



STABILIZATION SYSTEMS



Window Cleaning/
Suspended Maintenance Equipment
& Fall Protection Systems

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THE SUSPENDED EQUIPMENT EXPERTS

DESCRIPTION

The stabilization of platform, cage or bosun's chair equipment is a system designed to keep the equipment in contact with the building facade, to prevent movement. Without stabilization, worker safety could be in jeopardy due to wind action or building faces could become damaged due to equipment impacting upon them.

Currently, federal OSHA covers the subject of stabilization under 1910.66, Subpart F - Powered Platforms. Subpart F is confined to powered platform installations "permanently dedicated" to a specific building. Transportable platforms used to service buildings on an occasional basis are covered by 1910.28, Subpart D, Walking-Working Surfaces. Subpart D requires the contractor to securely lash temporary platforms to the building.

Permanent Powered Platform Stabilization Considerations

Permanent powered platforms purchased specifically for a particular building requires a stabilization system.

Permanent powered platforms are mandatory in New York State on all buildings 75'-0" (23 m) and higher and in California on all buildings 130'-0" (39.6 m) and higher.

CONTINUOUS STABILIZATION

Mullion tracks provide continuous stabilization as well as a practical solution for both roof rigging or ground rigging. This method employs tie-in guides in the form of internal or external tracks, i.e. mullion guides.

On the exterior of the building, provisions for tie-in guides/mullion tracks is supplied by the curtain wall manufacturer to provide a positive and continuous means of engagement between the platform and

the building during full vertical travel of the platform.

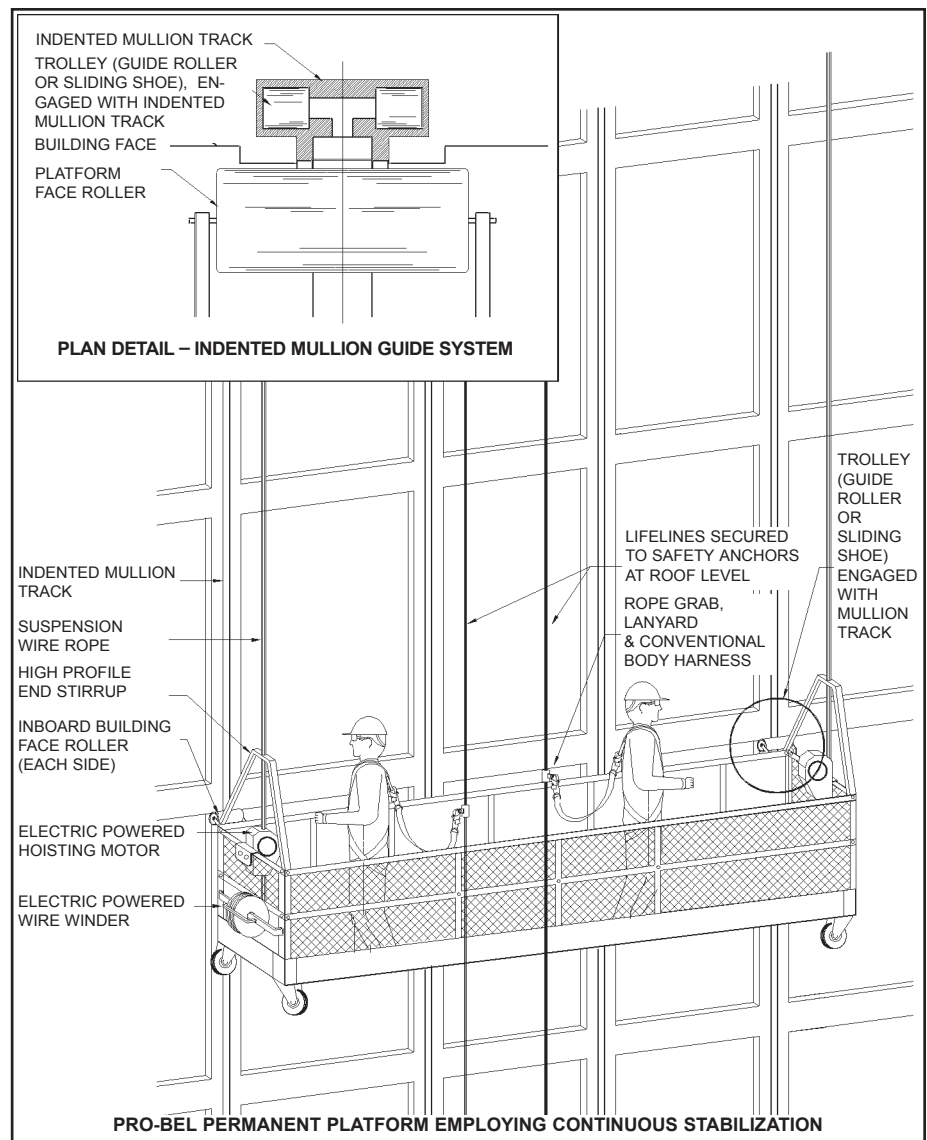
According to federal OSHA regulations, "Indented mullions, T-rails or other equivalent guides are acceptable as tie-in guides in a building face for a continuous stabilization system. Internal guides are embedded in other building members with only the opening exposed. External guides however, are installed external to the other building members and so are fully exposed."

