

SECTION 41 67 20

FALL ARREST ANCHOR SYSTEM

******* Gorbel, Inc. manufacturers a broad range of material handling cranes including monorail, bridge, gantry, and jib cranes. Numerous work station and industrial models and crane accessories are provided.**

This guide can be used to prepare a specification for incorporating Gorbel's Tether Track Rigid Rail Anchor System into a competitively bid construction project. This rigid rail fall arrest anchor system is designed to protect workers from falls in elevated work environments. Tether Track can support multiple workers. This rigid rail system has many advantages over a wire rope anchor system such as less fall clearance distance, reduced risk of secondary fall injuries, longer distances between supports, and safer work for multiple people.

The specification section is organized by placing information in three standard parts:

- PART 1 - GENERAL** **Describes administrative and procedural requirements.**
- PART 2 - PRODUCTS** **Describes materials, products, and accessories to be incorporated into the construction project.**
- PART 3 - EXECUTION** **Describes how the products will be installed at the construction site.**

Throughout this product guide specification, references are made to other specification sections that might be contained in the project manual. These references are presented as examples and coordination reminders. For each project, these references will need to be revised to reflect actual sections being used.

The specifier will need to edit this product specification for a specific project to reflect the options and applications being used. The guide section has been written so that most editing can be accomplished by deleting unnecessary requirements and options. Options are indicated by []. Notes to assist the specifier in selecting options and editing the specification guide are printed in bold and indicated with ***. For final editing, all brackets and notes will need to be deleted from the guide.**

ART 1 - GENERAL

1.1 SUMMARY

******* A complete fall arrest system includes an anchor system, body harness, and connector such as a shock-absorbing lanyard or a self-retracting lifeline (SRL). Gorbel's Tether Track serves as an anchor system in either a monorail or bridge configuration. For special applications, custom designed anchor systems are available from Gorbel, Inc. Fall arrest harnesses and connectors are available from other manufacturers. Tether Track can be supported either on free-standing posts or attached to the roof structure or other overhead building component. Edit the following paragraph to indicate type of fall arrest anchor system required for Project.**

- A. Section includes: [Monorail] [Bridge type] [Custom designed] fall arrest anchor system consisting of rigid, [floor supported,] [overhead mounted,] enclosed track rail and wheeled tether trolleys.
- B. Related sections:

******* List other specification sections related to work of this section such as the following. *******

- 1. Section 01 10 00 - Summary: Fall arrest harnesses and connectors provided by [Owner] [others under separate contract to Owner].

******* For floor supported fall arrest anchor systems, structural steel posts or other supports need to be designed by Architect or other Design Professional, specified in other sections, and be provide by other subcontractors. Edit and include the following paragraph if anchor system is floor supported. *******

- 3. Section [05 12 00 - Structural Steel Framing] [____]: Structural steel support system for floor mounted fall arrest anchor system.

******* Overhead mounted fall arrest anchor systems require an adequate overhead structure for support. Include the following paragraph for overhead support system. *******

- 4. Section [____] - [____]: Structural [beam] [roof slab] [auxiliary framing] [____] designed to support fall arrest anchor system and live loads.

1.2 REFERENCES

****** List by number and full title reference standards referred to in remainder of the specification section. 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):
 - 1. ANSI Z359 - Fall Protection Code.
- C. American Society for Testing and Materials (ASTM) Publications:
 - 1. ASTM A36 - Carbon Structural Steel.
 - 2. ASTM A325 - Structural Bolts, Steel, Heat Treated, 120/150 ksi Minimum Tensile Strength.
 - 3. ASTM A490 - Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
- D. American Welding Society (AWS):
 - 1. AWS D1.1 - Structural Welding Code.
- E. Occupational Safety and Health Administration (OSHA): OSHA Specification 1926 Subpart M - Fall Protection.

1.3 PERFORMANCE REQUIREMENTS

******* Edit this article to reflect specific project requirements. *******

- A. Fall arrest anchor system in conjunction with connectors and harnesses provided by Fall Protection Associates, Inc. Dba Hy-Safe Technology shall provide a means of protecting worker from fall in elevated work environments while providing for worker mobility to perform tasks.
- B. System shall be [floor supported] [overhead suspended], [monorail] [bridge] [_____] type interior installation providing protection for area indicated on Drawings.
- C. Installed track with tether trolleys shall be positioned at height indicated on drawings and should be straight and level to eliminate potential binding or drift.

