STRUTS & STUFF

I7.1 – Introduction:

Many field installation situations will require the contractor to make a decision to use strut type restraints rather than the cable restraints recommended by Kinetics noise control. Some of these situations will be:

1. Other components directly in the intended path of one of the restraint cables.
2. The pipe or duct is too close to a wall that cannot be penetrated.
3. There is no competent structure for attachment of one of the cable restraints.
4. The specification will not permit cable restraints, also known as tension only braces.

This section is designed to assist the contractor in selecting and installing strut members to be used in conjunction with the brackets and attachment hardware included in the restraint cable kits provided by Kinetics Noise Control to generate strut type restraints with equal capacity to the restraint cable kits. Each KSCU and KSCC Restraint Cable Kit provided by Kinetics Noise Control for any given restraint location will have enough KSCA and KSCC brackets respectively to fabricate strut type restraints for that location. The KSCA bracket is shown in Figure I7-1, and the KSCC brackets are shown in Figure I7-2.

I7.2 – Conditions of Use for Strut Type Restraints:

1. If a run of pipe or duct requires the use of ***even one*** strut type restraint along its length, ***all*** of the restraints on that run of pipe or duct ***must be strut type restraints***.
2. If concrete anchors are used to attach the hanger rods for the pipe or duct to the ceiling or roof structure, they must be anchors approved for use in seismic applications, see ASCE 7-05 Section 13.4.2. Consult with the engineer of record for the system being installed for the specification of the proper anchor.
3. Hanger rod sizes and anchor sizes may need to be increased to handle the additional tensile loads imposed on the hangers by the seismic loads see Section 8.0 of this manual. Consult

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com
VISCMA Member

with the engineer of record for the system being installed for the proper hanger rod and/or anchor size for use with strut type restraints.

4. The installation angle for the strut restraints will be limited to 45° by virtue of the design of the KSCA and KSCC brackets.
5. One strut restraint will replace one pair of cable restraints.
6. A web based program available from Kinetics Noise Control at www.kineticsnoise.com may be used to verify the adequacy of hanger rods and hanger rod anchors based on the particulars of the restraint in question.

I7.3 – Using the Restraint Designation Symbol to Select Struts:

Figure I7-1 shows a typical designation symbol for seismic restraints on the drawings produced by Kinetics Noise Control indicating the recommended seismic cable restraint and attachment hardware kits.

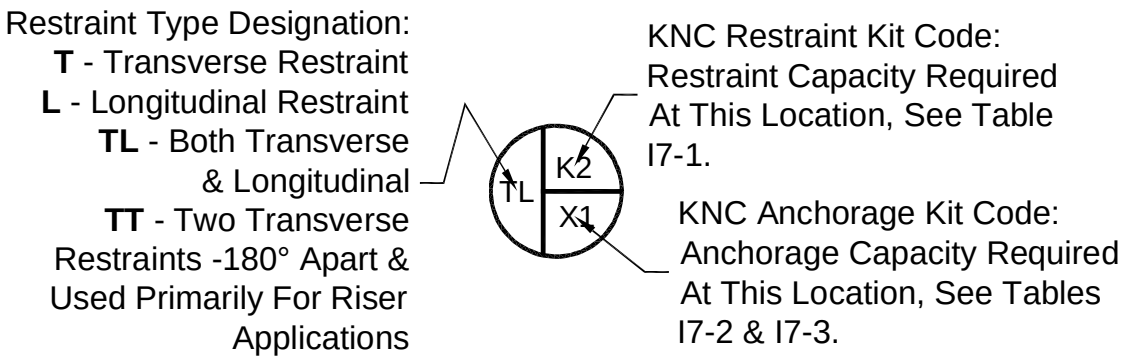


Figure I7-1; Typical Kinetics Noise Control Restraint Kit and Attachment Kit Designation Symbol

The KNC Restraint Codes are described in Table I7-1 and KNC Attachment Kit Codes are described in Tables I7-2 and I7-3. The restraint kit codes in Table I7-1 will be used to select the proper structural shape and size for the material used in the strut type restraint. The attachment kits described in Tables I7-2 and I7-3 will apply to both the cable type restraints and the strut type restraints.

Kinetics Noise Control provides conversion data for three types of structural members that may be used for strut type restraints, rolled structural angle, UNISTRUT® or equal strut channel, and pipe.

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

The first type of structural member discussed will be the rolled structural channels. The strut equivalents for Kinetics Noise Control restraint cable kits with rolled structural channel are shown in Table I7-4. This table covers the most readily available and easily handled sizes. Other sizes may be used, but will require analysis by the design professional responsible for the system.

Table I7-1; Seismic Restraint Cable Kit vs. Code Cross-Reference

KNC Restraint Kit Code	Restraint Kit Description
K2	KSCU-2 Cable Kit – 2 mm Cable & GRIPPLE HANGFAST No, 2 Connectors
K3	KSCU-3 Cable Kit – 3 mm Cable & GRIPPLE HANGFAST No, 3 Connectors
K4	KSCU-4 Cable Kit – 5 mm Cable & GRIPPLE HANGFAST No, 4 Connectors
K5	KSCU-5 Cable Kit – 6 mm Cable & GRIPPLE Lockable 6 mm Connectors
C1	KSCC-250 Cable Kit – 1/4″ Cable & Saddle + U-bolt Connectors
C2	KSCC-375 Cable Kit – 3/8″ Cable & Saddle + U-bolt Connectors
C3	KSCC-500 Cable Kit – 1/2″ Cable & Saddle + U-bolt Connectors

Table I7-2; Structural Concrete/Steel Attachment Kit vs. Code Cross-Reference

KNC Attachment Kit Code	Attachment Kit Description per Restraint Cable Note: Through bolts & nuts of the same size may be used for each kit and code shown below.
X1	(1) 1/4″ Concrete Anchor (with Grommet)
X2	(1) 3/8″ Concrete Anchor (with Grommet)
X3	(1) 1/2″ Concrete Anchor
Y1	(1) 5/8″ Concrete Anchor
Y2	(1) 3/4″ Concrete Anchor
Y3	(1) 7/8″ Concrete Anchor
Z1	(2) 3/8″ Concrete Anchors with Oversized Base Plate
Z2	(4) 3/8″ Concrete Anchors with Oversized Base Plate
Z3	(2) 1/2″ Concrete Anchors with Oversized Base Plate
Z4	(4) 1/2″ Concrete Anchors with Oversized Base Plate

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

Table I7-3; Structural Wood/Steel Attachment Kit vs. Code Cross-Reference

KNC Attachment Kit Code	Attachment Kit Description per Restraint Cable Note: Through bolts & nuts of the same size may be used for each kit and code shown below.
W1	(1) 1/4″ Lag Screw (with Grommet)
W2	(1) 3/8″ Lag Screw (with Grommet)
W3	(1) 1/2″ Lag Screw
W4	(1) 5/8″ Lag Screw
W5	(1) 3/4″ Lag Screw
W6	(1) 7/8″ Lag Screw
W7	(2) 3/8″ Lag Screws with Oversized Base Plate
W8	(4) 3/8″ Lag Screws with Oversized Base Plate
W9	(2) 1/2″ Lag Screws with Oversized Base Plate
W10	(4) 1/2″ Lag Screws with Oversized Base Plate

Table I7-4; Seismic Strut Restraint Size per KNC Restraint Code for Structural Steel Angle

KNC Restraint Code	Restraint Cable Kit	Structural Steel Angle Size (in)											
		1 x 1 x 1/8	1 x 1 x 1/4	1-1/2 x 1-1/2 x 1/4	2 x 2 x 1/4	2 x 2 x 3/8	2-1/2 x 2-1/2 x 1/4	2-1/2 x 2-1/2 x 1/2	3 x 3 x 1/4	3 x 3 x 1/2	3-1/2 x 3-1/2 x 1/4	3-1/2 x 3-1/2 x 1/2	4 x 4 x 1/4
		Maximum Strut Length (in)											
K2	KSCU-2	173	205	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
K3	KSCU-3	122	145	197	189	-----	-----	-----	-----	-----	-----	-----	-----
K4	KSCU-4	77	92	125	120	164	153	210	189	-----	-----	-----	-----
K5	KSCU-5	52	61	84	80	110	103	141	127	174	209	-----	-----
C1	KSCC-250	53	63	86	82	113	105	144	130	178	213	-----	-----
C2	KSCC-375	37	44	60	57	78	73	100	90	124	149	203	232
C3	KSCC-500	30	36	49	47	64	60	82	74	101	121	166	190

The strut equivalents for Kinetics Noise Control restraint cable kits with UNISTRUT® or equal strut channel are shown in Table I7-5. The UNISTRUT® channels listed in Table I7-5 are 1-5/8″ channels. Other sizes may be used, but will require analysis by the design professional responsible for the system.

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

Table I7-5; Seismic Strut Restraint Size per KNC Restraint Code for UNISTRUT® Profiles

KNC Restraint Code	Restraint Cable Kit	UNISTRUT® Profile			
		P1000	P1001	P5000	P5001
		Maximum Strut Length (in)			
K2	KSCU-2	165	-----	-----	-----
K3	KSCU-3	117	186	179	-----
K4	KSCU-4	74	118	113	160
K5	KSCU-5	49	79	76	108
C1	KSCC-250	51	81	78	110
C2	KSCC-375	34	56	54	77
C3	KSCC-500	16	46	44	62

The strut equivalents for Kinetics Noise Control restraint cable kits with pipe are shown in Table I7-6. The KSCA and KSCC brackets do not lend themselves well to use with struts fabricated from pipe. Either the pipe would need to be welded to the brackets, or the ends of the pipe would need to be flattened and drilled for bolts. The pipe listed in Table I7-6 covers the most readily available and easily handled sizes. Other sizes may be used, but will require analysis by the design professional responsible for the system.

Table I7-6; Seismic Strut Restraint Size per KNC Restraint Code for Pipe

KNC Restraint Code	Restraint Cable Kit	Nominal Pipe Size & Schedule						
		1" Sch. 40	1-1/4" Sch. 40	1-1/2" Sch. 40	2" Sch. 10	2" Sch. 40	2-1/2" Sch. 10	2-1/2" Sch. 40
		Maximum Strut Length (in)						
K2	KSCU-2	111	166	210	-----	-----	-----	-----
K3	KSCU-3	79	118	148	188	218	-----	-----
K4	KSCU-4	50	75	94	120	138	168	210
K5	KSCU-5	33	50	63	80	93	113	141

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

All three of these tables are used in the same manner. The steps required to convert the recommended cable restraint kits to strut type restraints are as follows.

1. Determine the KNC Restraint Codes from the restraint symbol on the drawing for the run of pipe of duct that requires the use of strut type restraints.
2. Determine the approximate length of the structural member required for the strut. Measure from the intended attachment point on the clevis, pipe, duct, or trapeze bar at a 45° angle, 1″ of rise for 1″ of horizontal distance, to the intended anchor point on the structure.
3. Determine the type or structural member that will be used for the strut restraint, rolled structural angle – Table I7-4, UNISTRUT® channel – Table I7-5, or pipe – Table I7-6.
4. Find the row in the table for the selected structural member for the strut that corresponds to the KNC Restraint Code from the drawing symbol, K2 through K5 or C1 through C3.
5. Move across this row until a Maximum Strut Length that exceeds the approximate length required for the strut as measured in step 2 above is found.
6. Move up this column to determine the required size for the structural member to be used for the strut restraint.

I7.4 – Attaching Strut Members to KSCA & KSCC Brackets:

The KSCA bracket is shown in Figure I7-2, and the KSCC bracket is shown in Figure I7-3 below. For each bracket type and size, the appropriate holes are shown in Figures I7-2 and I7-3 for attaching to the strut and the building structure. Always use the strut attachment hardware size indicated in Figures I7-2 and I7-3 to ensure the maximum possible capacity for the strut restraint assembly.

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

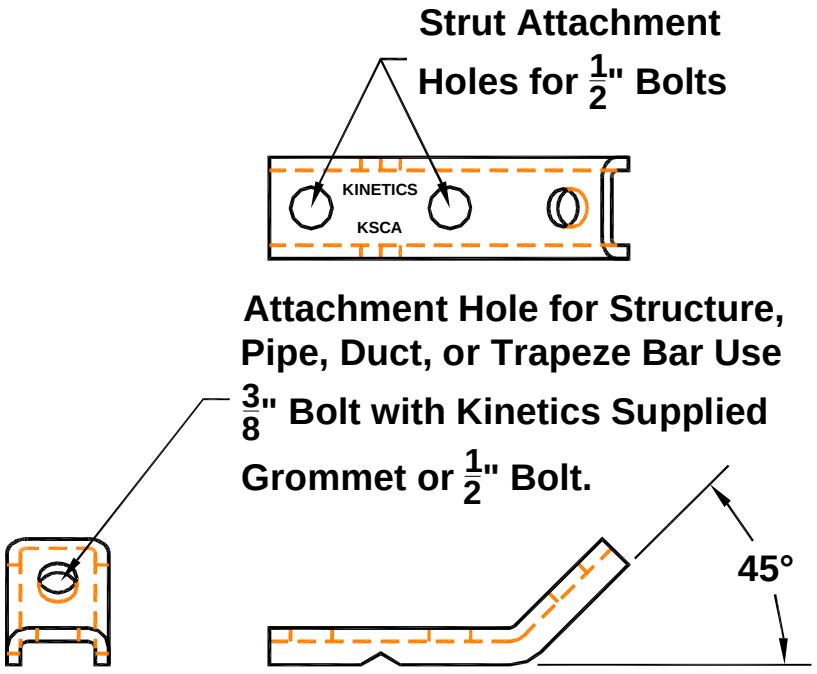


Figure I7-2; KSCA Bracket with Strut and Structure Attachment Holes Identified

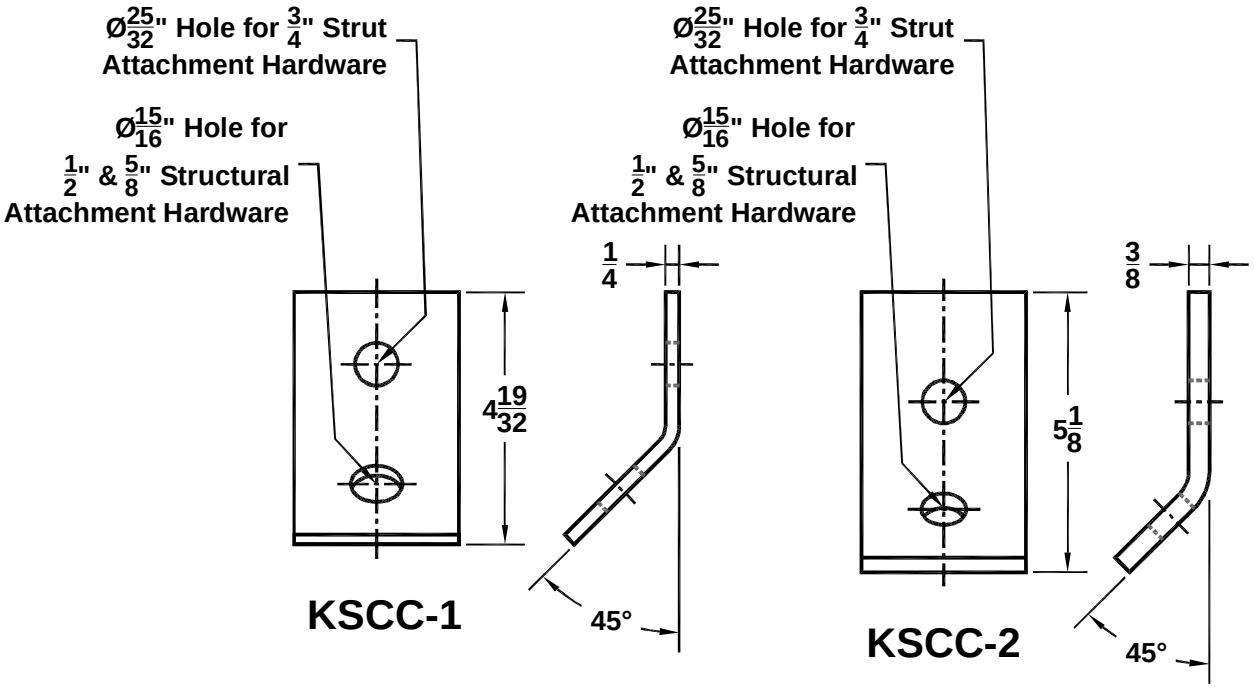


Figure I7-3; KSCC-1 & -2 Brackets with Strut and Structure Attachment Holes Identified

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

I7.5 – Attaching Strut Channel to KSCA & KSCC Brackets:

The attachment of strut channel to the KSCA and KSCC brackets is most easily accomplished using bolts and channel nuts. ***Please note the following!***

1. ***Not all strut channels are created equal!*** Different manufacturer's strut channels may have different strengths and capacities. If using other than UNISTRUT® brand strut channel, contact the design professional of record for the system for assistance in selecting the appropriate strut channel for use as seismic strut type restraint. Table I7-5 is based on 1-5/8 UNISTRUT® or equivalent channel.
2. ***Not all channel nuts are created equal!*** Different manufacturer's channel nuts will have different Allowable Pullout Strength and Resistance to Slip values. The channel nuts used in conjunction with Kinetics Noise Control KSCA and KSCC brackets must have serrated teeth to grip the strut channel and maximize the Resistance to Slip rating. Table I7-7 gives the Allowable Pull-Out Strength and Resistance to Slip for strut nut supplied by UNISTRUT®. If another manufacturer's channel nuts are to be used, the design professional of record for the system must ensure that their Allowable Pullout Strength and Resistance to Slip values are consistent with the seismic requirements indicated by Kinetics Noise Control for the application.

Table I7-7; Estimated UNISTRUT® Channel Nut Seismic Capacities – *For Reference Only*

Channel Nut Size	Torque (ft-lbs)	Allowable @ 3:1		Seismic Allowable @ 2:1		Force Class	Compatible Attachment Kits
		Pull-Out Strength (lbs)	Resistance To Slip (lbs)	Pull-Out Strength (lbs)	Resistance To Slip (lbs)		
1/2-13 UNC	50	2,000	1,500	3,000	2,250	IV	X1, X2, X3, Z1
5/8-11 UNC	100	2,500	1,500	3,750	2,250	IV	Y1, Y2, Y3
3/4-10 UNC	125	2,500	1,700	3,750	2,550	IV	Y1, Y2, Y3

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

I7.5.1 – KSCA Brackets to Strut Channel:

There are two options available for attaching KSCA brackets to strut channel. These options are shown in Figures I7-4 and I7-5. Both options are based on 1-5/8 strut channel and channel nuts with serrated teeth. Combinations of these two attachment options may be used to create at least six general strut restraint arrangements which are illustrated in Figures I7-6 through I7-11.

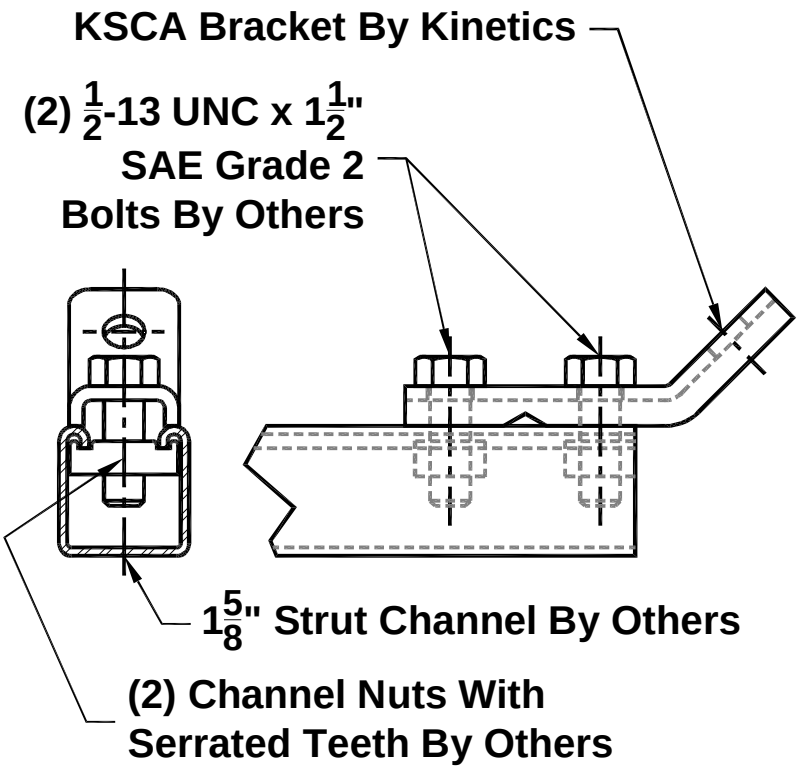


Figure I7-4; Attachment of KSCA Bracket to Strut Channel – Option #1

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

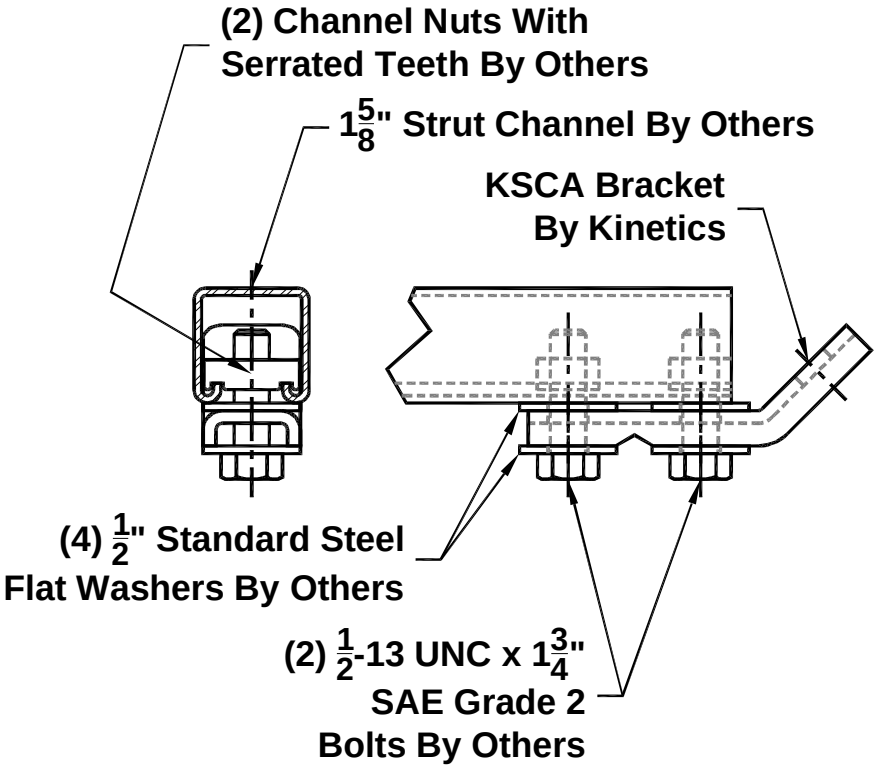


Figure I7-5; Attachment of KSCA Bracket to Strut Channel – Option #2

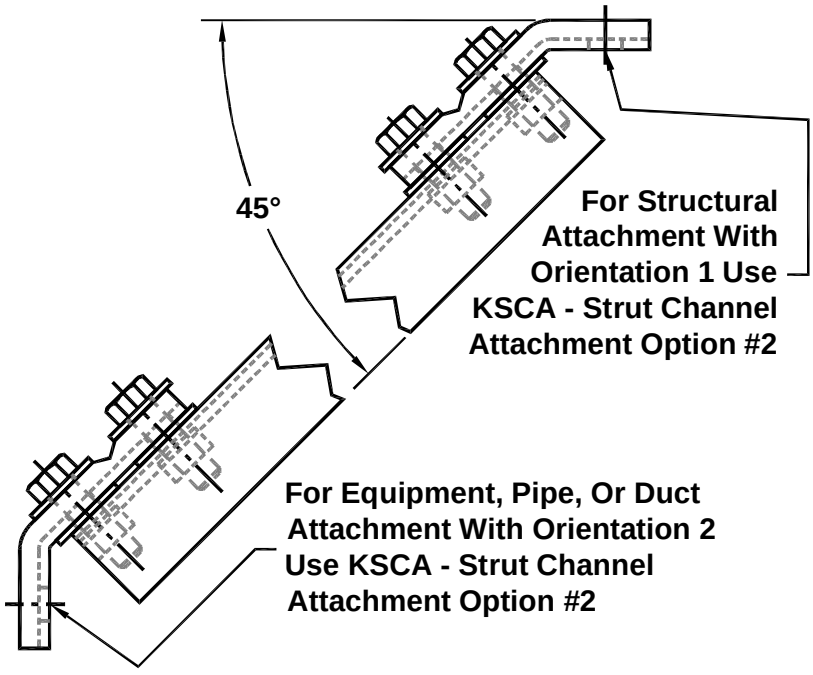


Figure I7-6; Attachment of KSCA Brackets to Strut Channel for Seismic Strut Restraints – General Arrangement #1

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

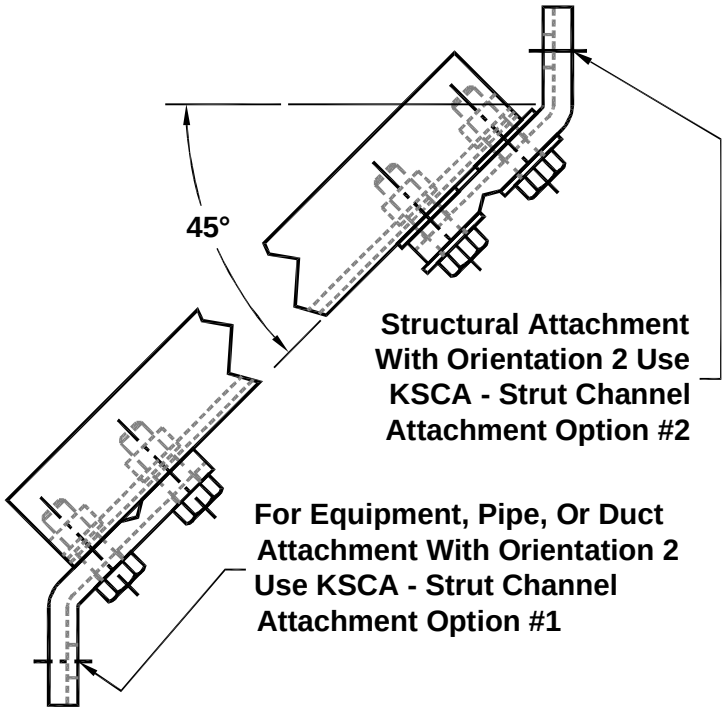


Figure I7-7; Attachment of KSCA Brackets to Strut Channel for Seismic Strut Restraints – General Arrangement #2