Trolleys (guide rollers or shoes), attached to the platform and supplied by the window cleaning equipment manufacturer, engage the tie-in guides/mullion tracks provided by

the curtain wall manufacturer. **Note:** careful co-ordination is required between these two manufacturers to ensure smooth, trouble-free platform operation, i.e. track alignment and properly fitted trolleys (See Pro-Bel Stabilization Recommendations).

INTERMITTENT STABILIZATION

Where continuous stabilization is not feasible with punched type or similar windows, or where building configuration does not allow, intermittent stabilization in the form of buttons or detent pins can be used providing the window cleaning/suspended maintenance equipment is designed for roof rigging.



Primary Suspension Fall Protection Equipment

Intermittent Stabilization (continued):

Tie-in guides such as buttons or detent pins are located in vertical rows and horizontally in close proximity to the suspension ropes. The maximum vertical interval between tie-in guides is to be three floors or 50 feet (15.3 m), whichever is less. **Note:** New York specifies 3 floors or 40'-0" (12.2 m) whichever is less.

As a platform descends past the elevation of a tie-in guide, each of the platform's two occupants secure a stabilizer tie between a suspension rope and a tie-in guide. Each stabilizer tie is to be adjustable or fixed length to provide continuous contact between the platform facade rollers and the building facade. This process will be repeated as each stabilization point (tie-in guide) is reached during descent of the platform.

The process will be reversed, that is, the stabilization ties will be removed as each stabilization point is reached, as the platform ascends.

The design load for stabilization components such as tie-in guides/buttons/detent pins are designed for a working load of 300 lbs (1.33 kN) per AISC requirements and/or other applicable codes and to 600 lbs (2.67 kN) against fracture or detachment.



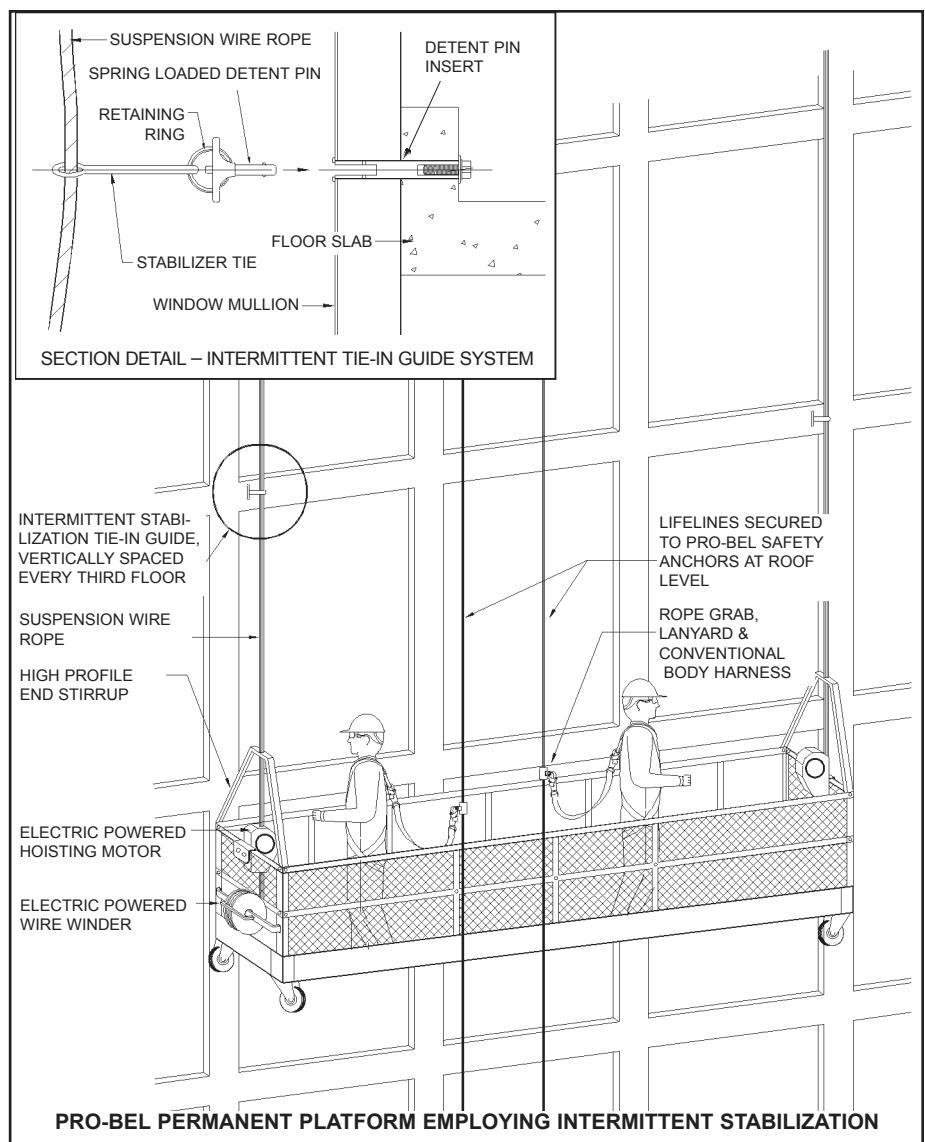
Two types of detent pins. Left photo shows pin typically employed for concrete, stone or similar material. Right photo shows pin typically used for metal window mullion.



