



# Application Brief

## SEISMIC ZONE MOUNTING GUIDELINES

These standard practice Structural Anchorage Provisions (SPSAC) are general guidelines for mounting the Starline Track Busway in a seismic zone. The final anchorage details will need to be determined by the engineer of record for the particular project. The site specific seismic factor, the structural framing system, floor/roof heights, and weight of the busway will all need to be taken into consideration.

This document will also provide guidance in determining if Starline Track Busway is exempt from seismic bracing for your particular application.

The following document is designed to meet the requirements of the 2007 international building code and the ASCE 7-05.

# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS

## TABLE OF CONTENTS:

<u>SHEET NUMBER:</u>	<u>SHEET TITLE:</u>
GN 1	GENERAL NOTES
GN 2	GENERAL NOTES
GN 3	ASCE 7-05 SECTION 13.1.4 EXEMPTIONS
GN 4	STARLINE TRACK BUSWAY DESIGN WEIGHTS
GN 5 – GN 7	DETERMINING IF EXEMPT FROM SEISMIC BRACING
PLAN 1	SINGLE TRACK LAYOUT PLAN AT CABLE BRACES
PLAN 2	SINGLE TRACK LAYOUT PLAN AT UNISTRUT BRACES
PLAN 3	GRID LAYOUT PLAN AT CABLE BRACES
PLAN 4	GRID LAYOUT PLAN AT UNISTRUT BRACES
DETAIL 1	STARLINE TRACK ANCHORAGE DETAIL WITH CABLE BRACES
DETAIL 2	STARLINE TRACK ANCHORAGE DETAIL WITH UNISTRUT BRACES
DETAIL 3	STARLINE TRACK BOTTOM CONNECTION DETAILS
DETAIL 4	STRUCTURE CONNECTION DETAILS WITH METAL DECK/CONCRETE FILL
DETAIL 5	STRUCTURE CONNECTION DETAILS WITH CONCRETE SLAB
DETAIL 6	STRUCTURE CONNECTION DETAILS WITH WOOD FRAMING

TITLE: **TABLE OF CONTENTS**

SHEET NO.:

**T1**

ISSUE DATE: JULY 1, 2008

# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS

## GENERAL NOTES:

1. THESE STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS (SPSAC) FOR THE STARLINE TRACK BUSWAY ARE INTENDED FOR USE BY THE ENGINEER OF RECORD FOR THE PARTICULAR PROJECT TO DETERMINE FINAL ANCHORAGE DETAILS FOR THEIR INDIVIDUAL PROJECT BASED ON THE SITE SPECIFIC SEISMIC FACTOR AND ON THE STRUCTURAL FRAMING SYSTEM AND FLOOR OR ROOF HEIGHTS.
2. THESE GUIDELINES ARE DESIGNED TO MEET THE REQUIREMENTS OF THE 2007 INTERNATIONAL BUILDING CODE AND THE ASCE 7-05.

### SEISMIC DESIGN FORCE PARAMETERS:

$$FP = \{0.4 \times AP \times SDS / (RP/IP)\} \times \{1 + (2 \times Z/H)\} \times WP \text{ (ASCE 7-05, EQ 13.3-1)}$$

$$FP \text{ (MAX)} = 1.6 \times SDS \times IP \times WP \text{ (ASCE 7-05, EQ 13.3-2)}$$

$$FP \text{ (MIN)} = 0.3 \times SDS \times IP \times WP \text{ (ASCE 7-05, EQ 13.3-3)}$$

$$SDS = 2/3 \times FA \times SS \text{ (2006 IBC, EQ 16-39)}$$

$$AP = 1.0 \quad RP = 2.5$$

$$IP = 1.5 \text{ OR } 1.0 \text{ (ASCE 7-05 TABLE 11-5-1)} \quad Z/H = 1.0 \text{ (ROOF LEVEL)}$$

$$SS = 3.0 \quad FA = 1.0$$

\* WHEN ANCHORING TO CONCRETE, THE SEISMIC FACTOR SHALL BE INCREASED BY A FACTOR OF 1.3.

3. SEE SHEET GN3 (SECTION 13.1.4 OF ASCE 7-051) FOR NON-STRUCTURAL COMPONENTS THAT ARE EXEMPT FROM SEISMIC REQUIREMENTS. SEE SHEETS GN 5 - GN 7 TO DETERMINE IF BUSDUCT IS EXEMPT FROM SEISMIC BRACING.
4. EACH LINEAR RUN OF BUSWAY REQUIRES A MINIMUM OF TWO TRANSVERSE BRACES (PERPENDICULAR TO THE RUN) AND ONE LONGITUDINAL BRACE (PARALLEL TO THE RUN).
5. CABLE BRACING SHALL BE DESIGNED TO ACCEPT LOADS IN TENSION; THEREFORE, TWO TRANSVERSE BRACES AND TWO LONGITUDINAL BRACES ARE REQUIRED AT EACH BRACE LOCATION. CABLE BRACES SHALL BE PRESTRESSED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE ( $3/16"$  AIRCRAFT CABLE); 7x7 STRAND CORE ( $3/32"$  AIRCRAFT CABLE)
6. UNISTRUT BRACING SHALL BE DESIGNED TO ACCEPT LOADS IN TENSION AND COMPRESSION; THEREFORE, ONE TRANSVERSE BRACE AND ONE LONGITUDINAL BRACE ARE REQUIRED AT EACH BRACE LOCATION. UNISTRUT BRACES CAN BE ROTATED 180 DEGREES FROM WHAT IS SHOWN IN THE DRAWINGS AT ANY BRACE.

TITLE: **GENERAL NOTES**

SHEET NO.:

**GN 1**

ISSUE DATE: JULY 1, 2008

# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS

## GENERAL NOTES CONT:

7. AT BRACING LOCATIONS, A VERTICAL SUPPORT IS REQUIRED. A UNISTRUT P1000T IS REQUIRED WHERE LENGTH INDICATED "L" ON DETAIL SHEETS 1 AND 2 IS GREATER THAN 15".
8. ALL INTERCONNECTIONS OF STARLINE TRACK BUSWAY PRODUCTS SHALL BE AS INDICATED IN OTHER SECTIONS OF THIS MANUAL.
9. ALL EXPANSION ANCHORS USED FOR ANCHORAGE SHALL BE HILTI KB TZ, INSTALLED WITH SPECIAL INSPECTION PER THE REQUIREMENTS OF ICC ESR 1917. OTHER EXPANSION ANCHOR MAY BE USED AT ENGINEER OF RECORD'S DISCRETION.
10. ½" DIAMETER MACHINE BOLTS SHALL BE USED AT ALL UNISTRUT CONNECTIONS UNLESS NOTED OTHERWISE. ALL BOLTS SHALL BE TORQUED PER UNISTRUT REQUIREMENTS.
11. WHERE CONCRETE SLAB OCCURS PER DETAIL SHEET 5, ENGINEER OF RECORD TO VERIFY CONCRETE SLAB IS REINFORCED WITH CONVENTIONAL REINFORCING. IF CONCRETE SLAB IS A POST TENSION SLAB, PROVIDE NON-DESTRUCTIVE RADIOGRAPHIC TESTING TO LOCATE POST TENSION TENDONS IN SLAB PRIOR TO DRILLING FOR EXPANSION ANCHOR PLACEMENT PER ENGINEER OF RECORD'S RECOMMENDATION.

