



**An Analysis of a Fall/Arrest Protection System for an Airport Jet bridge for  
East Island Aviation & Airport Bridge Co.  
Performed by FDR Safety**

**Executive Summary**

East Island Aviation (EIAS) & Airport Bridge Company (ABC) have developed a Fall Arrest/Protection system to protect employees while performing maintenance on Airport Jet Bridges.

On Friday December 7, 2007 an onsite inspection of a Fall Arrest/Protection system demonstration took place at Louis Armstrong New Orleans International Airport. Representatives from East Island (EIAS), Airport Bridge (ABC), and FDR Safety were present to evaluate and discuss design, application and implementation of this system.

The Fall Arrest/Protection design demonstration consisted of two horizontal lifelines mounted on each tunnel of the Jet Bridge, a cable lanyard, and a body harness on a 300lb manikin.

The deflection of line, cable and harness were within acceptable tolerances. Limits and tolerances of travel were also identified and will need to be adjusted for as design issues arise for various bridges.

**Compliance Review per OSHA standard 1926.500.**

The following information refers to the compliance ability of the application of this product demonstration. The results of this product demonstration are noted to each applicable sections of this standard. The outcomes and evidences are in *italics and photos* and follow the stated standard and or standards.

**1926.502 (a)(2)**

Employers shall provide and install all fall protection systems required by this subpart for an employee, and shall comply with all other pertinent requirements of this subpart before that employee begins the work that necessitates the fall protection.

*As evident by this analysis, the design & manufacturing team of (ABC) and (EIAS) has provided a plan and the framework for compliance that any employer can utilize.*



**1926.502(d) (1)**

Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials.

**1926.502(d) (2)**

Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of the system.

**1926.502(d) (3)**

Dee-rings and snap hooks shall have a minimum tensile strength of 5,000 pounds (22.2 kN).

**1926.502(d) (4)**

Dee-rings and snap hooks shall be proof-tested to a minimum tensile load of 3,600 pounds (16 kN) without cracking, breaking, or taking permanent deformation.

**1926.502(d) (5)**

Snap hooks shall be sized to be compatible with the member to which they are connected to prevent unintentional disengagement of the snap hook by depression of the snap hook keeper by the connected member, or shall be a locking type snap hook designed and used to prevent disengagement of the snap hook by the contact of the snap hook keeper by the connected member. Effective January 1, 1998, only locking type snap hooks shall be used.

**1926.502 (d) (6)**

Unless the snap hook is a locking type and designed for the following connections, snap hooks shall not be engaged:

**1926.502(d) (6) (i)**

Directly to webbing, rope or wire rope;

**1926.502(d) (6) (ii)**

to each other;



***Equipment shown meets 1926.502(d)(1) through (d)(6)(v)***

**1926.502(d)(6)(iii)**

to a dee-ring to which another snap hook or other connector is attached;

**1926.502(d)(6)(iv)**

to a horizontal lifeline; or

**1926.502(d)(6)(v)**

to any object which is incompatibly shaped or dimensioned in relation to the snap hook such that unintentional disengagement could occur by the connected object being able to depress the snap hook keeper and release itself.

### **1926.502(d)(7)**

On suspended scaffolds or similar work platforms with horizontal lifelines which may become vertical lifelines, the devices used to connect to a horizontal lifeline shall be capable of locking in both directions on the lifeline.

### **1926.502 (d)(8)**

**Horizontal lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.**



*This device was a two cable lifeline with 4 bolt anchors on either end of each tunnel.*



### **1926.502(d)(9)**

Lanyards and vertical lifelines shall have a minimum breaking strength of 5,000 pounds (22.2 kN).

**1926.502(d)(14)**

Ropes and straps (webbing) used in lanyards, lifelines, and strength components of body belts and body harnesses shall be made from synthetic fibers.

**1926.502(d)(15)**

Anchorage used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds (22.2 kN) per employee attached, or shall be designed, installed, and used as follows:



**1926.502(d)(15)(i)**

as part of a complete personal fall arrest system which maintains a safety factor of at least two; and

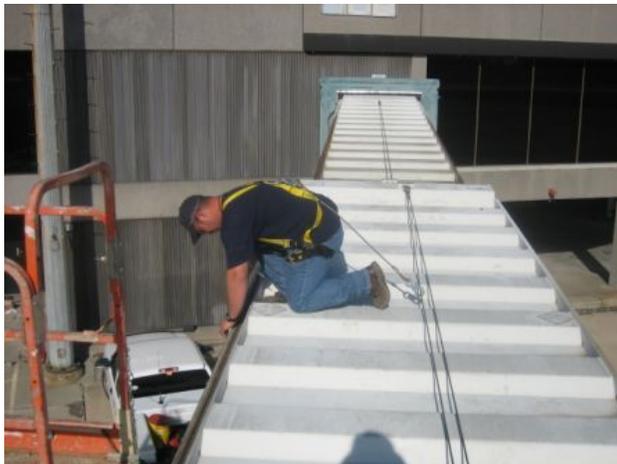
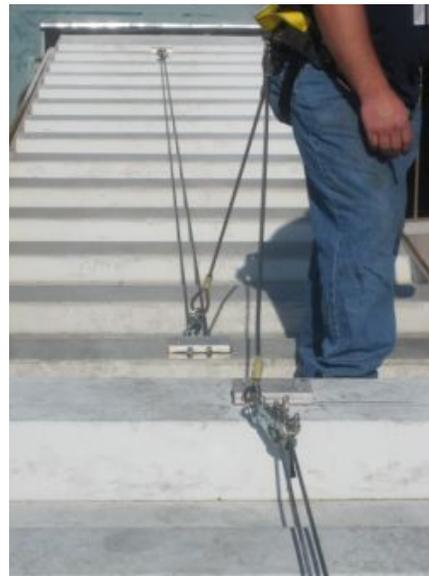
**1926.502(d)(15)(ii)**

under the supervision of a qualified person.

**1926.502(d)(16)**

Personal fall arrest systems, when stopping a fall, shall:

be rigged such that an employee can neither free fall more than 6 feet (1.8 m), nor contact any lower level;



*The 300 lb rock dummy was thrown from the sky bridge and the line deflected 15 inches. We measured the deflection of the 7/16" cable with two methods.*



*The cable was pulled by using a tension meter while in the JLG scissor lift.*

*The meter calculation was 45 ft lbs. and was also pulled by another working reaching a deflection of 6 inches.*

**Action item that was identified during the test which was subsequently addressed by the manufacturer**

*The horizontal life lines were slightly off center on each tunnel. With each tunnel (A,B,C) having varying widths, there was a concern about the wire rope lanyard/cable length for each employee.*

*This can be customized for each application with little or no difficulty and no compromise of design strength.*

**Conclusion:**

This Fall Arrest/Protection product design developed by East Island Aviation & Airport Bridge Co. for application to Airport Jet Bridges **meets** the compliance criteria set forth by the fore mentioned standards.

The design factor is base on calculations using the appropriate grade fasteners, hardware and proper installation to ensure an anchor point that meets the criteria of the standards within the safety envelope as intended to be used.

This product can also act as a fall restraint system by customizing lanyard lengths for each individual application.

Overall this is a good practical system that not only meets the OSHA requirements but also is practical and easy to use. The system requires little maintenance and training.