Photo shows partial curtain wall facade. Black dot in aluminum mullion is location for hole for detent pin.



Stabilization of this single work cage is achieved using buttons which are located on the underside of the window sunshades. Stabilization buttons are required starting at the highest elevation of the building, located in vertical rows every third floor or 50'-0" (15.3 m) whichever is less. In New York, vertical spacing is to be 3 storeys or 40'-0" (12 m).



Non-Permanent Platform Considerations

Temporary platforms (scaffolds) supplied by the window cleaning or maintenance contractor are required to be securely lashed to the building or structure to provide local stabilization (OSHA 1910.28, Subpart D).

However, unless the building has been designed and equipped with a stabilization system, i.e. mullion tracks, buttons or detent pins, workers are required or forced to stabilize their platform using any one of a variety of stabilization methods, including:

1. Rigging the platform using angulated roping where the suspended portion of the equipment in use does not exceed 130'-0" (39.6 m) above a safe surface or ground level (a suspension method where the upper portion of suspension is inboard from the attachments on the suspended unit, thus causing the suspended unit to bear against the face of the building).
2. By lashing platforms to building components such as mullions, sills, flashings or other obvious protrusions, using vice grip pliers or other means. In some cases, workers will install mechanical fasteners such as bolts or screws to secure the suspended platform. These practices can damage building facades.
3. By more labor intensive down rigged lines (highly restricted alternative requiring specific engineering).



Pro-Bel U-bar anchors concealed in walkway at base of Podium building are used to secure down-rigged cables which are used for platform stabilization. Workers attach platform stabilizer ties to the cables at each floor to prevent unwanted platform movement during excessive wind conditions. Designed to slip under load to protect against amplified loads.



Platform stabilization, in the form of tie-in buttons or detent pins, is a practical means of protecting both the worker and building facade from injury/damage due to wind action. A roof rigged system is required to use tie-in buttons or detent pins. Special provisions must be considered on multi-level buildings when the suspension heights exceed 130'-0 (39.6 m).

OSHA does not presently address the subject of stabilization system installation for non-permanent conventional platforms. However, wind speed, wind gusts, wind conditions at corners, platform area, weight, shape, building height, time period of suspension and similar conditions all have an effect on platform movement and worker safety at building heights over 130'-0" (39.6 m). See page S-5 for Pro-Bel Stabilization Recommendations.

Although stabilization systems are more commonly used with permanent powered platform installations, the designer should consider the use of either stabilization tracks, buttons or detent pins for

conventional suspended platform applications. These options will protect the face of the building as well as provide suitable securement for lashing the suspended platform if the building height is over 130'-0" (39.6 m).