- D. Fall arrest anchor system shall be designed to support multiple workers each weighing up to [310 pounds] [141 kilograms] with tools.
- E. Anchor system shall support full impact of falls vertically and at inclines up to 30 degree angle.
- F. System and components shall be rated for [900 pounds] [408 kilograms] maximum arresting force (MAF).
- G. Modular, pre-engineered design: Fall arrest anchor system shall be capable of expansion, disassembly, and relocation.
- H. Tether track: Enclosed type limiting dust and dirt collection on rolling surfaces.

1.4 SUBMITTALS

- A. Provide in accordance with Section 01 33 00 - Submittal Procedures:
 - 1. Product data for fall arrest anchor system and accessories. Describe materials, capacities, performance, and operation.
 - 2. Shop drawings showing system layout, configuration, dimensions, connections, supports, and fabrication and installation details.
 - 3. Design loads: Calculations of loads transmitted from fall arrest anchor system to supporting structure.
 - 4. Copy of warranty required by Paragraph 1.6 for review by Architect.
 - 5. Manufacturer's installation and maintenance instructions.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in designing and manufacturing overhead rail systems and lifting devices with 25 years successful experience.
- B. Manufacturer and installer shall have specific liability insurance (products and completed operations) in an amount of not less than \$9,000,000.
- C. Manufacturer and Installer Qualifications: Firm specializing in design and fabrication and installation of fall protection systems for structures with minimum 15 years' experience.
- D. Fall arrest anchor system shall be designed, fabricated, and installed in

accordance with ANSI Z359 and OSHA 1926, Subpart M.

E. Perform welding by certified operators in accordance with AWS D14.1.

F. Bolted connections shall be in accordance with torque tightening procedures specified in AISC Manual, Part 5.

1.6 WARRANTY

A. Provide under provisions of Section 01780 - Closeout Submittals:

1. 5 years warranty for fall arrest anchor system to cover defects in materials and workmanship.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Gorbel, Inc., P.O. Box 593, Fishers, New York 14453-0593; 800-821-0086; www.gorbel.com.
- B. Requests to use equivalent products of other manufacturers shall be submitted in accordance with Section 01 25 13 - Product Substitution Procedures.

2.2 FALL ARREST ANCHOR SYSTEM

***** Gorbel's Tether Track can be installed in two basic configurations:

Monorail system: Single Tether Track designed to provide worker mobility along a single straight line axis.

Bridge system: System consists of two parallel Tether Tracks supporting an aluminum Tether Track bridge allowing working mobility in both the X and Y axis.

Gorbel's fall arrest anchor system is designed for normal interior operation. Special fall arrest applications such as free standing systems, fold away systems, jibs, and outdoor systems can be custom designed and fabricated. Contact Gorbel, Inc. for assistance in designing and specifying unique fall arrest anchor systems. Select and edit one of the following paragraphs to indicate type of fall arrest anchor required for Project.

- A. Type: Fall arrest anchor system consisting of rigid, [floor supported,] [overhead mounted,] enclosed track rail and wheeled tether trolleys designed

to protect workers from falls in elevated work environments; Tether Track Rigid Rail Anchor System as manufactured by Gorbel, Inc. Wire rope anchor systems are not acceptable.

- B. Configuration: [Monorail system designed to provide worker mobility along a single straight line axis.] [Bridge system consisting of two parallel tether tracks supporting a suspended tether track bridge and allowing working mobility in both the X and Y axis.] [Custom designed [free standing system] [fold away system] [jib system] [outdoor system] [_____].
- C. Layout: As indicated and dimensioned on Drawings and reviewed shop drawings.

******* Standard Tether Track systems are designed to support either one or two workers each weighing up to 310 pounds (140 kilograms) with tools. Contact Gorbel, Inc. for assistance if heavier loads are required. *******

- D. Number of workers each weighing no more than [310 pounds] [140 kilograms] with tools to be supported: [1] [2].

****** Maximum track support span and cantilever distance will depend type of track and number of workers supported. Refer to Gorbel, Inc. product literature for allowable spans and cantilevers. *******

- E. Maximum distance between track supports: [_____] [feet] [meters].

- F. Maximum track cantilever: [_____] [feet] [meters].

2.3 COMPONENTS

- A. Tether track: Cold-rolled steel, enclosed track designed to accommodate easy, smooth movement without forcing or jamming of tether trolley with attached connector and to effortlessly follow worker.

