross Mount

1. Optional hanger assembly attaching plain or truss track to support steel. Fabricated from structural plate equipped with grade 5 bolts and beam clips.
2. Care should be taken to ensure adequate clearance.

P. Flush Clamp-Parallel Mount

1. Optional hanger assembly attaching plain or truss track to support steel. Fabricated from structural plate equipped with two grade 5 bolts and beam clips.
2. Care should be taken to ensure adequate clearance.

2.5 SHOP FINISHING

A. Standard Paint Colors:

1. All monorails and structural supports are painted with Spanco Standard Grey enamel.
2. All bridges painted Spanco Yellow.
3. Ford® Blue optional.

B. Surface Preparation and Painting Procedures:

1. Spanco adheres to the standards of the Society for Protective Coatings (SSPC) for all product surface preparation.
2. Spanco Crane components are deburred and descaled using power tools equipped with sanding discs and wire wheels prior to painting.
3. Components are washed with high-pressure/ high temperature biodegradable degreaser solution.
4. All components are coated with quick drying, semi-gloss enamel, applied to a minimum dry-film thickness of two to three mils.
5. A finishing coat is applied with a hot, airless, electrostatic spray paint system. Painted components are cured at air temperature.

SECTION 3 – EXECUTION

3.1 PREPARATION

A. DO NOT start installation until overhead support structure is prepared.

B. Inventory:

1. Check materials to ensure all parts are present.

2. Systems that mount directly to overhead supports with support flush mount brackets do not require lateral sway bracing.
3. All systems with drop rod hangers must be laterally and longitudinally braced. Lateral sway bracing furnished by others.

C. Motorized Tractor Drive:

1. Check electrical supply, conduit, wiring, disconnect switch, and other electrical components.

D. Support Structure

1. Check overhead support structure to ensure sufficient system support.
2. Check sway bracing for systems with drop rod hangers.

3.2 INSTALLATION

- A.** Ceiling mounted workstation design varies from system to system. Positioning of support brackets or hangers may vary with building structural arrangement as well as with track profile.
- B.** Units and accessories should be installed in accordance with manufacturer's instructions and shop drawings.
- C.** Do not modify crane components without manufacturer's approval.
- D. Clearances for moving crane components:**
1. Minimum vertical clearance: Three inches (76 mm) from any overhead obstruction.
 2. Minimum horizontal clearance: Two inches (51 mm) from any lateral obstruction.
 3. Prior to applying proper torque to the bolts, ensure monorail track is:
 - a. Level to within (plus or minus) 1/8 inch in 20 feet (3 mm in 6.1 m).
- E. Monorail Installation**
1. Establish where system is to be installed. Bolt proper mounting support brackets or hangers to the ceiling beams. Raise the track section and attach it to the brackets or hangers with appropriate fasteners. Monorail should extend between 4.5 inches and 12 inches beyond last support at either end for plain track or up to 48 inches for trussed track. Festoon storage may extend beyond last support.
- F. Splice Installation**
1. For systems with more than one section of track, additional section is installed in the same manner—with the addition of splice joint assembly.
 2. Plain Track: Splice joints should be within 12 inches of a support bracket or hanger.
 3. Reinforced Track: Splice joints should be within 48 inches of a support bracket or hanger.
 4. Adjust side setscrews so that track slots are aligned and there is a smooth transition from section to section. Tighten top setscrews then side setscrews for correct track alignment.
 5. Trussed track splice joints also include two splice plates and four 1/2-inch bolts with nuts and lock washers. Install splice plates to connect ends of truss tubes with the four through-bolts provided. Torque bolts to 50 foot-pounds.
 6. When end stop hole in track aligns with sleeve setscrew, move sleeve approximately 1/4 an inch to either side of end stop hole.
- G. Monorail End Stop Installation**
1. Secure end stop assemblies, end stop bolts, and lock nuts at both ends of monorail, except for end of festoon storage area, where applicable.
- H. Festoon Track Extension Installation**
1. Install festoon trolleys and cable in monorail. Use the following trolley spacing:
 - a. Bridges.....18-inch loops, approximately
 - b. Monorails.....36-inch loops, approximately