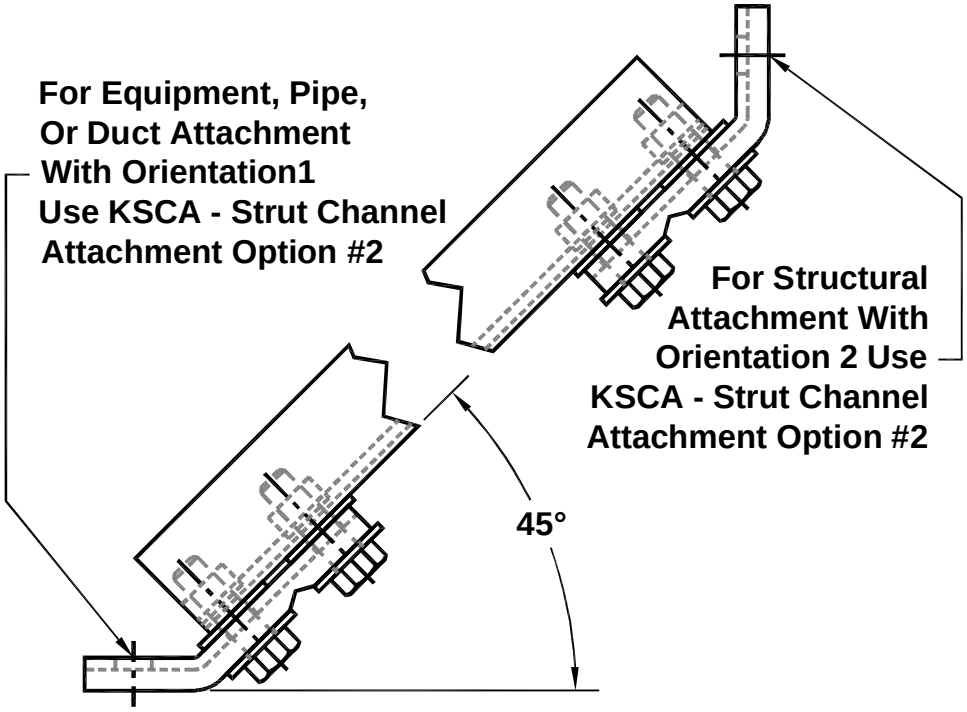


Figure I7-8; Attachment of KSCA Brackets to Strut Channel for Seismic Strut Restraints – General Arrangement #3

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

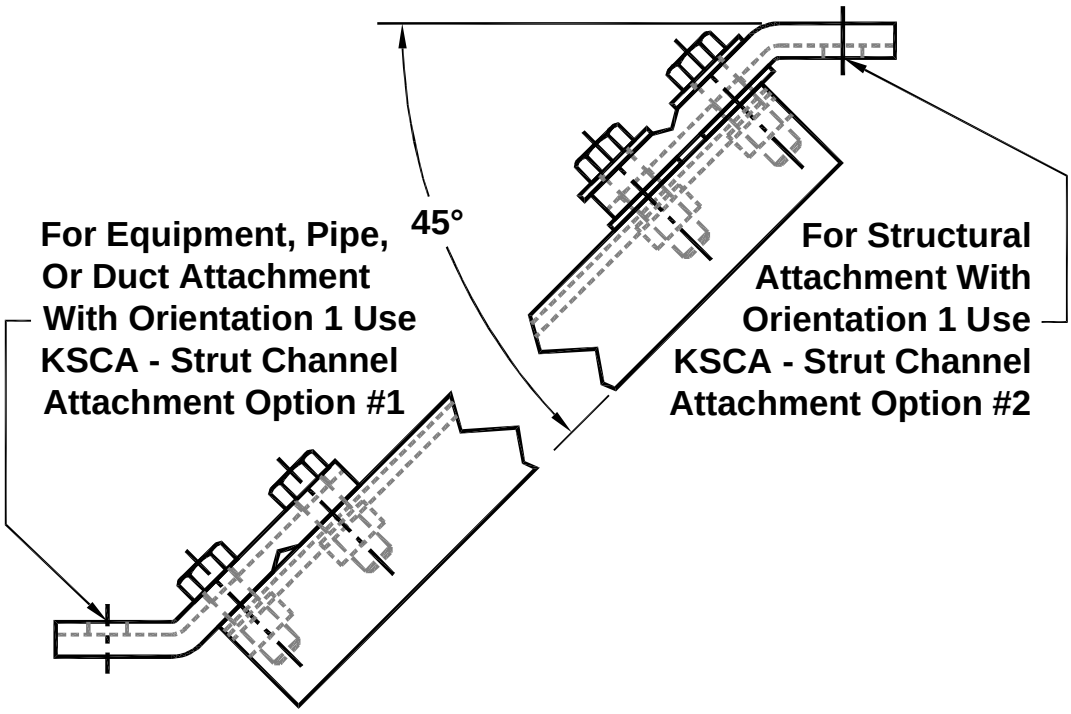


Figure I7-9; Attachment of KSCA Brackets to Strut Channel for Seismic Strut Restraints – General Arrangement #4

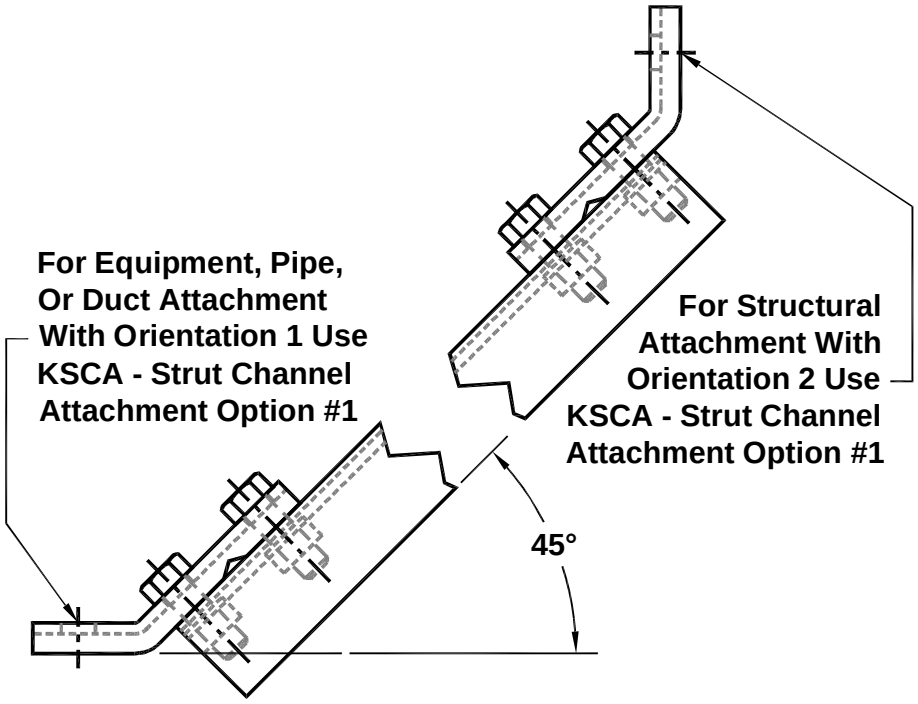


Figure I7-10; Attachment of KSCA Brackets to Strut Channel for Seismic Strut Restraints – General Arrangement #5

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

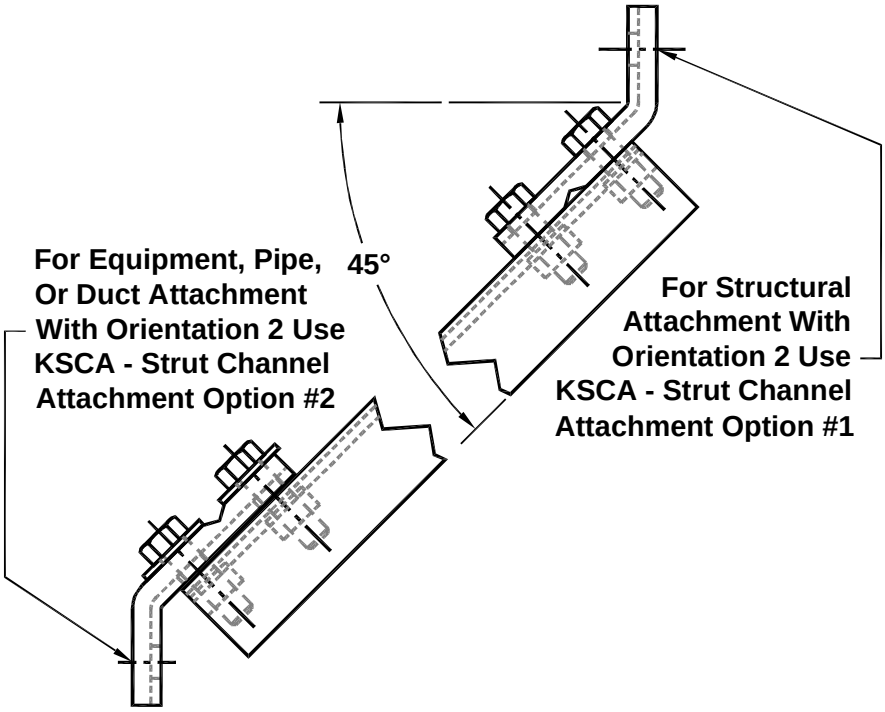


Figure I7-11; Attachment of KSCA Brackets to Strut Channel for Seismic Strut Restraints – General Arrangement #6

I7.5.2 – KSCC Brackets to Strut Channel:

There are two options available for attaching KSCC brackets to strut channel. These options are shown in Figures I7-12 and I7-13. Both options are based on 1-5/8 strut channel and channel nuts with serrated teeth. Combinations of these two attachment options may be used to create at least six general strut restraint arrangements which are illustrated in Figures I7-14 through I7-19.

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

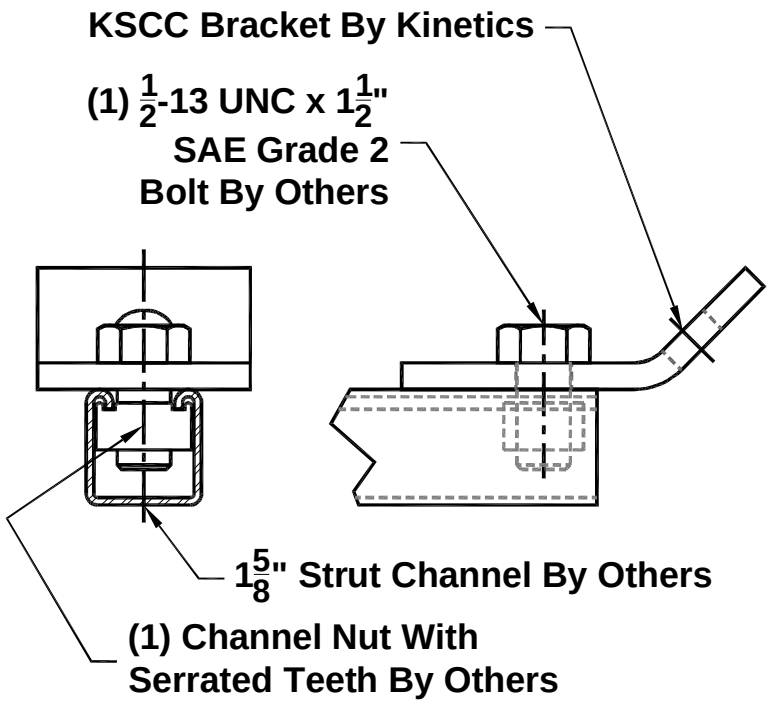


Figure I7-12; Attachment of KSCC Bracket to Strut Channel – Option #1

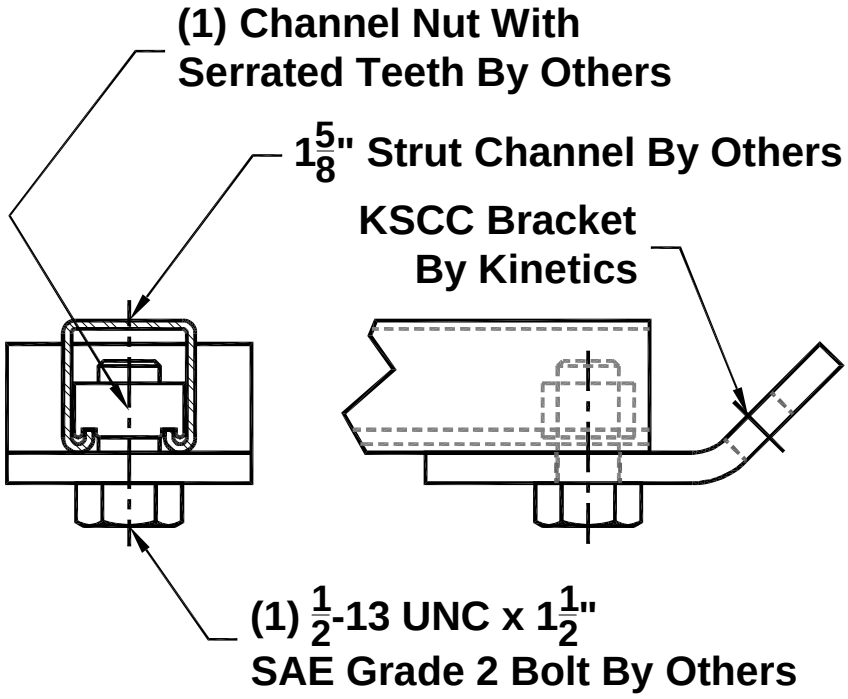


Figure I7-13; Attachment of KSCC Bracket to Strut Channel – Option #2

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

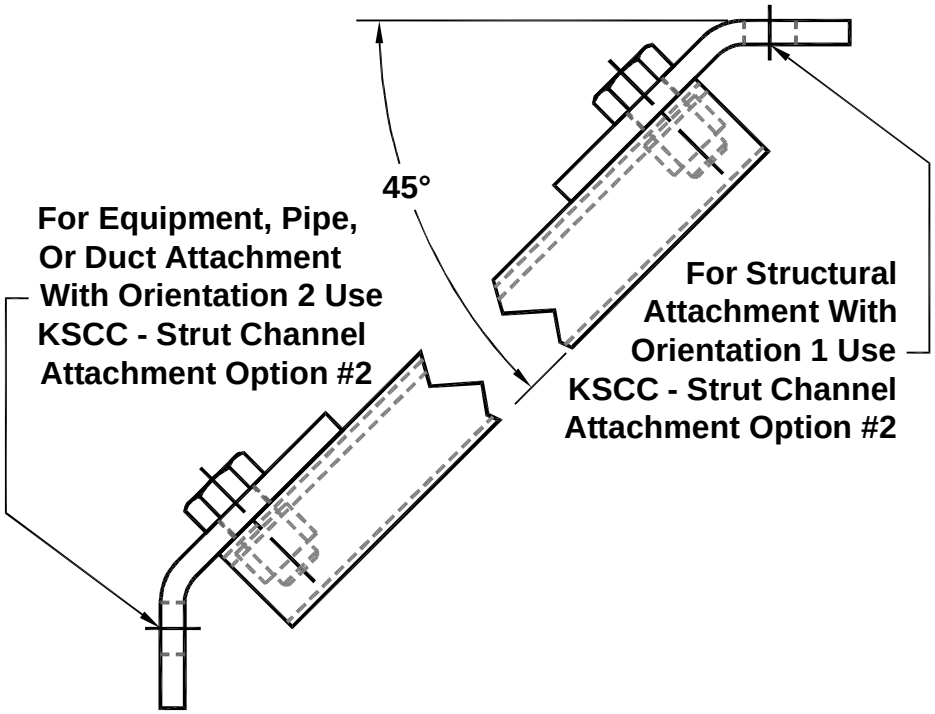


Figure I7-14; Attachment of KSCC Brackets to Strut Channel for Seismic Strut Restraints – General Arrangement #1

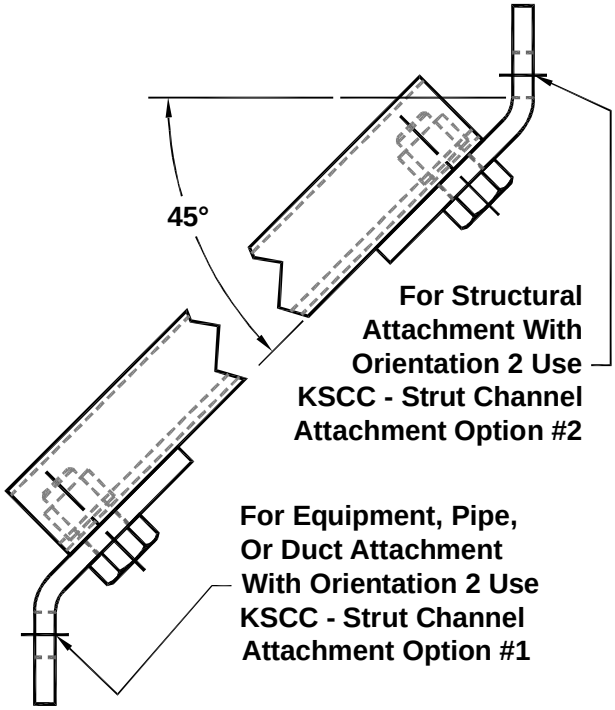


Figure I7-15; Attachment of KSCC Brackets to Strut Channel for Seismic Strut Restraints – General Arrangement #2

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

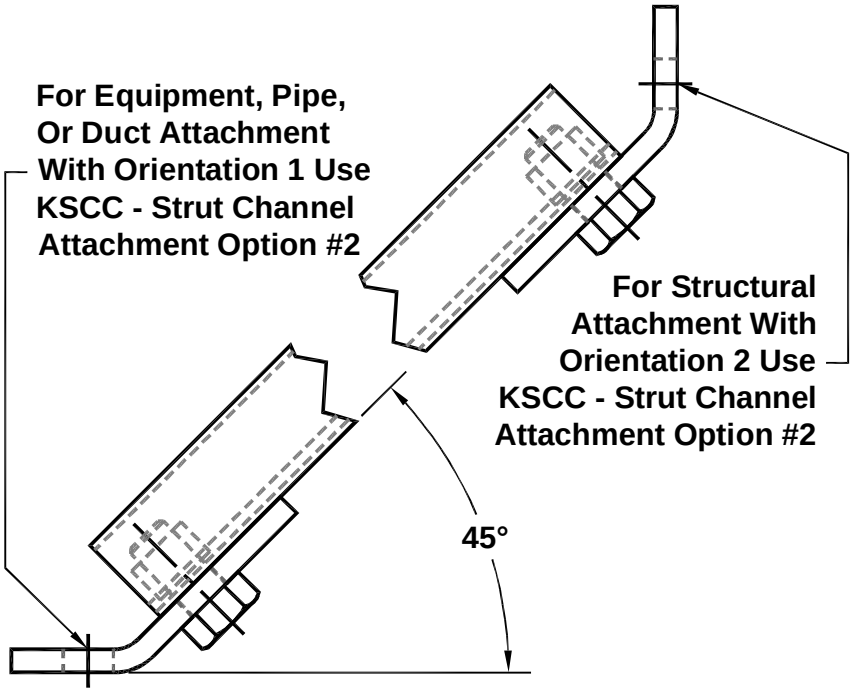


Figure I7-16; Attachment of KSCC Brackets to Strut Channel for Seismic Strut Restraints – General Arrangement #3

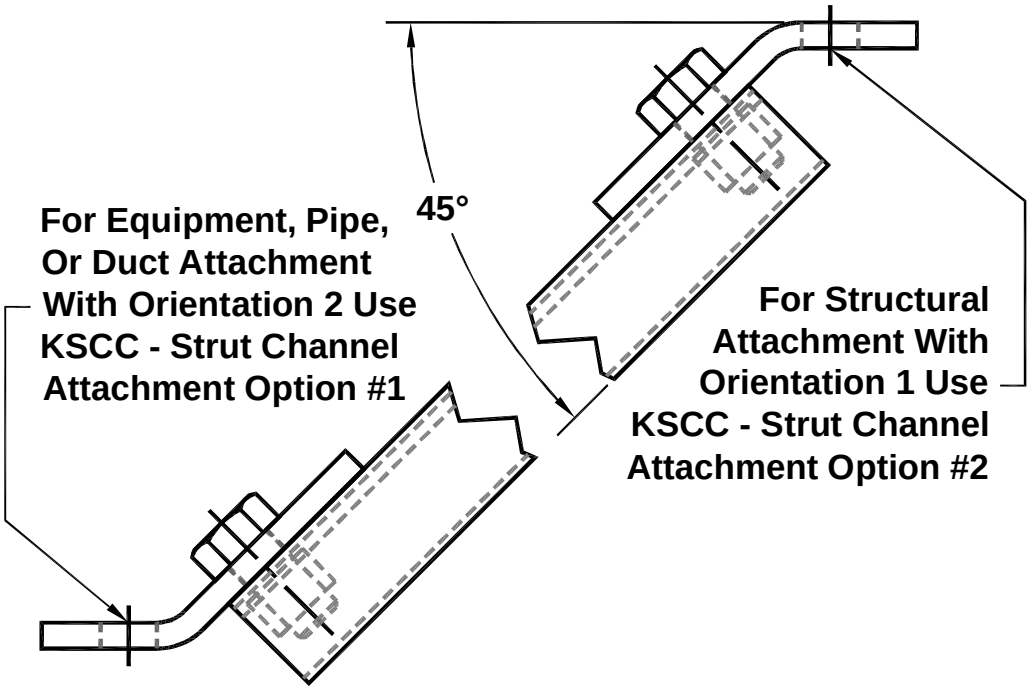


Figure I7- 17; Attachment of KSCC Brackets to Strut Channel for Seismic Strut Restraints – General Arrangement #4

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

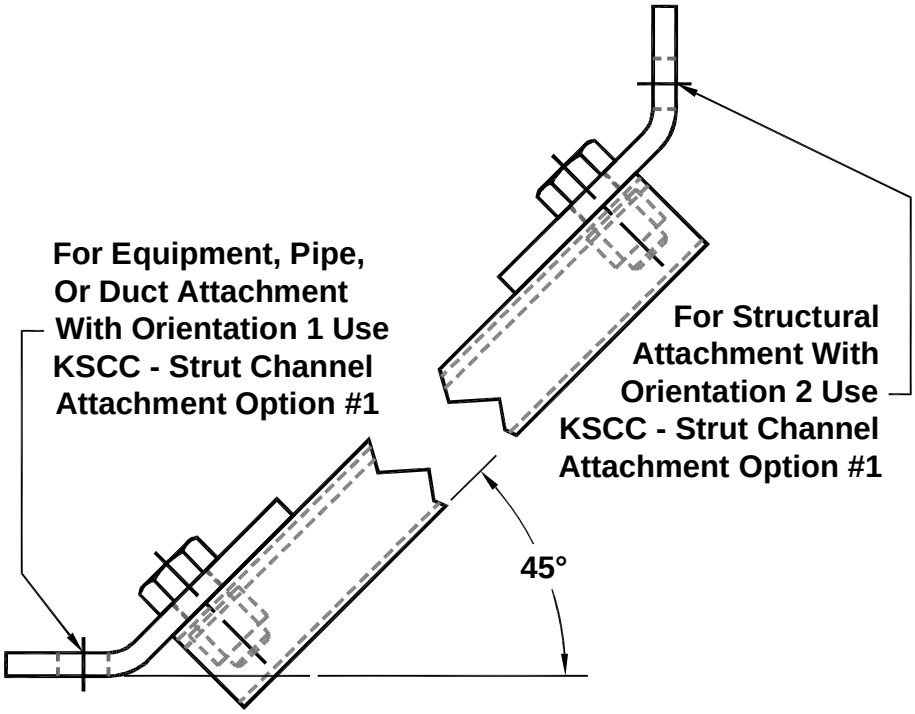


Figure I7-18; Attachment of KSCC Brackets to Strut Channel for Seismic Strut Restraints – General Arrangement #5

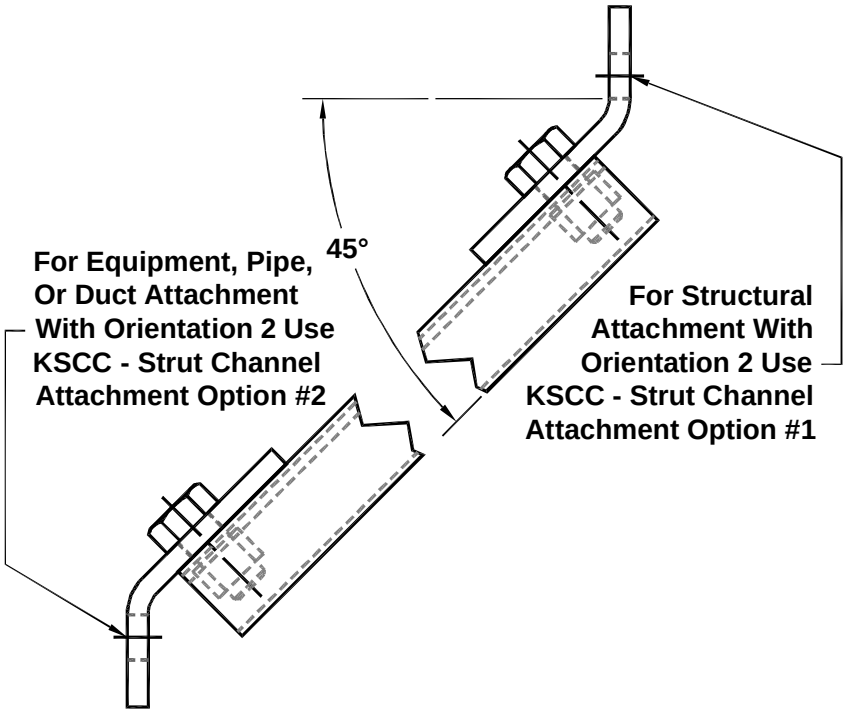


Figure I7-19; Attachment of KSCC Brackets to Strut Channel for Seismic Strut Restraints – General Arrangement #6

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

I7.6 – Attaching KSCA & KSCC Brackets to Rolled Structural Angle:

The attachment of rolled structural angle to the KSCA and KSCC brackets is most easily accomplished using bolts, nuts, and washers. The capacities restraints using these attachments will match those of the kits recommended by Kinetics noise control if the following conditions are met.

1. The rolled structural angle to be used for the restraint is properly selected according to the instructions provided in Section I7.2 – Using the Restraint Designation Symbol to Select Struts.
2. The attachment hardware sizes and grades are as specified in Figures I7-20, I7-21, I7-22, I7-23, I7-24, I7-35 and I7-36.

I7.6.1 – KSCA Brackets to Rolled Structural Angle:

There are five workable options available for attaching KSCA brackets to rolled structural angles. These options are shown in Figures I7-20, I7-21, I7-22, I7-23, and I7-24. Options #3, #4, and #5 shown in Figures I7-22, I7-23, and I7-24 may require that the corner of the angle leg be trimmed to eliminate interference with the structure, equipment, pipe, duct, or KSCA bracket. Combinations of the first three attachment options may be used to create at least ten practical general strut restraint arrangements which are illustrated in Figures I7-25 through I7-34.