1. Profile: Rectangular, tubular section with continuous bottom slot to allow movement of trolley and connector. Bottom running flanges to have 2 degree taper to keep trolley centered. Flat, non-centering tracks are not acceptable.

******* Tether Track is used to fabricate three styles of fall arrest system rails. Style and model depends of number of workers protected, distance between supports, and maximum cantilever. Refer to tables in Gorbel, Inc. product literature for selecting appropriate model.**

Plain track - Models F500 and F1000: Plain enclosed steel tether track providing

**maximum headroom. Spans range from 7 to 18 feet (2.1 to 5.5 meters).
Cantilevers range from 2 to 4.5 feet (0.6 to 1.4 meters).**

Trussed track - Models F500S, F500SL, and F500SLX: Truss fabricated from tubular steel sections with tether track used as bottom cord. Spans range from 16 to 30 feet (4.9 to 9.1 meters). Cantilevers range from 4 to 6 feet (1.2 to 1.8 meters).

Dual trussed track - Model F500SLD: Truss fabricated from tubular steel sections with two tether tracks used as bottom cord. The dual tether track enables one worker to pass by another on a monorail system without unsafely disconnecting. Maximum span of 35 feet (10.7 meters). 6 foot (1.9 meters) maximum cantilever.

Include the following to specify plain track application. *****

- B. Fall arrest rails: Plain enclosed steel tether track as specified in Paragraph 2.3.A; Plain Tether Track Rail, Model [F500] [F1000] as manufactured by Gorbel, Inc.

******* Include the following to specify trussed track. *******

- C. Fall arrest rails: Truss fabricated from tubular steel sections with tether track used as bottom cord; Trussed Tether Track, Model [F500S] [F500SL] [F500SLX] as manufactured by Gorbel, Inc.

******* Include the following to specify dual trussed track. *******

- D. Fall arrest rails: Truss fabricated from tubular steel sections with two tether tracks used as bottom cord enabling one worker to pass by another on a monorail system without unsafely disconnecting; Dual Trussed Tether Track, Model 500 SLD as manufactured by Gorbel, Inc.
- E. Tether trolleys: Wheeled, steel fabrication designed specifically to use with tether track specified in Paragraph 2.3.A for fall arrest systems and provide fluid movement and stability; Tether Trolleys as manufactured by Gorbel, Inc.
 - 1. Wheels: Equip each trolley with 3 pairs of wheels sized to roll within tether track.
 - a. Material: DURACOMP4 as provided Gorbel, Inc.
 - b. Profile: Provide wheels with 2 degree taper to match taper of tether track.

2. Connection device: Equip bottom of trolley with swivel eye for securing shock-absorbing lanyard or self-retracting lifeline and which allows free movement beneath trolley and prevents twisting of the connector.

******* Include the following paragraph for if fall arrest bridge system is being specified. *******

- F. Bridge for fall arrest bridge system: Extruded aluminum beam with tether track enclosed profile as specified in Paragraph 2.3.A.1 for bottom flange.

******* Contact Gorbel, Inc. for allowable spans, load capacities, and limitations for aluminum bridge. *******

1. Maximum span between supporting side trolleys: [_____] [feet] [meters].
2. Length: [[_____] [feet] [meters].] [As indicated on Drawings and reviewed shop drawings.]
3. Finish: Aluminum mill finish.
4. Hardware: Equip ends of aluminum bridge with means for attachment to side trolleys.

2.4 ACCESSORIES

- A. Provide fall arrest anchor system with end stops, splices, connecting devices, fasteners, anchors, and other hardware and accessories as required for a complete, secure, structurally sound, safe installation as indicated on Drawings and reviewed shop drawings.

******* Fall arrest anchor system can be attached to overhead structural steel framing. Tether Track can be rigidly attached flush to structural framing with clamps, bolts, or other fittings. Tracks can also be suspended from structural framing with suspension rods. This method requires the system to be braced laterally and longitudinally. Contact Gorbel, Inc. to determine appropriate suspension system for Project conditions and requirements. Include the following paragraph if overhead fall arrest anchor system is being specified. *******

- B. Design and provide attachment or suspension system for overhead mounted fall arrest anchor system including anchors, brackets, clamps, fasteners, suspension assemblies, fittings, auxiliary framing, bracing, and other components for complete, functional installation.

2.5 SHOP FINISHING

- A. Steam wash steel components with iron phosphate solution and apply baked enamel finish. Colors shall be as selected by Architect from manufacturer's full range.
- B. Provide spray cans of matching colors, air-drying paint for field touch-up.