Bosun's Chair (with Descent Control)

Bosun's chair stabilization is not presently covered by OSHA, Subpart D. Instead the OSHA ruling for stabilization is covered in a separate Memorandum to Regional Administrators from Patricia K. Clark, Director, Directorate of Compliance Programs, Department of Labor (March 12, 1991). Provision for local stabilization for descents in excess of 130'-0" (39.6 m) is required and normally suction cups are employed. Although suction cups are the popular choice of window cleaners, other methods of stabilization include the use of 'C' clamps and vice grip pliers.



Bosun's chair with descent control device is one of the most common types of equipment employed by the window cleaning trade.

PRO-BEL STABILIZATION RECOMMENDATIONS

Permanent Powered Platforms

Continuous Stabilization

When using a permanent powered platform, it is recommended that mullion tracks be employed for rigging flexibility i.e. can be roof or ground rigged. Tracks must be coped out or designed so that platform trolleys or sliding shoes can be inserted at both top and bottom of building.

In poorly designed continuous stabilization systems, joints in these track systems may become extended or discontinuous due to installation or building settlement. If this alignment problem is not taken into consideration or corrected, the system could jam when a platform trolley strikes a joint and this would cause a hazardous situation for workers on the platform.

Shallow depth tracks less than 2" (50 mm) deep are difficult to fit with trolleys/shoes. Strict co-ordination between mullion manufacturer and window cleaning equipment manufacturer is essential in this regard.

When roof rigging a platform on a multi-level building (over terraces, balconies or secondary roofs), suspension lines are required to be dropped to lower roof levels. A disconnectable system is required in order to release the suspension lines from the face of the building. Mullion tracks should be considered on upper and intermediate elevations when disconnecting from the stabilization system is necessary.

Intermittent Stabilization

Where intermittent stabilization is employed, it is recommended that buttons or detent pins be installed in vertical rows starting at the highest convenient elevation. The maximum vertical interval be-

tween anchors shall be three floors,



Continuous stabilization (mullion tracks)

directly below and in line with primary rigging equipment positions, i.e. davits or outriggers.

Non-Permanent Platforms or Chair Work

It is recommended that a building face stabilization system be *considered* on all buildings over 130'-0" (39.6 m) consisting of mullion tracks or buttons/detent pins in order to protect the face of the building in accordance with OSHA minimum requirement of lashing the suspended platform cable to the face of the building. See Stabilization options 1 to 4 listed below.

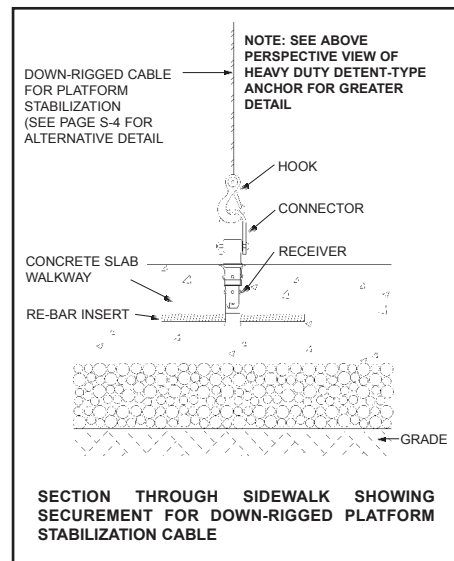
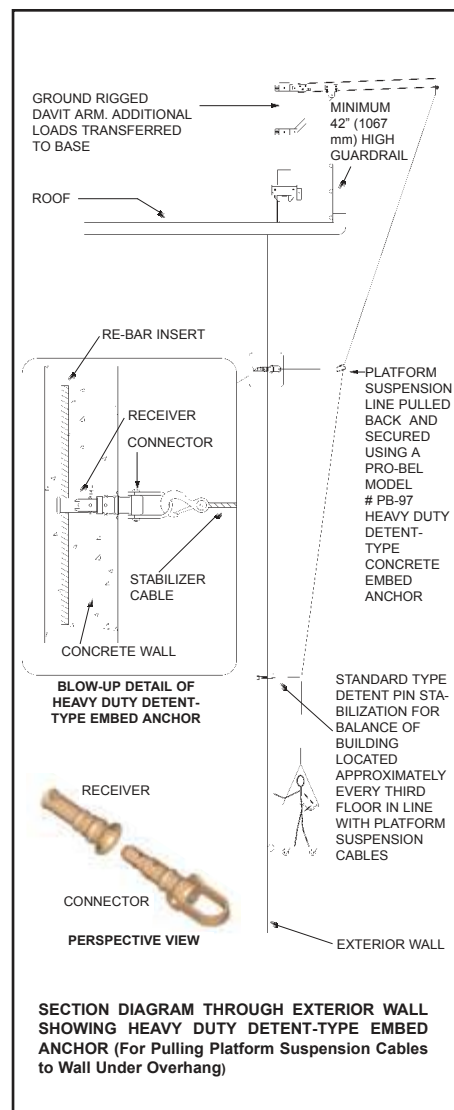
For buildings over 300'-0" (91.4 m) in height, it is imperative the building be equipped with one of the following stabilization systems in accordance with OSHA related rule requirements and ANSI/IWCA I-14.1:

1. Provision for davit bases anticipating future roof rigged davit arms and stage transfer locations. Install buttons every third floor starting at the highest elevation in line with suspension cables.
2. Buttons or detent pins at every floor in line with suspension cables (local stabilization).
3. Installation of mullion guides (tracks) on the complete building if feasible.
4. As a minimum, installation of one platform "drop" using mullion guides (tracks) with buttons on the balance of the building at every third floor from roof to ground level in line with suspension cables (roof rigged davit system is required).

The foregoing stabilization methods will help exterior maintenance personnel work safely in high winds as well as protect building faces against damage from unwanted platform movement. If nothing is specified, workers will only be encouraged to improvise using their own lashing techniques which may be harmful to facades.

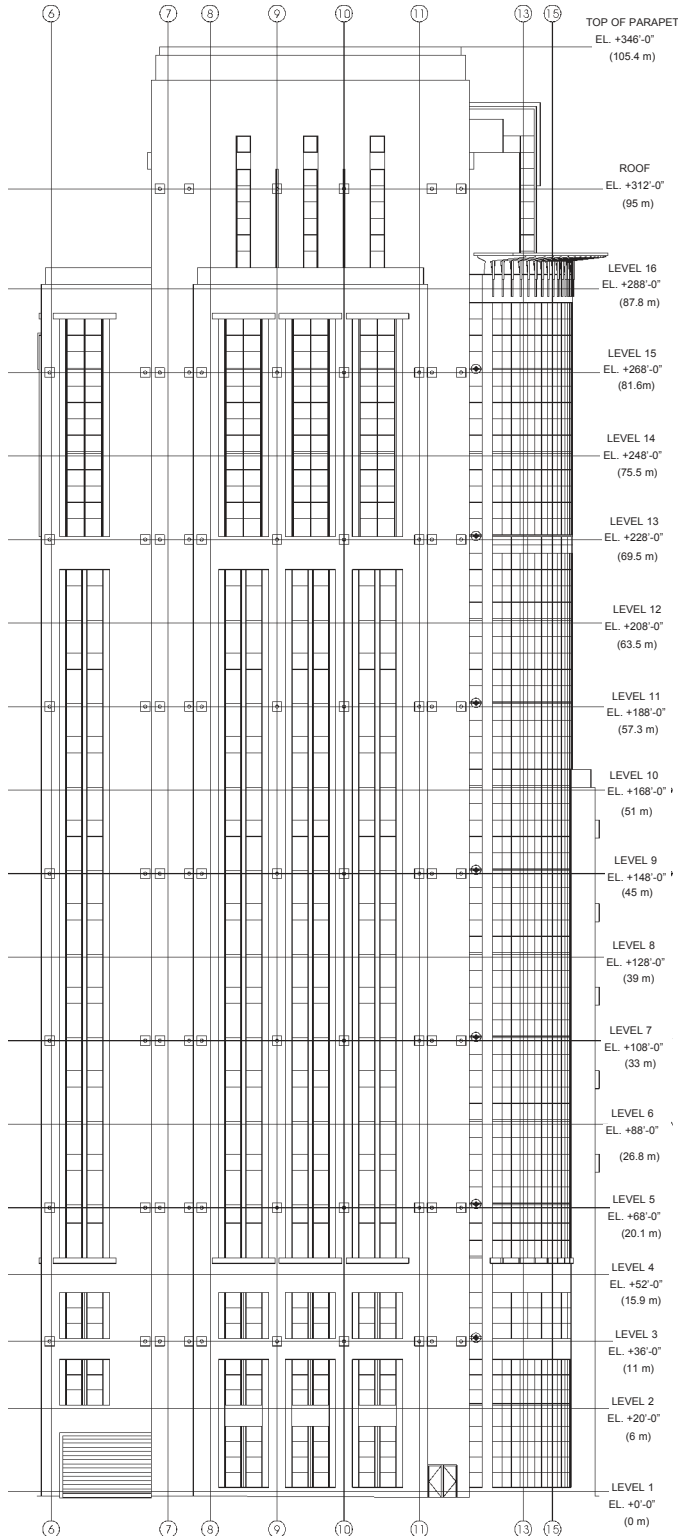


Intermittent stabilization (detent pin)