TITLE: **GENERAL NOTES**

SHEET NO.:

**GN 2**

ISSUE DATE: JULY 1, 2008

# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS

**13.1.4 Exemptions.** The following nonstructural components are exempt from the requirements of this section:

1. Architectural components in Seismic Design Category B other than parapets supported by bearing walls or shear walls provided that the component importance factor,  $I_p$ , is equal to 1.0.
2. Mechanical and electrical components in Seismic Design Category B.
3. Mechanical and electrical components in Seismic Design Category C provided that the component importance factor,  $I_p$ , is equal to 1.0.
4. Mechanical and electrical components in Seismic Design Categories D, E, and F where the component importance factor,  $I_p$ , is equal to 1.0 and either:
  - a. Flexible connections between the components and associated ductwork, piping, and conduit are provided.
  - b. Components are mounted at 4 ft (1.22 m) or less above a floor level and weigh 400 lb (1780 N) or less.
5. Mechanical and electrical components in Seismic Design Categories D, E, and F where the component importance factor,  $I_p$ , is equal to 1.0 and
  - a. Flexible connections between the components and associated ductwork, piping, and conduit are provided.
  - b. The components weigh 20 lb (89 N) or less or, for distribution systems, weighing 5 lb/ft (73 N/m) or less.

IN ORDER TO DETERMINE IF BUS DUCT IS EXEMPT  
FROM SEISMIC BRACING; SEE SHEET GN4-GN7

TITLE: **GENERAL NOTES**

SHEET NO.:

**GN 3**

ISSUE DATE: JULY 1, 2008

# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS

STARLINE TRACK BUSWAYS (WEIGHT OF BUSWAY AND LOADED BUSWAY)						
TAB	SERIES	SIZE		MAX WT	MAX LOADED WT	TOTAL WEIGHT
		WIDTH [IN]	LENGTH [IN]	[#/10']	[#/10']	[#/10']
1	B40	1.66	1.661	8	75	83
1	B50	1.66	1.661	8	75	83
1	B60C	1.66	1.661	9	75	84
2	B60	1.78	2.58	12.5	100	112.5
3	B100C	1.79	2.58	16	100	116
4	B100A	2.375	4.187	26	100	126
5	B100N	2.375	4.187	33	100	133
6	B100G	2.375	4.187	34	100	134
6	B100NG	2.375	4.187	34	100	134
7	B160	2.375	4.187	33	100	133
8	B225	2.375	4.187	35	100	135
8 AND 9	B225G	2.375	4.187	34	100	134
10	B400	5.7	5.05	95	100	195
10	B400G	5.7	5.05	100	100	200
10	B400N	5.7	5.05	110	100	210
10	B400NG	5.7	5.05	120	100	220

TITLE: **STARLINE TRACK BUSWAY  
DESIGN WEIGHTS**

SHEET NO.:

**GN 4**

ISSUE DATE: JULY 1, 2008

# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS

## DETERMINING IF EXEMPT FROM SEISMIC BRACING

1. Use Table 1-1 (ASCE 7-05) below to determine Occupancy Category

**TABLE 1-1 OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES FOR FLOOD, WIND, SNOW, EARTHQUAKE, AND ICE LOADS**

Nature of Occupancy	Occupancy Category
<p>Buildings and other structures that represent a low hazard to human life in the event of failure, including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Agricultural facilities</li> <li>• Certain temporary facilities</li> <li>• Minor storage facilities</li> </ul>	I
<p>All buildings and other structures except those listed in Occupancy Categories I, III, and IV</p>	II
<p>Buildings and other structures that represent a substantial hazard to human life in the event of failure, including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Buildings and other structures where more than 300 people congregate in one area</li> <li>• Buildings and other structures with daycare facilities with a capacity greater than 150</li> <li>• Buildings and other structures with elementary school or secondary school facilities with a capacity greater than 250</li> <li>• Buildings and other structures with a capacity greater than 500 for colleges or adult education facilities</li> <li>• Health care facilities with a capacity of 50 or more resident patients, but not having surgery or emergency treatment facilities</li> <li>• Jails and detention facilities</li> </ul> <p>Buildings and other structures, not included in Occupancy Category IV, with potential to cause a substantial economic impact and/or mass disruption of day-to-day civilian life in the event of failure, including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Power generating stations<sup>4</sup></li> <li>• Water treatment facilities</li> <li>• Sewage treatment facilities</li> <li>• Telecommunication centers</li> </ul> <p>Buildings and other structures not included in Occupancy Category IV (including, but not limited to, facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, hazardous waste, or explosives) containing sufficient quantities of toxic or explosive substances to be dangerous to the public if released.</p> <p>Buildings and other structures containing toxic or explosive substances shall be eligible for classification as Occupancy Category II structures if it can be demonstrated to the satisfaction of the authority having jurisdiction by a hazard assessment as described in Section 1.5.2 that a release of the toxic or explosive substances does not pose a threat to the public.</p>	III
<p>Buildings and other structures designated as essential facilities, including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Hospitals and other health care facilities having surgery or emergency treatment facilities</li> <li>• Fire, rescue, ambulance, and police stations and emergency vehicle garages</li> <li>• Designated earthquake, hurricane, or other emergency shelters</li> <li>• Designated emergency preparedness, communication, and operation centers and other facilities required for emergency response</li> <li>• Power generating stations and other public utility facilities required in an emergency</li> <li>• Ancillary structures (including, but not limited to, communication towers, fuel storage tanks, cooling towers, electrical substation structures, fire water storage tanks or other structures housing or supporting water, or other fire-suppression material or equipment) required for operation of Occupancy Category IV structures during an emergency</li> <li>• Aviation control towers, air traffic control centers, and emergency aircraft hangars</li> <li>• Water storage facilities and pump structures required to maintain water pressure for fire suppression</li> <li>• Buildings and other structures having critical national defense functions</li> </ul> <p>Buildings and other structures (including, but not limited to, facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, or hazardous waste) containing highly toxic substances where the quantity of the material exceeds a threshold quantity established by the authority having jurisdiction.</p> <p>Buildings and other structures containing highly toxic substances shall be eligible for classification as Occupancy Category II structures if it can be demonstrated to the satisfaction of the authority having jurisdiction by a hazard assessment as described in Section 1.5.2 that a release of the highly toxic substances does not pose a threat to the public. This reduced classification shall not be permitted if the buildings or other structures also function as essential facilities.</p>	IV

<sup>4</sup>Cogeneration power plants that do not supply power on the national grid shall be designated Occupancy Category II.

