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## Rigid Lifelines® Portable Box Frame Anchor Track™ System

This guide can be used to prepare a bid specification for the incorporation of a Portable Box Frame 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.**

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## **SECTION 1 – GENERAL**

### **1.1 SCOPE**

- A. Product:** The Portable Box Frame system provides rigid track fall protection and consists of two steel I-beam headers bolted to two steel tubing cross braces and four steel tubing support legs. Long and short steel tubing knee braces are bolted to each support leg and cross brace; Track is mounted on bottom of headers with single, dual, or multiple tracks for one, two, or multiple workers. Two steel tubing lower connection tubes are bolted longitudinally to the support legs to stabilize them. Each support leg is equipped with leveling jack weldments and foam-filled pneumatic tires. The leveling jack weldments lift the wheels to keep the system in place while in use. Two people can move the system by hand.
- B. General Design Standards:** System is designed in conformance with the following applicable standards:
  - 1. 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 up to and including the end stops of the monorail and up to 30 degrees off-center, perpendicular to the monorail.]
  - 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 Span: [The overall span is the distance from one cross brace to the other.]

5. Overall Height: [The overall height is measured at the highest point on the system after installation.]
6. Trolley-Hook Height: [The trolley-hook height is measured by the distance from the ground to the underside of the trolley hook.]
7. Worker Passability: [Worker passability depends on whether two workers need to pass one another while tied-off to the system. Worker passability also requires a dual track system.]
8. Support Centers: [Support Center is determined by the distance from one header to the other.]
9. Overhang: [Standard track overhangs are up to 18 inches from the center of a hanger location to the end of the trussed track.]
10. 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 bolted on headers.
  2. Cross braces.
  3. Support legs.
  4. Knee braces.
  5. Leveling jack weldments.
  6. Lower connection tubes.
  7. Foam-filled pneumatic tires.
  8. Track hanger assemblies.
  9. 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.
- F. **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 system and dynamic load movement.

#### 1.4 **DOCUMENTS**

##### **A. Submittal Procedures**

1. Product data is included for the system and all accessories. Product data provides capacities, performance, standard use, and applied forces to system.
2. Price guide, proposal drawing (if applicable), and approval Drawing (if applicable), 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 must 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 9001:2015 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 Competent 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 optimal 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 PORTABLE BOX FRAME ANCHOR TRACK™ SYSTEM**

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

**A.** The following is the Portable Box Frame system manufactured by Rigid Lifelines.

1. Two steel I-beam headers are bolted to two steel tubing cross braces and four steel tubing support legs. Long and short steel tubing knee braces are bolted to each support leg and cross brace; Track is mounted on bottom of headers with single, dual, or multiple tracks for one, two, or multiple workers. Two steel tubing lower connection tubes are bolted longitudinally to the support legs to stabilize them. Each support leg is equipped with leveling jack weldments and foam-filled pneumatic tires. The leveling jack weldments lift the tires to keep the system in place while in use. Two people can move the system by hand. Depending on design specification and dimensions, typical overall weights are between 4,390 and 6,307 pounds. Standard trolley-hook height distance is 22 feet. Standard track length distances are between 20 and 35 feet. Standard overall span distances are 15 or 25 feet. Standard support centers distances are between 15 and 25 feet. 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 have minimum yield strength of 46,000 pounds per square inch. Steel I-beams and plate have minimum yield strength of 36,000 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) are bolted to steel I-beam headers with hanger assemblies supported by steel tubing cross braces, knee braces, lower connection tubes, and support legs.

1. Cross braces: Fabricated from steel tubing and include plates for bolting to headers.
2. Headers: Fabricated from steel I-beam and include plates for bolting to track, cross braces, knee braces, and support legs.
3. Knee braces: Fabricated from steel tubing and include plates for bolting to support legs, cross braces, and headers.
4. Support legs: Fabricated from steel tubing and include plates for bolting to headers and resting on ground.