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

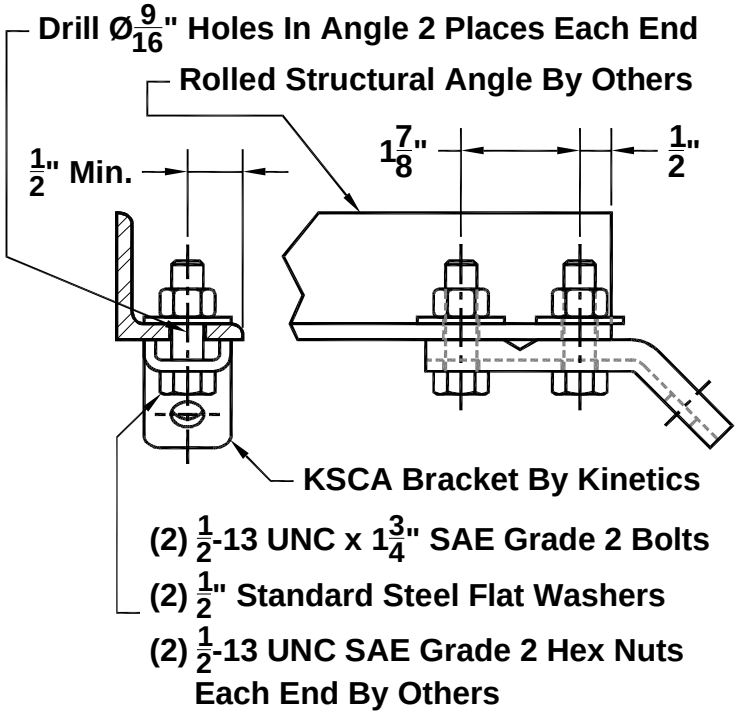


Figure I7-20; Attachment of KSCA Bracket to Rolled Angle – Option #1

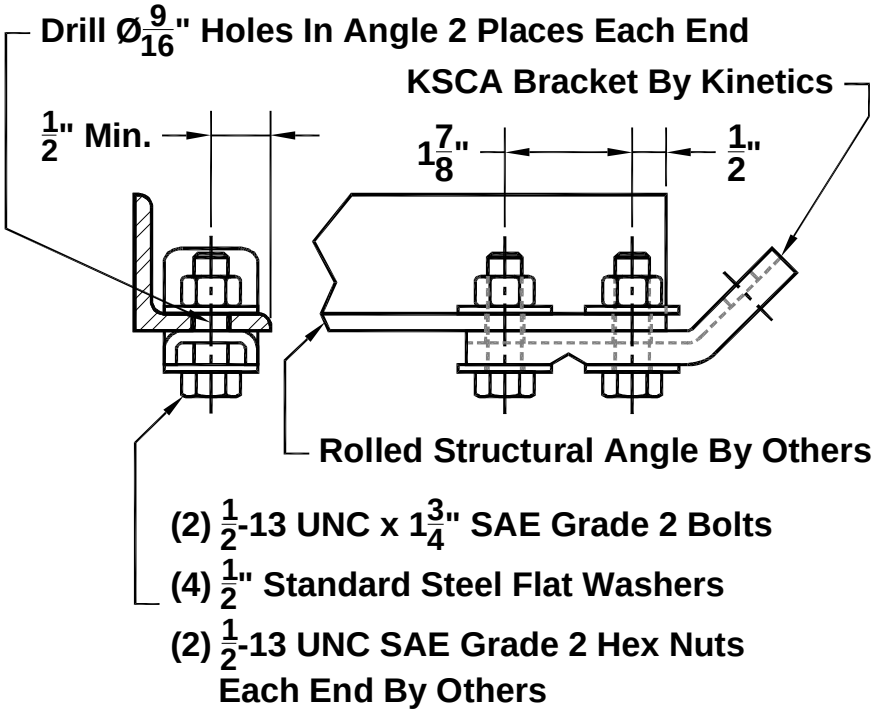


Figure I7-21; Attachment of KSCA Bracket to Rolled Angle – Option #2

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

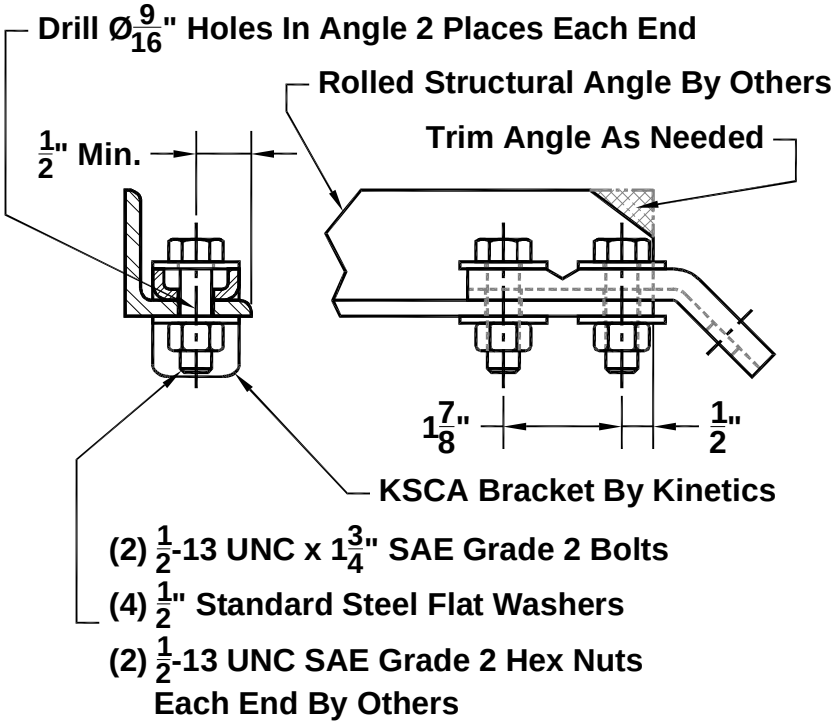


Figure I7-22; Attachment of KSCA Bracket to Rolled Angle – Option #3 *Trim as Angle Needed*

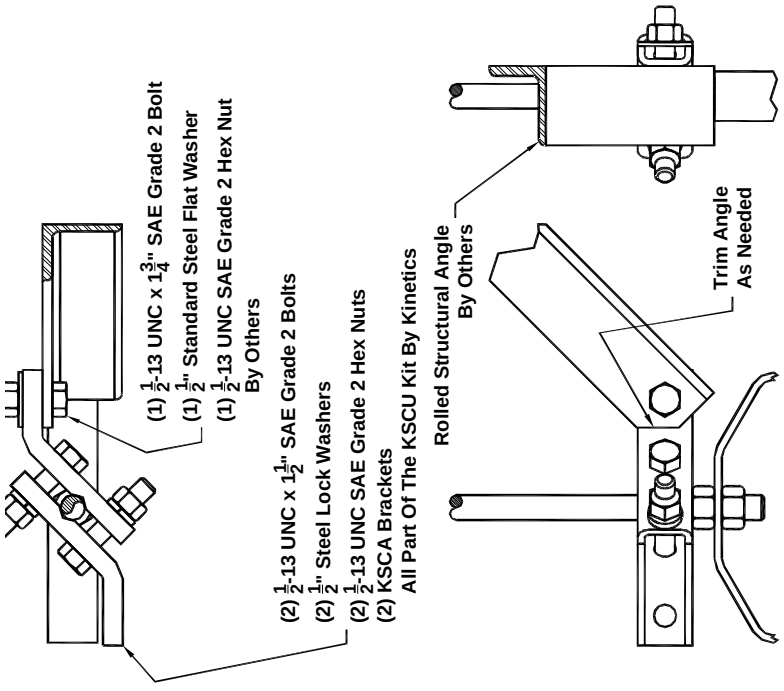


Figure I7-23; Attachment of KSCA Bracket to Rolled Angle for a Clevis Hanger Rod – Option #4 *Trim as Angle Needed*

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

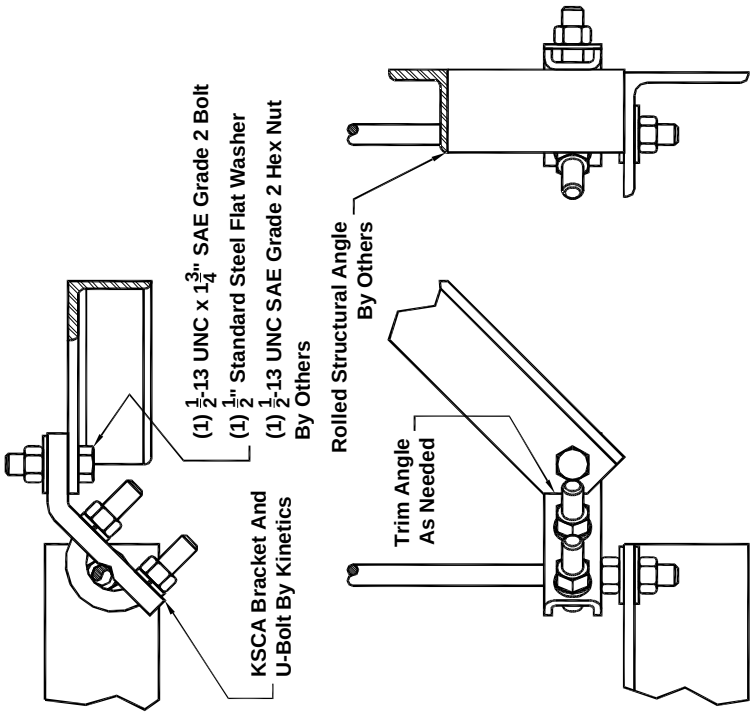


Figure I7-24; Attachment of KSCA Bracket to Rolled Angle for a Trapeze Bar Hanger Rod – Option #5 *Trim as Angle Needed*