2. Use Table 11.5-1 (ASCE 7-05) below to Determine Importance Factors

**TABLE 11.5-1 IMPORTANCE FACTORS**

Occupancy Category	I
I or II	1.0
III	1.25
IV	1.5

3. Determine Latitude/Longitude Coordinates -OR- zip code.

TITLE: <b>GENERAL NOTES</b>	SHEET NO.: <div style="text-align: center; font-size: 24pt; font-weight: bold;">GN 5</div> ISSUE DATE: JULY 1, 2008
-----------------------------	--

# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS

## DETERMINING IF EXEMPT FROM SEISMIC BRACING

4. Enter Coordinates (or zip code, to enter zip code, use zip code tab) onto Java Ground Motion Parameters Calculator on USGS Website.

<http://earthquake.usgs.gov/research/hazmaps/design/>

The screenshot shows a web-based calculator interface titled "Seismic Hazard Curves and Uniform Hazard Response Spectra". The interface includes a menu bar with "File" and "Help". Below the menu bar, there is a "Select Analysis Option" dropdown menu set to "ASCE 7 Standard, minimum design loads for buildings and other structures" and a "Description" button. The main content area is divided into several sections: "Region and DataSet Selection" with dropdowns for "Geographic Region" (set to "Conterminous 48 States") and "Data Edition" (set to "2005 ASCE 7 Standard"); "Location" with tabs for "Lat/lon", "Zip Code", and "Batch File"; "Latitude (Degrees)" and "Longitude (Degrees)" input fields with values "33.5" and "-119.5" respectively, and corresponding coordinates "(24.7, 50.0)" and "(-125.0, -65.0)"; "Basic Parameters" with a "Ground Motion" dropdown set to "NCE Ground Motion" and two buttons: "Calculate Ss & S1" and "Calculate SM & SD Values"; and "Response Spectra" with four buttons: "Map Spectrum", "Site Modified Spectrum", "Design Spectrum", and "View Spectra". At the bottom right, there are "View Maps" and "Clear Data" buttons, and the USGS logo with the tagline "science for a changing world".

- Selection Analysis Option: ASCE 7 Standard, minimum design loads for buildings and other structures
- Enter Latitude and Longitude degrees –OR- Zip Code
- Select "Site Modified Spectrum"
- Set Site Class to Site Class to D (see next sheet)

TITLE: **GENERAL NOTES**

SHEET NO.:

**GN 6**

ISSUE DATE: JULY 1, 2008



# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS

## DETERMINING IF EXEMPT FROM SEISMIC BRACING

5. Obtain Seismic Factors from Site modification Spectrum (choose correct Site Class; default is site class D)

**Site Coefficients Window**

Sol Factors as Function of Site Class and Spectral Acceleration

Values of Fa as a function of Site Class and 0.2 sec MCE Spectral Acceleration

Site Class	Ss<=0.25	Ss=0.50	Ss=0.75	Ss=1.00	Ss>=1.25
A	0.8	0.8	0.6	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	a	a	a	a	a

Values of Fv as a function of Site Class and 1.0 sec MCE Spectral Acceleration

Site Class	S1<=0.10	S1=0.20	S1=0.30	S1=0.40	S1>=0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	a	a	a	a	a

Notes:  
Use straight-line interpolation for intermediate value of Ss and S1.  
Note: Site-specific geotechnical investigation and dynamic site response analyses shall be performed.

Calculate Site Coefficient

Spectral Accelerations

Ss, g: 0.725      S1, g: 0.259

Site Class:

Set Site Class:

Discussion

Site Coefficients

Interpolated soil factors for the conditions shown. Values may also be entered manually.

Fa: 1.22

Fv: 1.881

OK

6. Find Sds Value

$$Sds = 2/3 \times Fa \times Ss$$

(For example above,  $Fa=1.22$ ;  $Ss=0.725$ ;  $Sds = 2/3 \times 1.22 \times 0.725 = 0.596$ )

7. Use Table 11.6-1 (ASCE 7-05) below to Determine Seismic Design Category

Value of Sds	Occupancy Category		
	I or II	III	IV
$Sds < 0.167$	<u>A</u>	<u>A</u>	<u>A</u>
$0.167 \leq Sds < 0.33$	<u>B</u>	<u>B</u>	<u>C</u>
$0.33 \leq Sds < 0.5$	<u>C</u>	<u>C</u>	D
$0.5 \leq Sds$	D	D	D

\*per exemption on GN3, at locations Underlined above, seismic bracing is not required.  
(For example above,  $Sds = 0.596$ . Therefore  $0.5 \leq 0.596$  and seismic design category would be D. Therefore Busduct would need to be braced for seismic loads.)

TITLE: **GENERAL NOTES**

SHEET NO.:

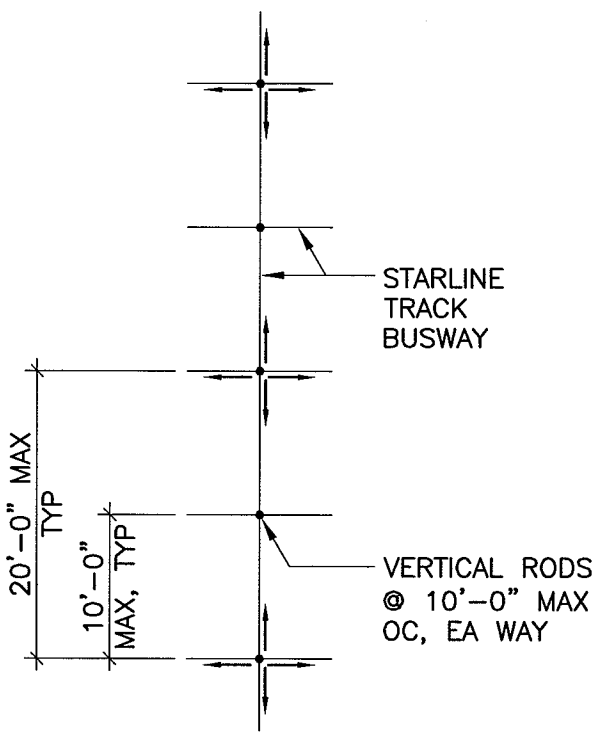
**GN 7**

ISSUE DATE: JULY 1, 2008

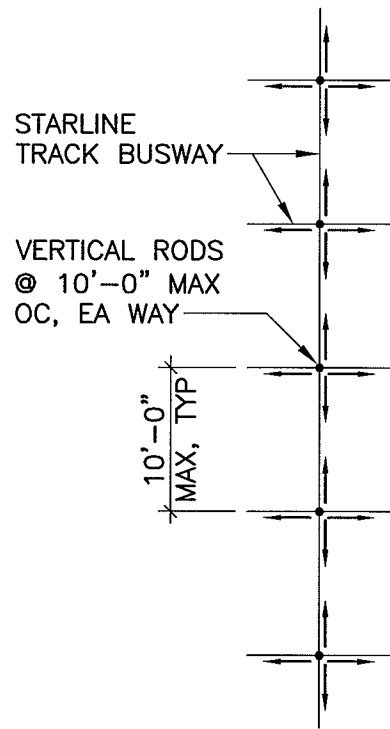
# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS

**NOTES:**

1. 6" MAX OFFSET WHERE VERTICAL ROD AND DIAGONAL BRACE(S) OCCUR AT SAME LOCATION.
2. INDICATES BRACE LOCATION AND ORIENTATION.



TYPICAL SINGLE TRACK LAYOUT



SINGLE TRACK LAYOUT  
FOR 400 SERIES

TITLE: **SINGLE TRACK LAYOUT  
PLAN AT CABLE BRACES**

SHEET NO.:

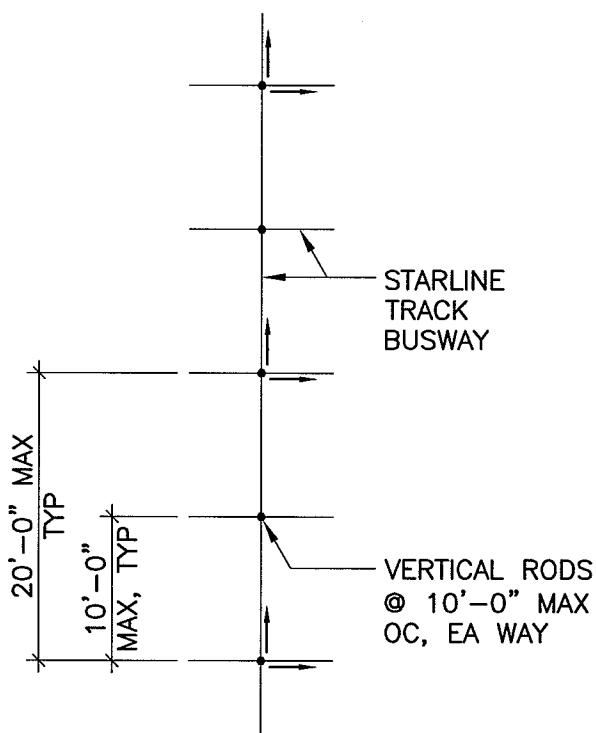
**PLAN 1**

ISSUE DATE: JULY 1, 2008

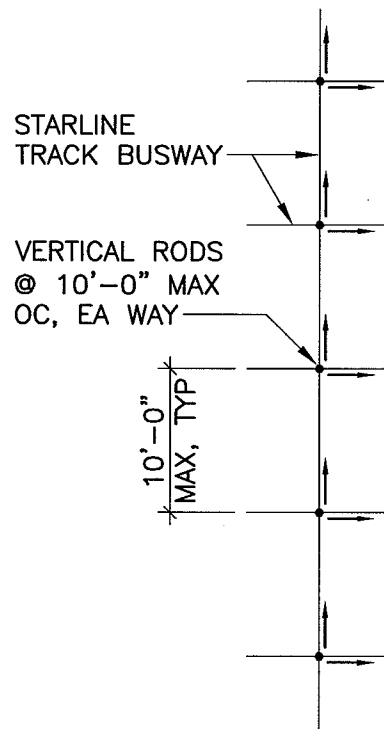
# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS

**NOTES:**

1. 6" MAX OFFSET WHERE VERTICAL ROD AND DIAGONAL BRACE(S) OCCUR AT SAME LOCATION.
2. INDICATES BRACE LOCATION AND ORIENTATION.



**TYPICAL SINGLE TRACK LAYOUT**



**SINGLE TRACK LAYOUT  
FOR 400 SERIES**

TITLE: **SINGLE TRACK LAYOUT  
PLAN AT UNISTRUT BRACES**

SHEET NO.:

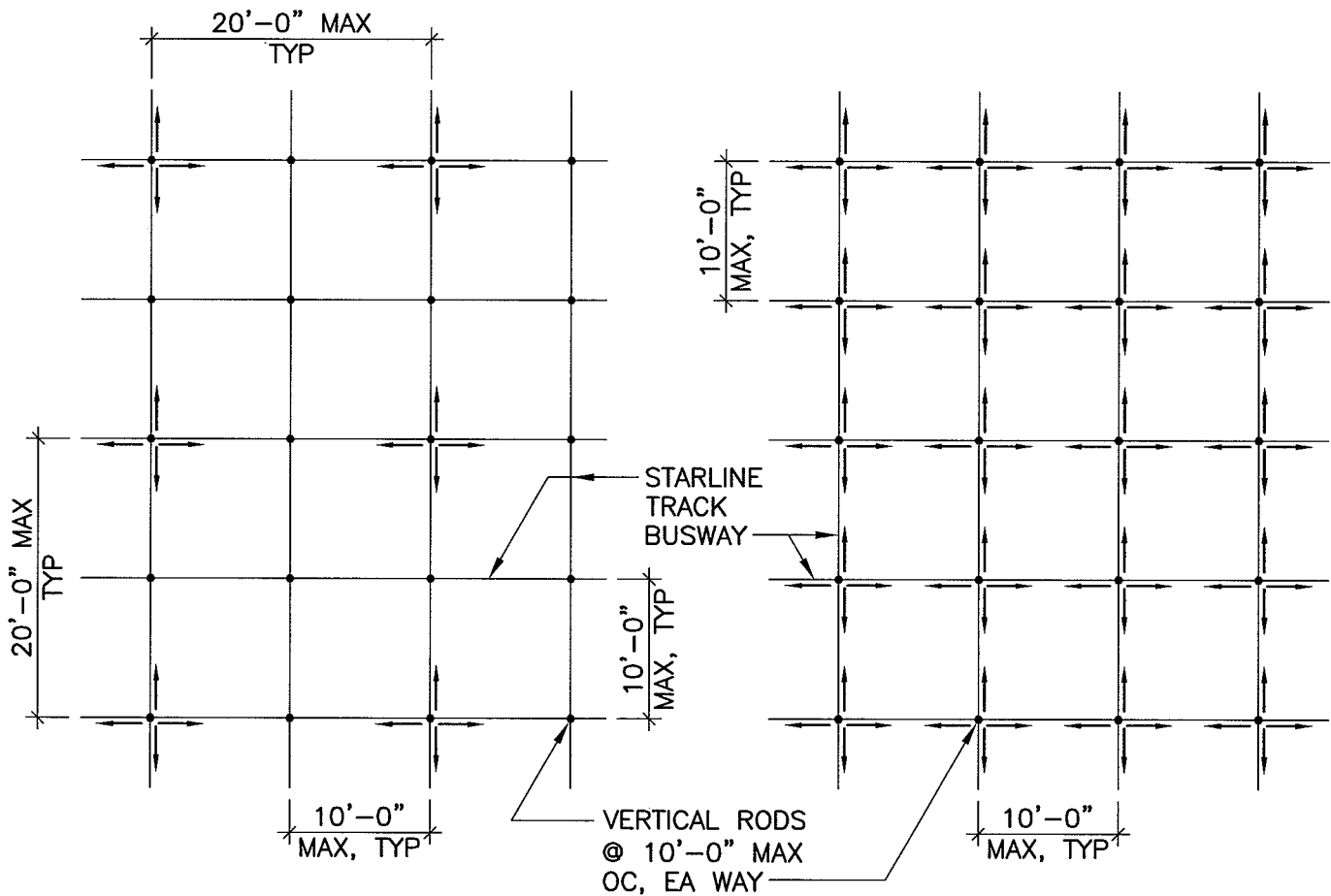
**PLAN 2**

ISSUE DATE: JULY 1, 2008

# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS

**NOTES:**

1. 6" MAX OFFSET WHERE VERTICAL ROD AND DIAGONAL BRACE(S) OCCUR AT SAME LOCATION.
2. INDICATES BRACE LOCATION AND ORIENTATION.



**TYPICAL GRID LAYOUT**

**GRID LAYOUT FOR 400 SERIES**

TITLE: **GRID LAYOUT PLAN  
AT CABLE BRACES**

SHEET NO.:

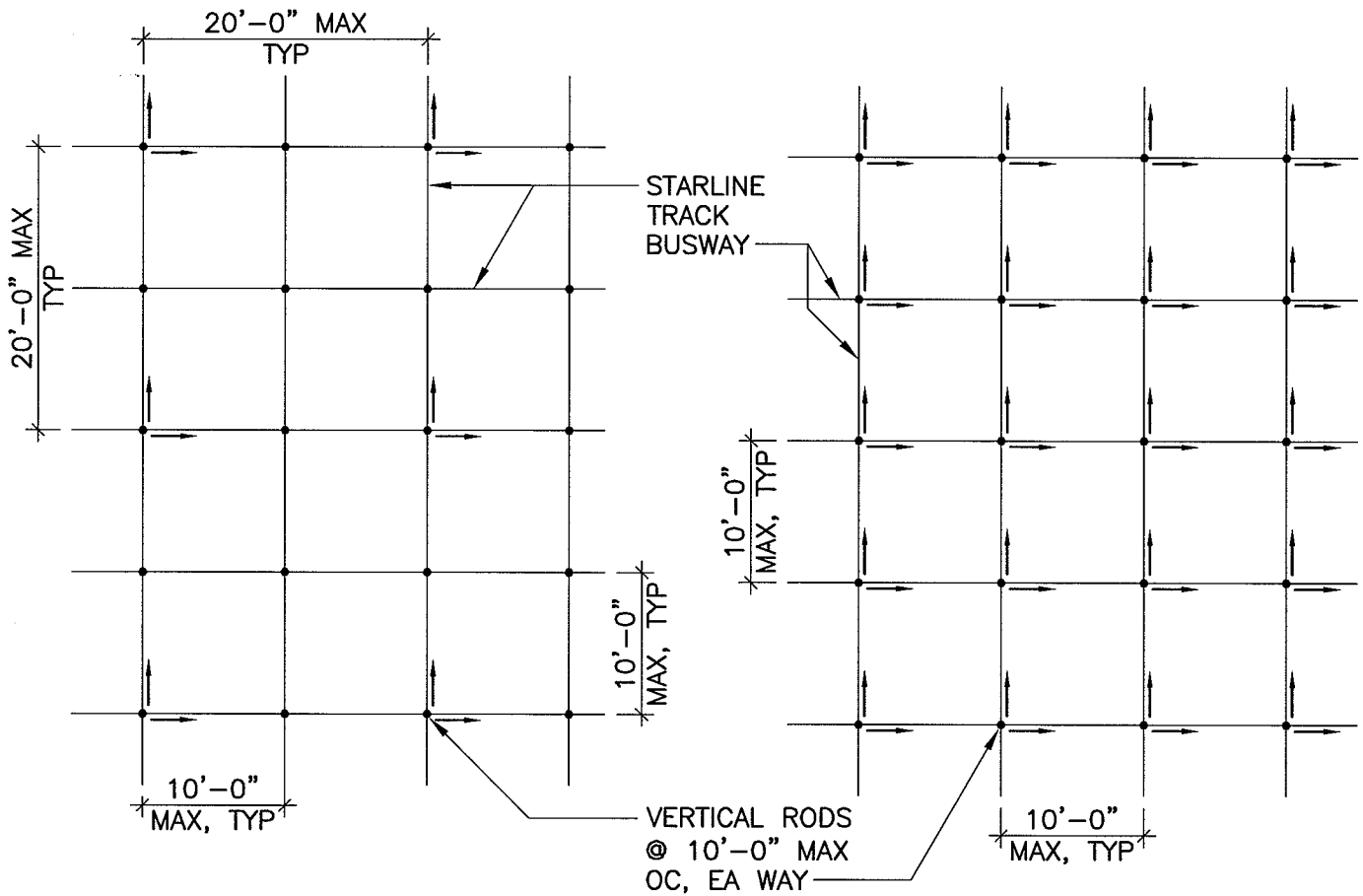
**PLAN 3**

ISSUE DATE: JULY 1, 2008

# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS

**NOTES:**

1. 6" MAX OFFSET WHERE VERTICAL ROD AND DIAGONAL BRACE(S) OCCUR AT SAME LOCATION.
2. INDICATES BRACE LOCATION AND ORIENTATION.