5. Leveling jack weldments: Fabricated from steel tubing and include plates for bolting to support legs, lower connection tubes, and casters.
6. Lower connection tubes: Fabricated from steel tubing and include plates for bolting to support legs and leveling jack weldments.
7. Foam-filled pneumatic tires: Standard tires are single or dual foam-filled pneumatic depending on system size and include plates for bolting to leveling jack weldments.
8. Hanger assemblies: Includes hanger assemblies that provide a rigid connection for suspending tracks. Assembly to consist of truss clamp plates.
9. Runways: Vertical truss fabricated from square steel tubes and enclosed steel track.
  - a. Track: Enclosed cold-formed steel track serves as bottom cord of trussed track and permits end trucks or trolley wheels to ride on lower inside flanges. Fabricated lower running flanges with flat surface are for higher durability and wheel contact. Sloped flanges are not permitted.
  - b. Standard track overhangs: Up to 60 inches of overhang is allowed from a hanger location to the end of the trussed track.
10. 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 is provided standard by Rigid Lifelines®. Steel wheels are optional.
  - d. Designed for attachment of carabiner.
11. End stops: Molded composite resilient bumper installed in track to prevent the trolley or 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 Portable Box Frame 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 heights and spans
2. Single, dual, or multiple tracks for use by one, two, or multiple workers
3. Layered primer with single and double enamel coatings, epoxy coatings, and galvanized finish
4. Traveling bridge design to keep the trolley directly overhead
5. Anchor Track™ options
  - a. Single, dual, triple, or quad trussed track
  - b. Steel Track: Rolled from ASTM A572, A607, or A715 grade steel; available with enamel, powder, epoxy, or galvanized coatings

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## 2.4 **SYSTEM COMPONENTS**

### **A. Headers**

1. Plates are welded to steel I-beams so that the headers can be bolted to cross braces, support legs, knee braces, and track.

### **B. Cross Braces**

1. Plates are welded to steel tubes so that the cross braces can be bolted to headers.

### **C. Knee Braces**

1. Plates are welded to steel tubes so that the knee braces can be bolted to support legs, cross braces, and headers.
2. Knee brace mounting plates come painted with four 9/16-inch diameter holes and are used to bolt the knee braces to support legs and cross braces.

### **D. Support Legs**

1. Plates are welded to steel tubes so that one end of the support legs can be bolted to headers and the other end can rest firmly on the ground.

### **E. Leveling Jack Weldments**

1. Plates are welded to steel tubes so that one end of the leveling jack weldments can be bolted to support legs and the other end can be bolted to foam-filled pneumatic tires.
2. Tire Mounting Plates come painted with four 9/16-inch diameter holes and are used to bolt the leveling jack weldments to support legs.

### **F. Lower Connection Tubes**

1. Steel tubes bolt to support tube pivot plates. The lower connection tubes run longitudinally.
2. Support tube mounting plates come painted with four 9/16-inch diameter holes and are used to bolt the lower connection tubes to support legs.

### **G. Foam-Filled Pneumatic Tires**

1. Tires come assembled with swivel locks and mounting plate.
2. Mounting plates are used to bolt the casters to the leveling jack weldments.
3. Swivel locks prevent the tires from turning.

### **H. 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.

### **I. Track Hanger Assemblies**

1. All Portable Box Frame Anchor Track™ Systems are provided with a flush-type hanger assembly for attachment to headers.
2. Hanger assemblies are of appropriate size and numbers for selected system.

### **J. 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.

### **K. 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 eight 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 Yellow ArmorPoxy™.

### 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 assembly until support structures are properly prepared.

### B. **Inventory:**

1. Check materials to ensure all parts are present.
2. Anchor bolts for support columns are not included. Four, 1-5/16-inch diameter holes are provided for anchor bolts.

