

# Rigid Lifelines® Ceiling-Mounted Monorail Anchor Track™ System

This guide can be used to prepare a bid specification for the incorporation of a Ceiling-Mounted Monorail Anchor Track System 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:** Sold as individual components, standard assemblies in kit form, or as a custom engineered system, the Ceiling-Mounted Monorail Anchor Track System provides rigid fall protection and easily mounts to existing structures. This system is provided with drop-rod type hanger assemblies that include adjustable beam clamps and 12-inch drop rod or with flush-mount type hanger assemblies. The drop-rod type hanger assembly requires sway bracing and allows for slopes up to 14 degrees. Single, dual, or multiple tracks are available for one, two, or multiple workers. This permanent system easily accommodates and navigates long spans and curves of fall protection coverage.
- B. General Design Standards:** System is designed in conformance with the following applicable standards:
  - a. ANSI Z359, OSHA 1910.66, and AISC Manual of Steel Construction.
- C. Standard Equipment Specifications:**
  1. Standard Track Length: [Track length is determined by the amount of actual working area needed, the fall hazard, and by the length of the track from one end stop to the other.]
  2. Coverage Area: [Linear coverage on the x-axis of up to 30-degrees off center.]
  3. Working Capacity: [All standard systems are designed for use with lanyards that limit the maximum average arresting force to 900 pounds. Worker capacity also depends on

the number of people using the system at once. For more than two worker access, please contact a Rigid Lifelines technical sales support specialist.]

4. Overall Height: [The overall height is measured at the highest point on system after installation.]
5. Trolley-Hook Height: [The trolley-hook height is measured by the distance from the ground to the underside of the trolley hook.]
6. Worker Pass-Ability: [Worker pass-ability depends on whether two workers need to pass one another while tied-off to the system. Worker pass-ability also requires a dual track system.]
7. Support Spacing: [Support spacing is determined by the distance from one ceiling support beam to next.]
8. Construction: [Fabricated using high-strength steel or ASTM A36 steel for structural components.]

## 1.2 REFERENCES

- A. **American Institute of Steel Construction (AISC):** Manual of Steel Construction
- B. **American National Standards Institute (ANSI):** ANSI Z359: Fall Protection Code
- C. **American Society for Testing and Materials (ASTM) A36:** Carbon Structural Steel
- D. **American Society for Testing and Materials (ASTM) B221:** Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube
- E. **American Society of Automotive Engineer (ASAE) J429:** Grade 5
- F. **American Welding Society (AWS) D1.1:** Structural Welding Code
- G. **Occupational Safety and Health Administration (OSHA)—**Specification 1910.66: Personal Fall Arrest System

## 1.3 PERFORMANCE REQUIREMENTS

- A. **Coverage:** System shall provide linear coverage of size indicated on drawings and consist of:
  1. Enclosed track.
  2. Track hanger assemblies.
  3. Swiveling connector Anchor Trolley™.
- B. **Modular, Pre-Engineered Design:** System shall be designed for one, two, or multiple workers using single, dual, or multiple tracks.
  1. System shall be designed, fabricated, and installed in accordance with ANSI Z359, OSHA 1910.66, and AISC Manual of Steel Construction.
- C. **Design Strength:** For one user, the system shall be designed based on a worst-case placement of the 900-pound (408 kg) maximum average arresting force with a safety factor of two and the weight of the anchor system.
- D. **Operating Temperature:** 5 to 200 degrees F (-15 to 93 C)
- E. **Structural Design:** The system's structural design is based on dynamic load capacity.
 

**System shall be designed to withstand:**

  1. System and dynamic load and impact factors.
  2. Dynamic load capacity equal to rated capacity.
  3. Inertia forces from the system and dynamic load movement.

## 1.4 DOCUMENTS

### A. Submittal Procedures

1. Product data is included for system and all accessories. Product data provides capacities, performance, standard use, and applied forces to system.
2. Shop drawings, which outline system configuration, dimensions, construction, and assembly details.
3. Manufacturer's Warranty
4. Manufacturer's *Assembly and Operation Instruction Manual* with included Assembly Drawings

## 1.5 QUALITY ASSURANCE

- A. Standard system shall be designed, fabricated, and installed in accordance with ANSI Z359, OSHA 1910.66, and AISC. Rigid Lifelines® assures the safety and quality of all systems when installed and maintained according to their *Assembly and Operation Instruction Manual*.
1. Applications where system will be used in potentially hazardous environments or explosive environments require special consideration. These special conditions must be disclosed prior to placing an order.
  2. Applications where system will be used in essential facilities, such as fire departments, military buildings, or communications buildings, will require special consideration.
  3. Custom systems (systems modified over and above the standard dimensions or capacities shown within our Rigid Lifelines literature) will require special consideration.
- B. If different specifications are required, alternate specifications need to be requested before the order is placed. System modifications may be required at additional cost to conform to specifications other than ANSI and OSHA.
- C. **Manufacturer's Qualifications:** An ISO 9001 registered company with more than 20 years of experience successfully designing and manufacturing fall protection solutions.
- D. **Installer's Qualifications:** A company that is acceptable to the manufacturer and meets OSHA requirements for a Qualified Person assembling and installing fall protection systems for multiple applications. Installer should be able to:
1. Bolt connections in accordance with torque tightening procedures specified in AISC Manual, Part 5.
  2. Clearly label system with maximum average arresting force visible from tie-off position.