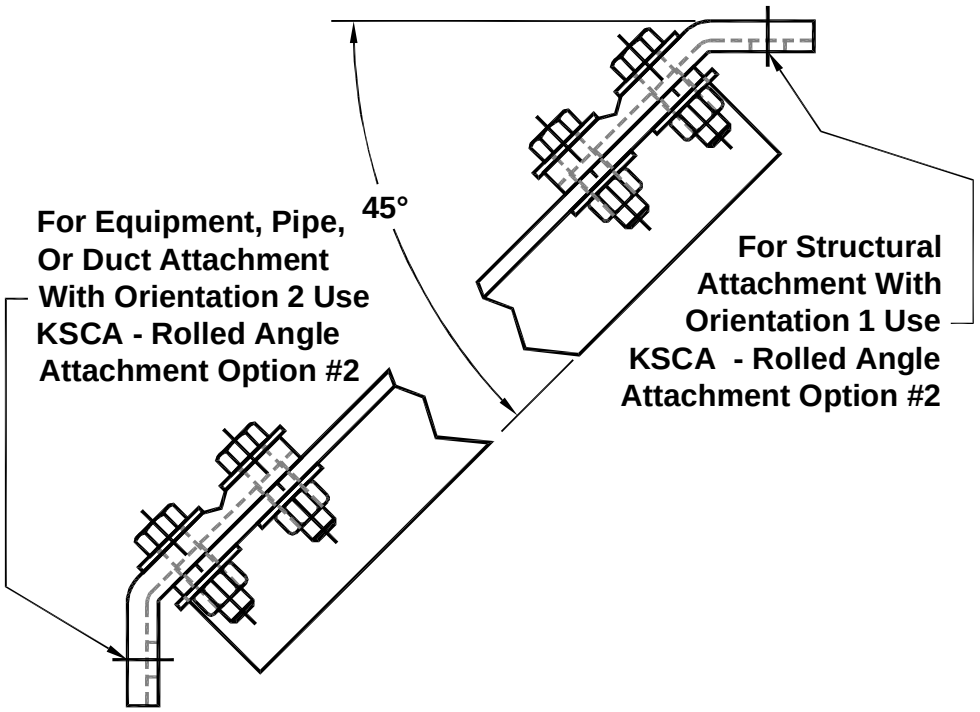


Figure I7-25; KSCA Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #1

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

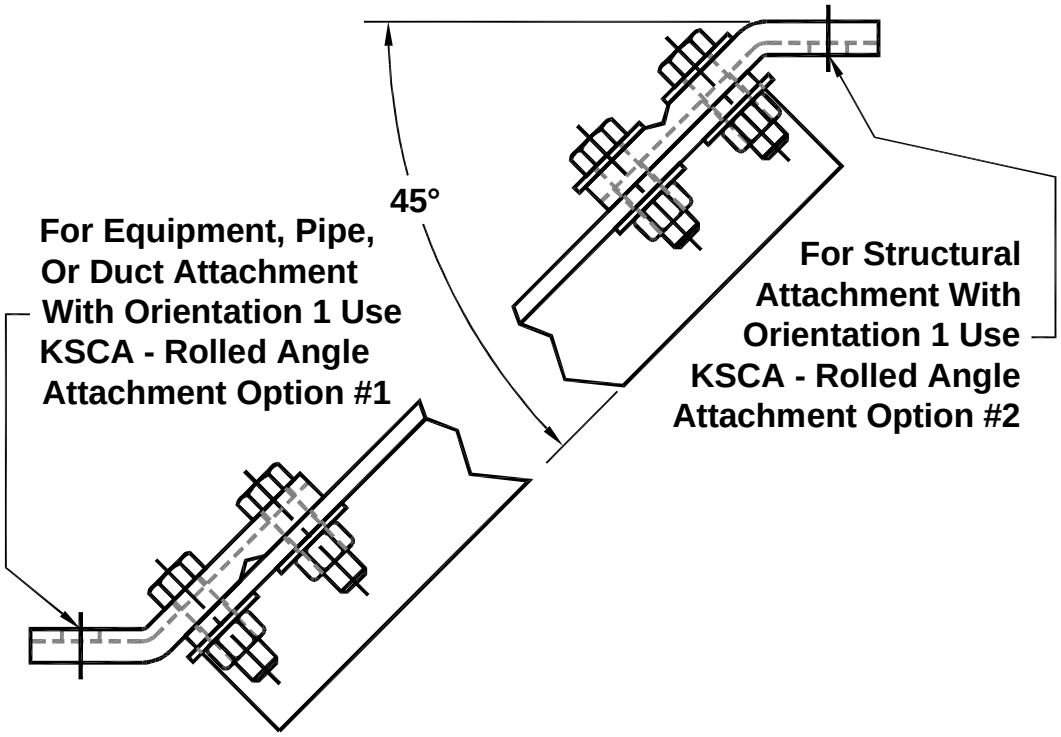


Figure I7-26; KSCA Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #2

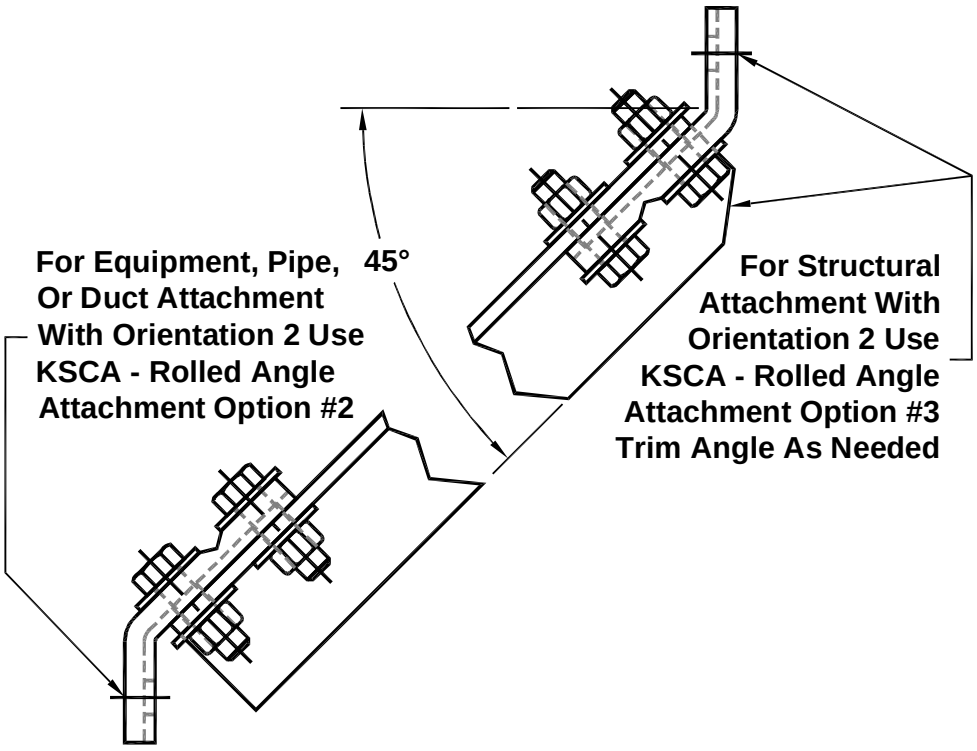


Figure I7-27; KSCA Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #3

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

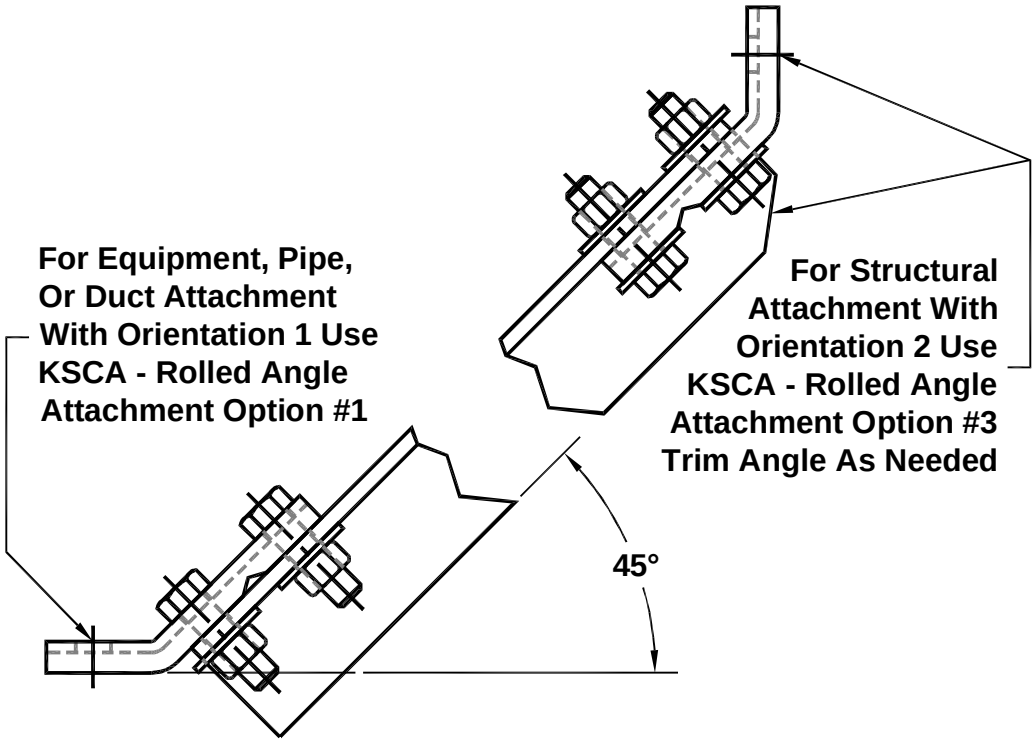


Figure I7-28; KSCA Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #4

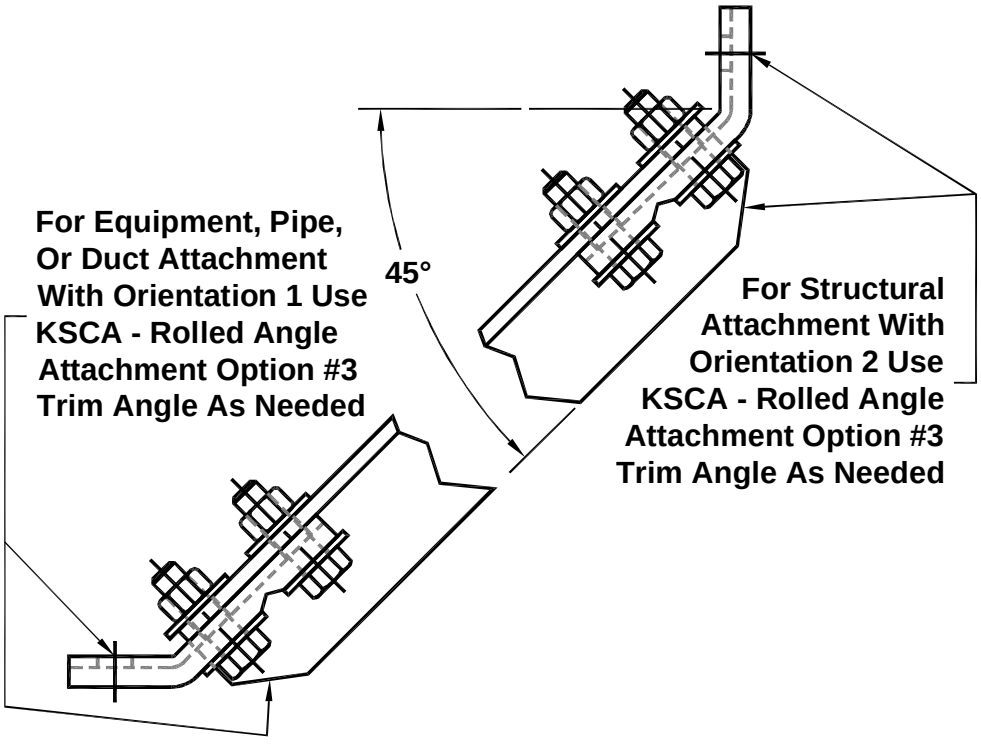


Figure I7-29; KSCA Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #5

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

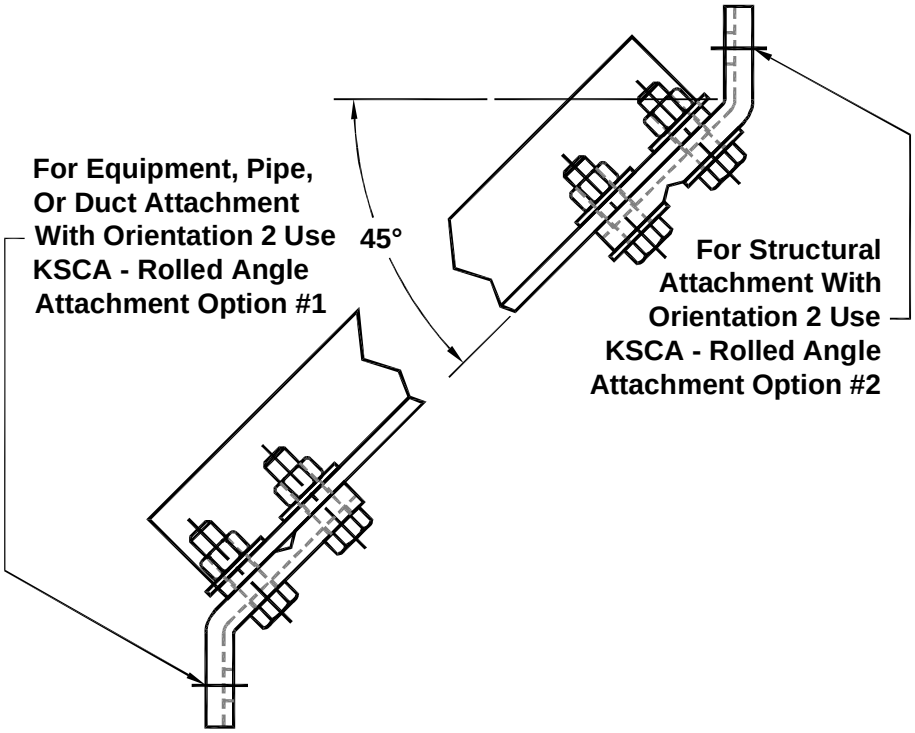


Figure I7-30; KSCA Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #6

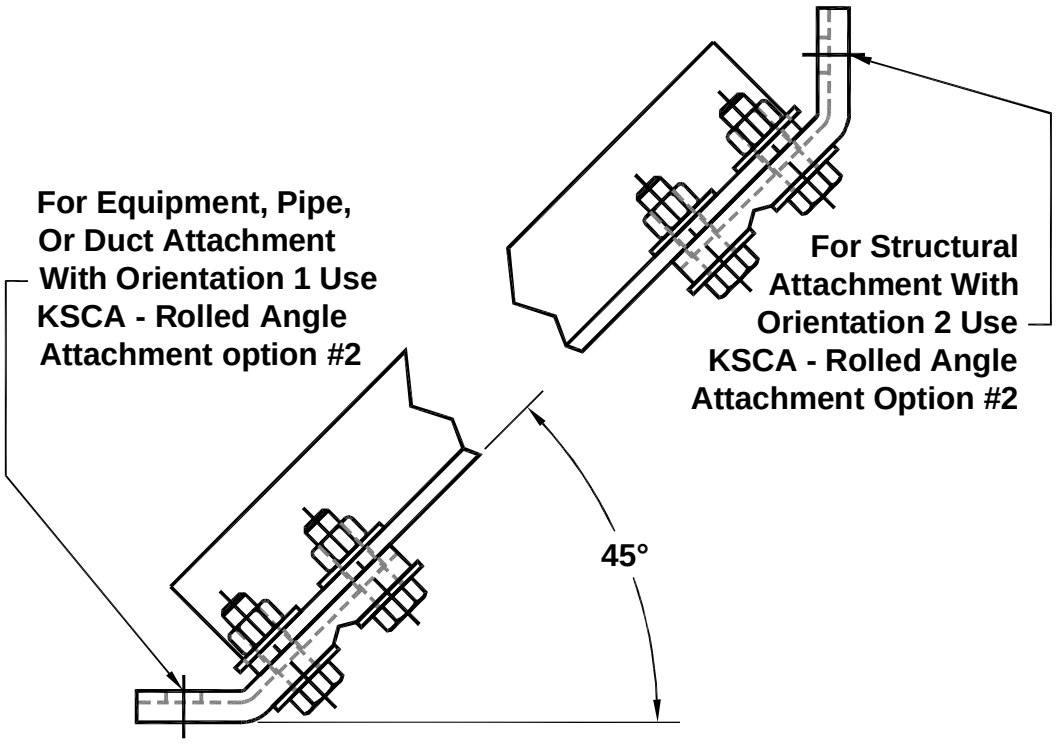


Figure I7-31; KSCA Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #7

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

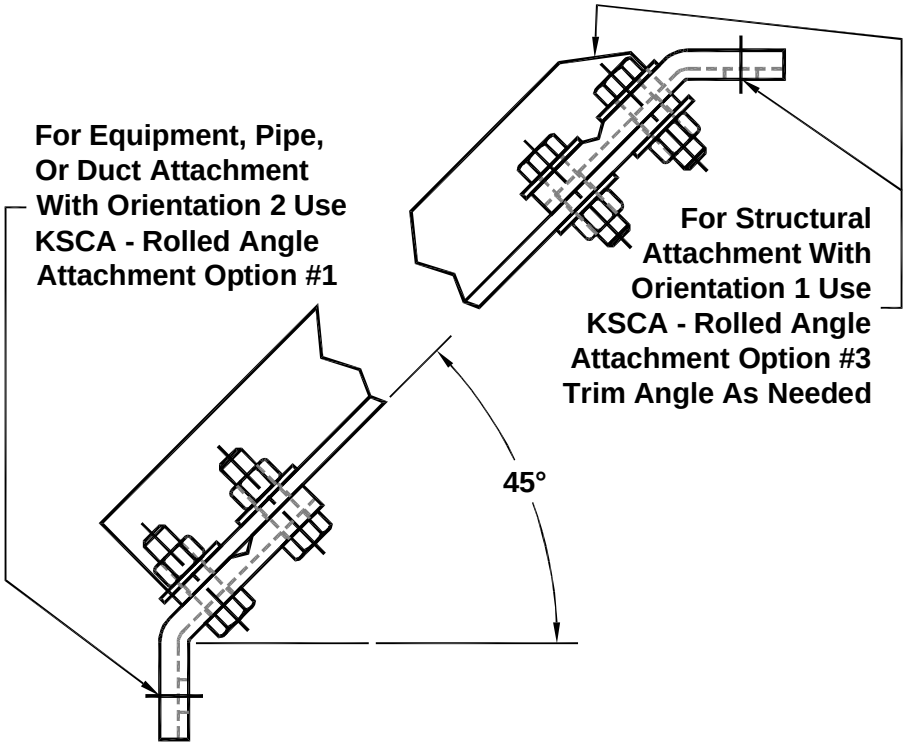


Figure I7-32; KSCA Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #8

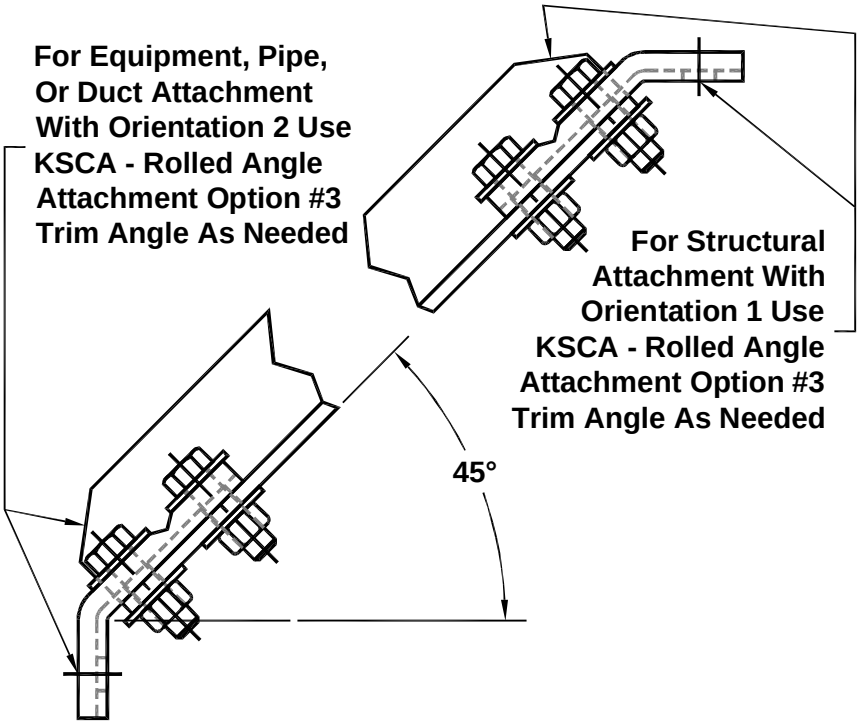


Figure I7-33; KSCA Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #9

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

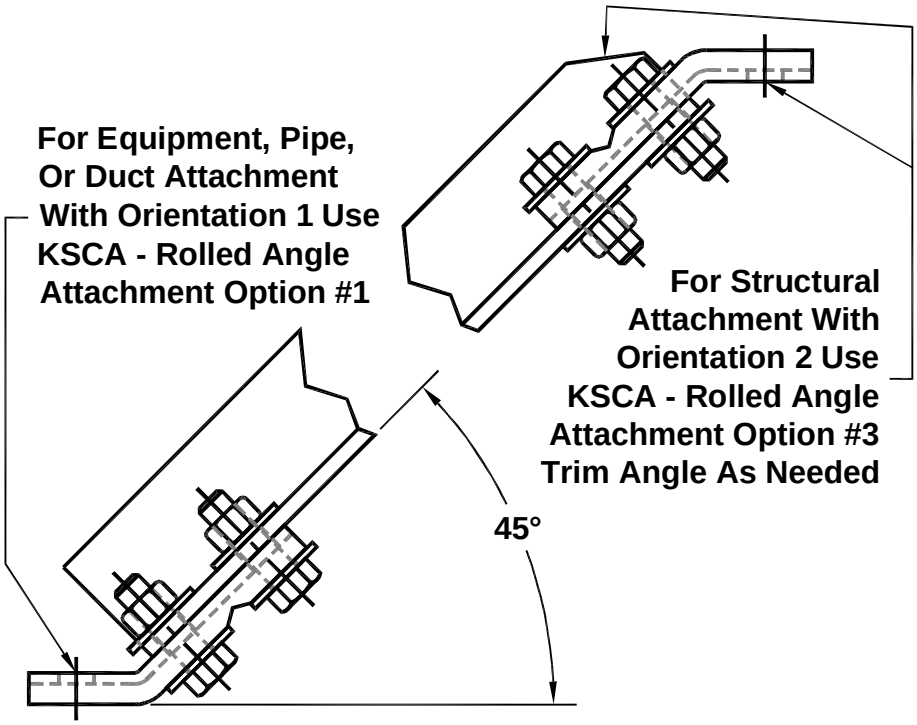


Figure I7-34; KSCA Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #10

I7.6.2 – KSCC Brackets to Rolled Structural Angle:

There are two useful options available for attaching KSCC brackets to rolled structural angles. These options are shown in Figures I7-35 and I7-36. Option #2, shown in Figure I7-36 may require that the corner of the angle leg be trimmed to eliminate interference with the structure, equipment, pipe, or duct. Combinations of these attachment options may be used to create at least eight practical general strut restraint arrangements which are illustrated in Figures I7-37 through I7-44.

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

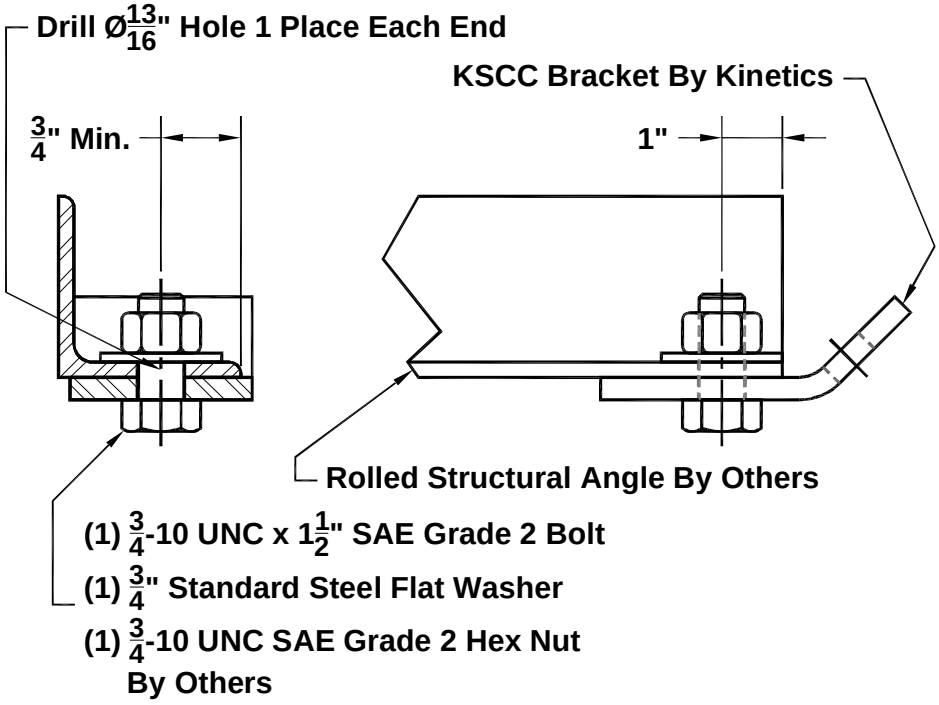


Figure I7-35; Attachment of KSCC Bracket to Rolled Angle – Option #1

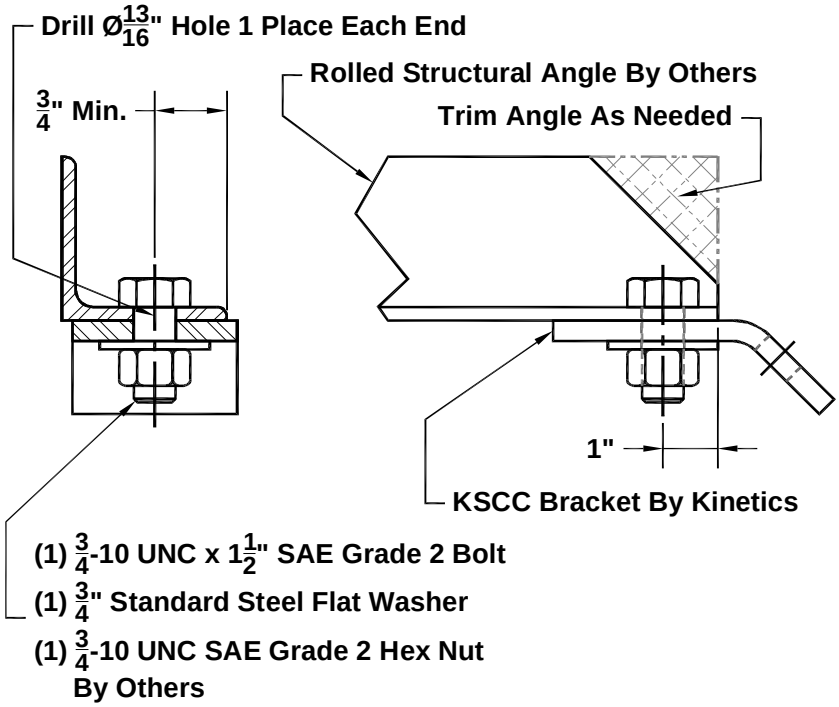


Figure I7-36; Attachment of KSCC Bracket to Rolled Angle – Option #2

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

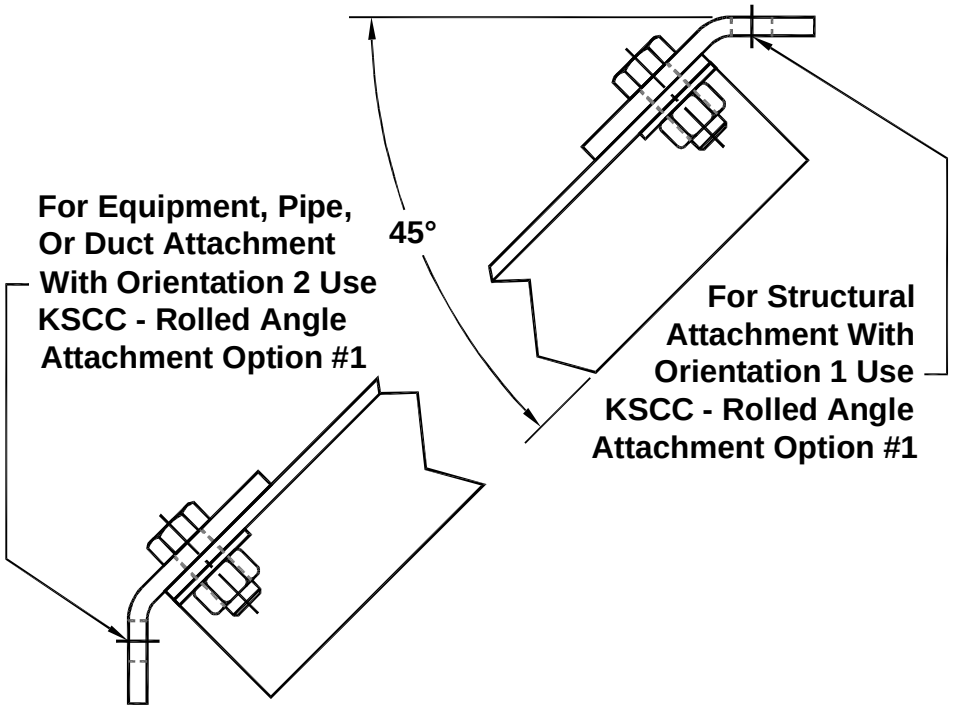


Figure I7-37; KSCC Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #1

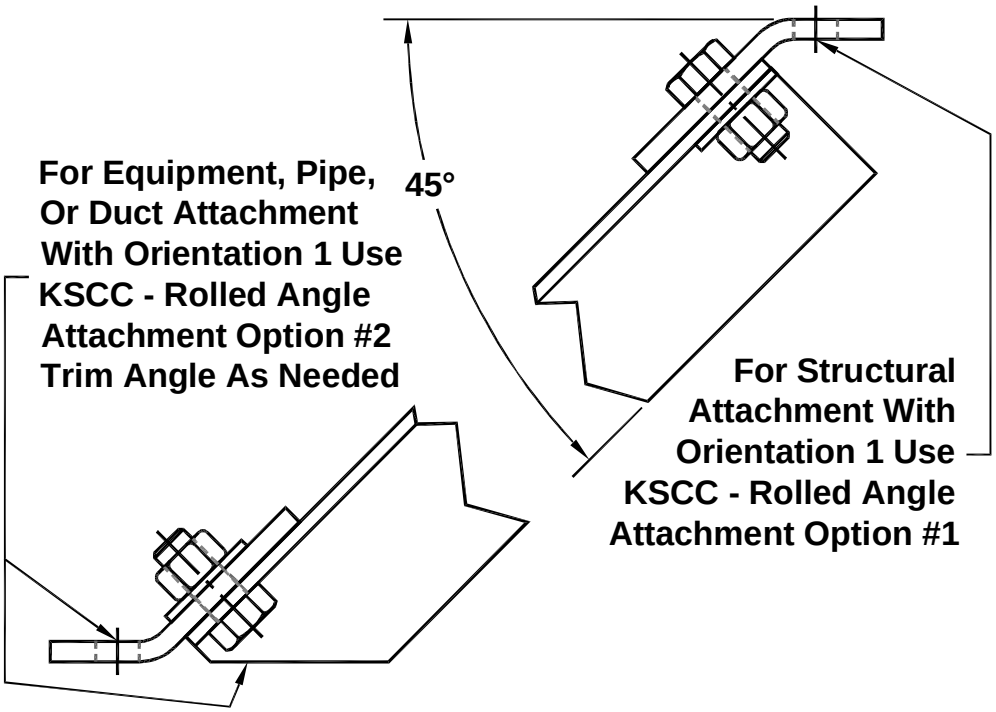


Figure I7-38; KSCC Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #2

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

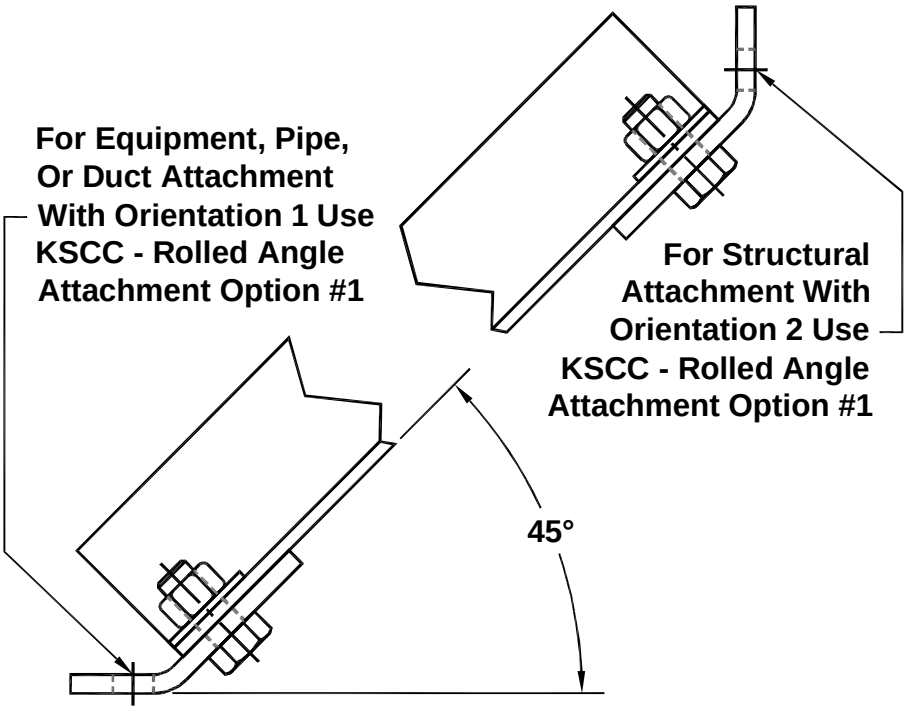


Figure I7-39; KSCC Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #3

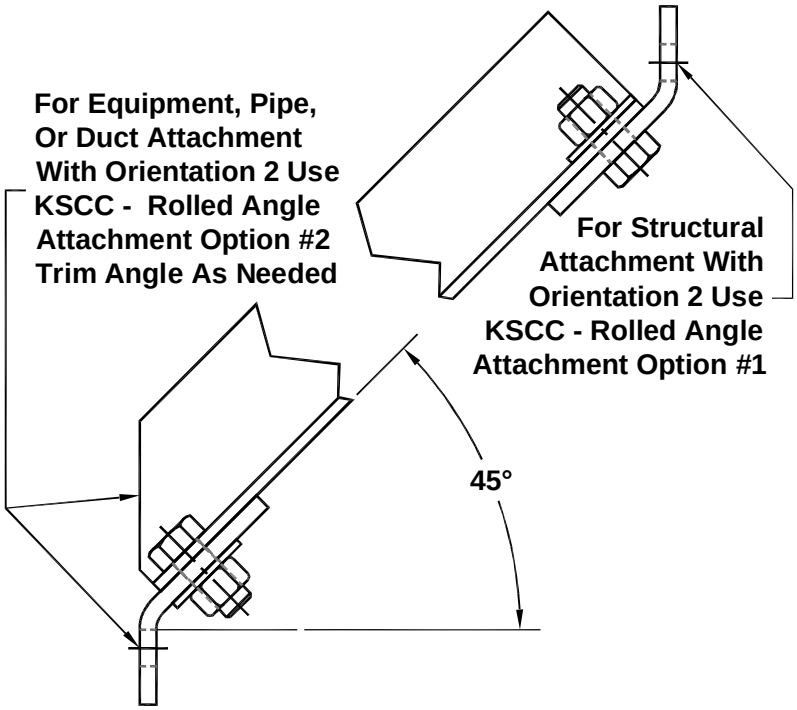


Figure I7-40; KSCC Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #4

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

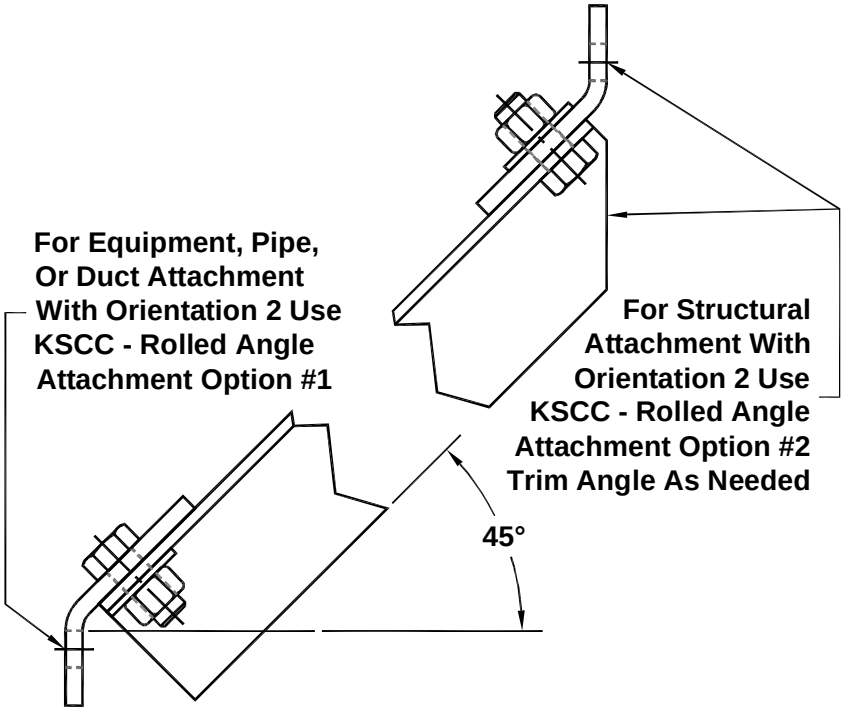


Figure I7-41; KSCC Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #5

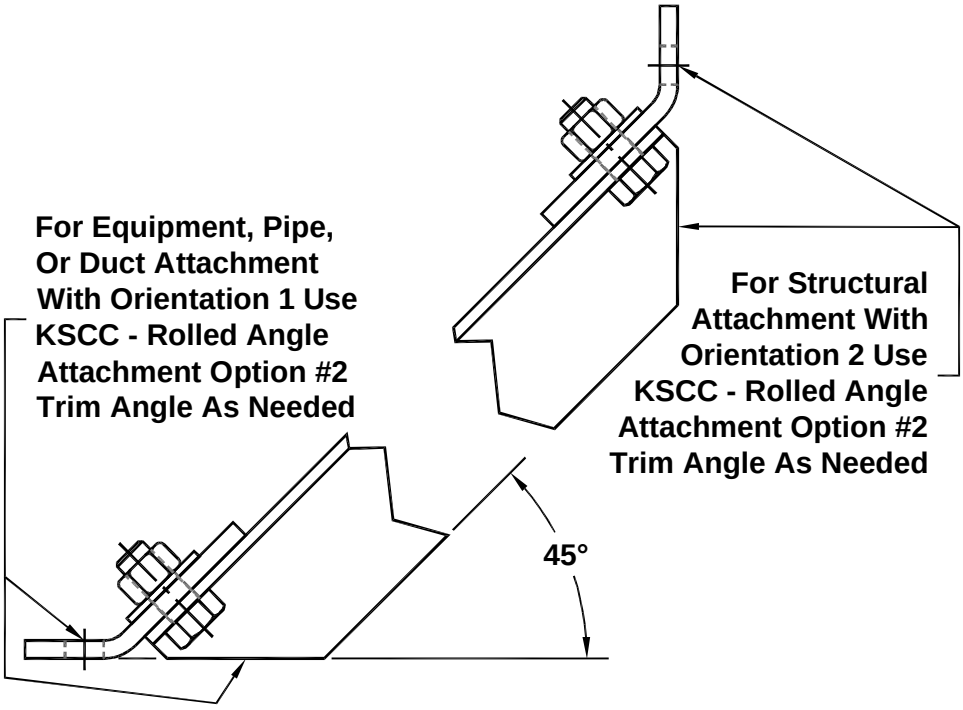


Figure I7-42; KSCC Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #6

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

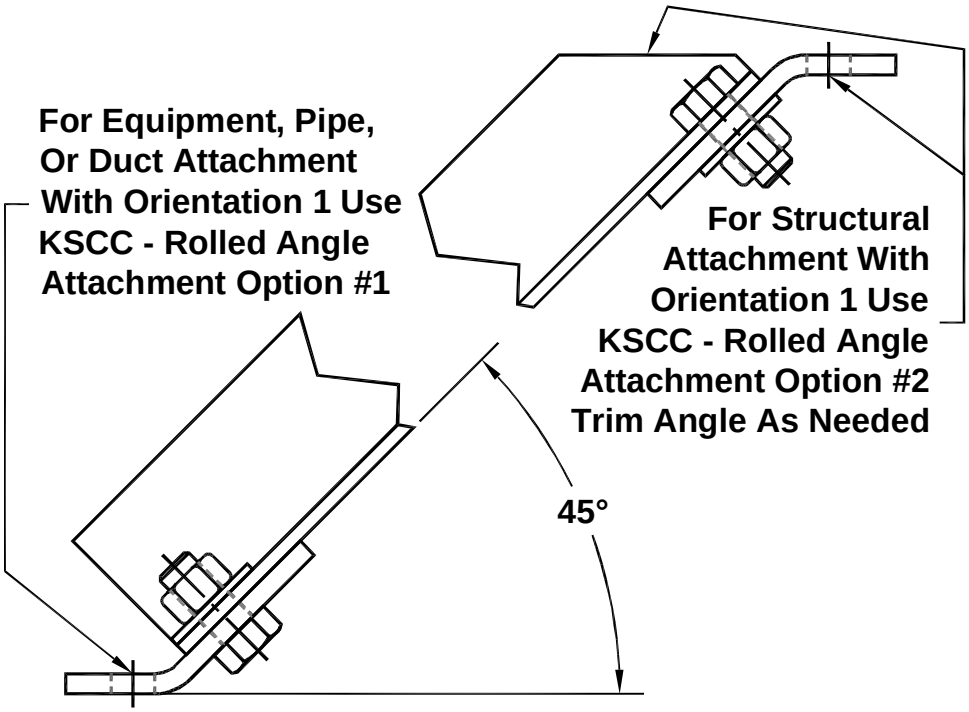


Figure I7-43; KSCC Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #7

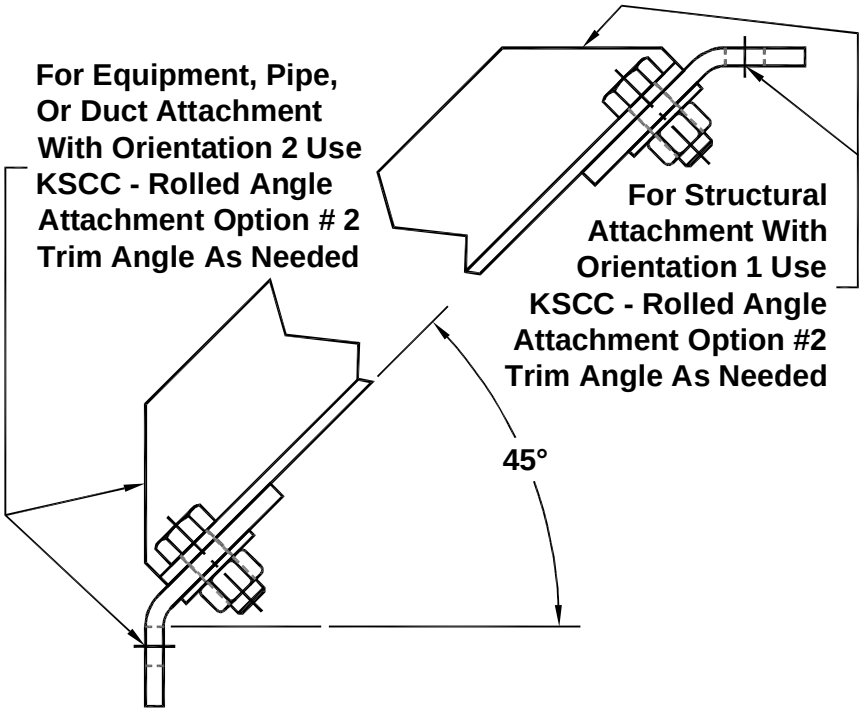


Figure I7-44; KSCC Brackets – Rolled Angle for Seismic Strut Restraints–General Arrangement #8

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

I7.7 – Attaching KSCA & KSCC Brackets to Schedule 40 IPS Pipe:

Due to the nature of pipe, it will be difficult to drill the pipe to accurately locate the KSCA and KSCC brackets, and make the attachment using bolts nuts and washers. Kinetics Noise Control recommends that the attachment of the KSCA brackets to schedule 40 IPS pipe be made by welding. The weld attachment details for the KSCA bracket are shown in Figure I7-45. The weld size and length specified will generate the full capacity of the restraints recommended by Kinetics Noise Control when the appropriate schedule 40 IPS pipe has been selected fro Table I7-6 according to the instructions outlined in Section I7.2 – Using the Restraint Designation Symbol to Select Struts. It is not possible to weld the KSCC brackets to the schedule 40 IPS pipes shown in Table I7-6 securely enough to generate the full rated capacity of the restraints recommended by Kinetics Noise Control. This is due to the wall thickness of the pipe, and the possible length of contact between the pipe and the KSCC brackets. ***Therefore, Kinetics Noise Control does not recommend using the KSCC brackets for strut type restraints fabricated from schedule 40 IPS pipe***.