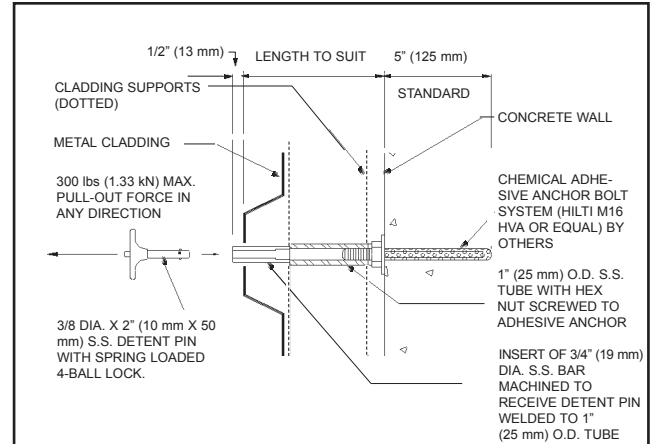


INTERMITTENT STABILIZATION DETAILS

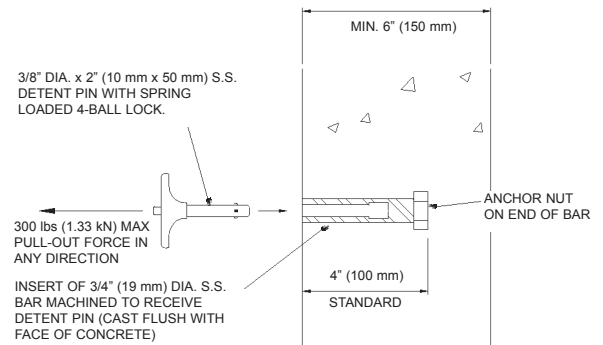
Securement to Concrete



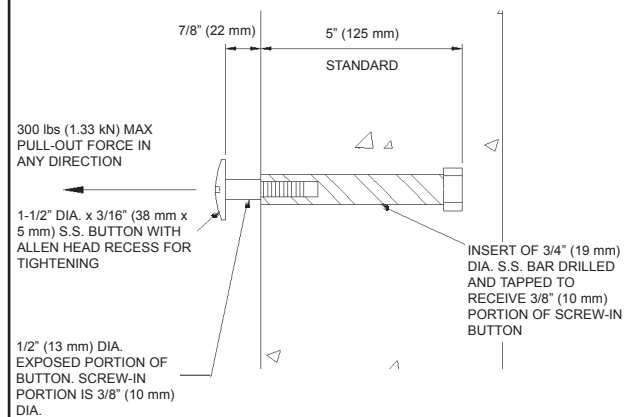
ELEVATION – EXAMPLE PRO-BEL INTERMITTENT STABILIZATION TIE-IN GUIDE LAYOUT



DETENT PIN SECTION DETAIL – RETROFIT APPLICATION (Brick or Other Cladding Material Similar)