## 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 the engineered track equipment, wearable end truck wheels, and Anchor Trolley™ wheels and teeth to be free from defects in material and workmanship for a period of ten (10) years commencing on the date of shipment from the Rigid Lifelines facility.

## 1.7 CONDITIONS/DELIVERY, STORAGE, AND 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. Rigid Lifelines®

**Locations:** Morgantown, PA and Las Vegas, NV; **Phone:** 800-869-2080;

**Website:** RigidLifelines.com

### 2.2 CEILING-MOUNTED MONORAIL ANCHOR TRACK™ SYSTEM

\*System is available for one, two, or multiple workers.

#### A. The Ceiling-Mounted Monorail system as manufactured by Rigid Lifelines.

1. Sold as individual components, standard assemblies in kit form, or as a custom engineered system, the system provides rigid fall protection and easily mounts to existing structures. This system is provided with drop-rod type hanger assemblies that include adjustable beam clamps and 12-inch drop rod or with flush-mount type hanger assemblies. The drop-rod type hanger assembly requires sway bracing and allows for slopes up to 14 degrees. Depending on existing ceiling support structure design and dimensions, track spans are virtually unlimited. Field assembly comes with bolt-together components (no welding required).
2. Construction: Fabricated using high-strength steel or ASTM A36 steel for structural components.

#### B. Design Factors: Track, tubing, and welded track has minimum yield strength of 46,000 pounds per square inch. Track profile design ensures wheel protection, accurate alignment with minimum friction, and low-maintenance, self-cleaning profile. All track shall have full contact flange loading surfaces (flat) to decrease flange and wheel loads during a fall event.

#### C. Structure: Enclosed Anchor Track(s) bolted to existing structures with hanger assemblies

1. Hanger assemblies: Includes hanger assemblies that provide a rigid connection for suspending tracks. Assembly to consist of angle truss clamps and truss clamp plates. Use of threaded rods in flush hanger assemblies not permitted.
2. Runways: Vertical truss fabricated from square steel tubes and enclosed steel track.
  - a. Track: Enclosed cold-formed steel track that serves as bottom cord of trussed track and permits trolley(s) to ride on lower inside flanges. Fabricate lower running flanges with flat surface for higher durability and wheel contact. Sloped flanges are not permitted.

- b. Track splice: Includes truss splice plates and channel-shaped track splice joints for joining track sections. Splice joints must be located within 48 inches of a support point.
  - c. Standard track cantilevers: Up to 18 inches of cantilever is allowed from a hanger location to the end of the trussed track. Up to 12 inches of cantilever is allowed from a hanger location to the end of the plain track. Longer track cantilevers are done on a customized basis.
3. Swiveling connector Anchor Trolley™: Rigid-body trolley designed to ride inside enclosed track and to carry load.
- a. Construction: Steel body with two wheels on each side and positioning attachment point at center of trolley so load weight is evenly distributed to trolley wheels.
  - b. Braking system: If at least 80 pounds of force, including the weight of the self-retracting lanyard, are exerted on the swiveling connector, a series of eight hardened-alloy steel contact points create friction against the enclosed track. The friction generated by the contact points, in conjunction with the weight of the worker, causes the trolley to stop all movement on the track.
  - c. 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 Rigid Lifelines®. Steel wheels are optional.
  - d. Designed for attachment of carabiner.
4. End stops: Molded composite resilient bumper installed in track to prevent end trucks from rolling out of track. Bolt stops without energy absorbing bumper are not acceptable.

## 2.3 SYSTEM OPTIONS

**\*The following options are available for the Ceiling-Mounted Monorail Anchor Track™ System.** [Select required options from the following, or contact Rigid Lifelines if other types of accessories are required.]