There are four basic general arrangements possible for attaching KSCA brackets to schedule 40 IPS pipe. These options are shown in Figures I7-46, I7-47, I7-48, and I7-49. All of these options may require that the pipe be trimmed to clear the structure, pipe, duct, or trapeze bar.

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

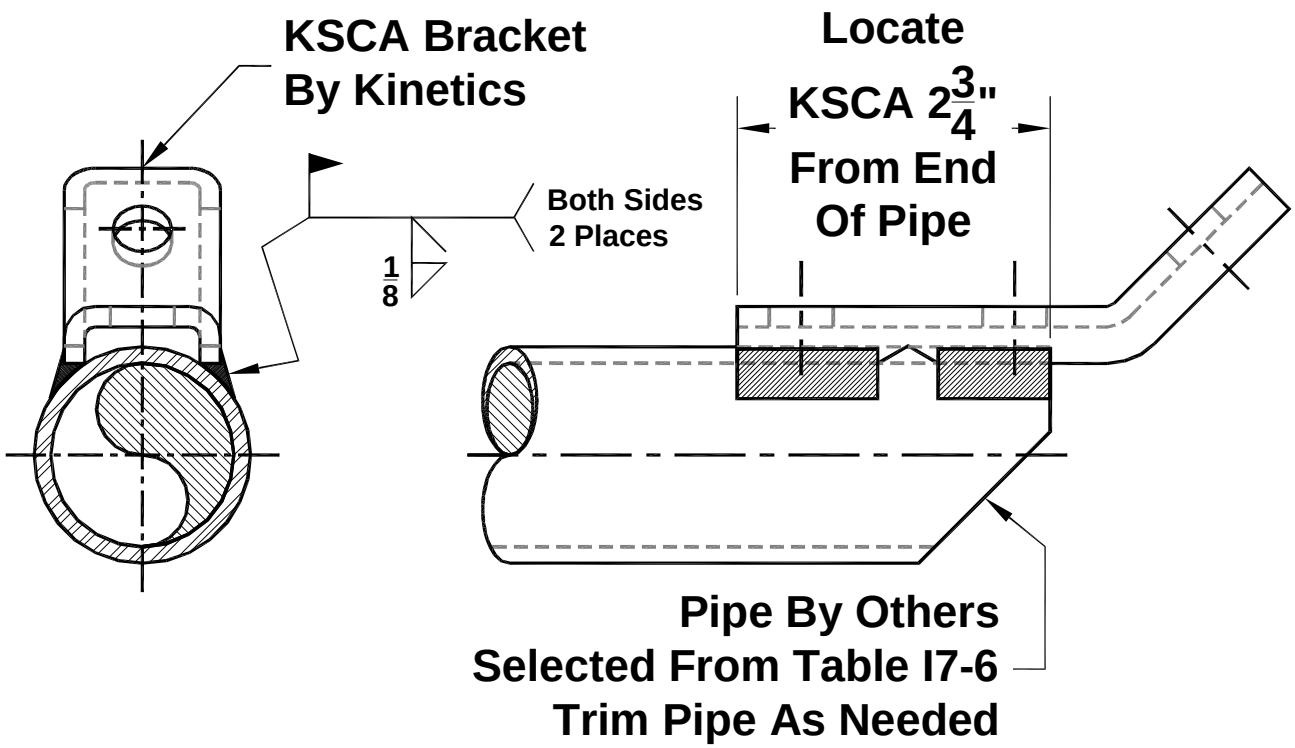


Figure I7-45; Weld Attachment of KSCA Bracket to Schedule 40 IPS Pipe

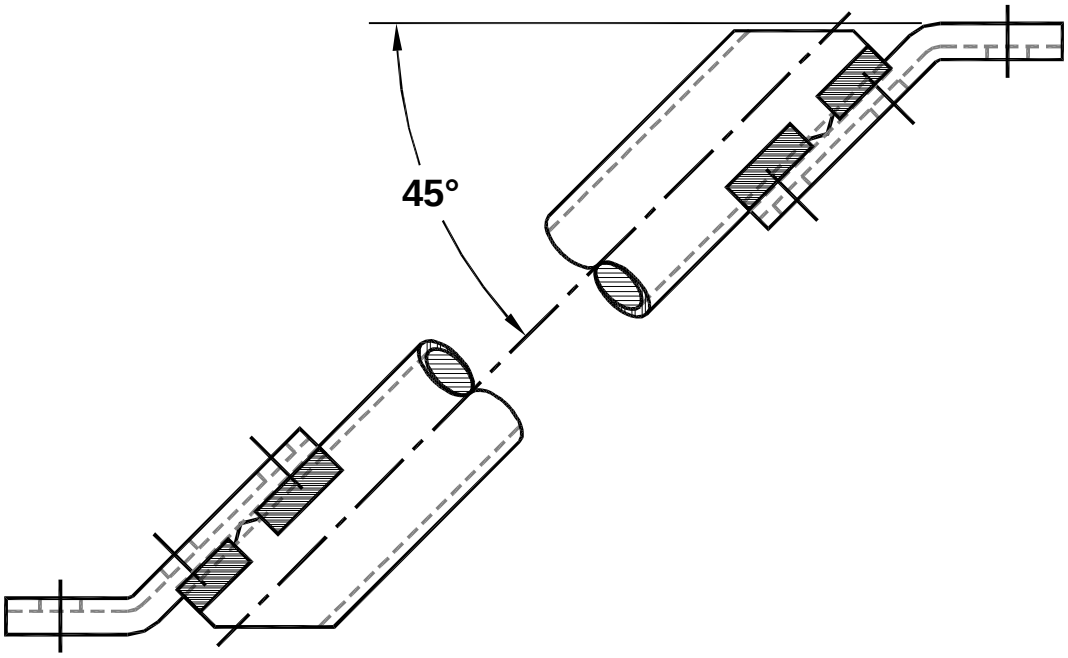


Figure I7-46; KSCA Brackets – Pipe for Seismic Strut Restraints–General Arrangement #1

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

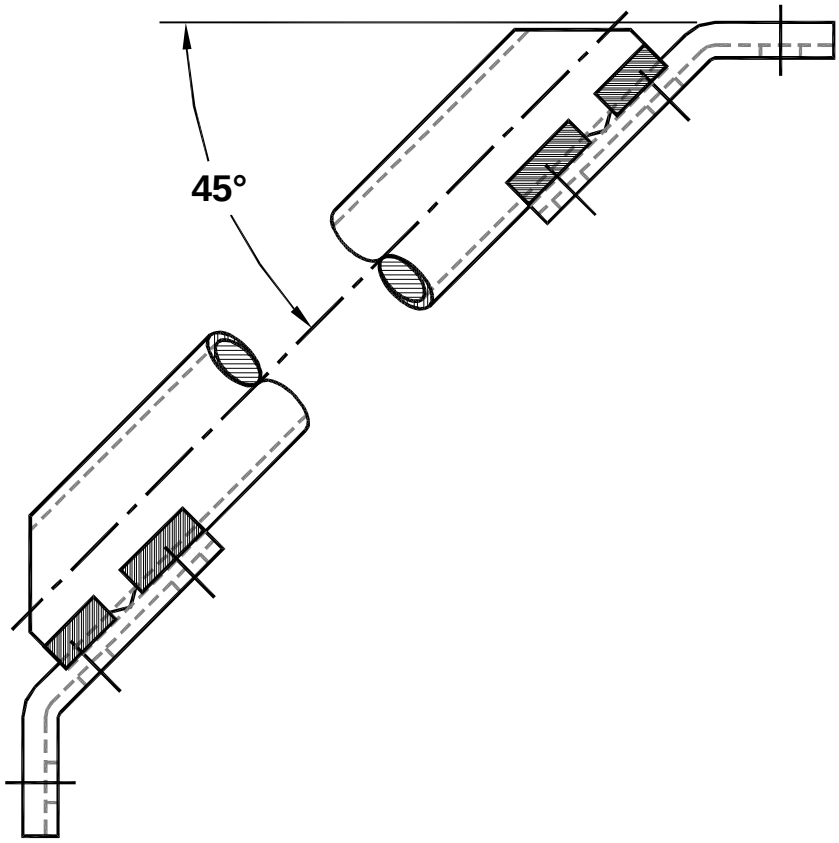


Figure I7-47; KSCA Brackets – Pipe for Seismic Strut Restraints–General Arrangement #2

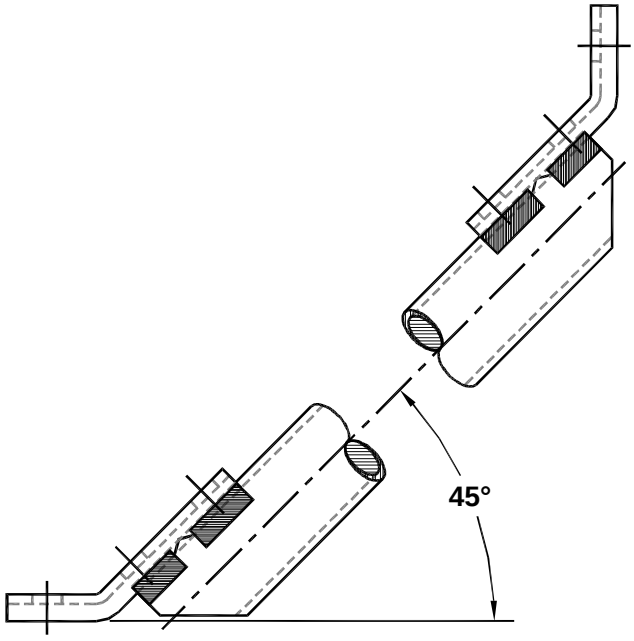


Figure I7-48; KSCA Brackets – Pipe for Seismic Strut Restraints–General Arrangement #3

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

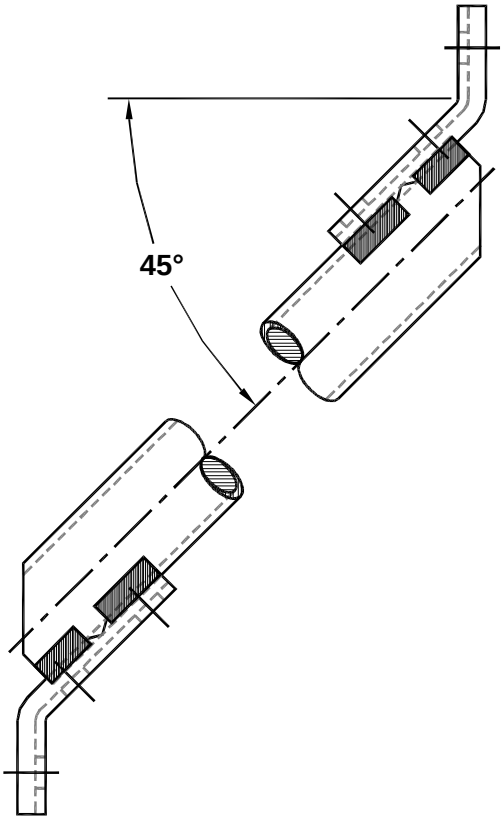


Figure I7- 49; KSCA Brackets – Pipe for Seismic Strut Restraints–General Arrangement #4

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

I7.8 – Strut Restraint Schematics for Piping:

Sheet H – View C shown in Figure I7-50 will be typical of the other figures in this section. They refer to the drawing sheet and view on the installation drawings provided by Kinetics Noise Control for each project requiring seismic restraint for pipe and duct systems.

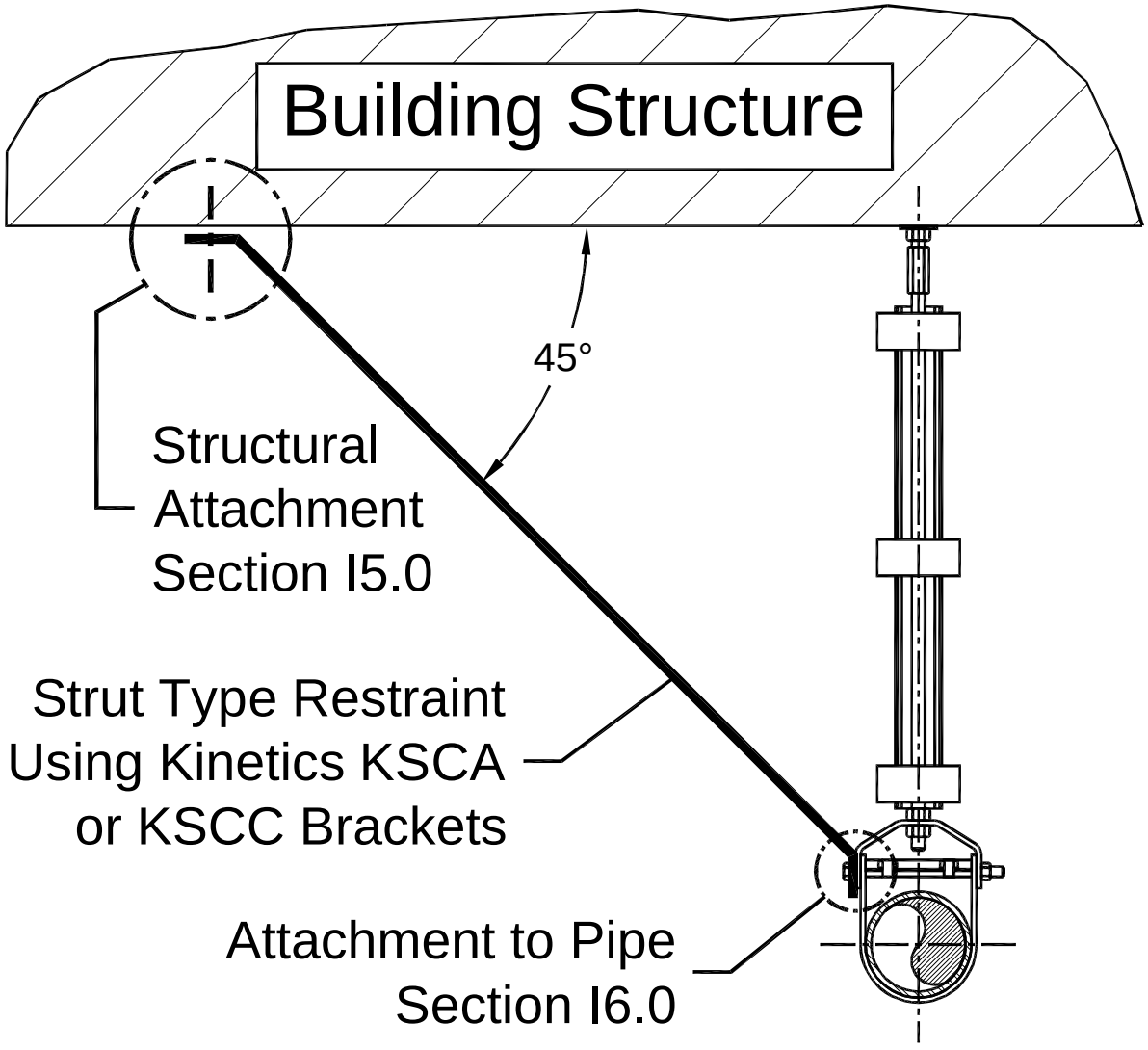


Figure I7-50; Transverse (T) Strut Type Restraint Schematic for Single Clevis Supported Pipe – Strut Type Restraint Attached to Clevis Hanger

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

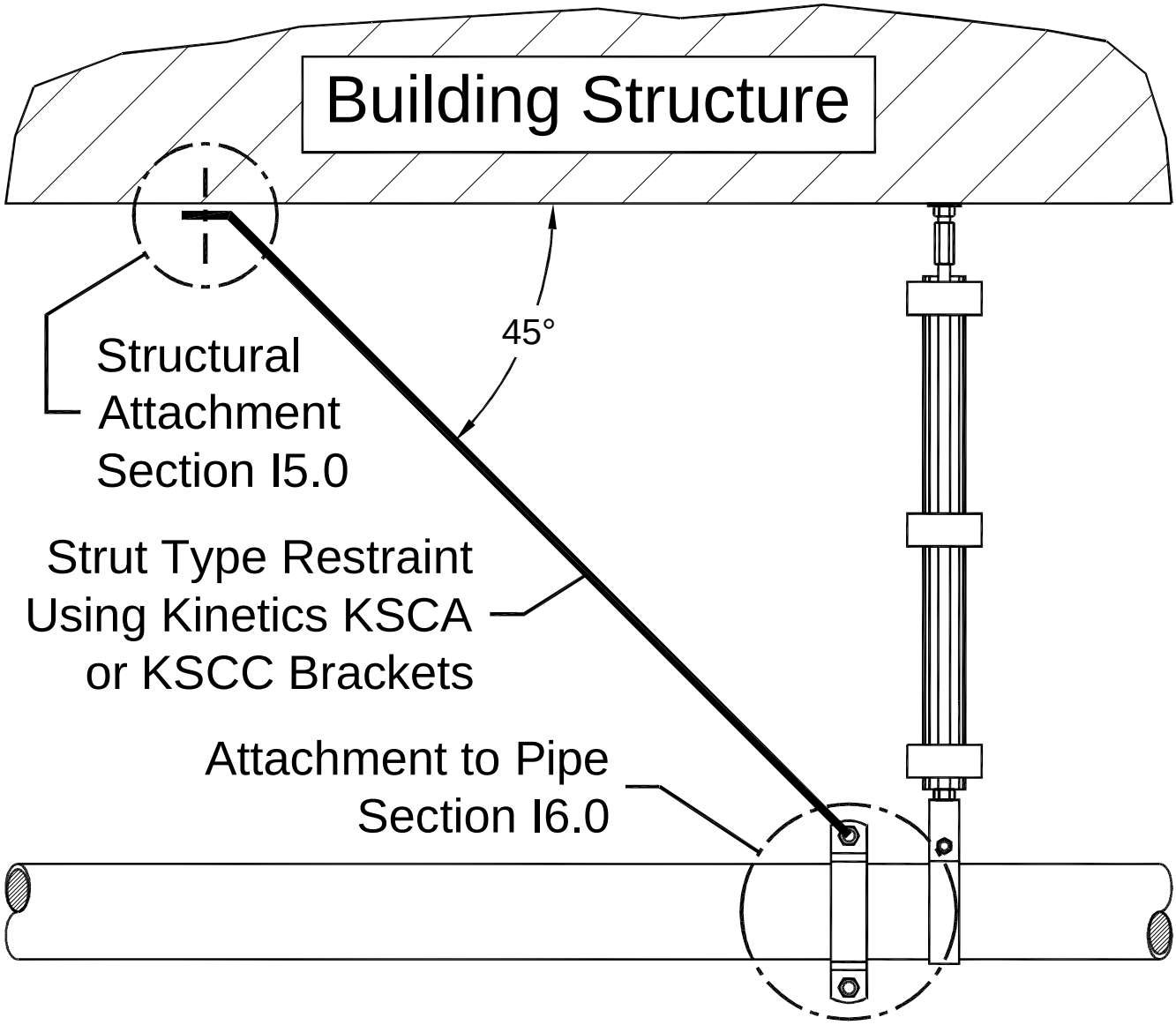
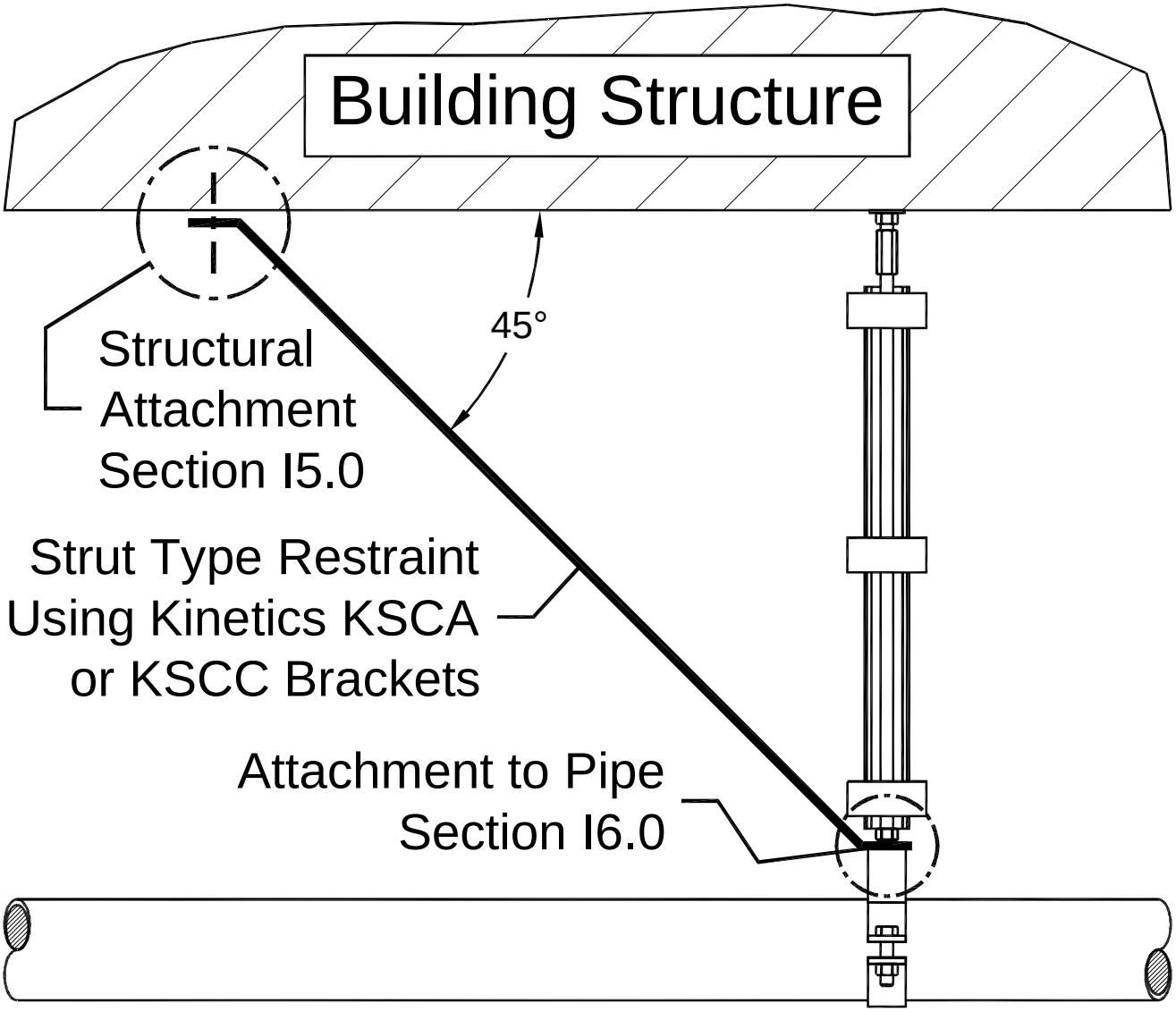


Figure I7-51; Longitudinal (L) Strut Type Restraint Schematic for Single Clevis Supported Pipe – Strut Type Restraint Attached to a Pipe Riser Clamp Immediately Adjacent to the Clevis Hanger

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com



Sheet H - View A

Figure I7-52; Longitudinal (L) Strut Type Restraint Schematic for Single Clevis Supported Pipe – Strut Type Restraint Attached to a Clamp Type Clevis Hanger

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada

Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

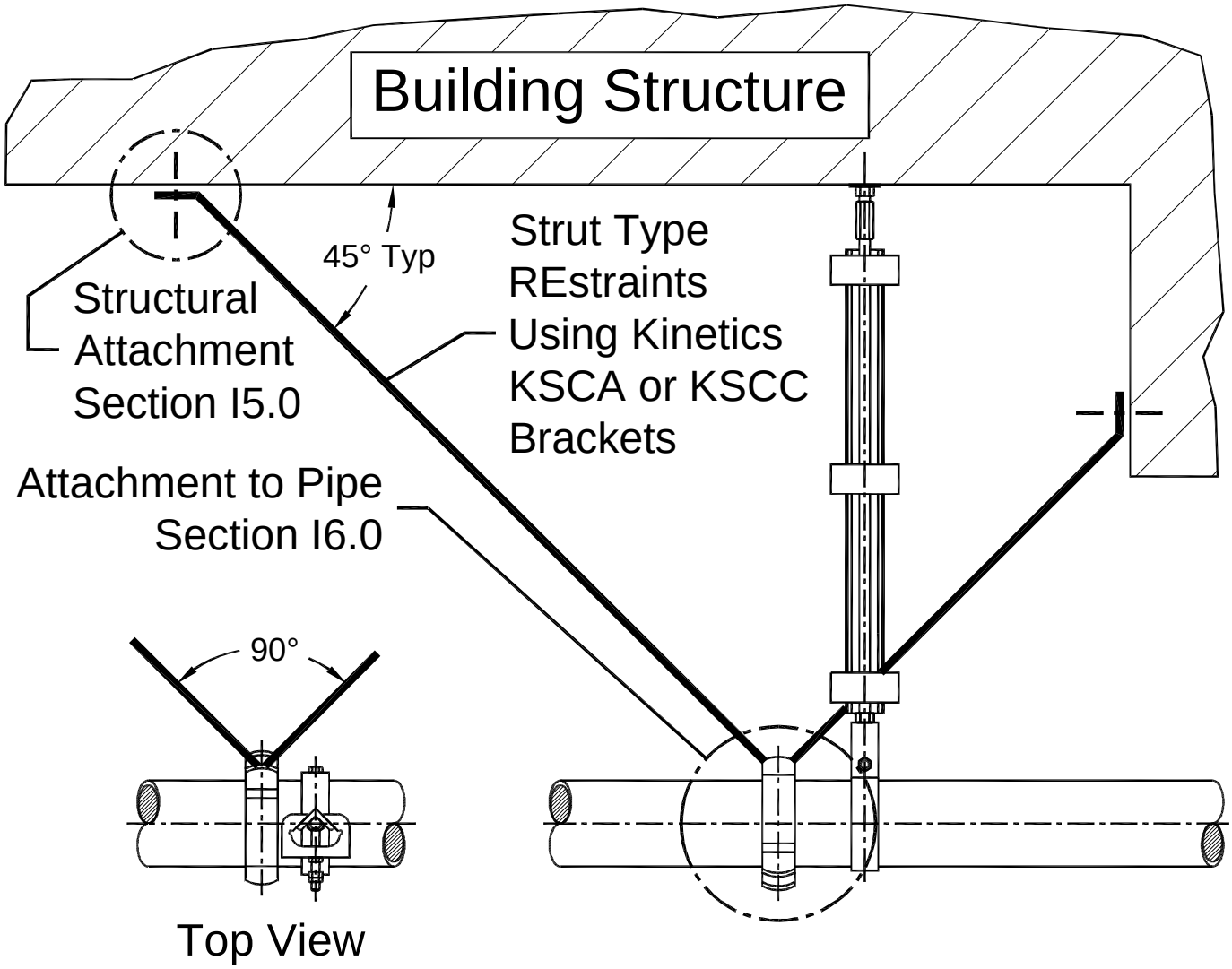


Figure I7-53; Combined Transverse & Longitudinal (TL) Strut Type Restraint Schematic for Single Clevis Supported Pipe – Strut Type Restraints Attached to a Pipe Riser Clamp Immediately Adjacent to the Clevis Hanger