**TYPICAL GRID LAYOUT**

**GRID LAYOUT FOR 400 SERIES**

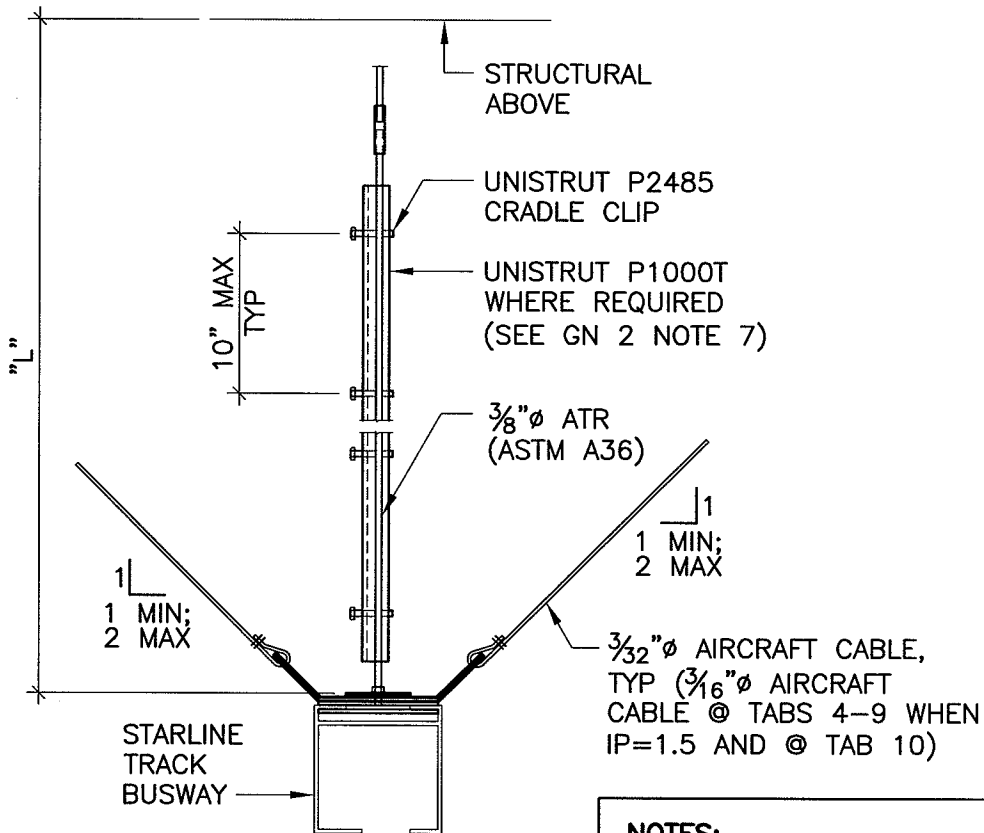
TITLE: **GRID LAYOUT PLAN  
AT UNISTRUT BRACES**

SHEET NO.:

**PLAN 4**

ISSUE DATE: JULY 1, 2008

# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS



### NOTES:

1. SEE DETAIL 3 FOR TRACK BOTTOM CONNECTION DETAILS.
2. SEE DETAILS 4 THRU 6 FOR STRUCTURE CONNECTION DETAILS.

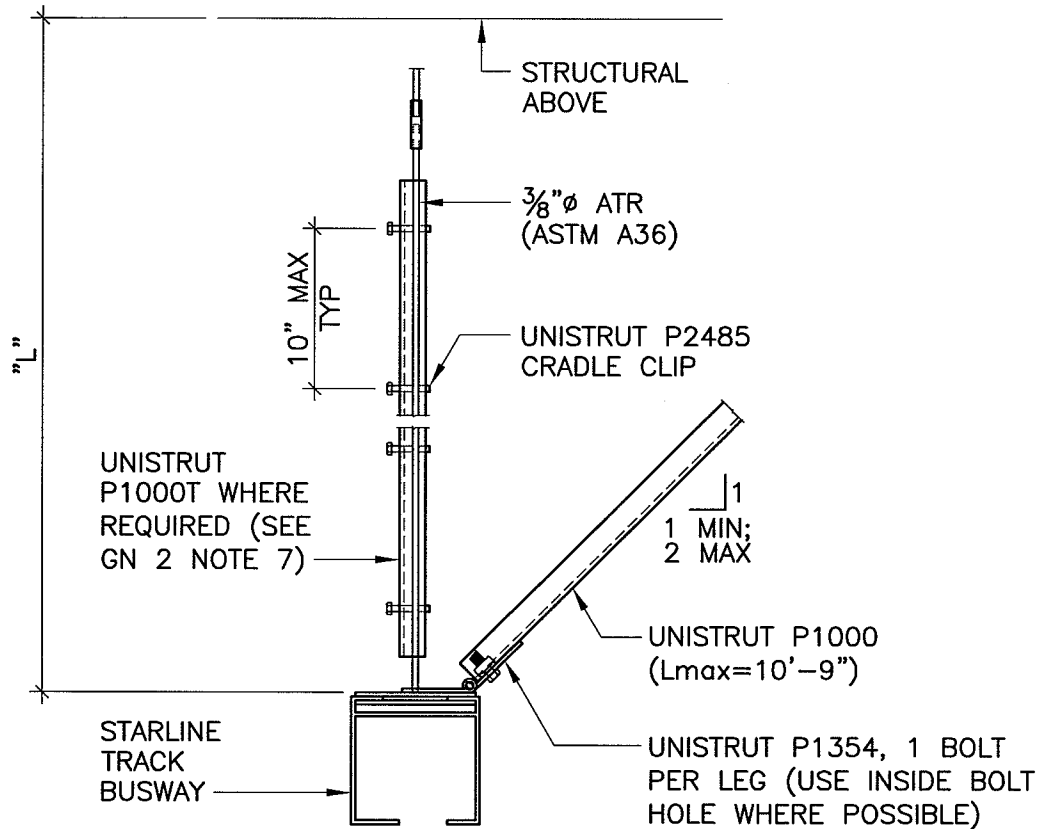
TITLE: TRACK ANCHORAGE DETAIL  
WITH CABLE BRACES

SHEET NO.:

**DETAIL 1**

ISSUE DATE: JULY 1, 2008

# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS



**NOTES:**

1. SEE DETAIL 3 FOR TRACK BOTTOM CONNECTION DETAILS.
2. SEE DETAILS 4 THRU 6 FOR STRUCTURE CONNECTION DETAILS.

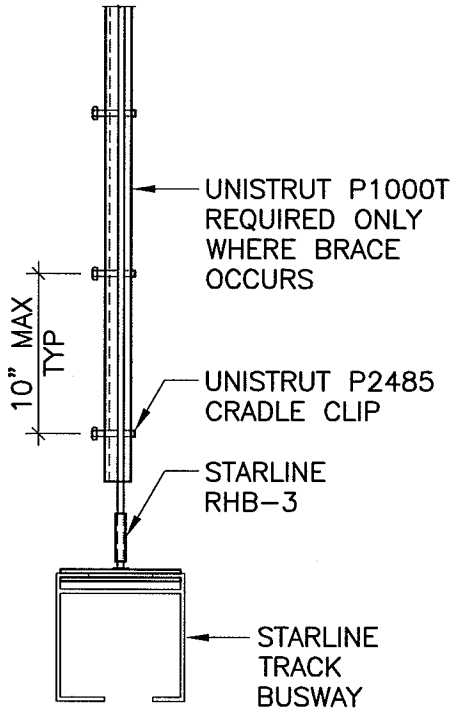
TITLE: **TRACK ANCHORAGE DETAIL  
WITH UNISTRUT BRACES**

SHEET NO.:

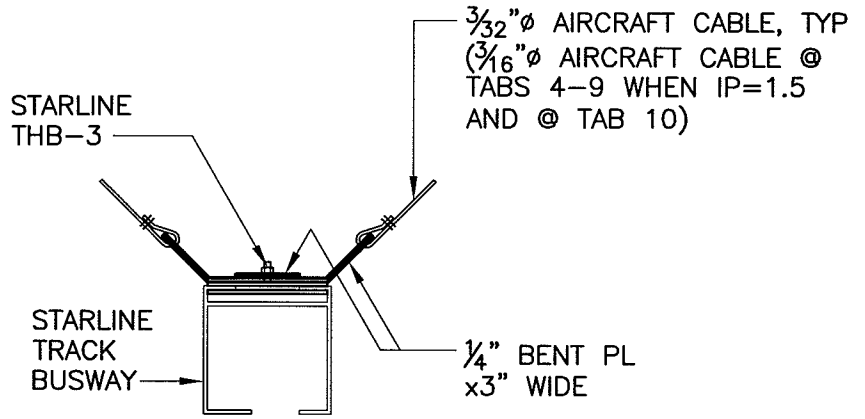
**DETAIL 2**

ISSUE DATE: JULY 1, 2008

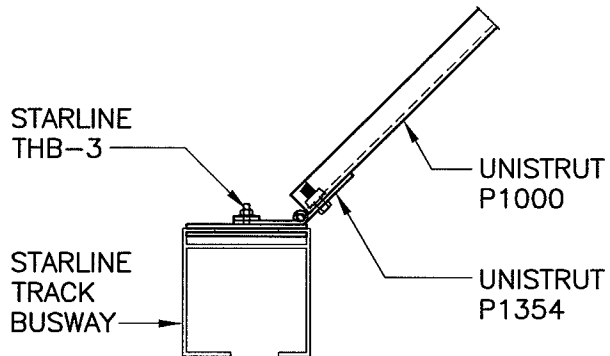
# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS



**VERTICAL ROD  
CONNECTION**



**DIAGONAL BRACE  
CONNECTION FOR CABLES**



**DIAGONAL BRACE  
CONNECTION FOR UNISTRUT**

TITLE: TRACK BOTTOM  
CONNECTION DETAILS

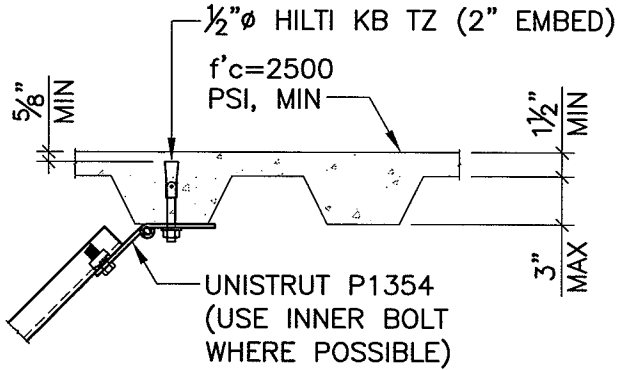
SHEET NO.:

**DETAIL 3**

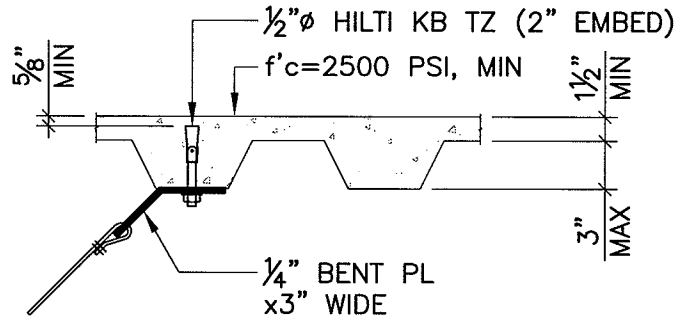
ISSUE DATE: JULY 1, 2008



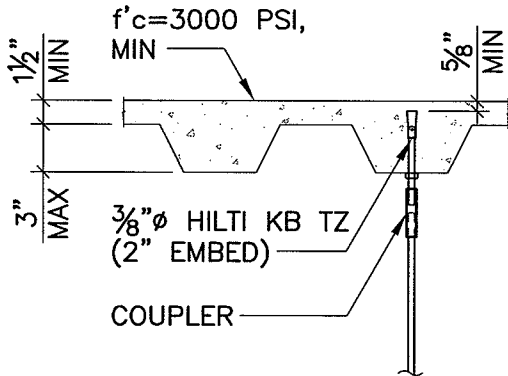
# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS



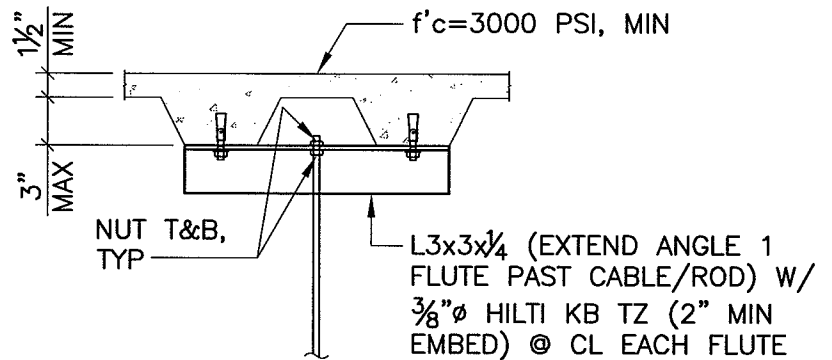
**UNISTRUT BRACE CONNECTION**



**CABLE BRACE CONNECTION**



**VERTICAL ROD CONNECTION  
AT CL OF BOTTOM FLUTE**



**VERTICAL ROD CONNECTION  
AT ALL OTHER LOCATIONS**

**NOTE:**

ROD/CABLE DIAMETER,  
COUPLER AND ANCHOR BOLT  
DIAMETER SHALL BE THE SAME.