### A. Application Options

1. Custom spans, designs, and hanger assemblies
2. Single, dual, or multiple tracks for use by one, two, or multiple workers
3. Flush-cross mounted or flush-parallel mounted to existing structures
4. Beam clamp hangers and drop rods (require sway bracing)
5. Two or three-way track switches for multiple directions of travel allow the fall protection to cover any specific area
6. Sloped hangers with drop rods (require sway bracing) accommodate slopes up to 14 degrees
7. Curved track
8. Mylar™ lip seal: For heavy dust or paint overspray applications
9. Anchor Track options
  - a. Plain or trussed track (single, dual, triple, or quad trussed track)
  - b. Aluminum Anchor Track: Extruded from high-strength 6061-T6 aluminum alloy
  - c. Steel Track: Rolled from ASTM A572, A607, or A715 grade steel; available with enamel, powder, epoxy, or galvanized coatings
  - d. Stainless steel track: 304 stainless for 500 Series track

## 2.4 SYSTEM COMPONENTS

### A. Track

1. Steel enclosed trussed track allows for greater spans and greater distance between supports.
2. Low profile keeps space requirements to a minimum.
3. Combination of high strength to low weight ratio reduces stress on structures.

### B. Track Hanger Assemblies

1. All Ceiling-Mounted Monorail Anchor Track™ Systems are provided with drop-rod type hanger assemblies that include adjustable beam clamps and a 12-inch drop rod or with a flush type hanger assembly for attachment to ceiling structures.
2. Hanger assemblies are of appropriate size and numbers for selected system.

### C. Track Splice Assemblies

1. Slide track splice over track profile to ensure proper alignment.
2. Trussed track splice assembly bolts through top chord to prevent joints from separating.

### D. Threaded Drop Rod Hanger Assembly

1. Standard hanger assembly for trussed track includes:
  - a. Adjustable beam clamps that provide a secure fit to ceiling structure. Flange widths range from two inches to eight inches.
  - b. Standard 12-inch drop rod (Systems with drop rods longer than 12 inches require special design attention by a qualified person.)
  - c. Trussed track support brackets.

### E. Sway Bracing

1. Required on all drop-rod supported systems to ensure maximum track rigidity.
2. Sway brace clips attach to standard drop rods and track clamps. The sway brace clips fit one-inch diameter schedule 40 pipe at a 45-degree angle.
3. One-inch pipe supplied by others.

### F. Flush-Cross Mount Hanger Assemblies

1. Optional hanger assembly that longitudinally attaches track to ceiling structure.
2. Hanger assembly is fabricated from structural plate equipped with Grade 5 bolts and beam clips.

### G. Flush-Parallel Mount Hanger Assemblies

1. Optional hanger assembly that latitudinally attaches track to ceiling structure.
2. Hanger assembly is fabricated from structural plate equipped with Grade 5 bolts and beam clips.

### H. End Stops

1. End stops are equipped with resilient rubber bumpers to increase impact resistance and are through bolted to the enclosed track.
2. End stops are standard on all systems.

### I. Swiveling Connector Anchor Trolley™

1. The Anchor Trolley is built with non-consumable parts and a fault indicator that appears if an internal spring breaks.
2. When at least 80 pounds of force, including the weight of the self-retracting lanyard, are exerted on the swiveling connector, the brakes engage.
3. The brakes are composed of a series of 8 hardened-alloy steel contact points that create friction against the enclosed track. The friction generated by the contact points, in conjunction with the weight of the worker, causes the trolley to stop on the track.

## 2.5 SHOP FINISHING

### A. **Standard Paint Colors:**

1. All systems are painted with one coat of Rigid Lifelines® Yellow Industrial Enamel.

### B. **Surface Preparation and Painting Procedures:**

1. Rigid Lifelines adheres to the standards of the Society for Protective Coatings (SSPC) for all product surface preparation.
2. Rigid Lifelines Anchor Track System 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.
6. Painted components are cured at air temperature.

## SECTION 3 – EXECUTION

### 3.1 PREPARATION

A. **DO NOT** start installation until support structures are properly prepared.

### B. **Inventory:**

1. Check materials to ensure all parts are present.

### 3.2 ASSEMBLY

A. Units and accessories should be installed in accordance with manufacturer's *Assembly and Operation Instructions Manual*.

B. Do not modify system components without manufacturer's approval.

### C. **Installation Manual/Assembly Drawings**

1. Refer to installation manual to find dimensions for a specific model.
2. Consult included assembly drawings for list of building materials.

### D. **Enclosed Track Installation**

1. Raise track into position and clamp it to structure with beam clamp hangers.
2. Do not cantilever ends of trussed tracks more than 48 inches beyond support centers.

E. **Track Splice Installation** (Application varies depending on required track length and support structure)

1. For systems with more than one section of track, an additional section is installed in the same manner, with the addition of splice joint assembly.
2. The track splice joint is made using a sleeve. Slide sleeve over end of first track, and butt second track against first. Center sleeve over joint. Tighten all top setscrews and side setscrews for correct track alignment. Do not over tighten screws.
3. Track splice joints include two splice plates. Install splice plates to connect ends of truss top tubes. For trussed track, splice joints should be within 48 inches of support hanger.