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

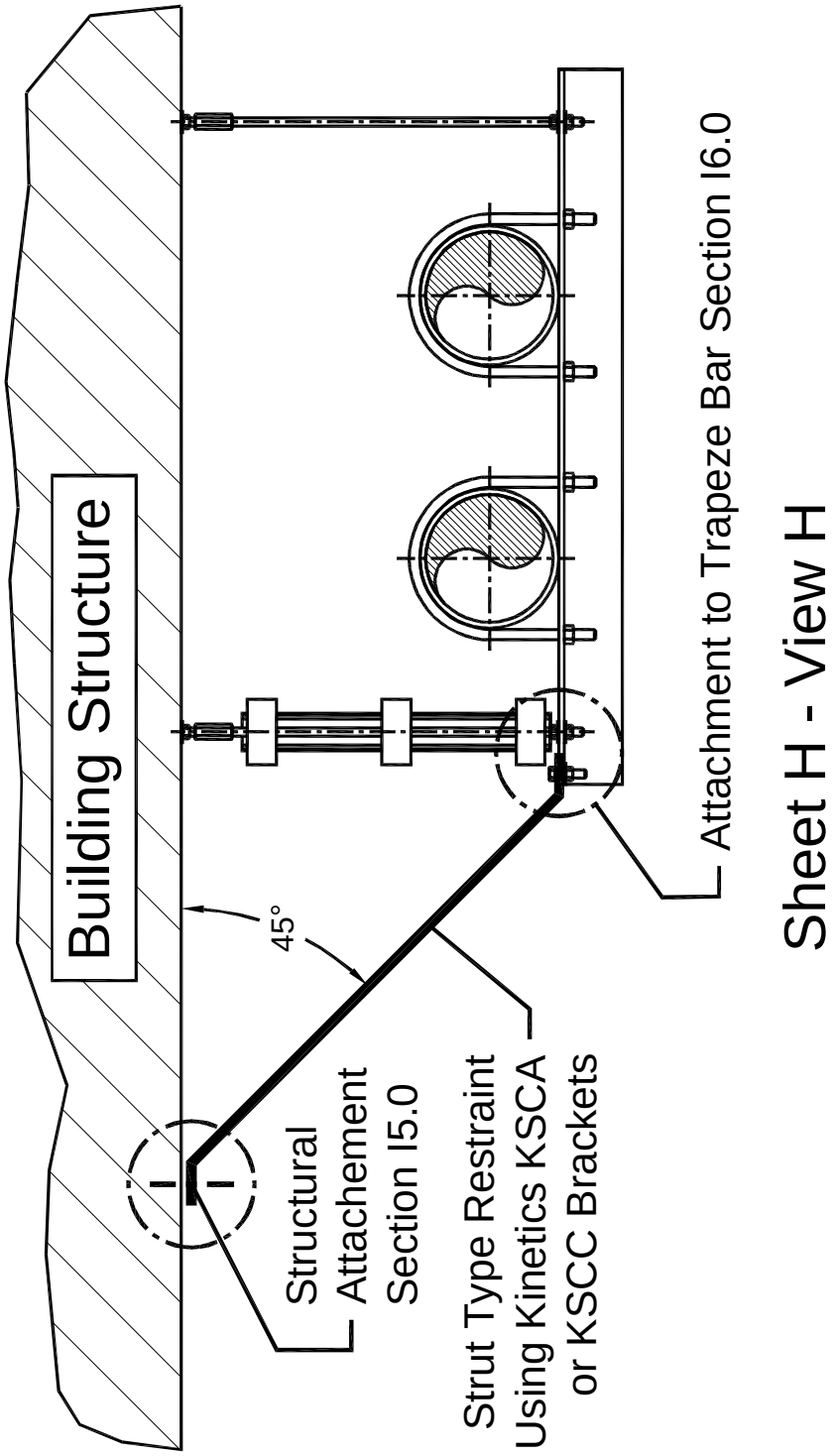


Figure I7-54; Transverse (T) Strut Type Restraint Schematic for Trapeze Supported Pipe – Strut Type Restraint Attached to One End, or One Hanger Rod, of the Trapeze Bar and Directed Outside the Trapeze

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

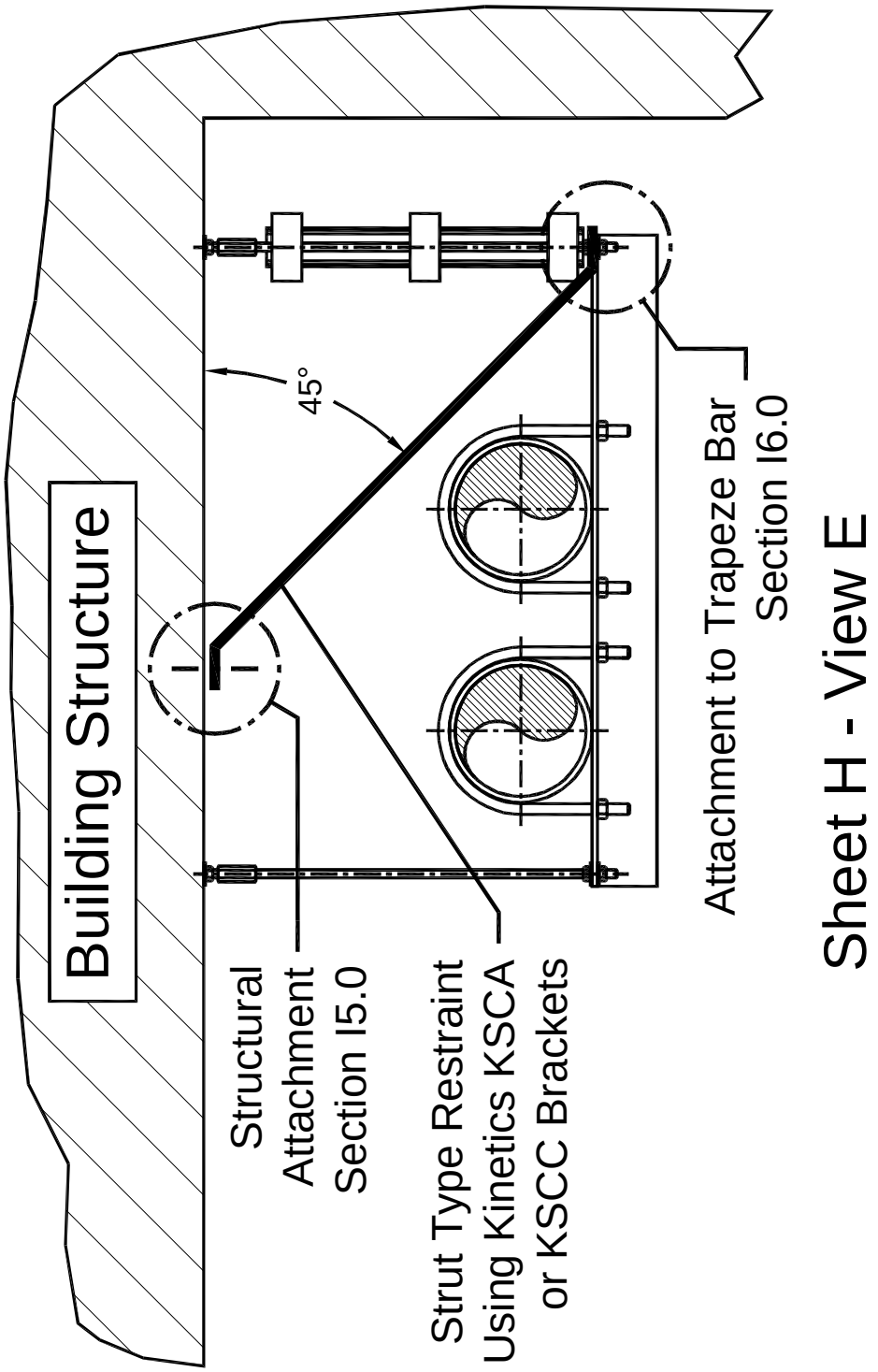


Figure I7-55; Transverse (T) Strut Type Restraint Schematic for Trapeze Supported Pipe – Strut Type Restraint Attached to One End, or One Hanger Rod, of the Trapeze Bar and Directed Inside the Trapeze

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

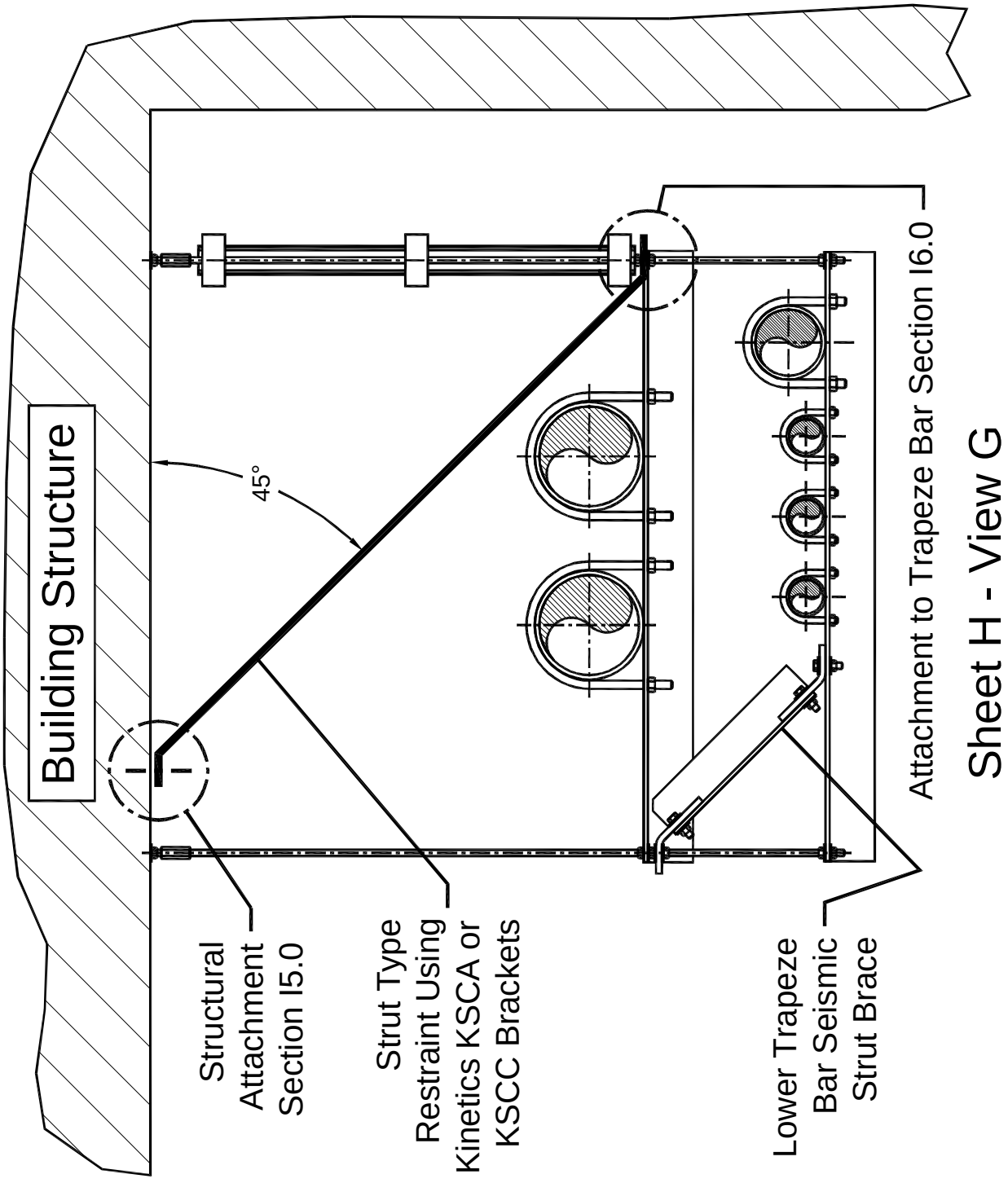


Figure I7-56; Transverse (T) Strut Type Restraint Schematic for Trapeze Supported Pipe – Strut Type Restraint Attached to One End, or One Hanger Rod, of the Trapeze Bar and Directed Inside the Trapeze with a Second Tier Trapeze Support for Additional Pipes

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

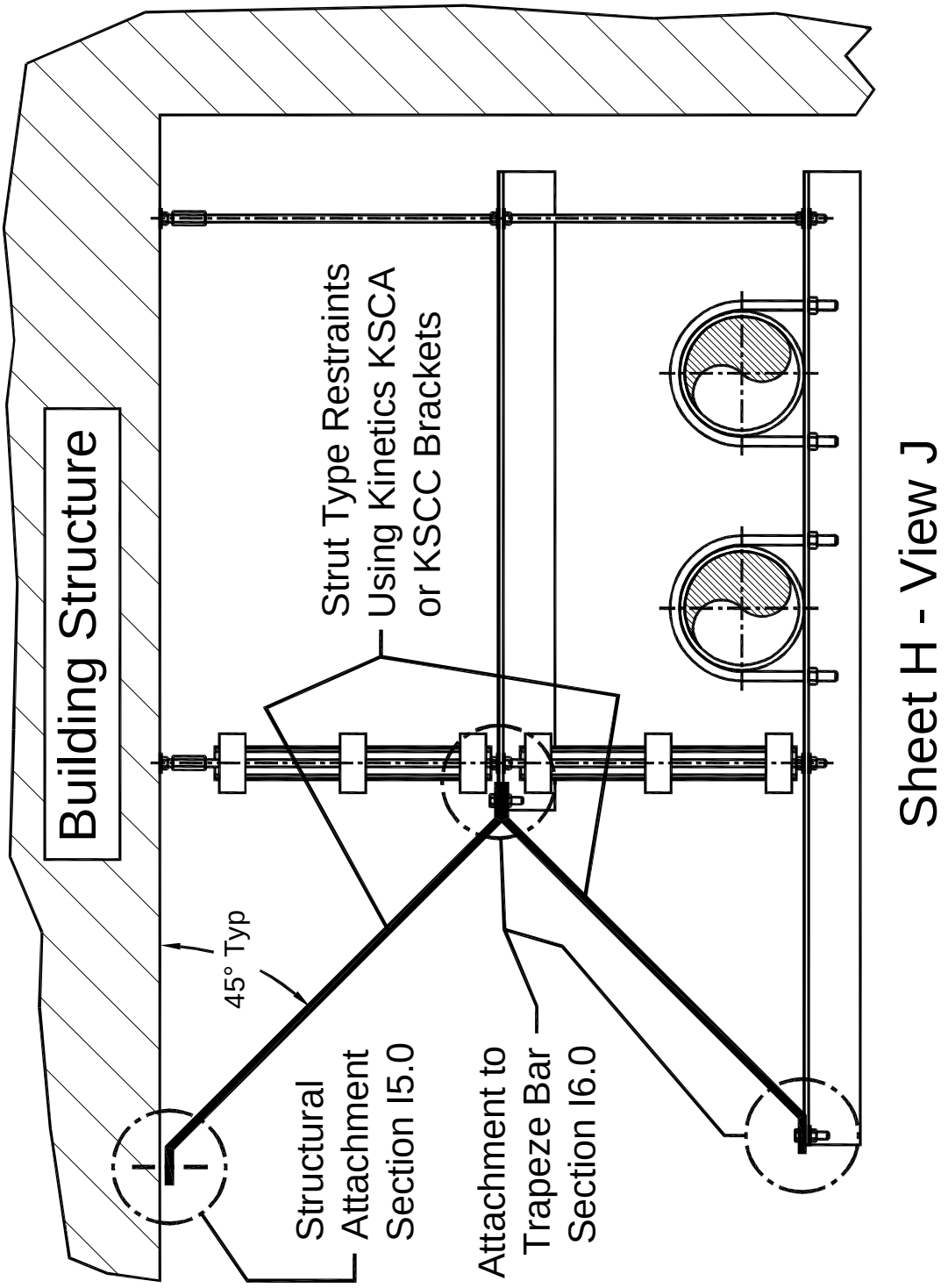


Figure I7-57; Transverse (T) Strut Type Restraint Schematic Arrangement for Trapeze Supported Pipe – Strut Type Restraints Attached to One End, or One Hanger Rod, of the Trapeze Bar and Directed Outside the Trapeze Bar for Use in Tight Space Situations

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

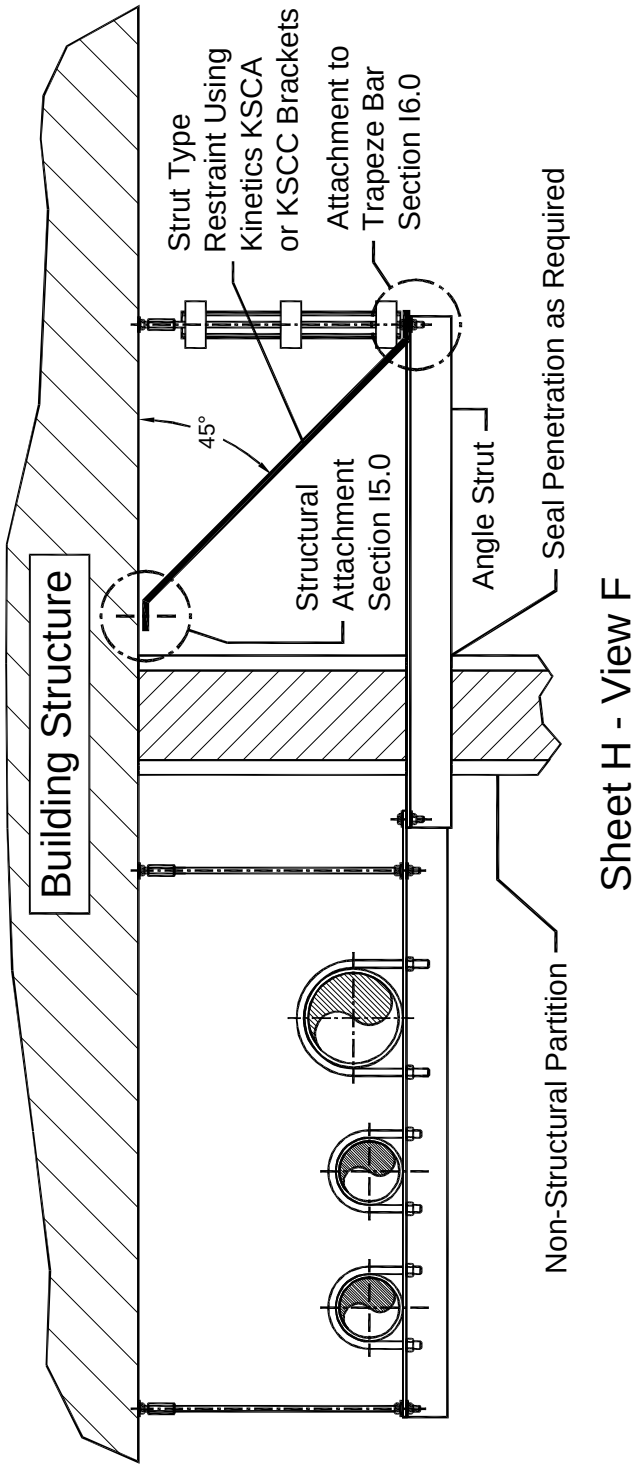
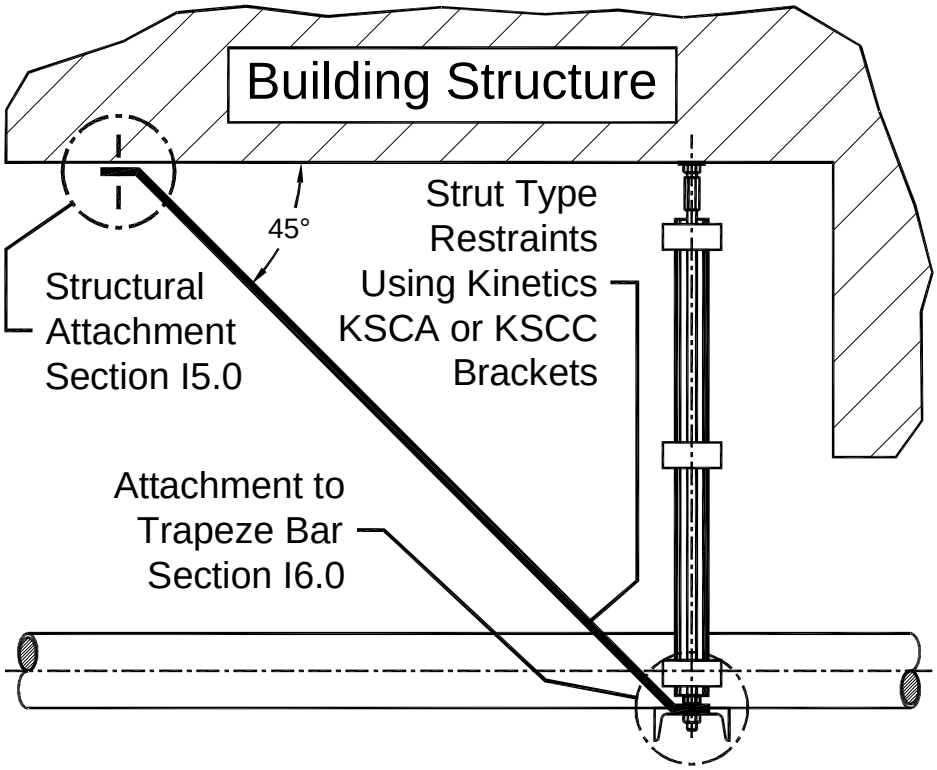
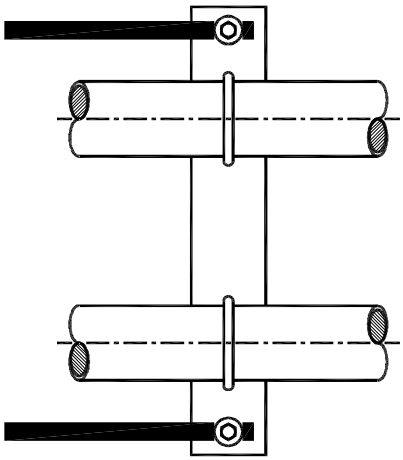


Figure I7-58; Transverse (T) Strut Type Restraint Schematic for Trapeze Supported Pipe – Trapeze Bar is Too Close to a Wall to Allow a Normal Restraint Arrangement – Obtain Permission from the Structural Engineer and Architect Before Penetrating the Wall

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com



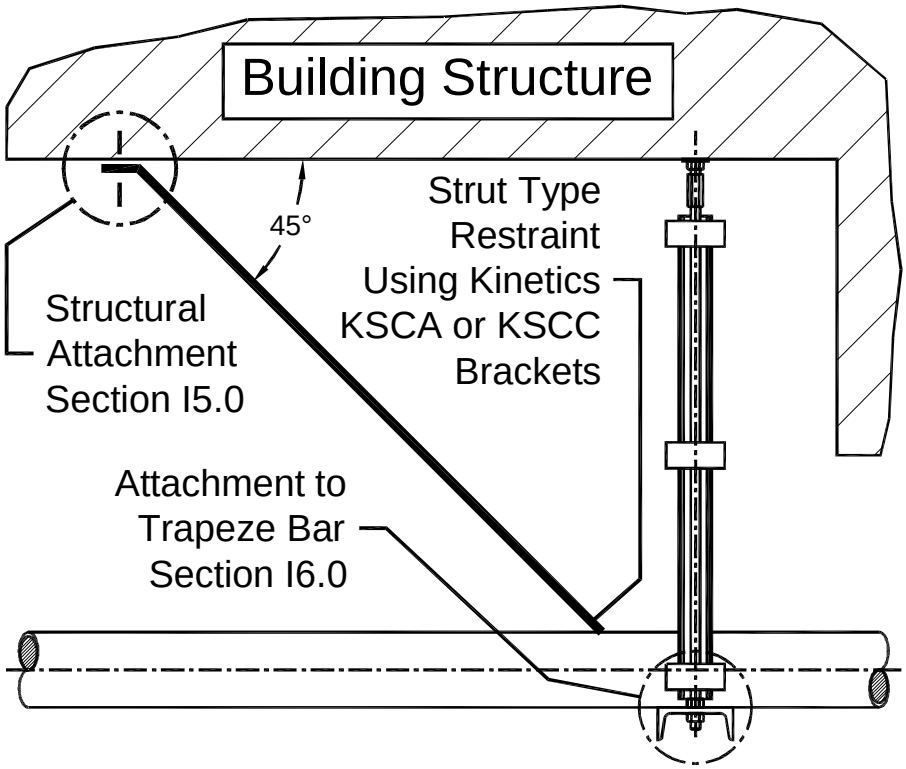
Sheet H - View K
Side View Opt. #1



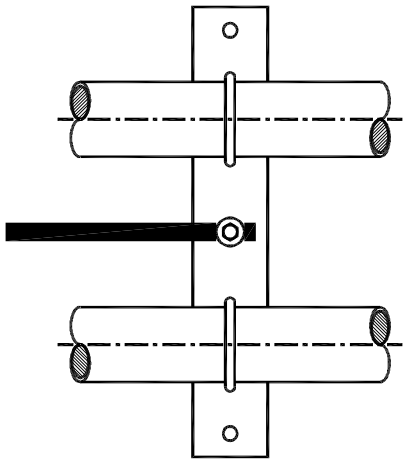
Top View Opt. #1

Figure I7-59; Longitudinal (L) Cable Restraint Schematic for Trapeze Supported Pipe – Option #1 – Restraint Forces are Balanced Side-to-Side

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com



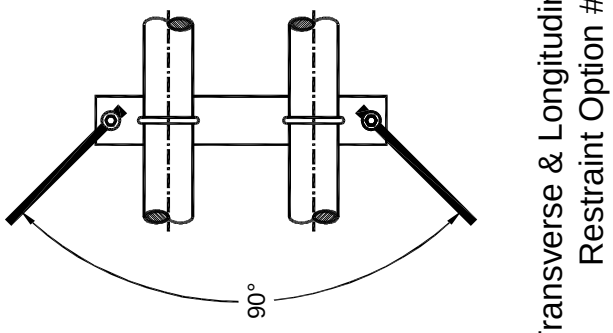
Sheet H - View K
Side View Opt. #2



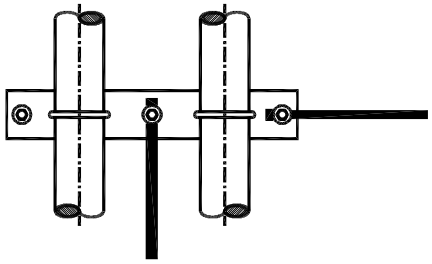
Top View Opt. #2

Figure I7-60; Longitudinal (L) Cable Restraint Schematic for Trapeze Supported Pipe – Option #2 – Restraint Forces are Balanced Side-to-Side

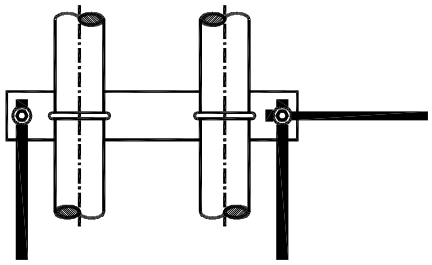
KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com



Transverse & Longitudinal (TL) Restraint Option #3



Transverse & Longitudinal (TL) Restraint Option #2



Transverse & Longitudinal (TL) Restraint Option #1

Figure I7-61; Combined Transverse & Longitudinal (TL) Strut Type Restraints for Trapeze Supported Pipe – All of the Options Shown Provide Balanced Longitudinal Restraint Forces Side-to-Side

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

I7.9 – Strut Restraint Schematics for Duct:

Sheet H1 – View A shown in Figure I7-62 will be typical of the other figures in this section. They refer to the drawing sheet and view on the installation drawings provided by Kinetics Noise Control for each project requiring seismic restraint for pipe and duct systems.