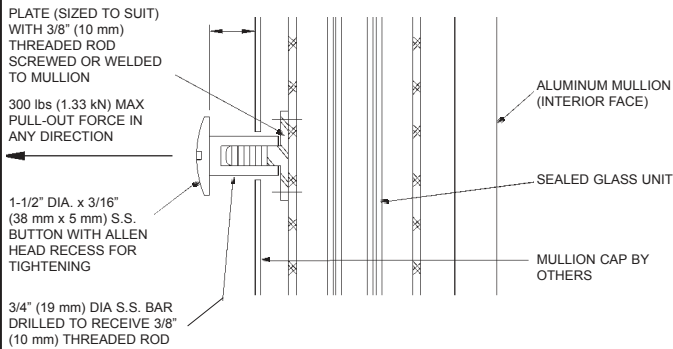
DETENT PIN SECTION DETAIL – POURED OR PRECAST CONCRETE WALL



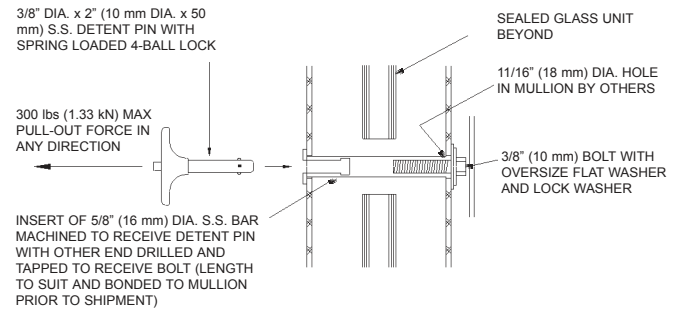
BUTTON SECTION DETAIL – POURED OR PRECAST CONCRETE WALL

Intermittent Stabilization Details (Continued)

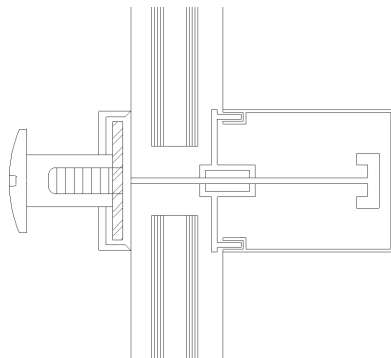
Securement to Window Mullion



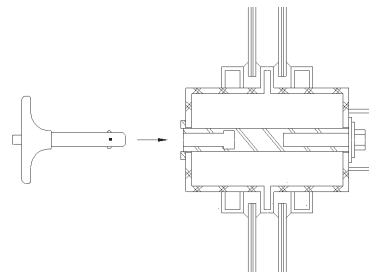
BUTTON SECTION DETAIL – WINDOW MULLION



DETENT PIN SECTION DETAIL – WINDOW MULLION

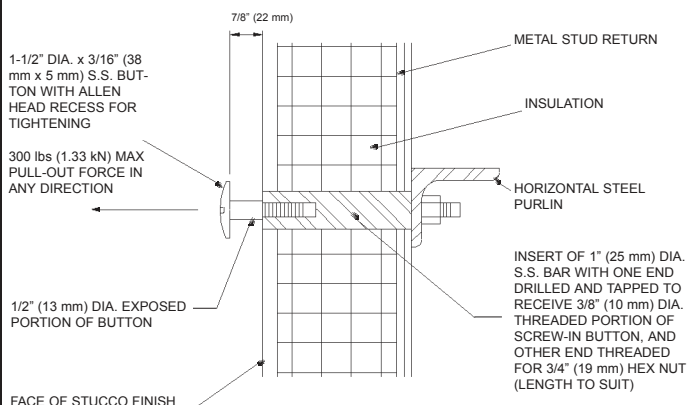


PLAN VIEW OF MULLION ABOVE

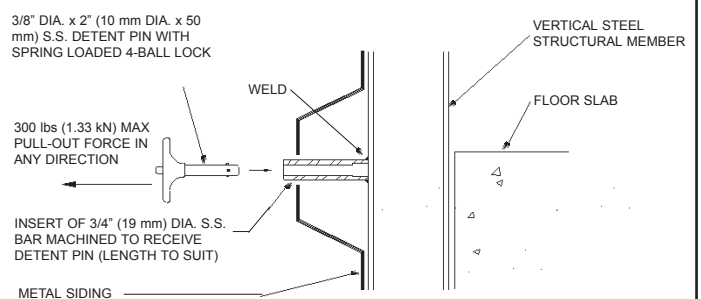


PLAN VIEW OF MULLION ABOVE

Securement to Steel



BUTTON SECTION DETAIL – EXTERIOR INSULATION FINISH SYSTEM (Stone or Other Cladding Similar)



DETENT PIN SECTION DETAIL – METAL SIDING

SPECIFICATION

Platform Stabilization (Tie-In Guides):

PERMANENT POWERED PLATFORMS

SPEC NOTE: The following clauses are written for inclusion at the end of the "Materials" section of a Pro-Bel Permanent Powered Platform specification. It is recommended that all buildings more than 130'-0" (40 m) in height employing a permanent installation have either a continuous stabilization system (mullion tracks), or an intermittent stabilization system (buttons or detent pins) at every third floor or 50'-0" (15.3 m) whichever is less, to protect workers against high winds. Note: New York Department of Labor specifies three floors or 40'-0" (12.2 m) whichever is less.