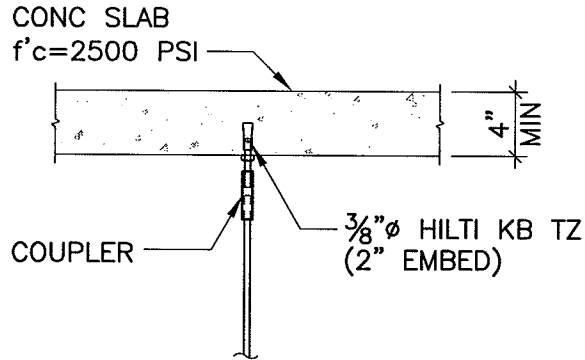
TITLE: **STRUCTURE CONNECTION DETAILS  
WITH METAL DECK/CONCRETE FILL**

SHEET NO.:

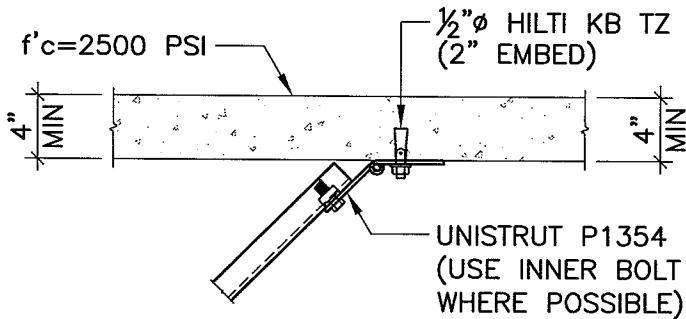
**DETAIL 4**

ISSUE DATE: JULY 1, 2008

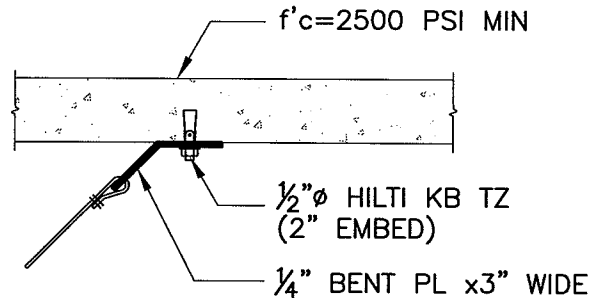
# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS



**VERTICAL ROD CONNECTION**



**UNISTRUT BRACE CONNECTION**



**CABLE BRACE CONNECTION**

**NOTE:**  
ROD/CABLE DIAMETER,  
COUPLER AND ANCHOR BOLT  
DIAMETER SHALL BE THE SAME.

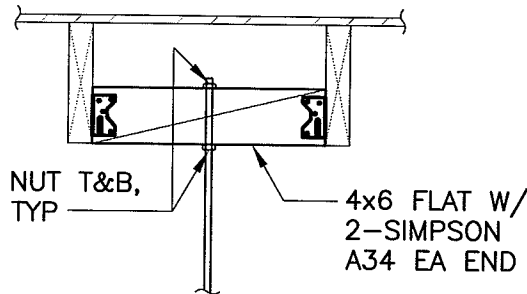
TITLE: **STRUCTURE CONNECTION  
DETAILS WITH CONCRETE SLAB**

SHEET NO.:

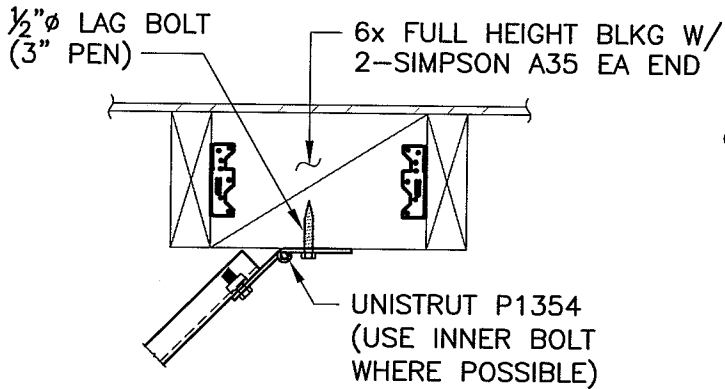
**DETAIL 5**

ISSUE DATE: JULY 1, 2008

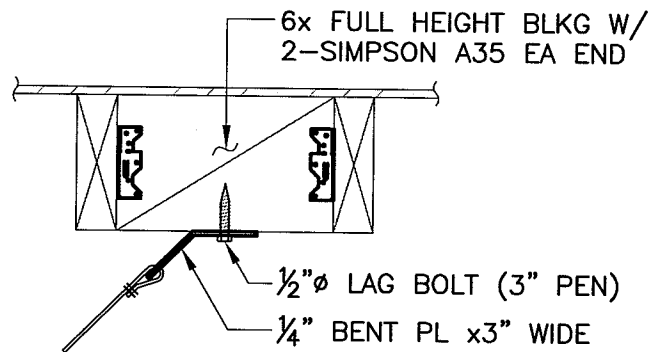
# STARLINE TRACK BUSWAYS STANDARD PRACTICE STRUCTURAL ANCHORAGE PROVISIONS



**VERTICAL ROD CONNECTION**



**UNISTRUT BRACE CONNECTION**



**CABLE BRACE CONNECTION**

**NOTE:**  
ROD/CABLE DIAMETER,  
COUPLER AND ANCHOR BOLT  
DIAMETER SHALL BE THE SAME.

TITLE: **STRUCTURE CONNECTION  
DETAILS WITH WOOD FRAMING**

SHEET NO.:

**DETAIL 6**

ISSUE DATE: JULY 1, 2008