2. Place festoon track extension on end of Monorail as close as possible to power junction box. Align festoon track extension prior to tightening bolts. Adjust bolts in side of festoon track extension to ensure alignment of bottom flanges of track. Clamp festoon track extension firmly into a straight level position prior to tightening top of extension. Check to ensure all surfaces of track ends and festoon track extension are in contact.
3. Use end stop supplied with system, and install according to installation instructions in end of festoon track extension.
4. All end stop bolts must have rubber bumper to ensure festoon trolleys remain in track.
5. Ensure all end stop warning labels are in place.
6. Install festoon end clamp to secure festoon cable at end of festoon track extension.
7. Ensure trolleys slide across Monorail and festoon track extension joint smoothly.
8. Ensure all trolleys stack properly in festoon track extension area, clear through bolts, and contact end stop.

I. Monorail Festoon Installation

1. Install festoon trolleys into storage area of monorail track if system includes festooning.
2. Secure end stop bolts and rubber bumpers. Locate and secure festoon end clamps. Install festoon cable on festoon trolleys at equal spacing, approximately six feet, seven inches apart for 36-inch loops.

J. Hoist Trolley and Monorail Festoon Installation

1. Install hoist trolley and festoon trolleys on track. Secure end stop bolts and rubber bumpers.
2. To prevent personal injury or death DO NOT operate crane without end stop through bolts securely in place.
3. Once installation is completed, the track should be leveled. Install lateral and longitudinal sway bracing. The total system should be checked for tightness of all nuts and bolts.

K. Hoist Installation

1. Attach hoist to the hoist trolley. Use washers on hoist mounting pin to center hoist inside hoist trolley. Reinstall washers on outside of hoist trolley (both sides) before installing or reinstalling cotter pins to secure hoist-mounting pin. Replace cotter pin(s) if worn or broken. Bend cotter pin around mounting pin.
2. Do not operate hoist or crane if cotter pins are not in place and properly bent over on both sides of hoist trolley. Check regularly that cotter pins are in place and securing hoist on hoist trolley.

3.3 FIELD QUALITY CONTROL

*Perform field quality control testing as recommended by manufacturer

A. Inspection

1. Verify all bolts are tight and lock washers fully compressed.

B. Field Test

1. Ensure crane operates properly (movement is smooth and consistent).
2. Verify motorized operation and controls function properly.
3. Make adjustments as needed, and correct inadequacies.

C. Acceptance Test

1. After the enclosed track crane system has been installed, OSHA requires an acceptance test before operating and after any modifications. An authorized dealer or installer should perform the test.

D. Maintenance

1. A system inspection should be performed 30 days after installation. All nuts, bolts, and screws should be checked for tightness. All end stops, cotter pins, and hoist trolleys should be checked for abnormal wear or breakage. Check track splices for alignment, and verify that end trucks and festoon trolleys travel smoothly through joints. Check that festoon cables and/ or hoses are securely clamped to festoon trolleys and end clamps.
2. A complete inspection of all fasteners and connections should be performed annually or every two thousand (2,000) hours. Heavy conditions of use may require more frequent inspections.
3. Operators should visually inspect the system before each use to note any unusual or abnormal system operations.

E. Clean Surfaces

1. Touch up scratches and blemishes with matching paint from manufacturer.
2. Keep surfaces clean and clear of build-up and residue.

F. Protect Crane

1. Protect installed products until completion of project.
2. Touch up, repair, or replace damaged products before substantial completion.

G. Quality Standards

1. Spanco, Inc. is an ISO 9001-2008 Registered Corporation.
2. Spanco Cranes are manufactured to standards ensuring safety, reliability, and the highest quality.
3. Spanco products are manufactured in the United States of America at facilities located in Morgantown, Pennsylvania and Las Vegas, Nevada.
4. Spanco certifies that all goods are in full compliance with the Buy American Clause of the American Recovery and Reinvestment Act (ARRA) of May 2009.