SPEC NOTE: Re 1. below. Ensure strict co-ordination between mullion manufacturer and suspended access equipment manufacturer to avoid joint alignment problems. In curtain wall specification, specify the exterior of the building is to be designed to provide a positive and continuous means of engagement between the suspended platform and the building during full vertical travel of the platform on the face of the building. Tie-in guide dimensions for internal track to be minimum 1" (25 mm) opening with minimum inside dimensions of 2-1/2" wide by 2-1/2" deep (64 mm X 64 mm). Cope out or design tracks so that platform trolleys can be inserted at both top and bottom of building.

1. **Continuous Stabilization:** Provide guide roller/sliding shoe assembly at each end of bottom of platform designed to provide continuous engagement between platform and internal tracks. Co-ordinate design with curtain wall manufacturer to ensure smooth operation.

2. **Intermittent Stabilization Anchors:**

A. Buttons: Locate buttons every third floor or 50'-0" (15.3 m) whichever is less, in line with platform suspension points. Buttons to be Pro-Bel stainless steel or other corrosion resistant material 1-1/2" dia. X 3/16" thickness (38 mm dia. X 5 mm) with Allen head recess, complete with threaded s.s. building anchor insert of size and configuration to suit building facade and sufficient quantity adjustable s.s. stabilizer ties. The design load for stabilization components such as tie-in guides/buttons/detent pins are designed for a working load of 300 lbs (1.33 kN) per AISC requirements and/or other applicable codes and to 600 lbs

(2.67 kN) against fracture or detachment. Bolts and any other connecting hardware to be made of stainless steel or hot dipped galvanized steel.

SPEC NOTE: Re B. below. Specify detent pins where flush building appearance is critical.

B. Detent Pins: Locate detent pin inserts every third floor or 50'-0" (15.3 m) whichever is less in line with platform suspension points. S.S. building inserts of size, configuration, and quantity to suit building facade. Detent pins to be Pro-Bel s.s. or other corrosion resistant material 5/16" or 3/8" dia. (8 mm or 10 mm) to suit. Tie handles with spring loaded ball lock to suit building facade; include sufficient quantity adjustable s.s. stabilizer ties. The design load for stabilization components such as tie-in guides/buttons/detent pins are designed for a working load of 300 lbs (1.33 kN) per AISC requirements and/or other applicable codes and to 600 lbs (2.67 kN) against fracture or detachment. Bolts and other connecting hardware to be made of stainless steel or hot dipped galvanized steel.

NON-PERMANENT (TEMPORARY) PLATFORMS

SPEC NOTE: The following clauses are written for inclusion at the end of the "Materials" section of a Pro-Bel Davit Systems or Outrigger Beam Systems specification. It is recommended that all buildings more than 130'-0" (40 m) in height be designed with a stabilization system, to protect workers against high winds.

1. **Intermittent Stabilization Anchors:**

A. Buttons: Locate buttons at every floor level except for the bottom three floors in line with platform suspension points. Buttons to be Pro-

Bel stainless steel or other corrosion resistant material 1-1/2" dia. X 3/16" thickness (38 mm dia. X 5 mm) with Allen head recess, complete with threaded s.s. building anchor insert of size and configuration to suit building facade and sufficient quantity adjustable s.s. stabilizer ties. The design load for stabilization components such as tie-in guides/buttons/detent pins are designed for a working load of 300 lbs (1.33 kN) per AISC requirements and/or other applicable codes and to 600 lbs (2.67 kN) against fracture or detachment. Bolts and any other connecting hardware to be made of stainless steel or hot dipped galvanized steel.

SPEC NOTE: Re B. below. Specify detent pins only where flush building appearance is critical as pin holes are not as easy to locate as buttons during maintenance operations.

B. Detent Pins: Locate detent pins at every floor level except for the bottom three floors in line with platform suspension points. Detent pins to be Pro-Bel s.s. or other corrosion resistant material 5/16" or 3/8" dia. (8 mm or 10 mm) tie handle with spring loaded ball lock, quantity to suit. The design load for stabilization components such as tie-in guides/buttons/detent pins are designed for a working load of 300 lbs (1.33 kN) per AISC requirements and/or other applicable codes and to 600 lbs (2.67 kN) against fracture or detachment. Bolts and other connecting hardware to be made of stainless steel or hot dipped galvanized steel.

SPEC NOTE: If the building has been designed with davit bases to suit roof rigged davit arms, locate buttons/detent pins every third floor or 50'-0" (15.3 m) whichever is less in line with davit base suspension points.



This birds-eye view of a permanent powered platform shows platform stabilizer ties secured to a horizontal cable attached to the building approximately every three floors.

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