PART 3 - EXECUTION**3.1 PREPARATION**

- A. Coordinate provision of fall arrest anchor system with:
 - 1. Provision of fall arrest harnesses and connectors provided by others in accordance with [Section 01 10 00 - Summary] [Section [41 67 19 - Plant Safety Equipment] [_____]]. Ensure that attachment of connectors is compatible with tether trolleys being provided.

******* Include the following paragraph for floor supported fall arrest anchor system.***********

2. Design, fabrication, and installation of structural steel support system for floor mounted fall arrest anchor system as specified in Section [05 12 00 - Structural Steel Framing] [____].
 - a. Verify that structure, spacing, and bracing of supports are compatible with structural capacities of fall arrest rails [and bridge rail for fall arrest bridge system].
 - b. Verify that connections of fall arrest rails to floor mounted supports have been adequately designed and that required anchors, fasteners, and other hardware has been provided.

******* Include the following paragraph for overhead mounted fall arrest anchor system. *******

3. Design and installation of structural [beam] [roof slab] [auxiliary framing] [____] for overhead support of fall arrest anchor system as specified in Section [____] - [____].
 - a. Verify that structure, spacing, and bracing of supports are compatible with structural capacities of fall arrest rails [and bridge rail for fall arrest bridge system].
 - b. Verify that connections of fall arrest rails to overhead mounted supports have been adequately designed and that required anchors, fasteners, and other hardware has been provided.

B. Prior to installation:

1. Verify support structure is ready to receive fall arrest anchor system.
2. Inventory parts. Verify all required components are available and undamaged.

3.2 INSTALLATION

- A. Install fall arrest anchor system in accordance with manufacturer's instructions and reviewed shop drawings.
- B. Do not modify system components in any manner without advance, written approval from system manufacturer.

******* Include the following paragraph to specify floor supported system. *******

- C. Rigidly attach fall arrest rails to steel [posts] [columns] [_____] with clamps, brackets, bolts, and other fittings as detailed on reviewed shop drawings.

******* Include the following paragraph to specify rigidly attached, overhead mounted system. *******

- D. Rigidly attach fall arrest rails to overhead structural steel framing with clamps, brackets, bolts, and other fittings as detailed on reviewed shop drawings.

******* Include the following paragraph to specify overhead mounting with suspension rod hangers. *******

- E. Install fall arrest rails with threaded suspension rod hanger assemblies as detailed on reviewed shop drawings. Attach upper hanger bracket to steel support framing and attach lower hanger brackets to rails. Lift rails into place and temporarily support. Connect threaded rods to upper and lower bracket. Ensure two minimum threads are beyond hexnut and rods are plumb and not bent.
- F. Install auxiliary bracing as required to prevent lateral and longitude sway and movement of system as detailed on Drawings and reviewed shop drawings.
- G. Prior to torquing bolts, ensure rails are:
 - 1. Accurately spaced and level.
 - 2. Tether track splice transitions are smooth with no raised areas to inhibit movement of trolley.

******* Include the following paragraph if bridge fall arrest anchor system is being specified. *******

- 3. Bridge system rails are parallel within plus or minus [1/8 inch in 20 feet] [3 mm in 6 meters].
- H. Tighten mounting bolts to manufacturer recommended torque ratings.
- I. Tether trolleys: Insert into fall arrest track [and bridge rail] in quantities and at locations indicated on Drawings and reviewed shop drawings.
- J. End stops: Bolt stops into open ends of fall arrest track [and bridge rail] in accordance with manufacturer's instructions and reviewed shop drawings.

3.3 FIELD QUALITY CONTROL

- A. Move tether trolleys [and bridge rail] through entire travel to ensure system is clear of obstructions and trolleys move freely and smoothly.
- B. Inspect installed fall arrest anchor system. Verify all bolts are tight and lockwashers fully compressed.
- C. Field test system with connector and simulated load attached to swivel eye of tether trolley. Ensure system operates functionally, safely, and smoothly. Adjust as required and correct deficiencies.
- D. Clean surfaces. If necessary, touch-up paint damage, scratches, and blemishes with manufacturer provided matching paint.
- E. Protect fall arrest anchor system from other construction operations.

3.4 DEMONSTRATING AND TRAINING

- A. In accordance with Section 01 79 00 - Demonstration and Training, provide demonstration and training session for Owner's representative covering operation and maintenance of fall arrest anchor system.

END OF SECTION