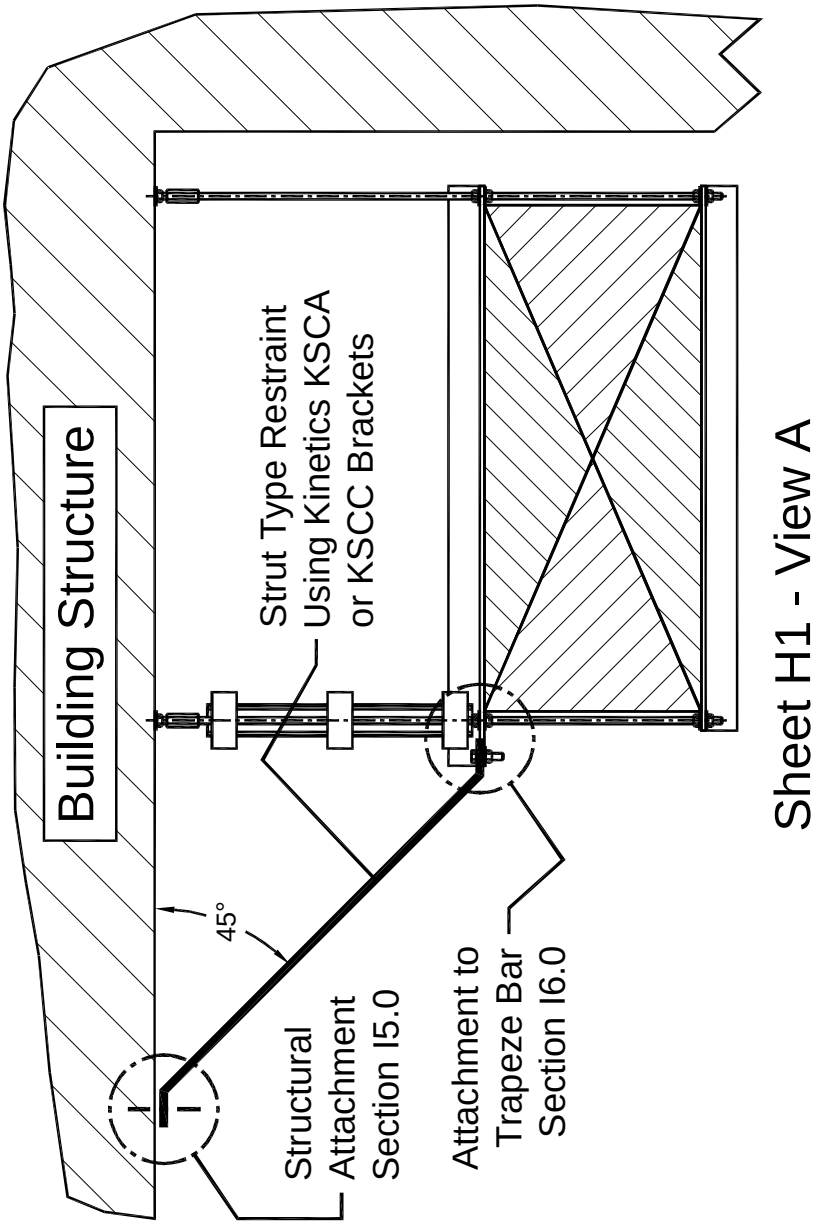


Figure I7-62; Transverse (T) Strut Type Restraint Schematic for Trapped Rectangular Duct – Restraint on Top Trapeze Bar at One Hanger Location Directed Outward from the Trapeze Bar

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

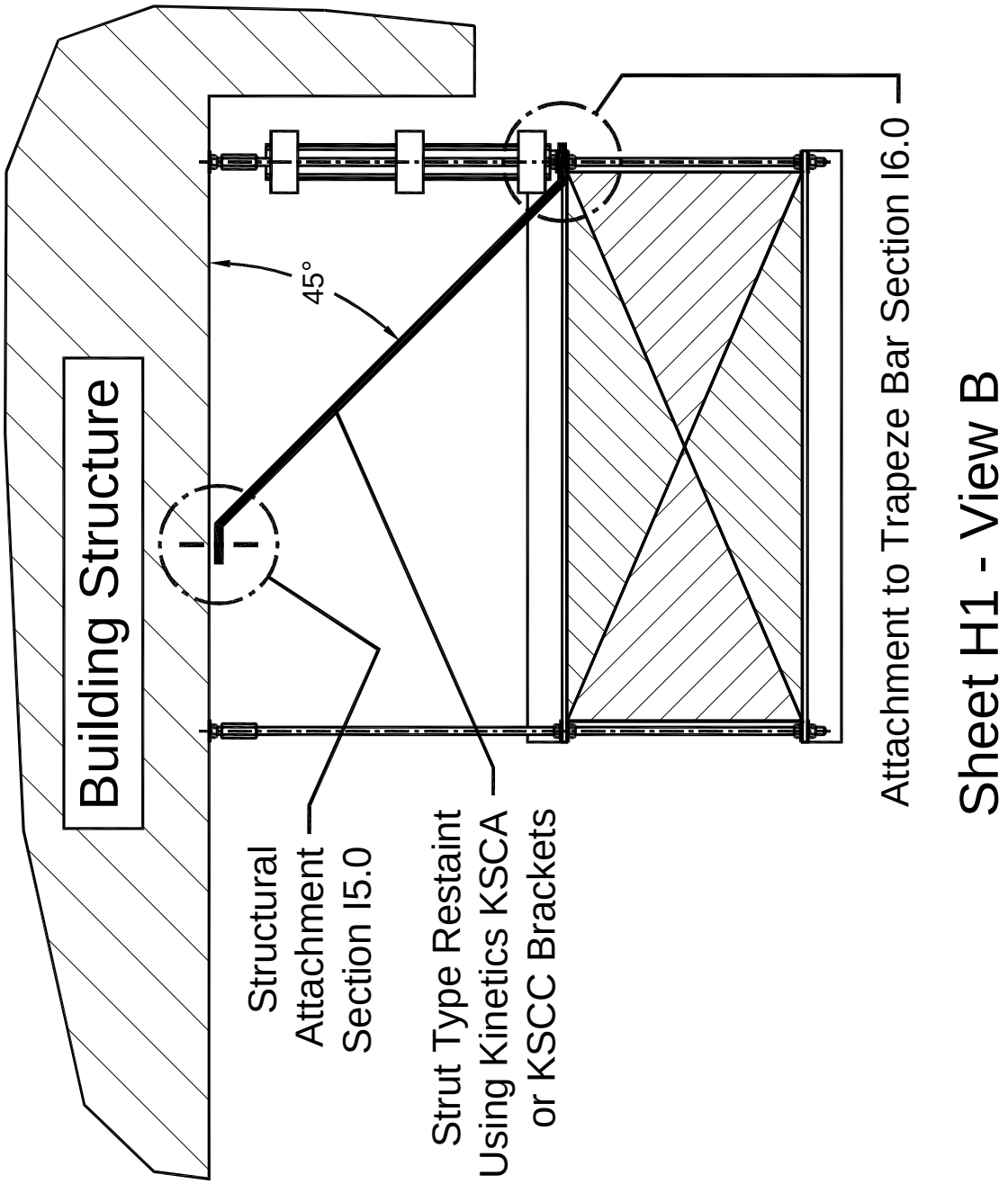


Figure I7-63; Transverse (T) Strut Type Restraint Schematic for Trapped Rectangular Duct – Restraint on Top Trapeze Bar at One Hanger Location Directed Inward Over the Top of the Duct

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

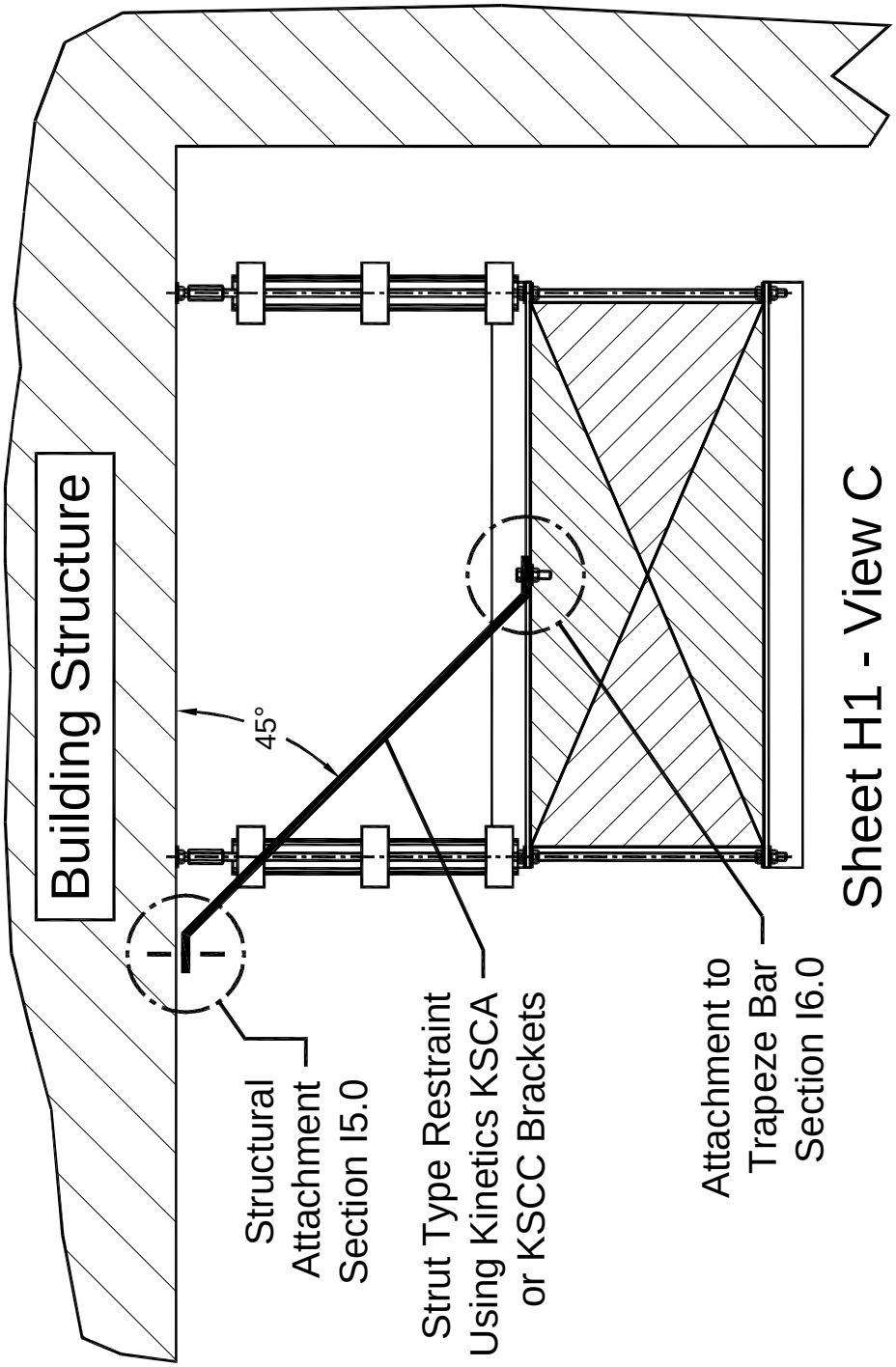


Figure I7-64; Transverse (T) Strut Type Restraint Schematic for Trapped Rectangular Duct – Restraint at the Center of the Top Trapeze Bar and Directed Outward Across the Top of the Duct

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

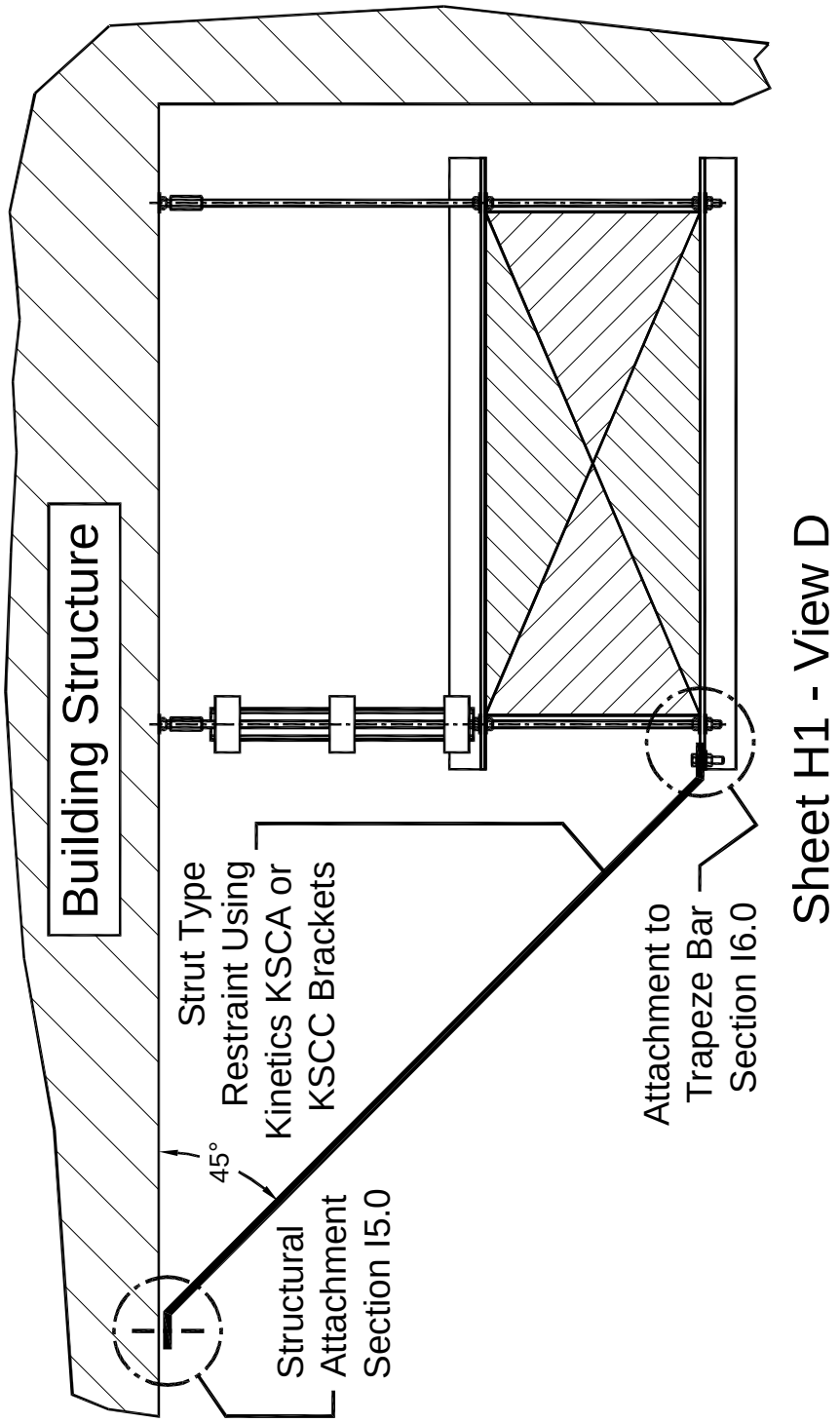


Figure I7-65; Transverse (T) Strut Type Restraint Schematic for Supported Rectangular Duct – Strut Type Restraint Attached to One End, or One Hanger Rod, of the Trapeze Bar and Directed Outward fro the Trapeze Bar

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

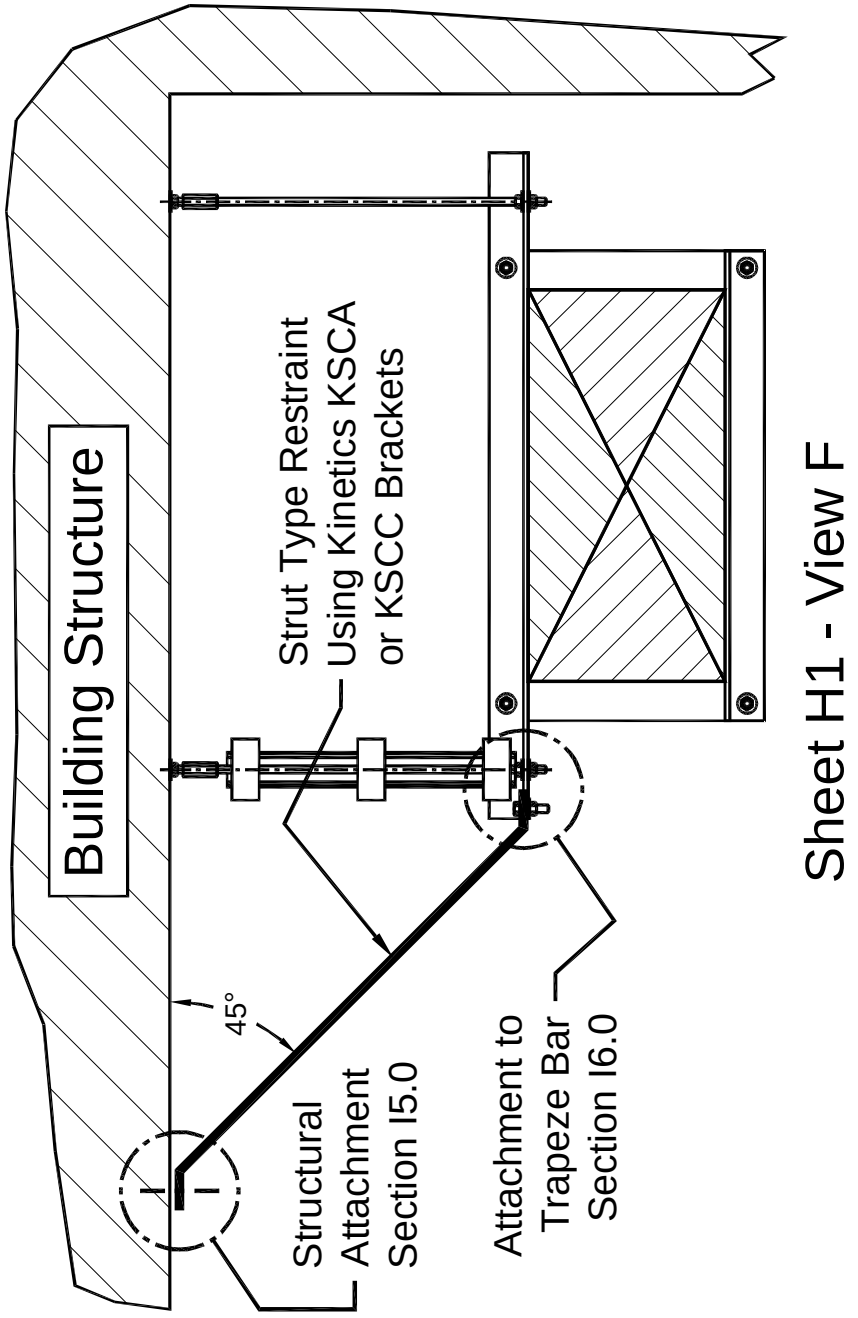


Figure I7-66; Transverse (T) Strut Type Restraint Schematic for Suspended Rectangular Duct – Restraint Attached to One End, or One Hanger Rod, of the Trapeze Bar and Directed Outward from the Trapeze Bar

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

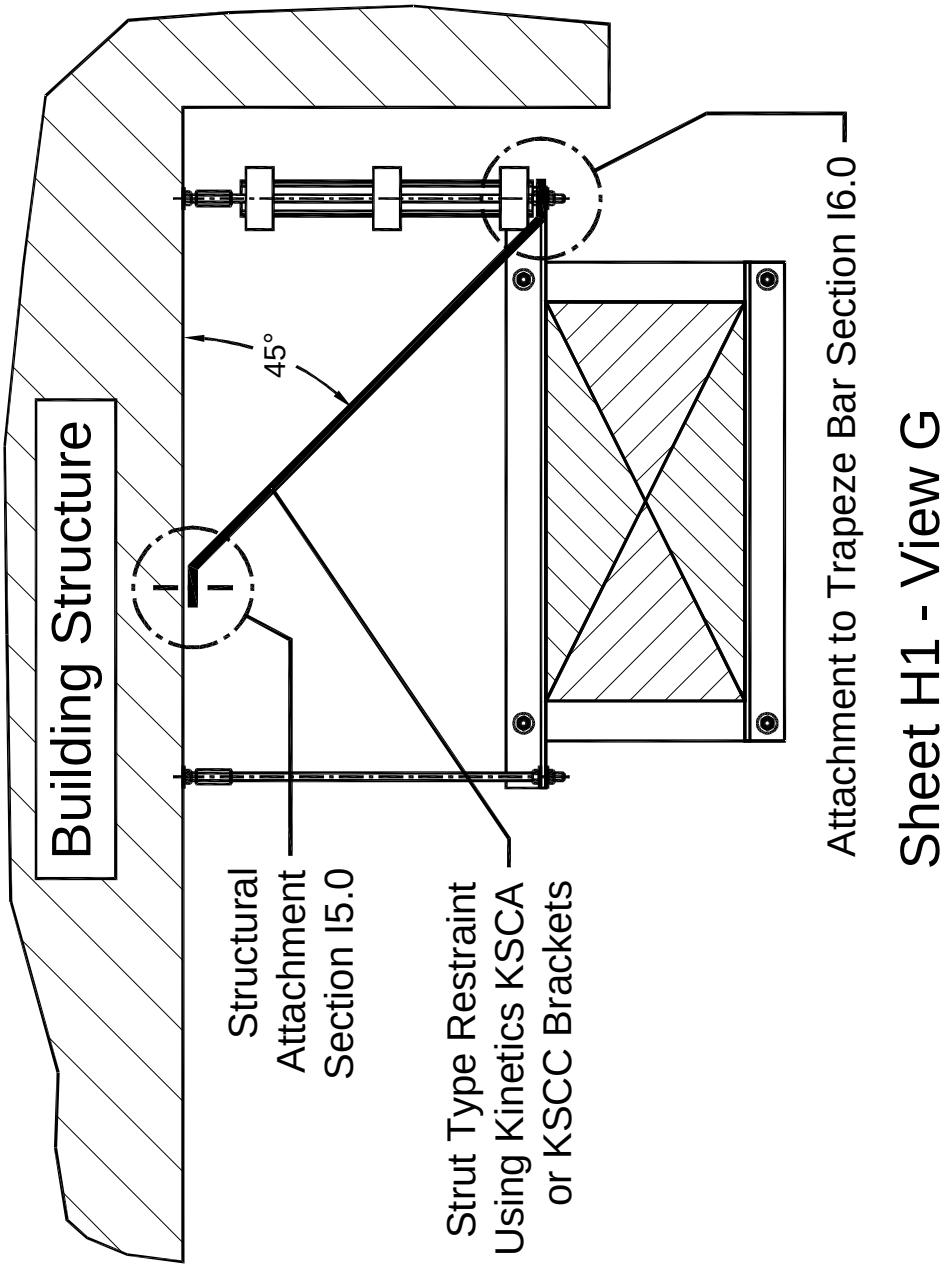


Figure I7-67; Transverse (T) Strut Type Restraint Schematic for Suspended Rectangular Duct – Strut Type Restraint at One Hanger Location and Directed Inward over the Top of the Duct

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

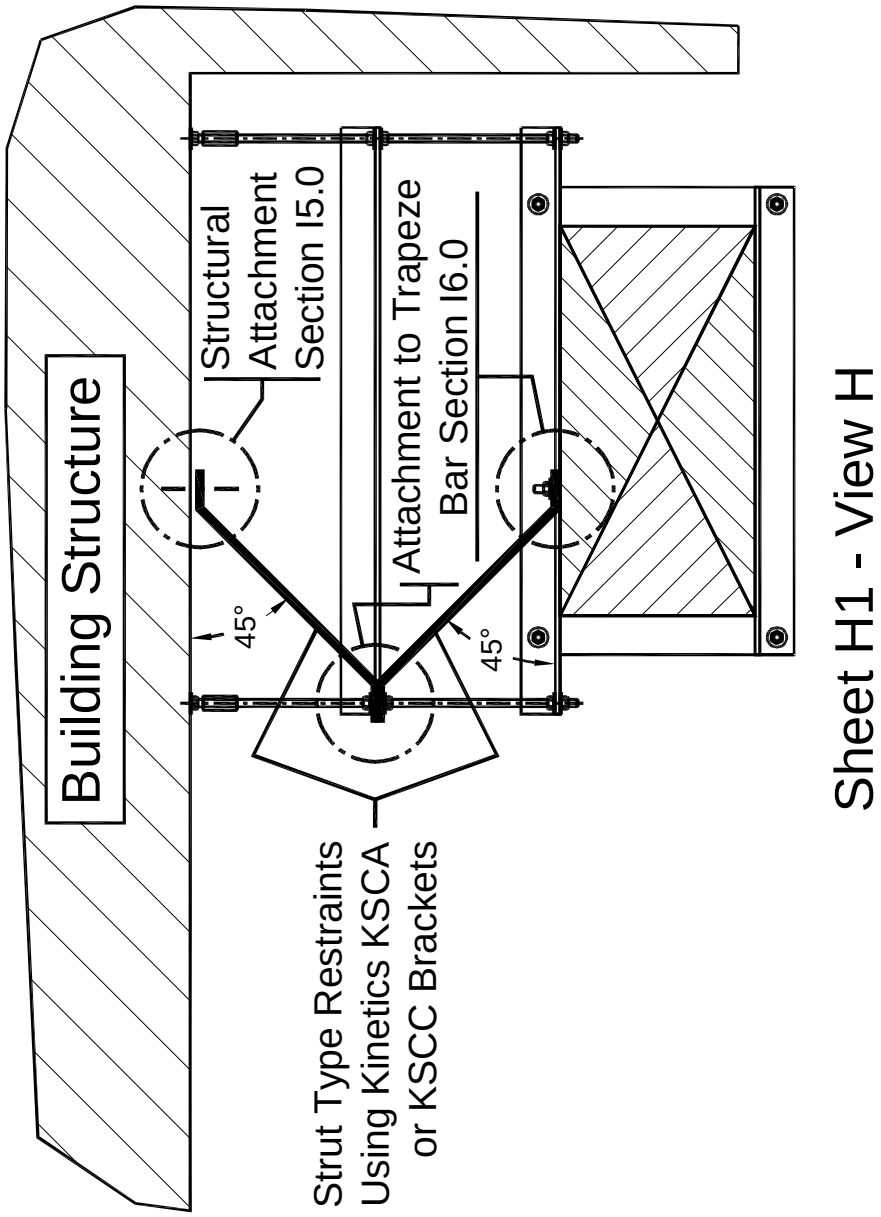


Figure I7-68; Transverse (T) Strut Type Restraint Schematic for Suspended Rectangular Duct – Two Strut Type Restraints Connected Through an Intermediate Trapeze Bar and Directed Inward from the Intermediate Trapeze Bar