### C. **Foundation**

1. Check concrete footings, slabs, or other foundations to ensure sufficient system support.
2. Ensure accurate anchor bolt patterns are provided for foundation design.

### 3.2 ASSEMBLY

[NOTE: The following installation information is provided only as a reference tool. For complete installation and maintenance instructions, refer to manual 103-0071.]

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. **Cross Brace Installation**

1. Place at least eight six-inch by six-inch (or larger) wooden blocks in a square pattern on the ground, with three blocks on each side.
2. Place the first header on the blocks on one side of the square, with the plates for the knee braces facing down.
3. Place a cross brace perpendicular to the header, creating a corner.
4. Fasten the cross brace to the header using bolts and nuts. Securely tighten all nuts.
5. Repeat steps 1. through 4. to attach the remaining cross brace and header.
6. Ensure that the cross braces are perfectly level and form 90-degree corners with headers.

**E. Knee Brace Installation**

1. Using a crane, lift the cross braces and headers high enough to attach the knee braces.
2. Attach the short knee braces to the cross braces using bolts, nuts, and knee brace mount plates. Ensure that the short knee braces are facing towards the corners. Securely tighten the nuts.
3. Attach the long knee braces to the plates on the headers using nuts and bolts. Ensure that the long knee braces are facing towards the corners. Securely tighten the nuts.
4. Leave the system lifted in the air to attach the enclosed track.

**F. Enclosed Track Installation**

1. Raise track into position and clamp it to headers with fasteners.
2. Do not overhang ends of tracks more than 60 inches beyond support centers.

**G. Support Leg Installation**

1. Using a crane, lift the assembly high enough to fit the support legs under the plates found on the bottom corners of both headers.
2. Lift a support leg to the bottom corner of a header using a forklift. Align the holes on the bottom of the header with the top of the support leg and bolt the support leg to the header using bolts and nuts. Securely tighten the nuts.
3. Move the bottom of the short knee brace so it is flush against the support leg. Place a knee brace mount plate on the opposite side of the flush short knee brace on the support leg. Insert bolts through the knee brace mount plate and the short knee brace and secure with nuts. Securely tighten the nuts.
4. Move the bottom of the long knee brace so it is flush against the support leg. Place a knee brace mount plate on the opposite side of the flush long knee brace on the support leg. Insert bolts through the knee brace mount plate and the long knee brace and secure with nuts. Securely tighten nuts.
5. Repeat steps 1. through 4. to attach the remaining three support legs to the headers and short and long knee braces.
6. Lower the system until it rests firmly on the bottom plates of the support legs.
7. Ensure that all support legs are plumb. Properly torque all support leg nuts.
8. Properly torque the short and long knee brace nuts.

**H. Leveling Jack Weldment and Lower Connection Tube Installation**

1. Attach the leveling jack weldment to the support leg using a caster mounting plate, nuts, and bolts. The top of the caster mounting plate should be 40 inches from the ground. Securely tighten the nuts.
2. Attach wheel assemblies to the leveling jack weldment using nuts, bolts, and flat washers. Securely tighten the nuts for now.
3. Attach the support tube mount plate to the lower connection tube using a bolt and nut. Securely tighten the nut. Now attach the lower connection tube to the support leg using nuts and bolts. Securely tighten the nuts.
4. Repeat steps 1. through 3. to attach the remaining leveling jack weldments and lower connection tubes to the support legs.
5. Properly torque all nuts.

**I. 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.

**J. Final Assembly**

1. Torque locknuts and bolts 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 *Portable Box Frame Anchor Track™ System Assembly and Operation Instruction Manual* for more information.

#### **A. Inspection**

1. *After a Fall Event and Annual Anchor Track™ System Inspection Checklist*
  - 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. A qualified person or competent person must 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. Verify that Anchor Trolley™ travels smoothly through track(s).
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 9001:2015 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 system components are in full compliance with the Buy American Clause of the American Recovery and Reinvestment Act (ARRA) of May 2009.