### F. **Swiveling Connector Anchor Trolley™ Installation**

1. Install swiveling connector Anchor Trolley on track. Secure end stop bolts and rubber bumpers.

2. After installation is complete, enclosed tracks should be leveled. Check tightness for all bolts and nuts.

#### G. Final Assembly

1. Torque locknuts, bolts, and flat washers to appropriate specifications shown in manual.
2. **This system must be used with an ANSI-rated self-retracting lanyard (SRL).** Connect SRL and retrieval tagline in accordance with manufacturer's specifications.

### 3.3 FIELD QUALITY CONTROL

\*Perform field quality control inspection before each use, after a fall event, and annually. These checklists are included in the *Assembly and Operation Instruction Manual*. A Competent or Qualified Person must conduct the annual inspection. Consult the *Ceiling-Mounted Monorail Anchor Track™ System User Manual* for more information.

#### A. Inspection

1. *After a Fall Event and Annual Anchor Track™ System Inspection*
  - a. Check that the beam clamps are installed horizontal within + / - five degrees.
  - b. Check that end stop bolts are present and have locknuts installed.
  - c. Using a torque wrench, check that all bolts are present and torqued to values shown on Assembly Drawing.
  - d. Check that splices, if supplied, are centered on track joints.
  - e. Verify that capacity labels are present, attached, and legible. See Label Placement Drawing. Verify that the number of trolleys matches the value on the capacity label.
  - f. Verify that the fall arrest system is not being used for material handling.
  - g. Check the track for levelness within + / - 1/4 inches per 20 feet of track.
  - h. Check the track flanges. Track flanges cannot be bent downward more than five degrees. Check the track thickness. Track thickness cannot be worn more than 10 percent.
  - i. Check all system welds for cracks.
  - j. Check system components for corrosion and bent or damaged areas.
  - k. Check that all wheel studs, if supplied, are torqued to value shown on Assembly Drawing. Note that these 1/2-inch wheel studs have a different torque value than the system's other 1/2-inch bolts.
  - l. Verify trolley can traverse entire length of track without snags.
  - m. Check trolley for visibly bent swiveling connector, broken welds, or excessive wear or corrosion.
  - n. Test the operation of the trolley's swiveling connector and verify that it can rotate freely. Test the operation of the trolley and verify the wheels rotate freely.
  - o. Check system components for loose components.
  - p. Check system components for loose or missing fasteners.
  - q. Check system support structure for stability.
  - r. Verify that hanger assemblies are installed properly and fasteners are torqued to proper values.
  - s. Check that the support arms pivot bolts, if supplied, are properly installed and tightened. Check system for unauthorized modifications. Only Rigid Lifelines can authorize modifications. Remove system from service if it is modified in any way.
2. *Before Each Use Inspection Checklist*
  - a. Test the swiveling connector(s) on each trolley to verify that each trolley rotates and swivels freely.
  - b. Verify that the trolley(s) can easily and smoothly roll the full length of the track(s).



- c. Check all system welds for cracks.
- d. Check system components for corrosion.
- e. Check system components for bent or damaged areas.
- f. Check support structure for stability.
- g. Visually check all bolted assemblies for proper connections and properly secured bolts and nuts.

**B. Acceptance Inspection**

1. After the system has been installed and after any modifications, an acceptance inspection must be performed using the *After a Fall Event and Annual Anchor Track System Inspection Checklist* included in the *Assembly and Operation Instruction Manual* before use. An authorized dealer or installer should perform acceptance inspections.

**C. Maintenance**

1. To keep systems in good operating order, engineers recommend establishing a regular schedule of inspection and lubrication. All parts should be inspected, all loose parts adjusted, and worn parts replaced at once.
2. Check track splices for alignment, and verify that Anchor Trolley™ travels smoothly through joints.
3. A Competent Person must perform an annual system inspection using the *After a Fall Event and Annual Anchor Track System Inspection Checklist* included in the *Assembly and Operation Instruction Manual*.

**D. Clean Surfaces**

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

**E. Protect System**

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

**F. Quality Standards**

1. Rigid Lifelines® is an ISO 9001-2008 Registered Corporation.
2. Welding performed during manufacturing process meets the American Welding Society's (AWS) D1.1 Standards.
3. Rigid Lifelines Anchor Track™ Systems are manufactured to standards ensuring safety, reliability, and the highest quality.
4. Rigid Lifelines products are manufactured in the United States of America at facilities located in Morgantown, Pennsylvania, and Las Vegas, Nevada.
5. Rigid Lifelines certifies that all rigid rail goods are in full compliance with the Buy American Clause of the American Recovery and Reinvestment Act (ARRA) of May 2009.