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

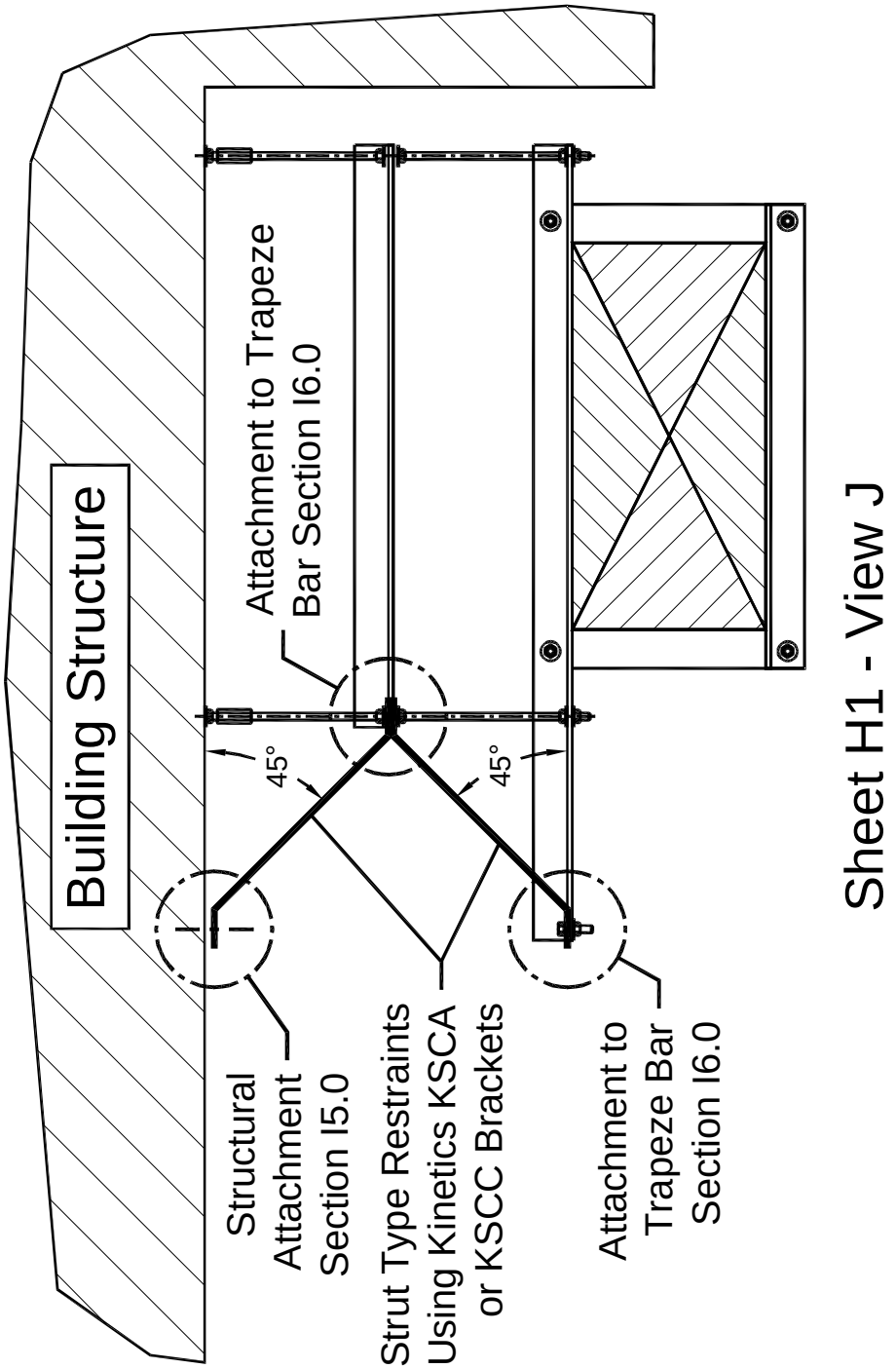


Figure I7-69; Transverse (T) Strut Type Restraint Schematic for Suspended Rectangular Duct – Two Strut Type Restraints Connected Through an Intermediate Trapeze Bar and Directed Outward from the Intermediate Trapeze Bar

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

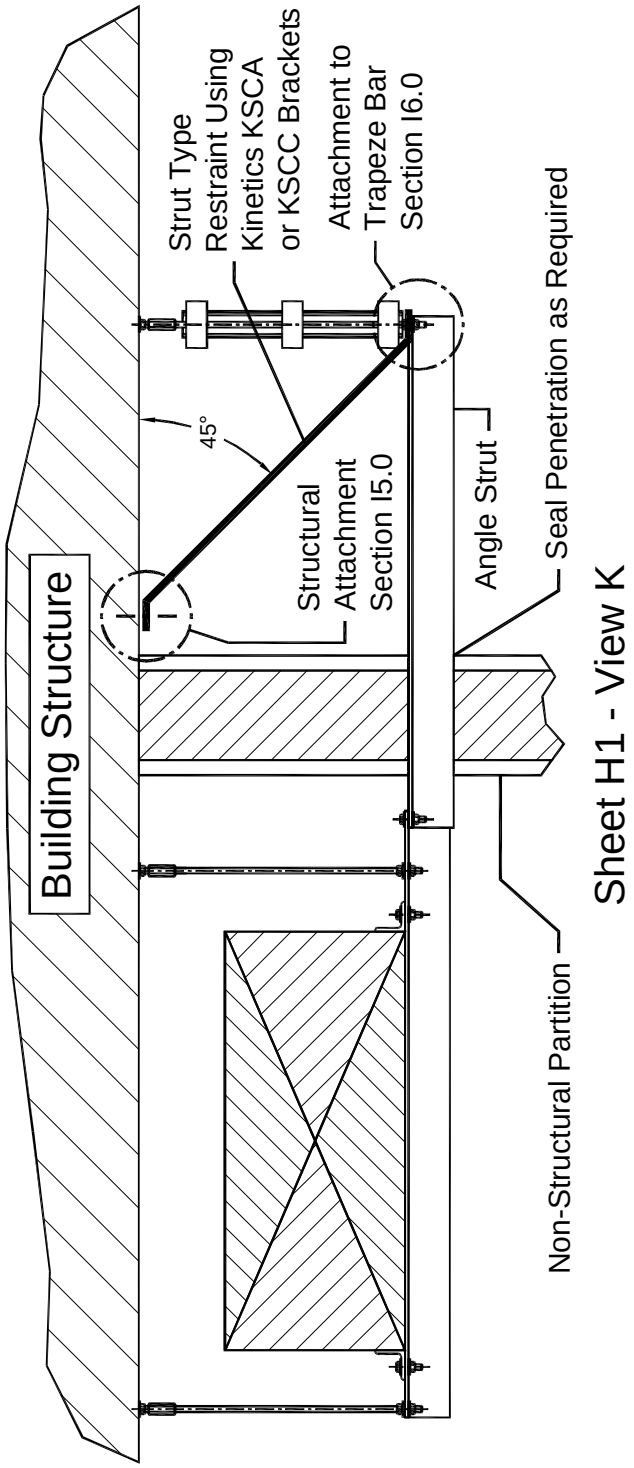


Figure I7-70; Transverse (T) Strut Type Restraint Schematic for Supported Rectangular Duct – Trapeze Bar is Too Close to a Wall to Allow a Normal Restraint Arrangement – Obtain Permission from the Structural Engineer and Architect Before Penetrating the Wall

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

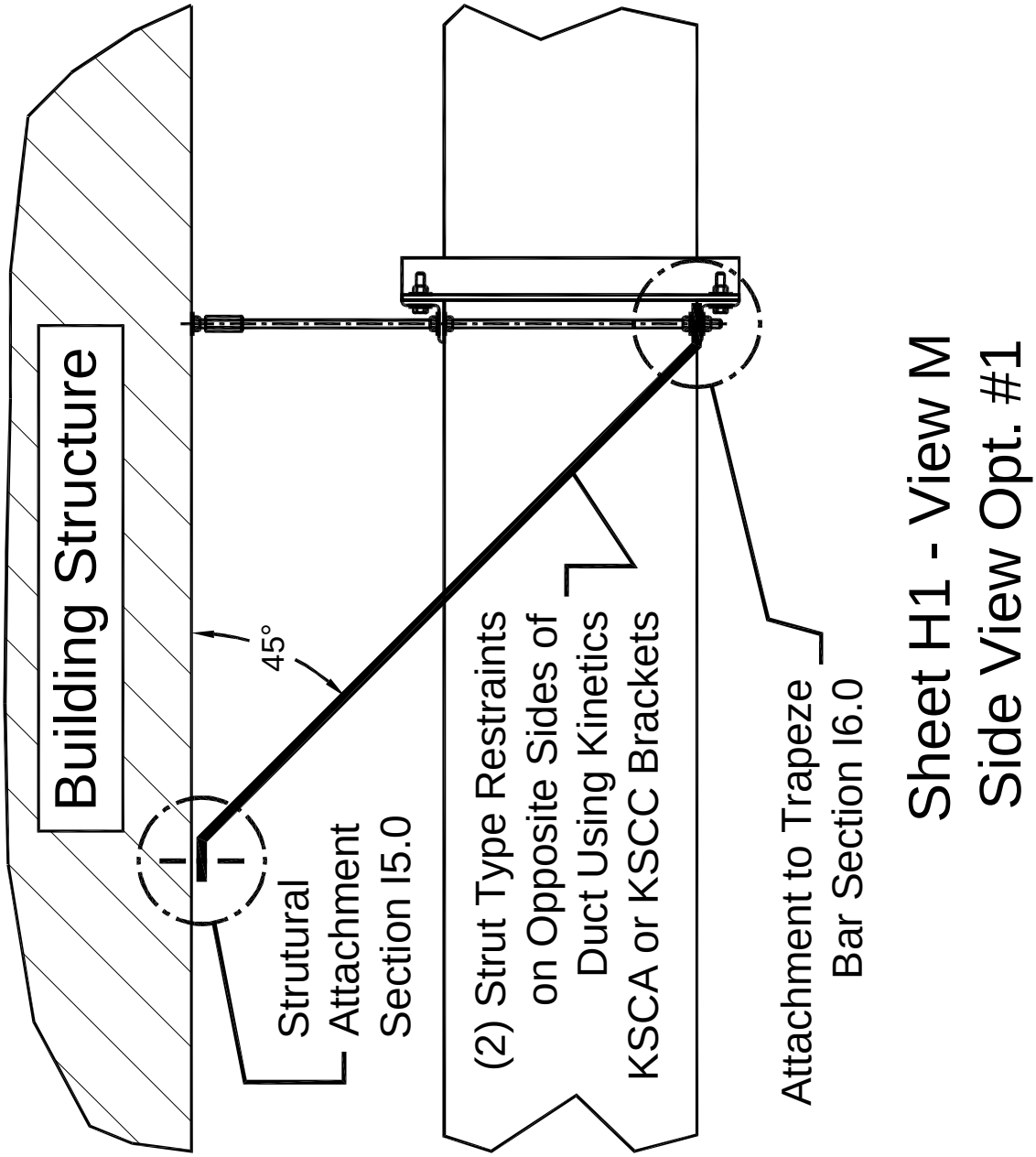


Figure I7-71; Longitudinal (L) Strut Type Restraint Schematic for Rectangular Duct – Restraints Located on Each Side of the Bottom Trapeze Bar

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

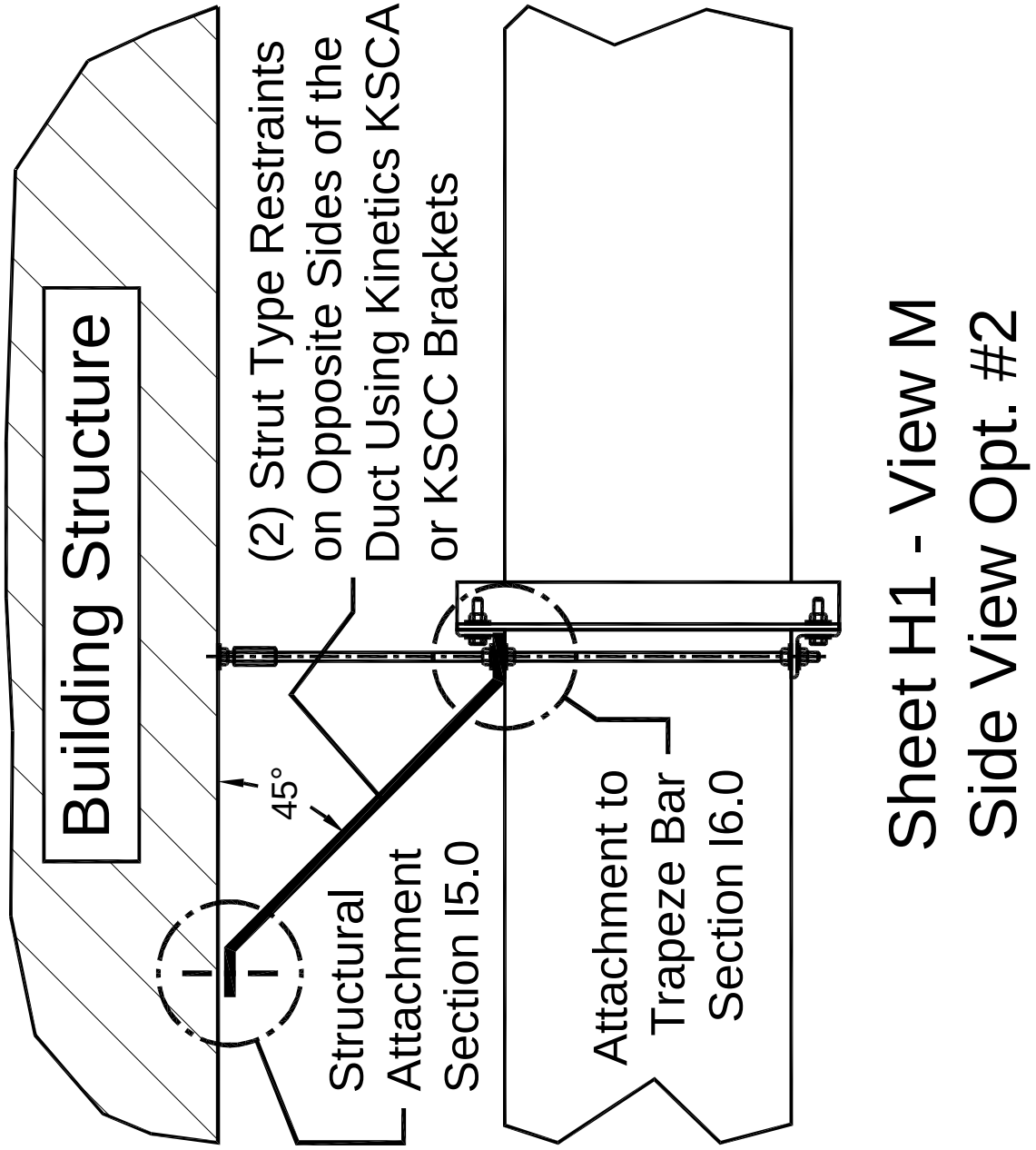


Figure I7-72; Longitudinal (L) Strut Type Restraint Schematic for Trapped Rectangular Duct – One Strut Type Restraints Located in the Center of the Top Trapeze Bar or Two Strut Type Restraints One Located on Each Side of the Top Trapeze Bar

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

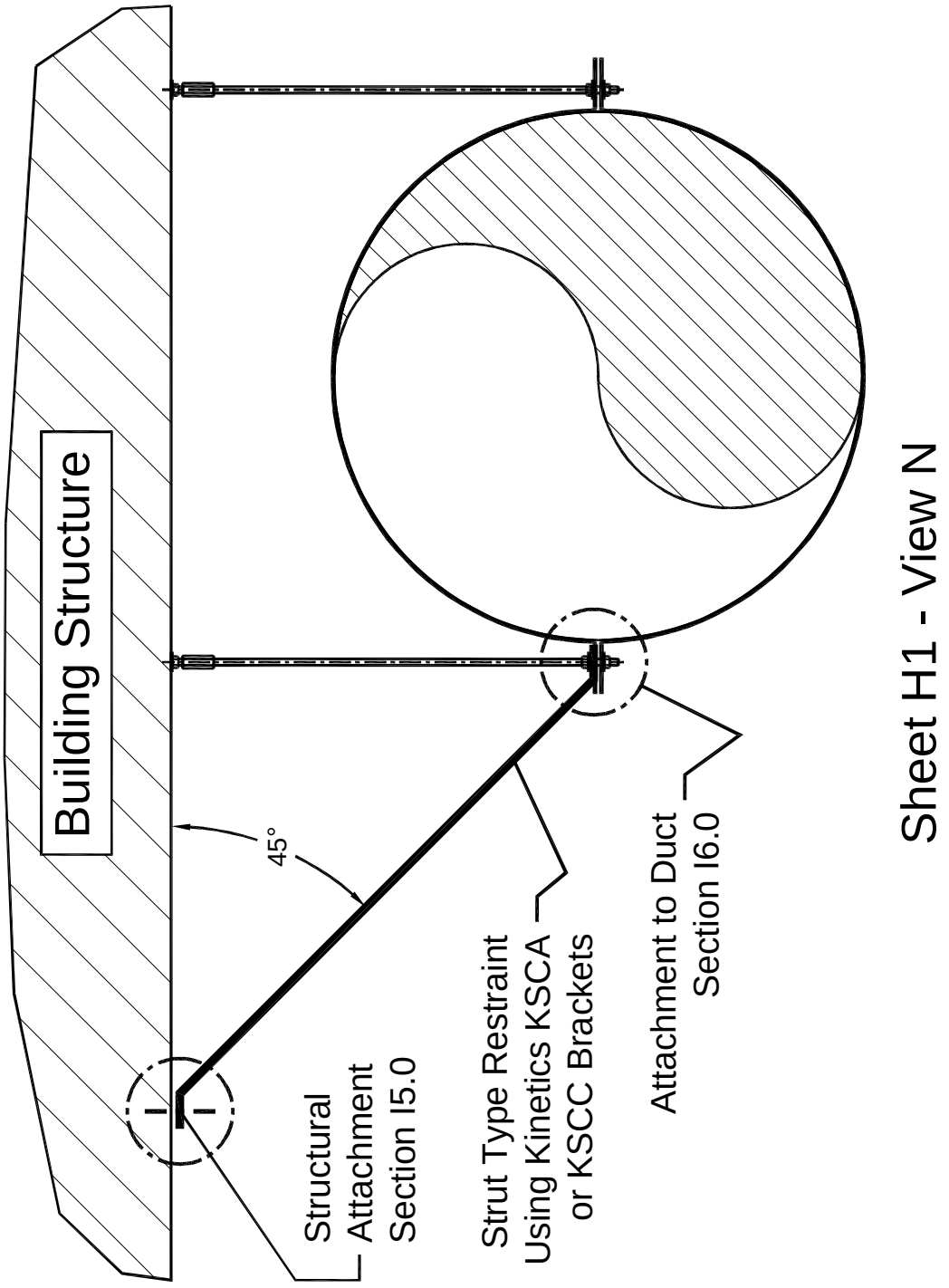


Figure I7-73; Transverse (T) Strut Type Restraint Schematic for Round Duct Supported by Two Hanger Rods

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

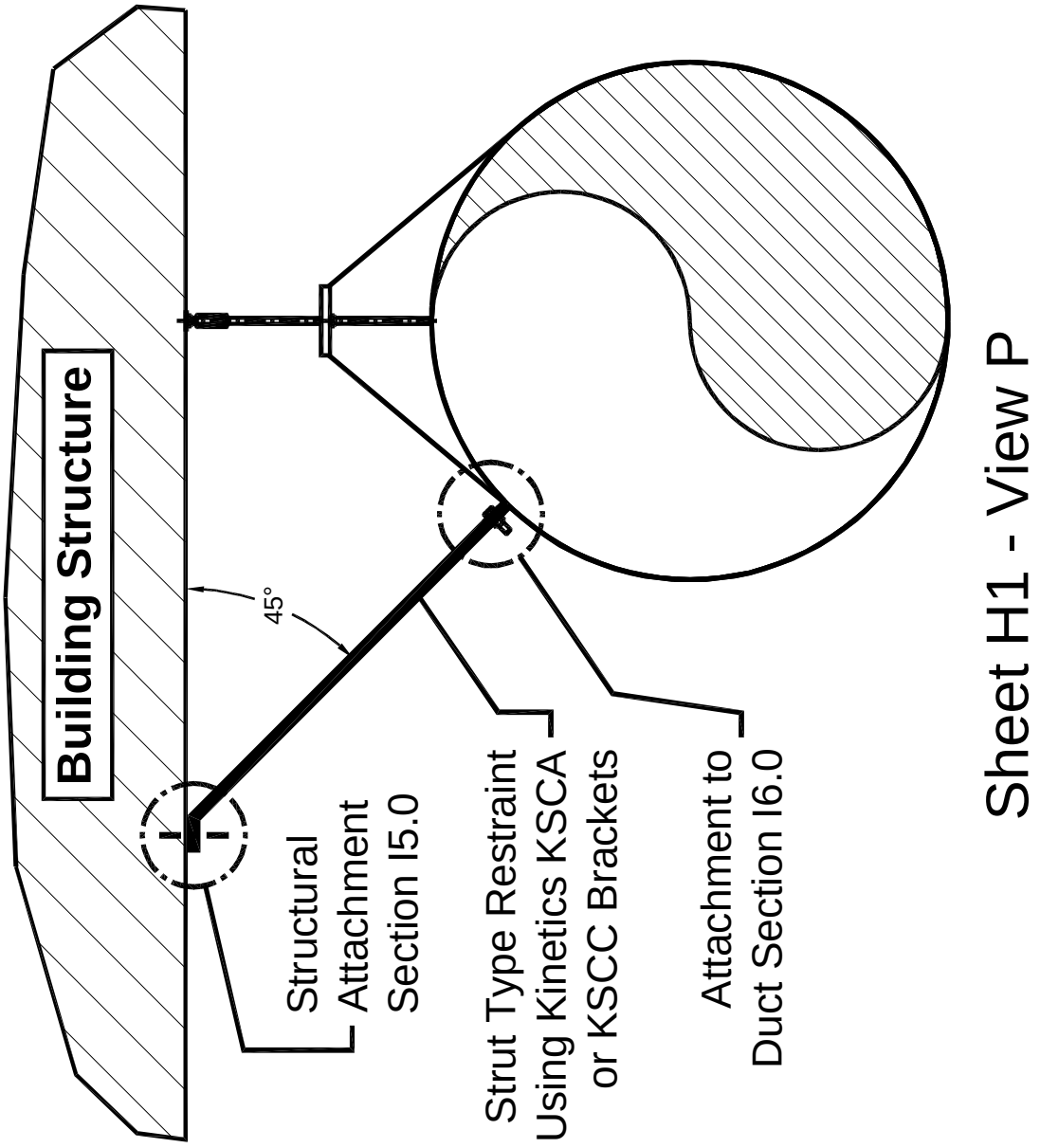


Figure I7-74; Transverse (T) Strut Type Restraint Schematic for Round Duct Supported by One Hanger Rod – Restraint adjacent to Hanger Rod Attached to a Band Clamp

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

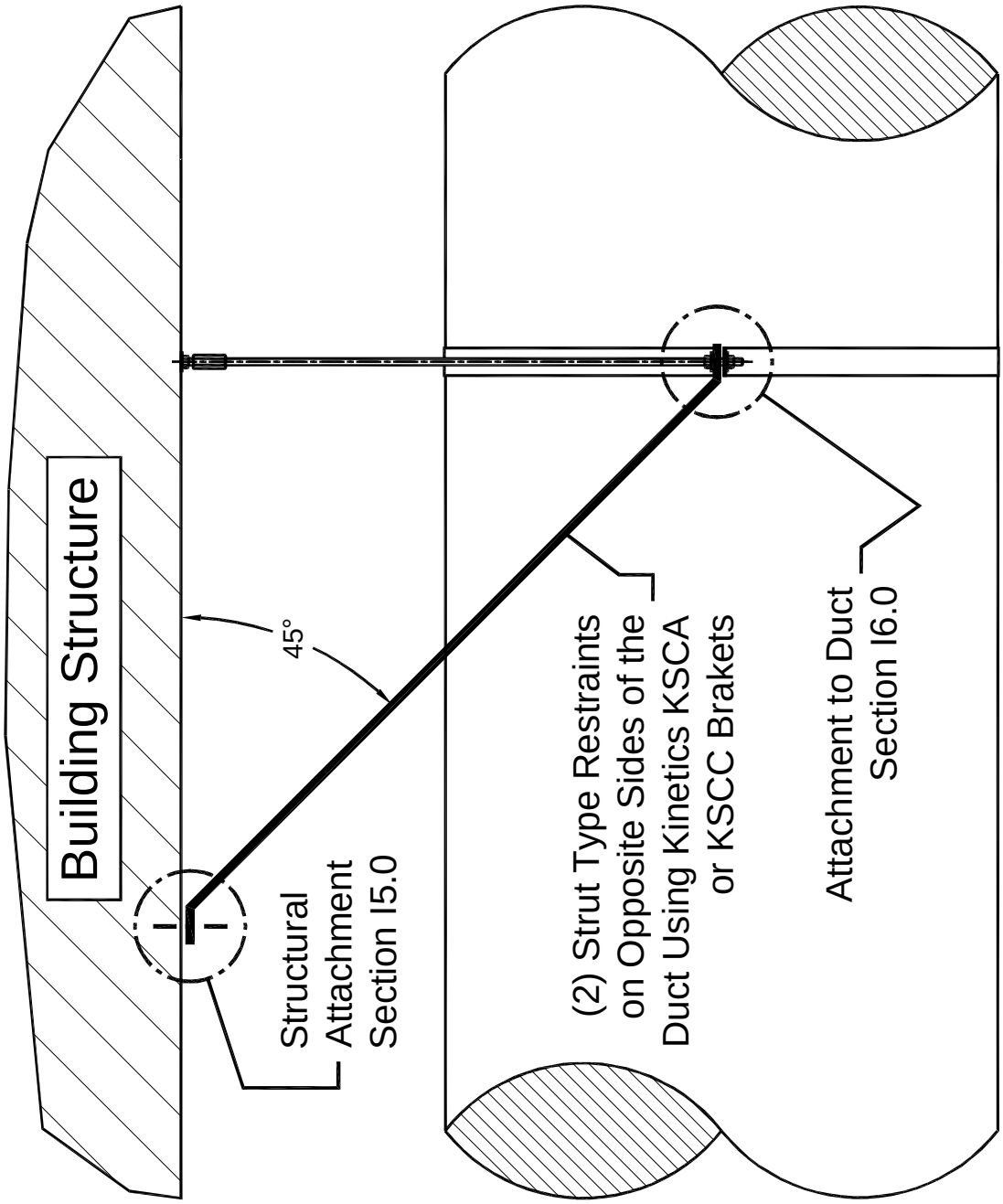


Figure I7-75; Longitudinal (L) Strut Type Restraint Schematic for Round Duct Supported by Two Hanger Rods – One Restraint on Each Side of the Duct

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

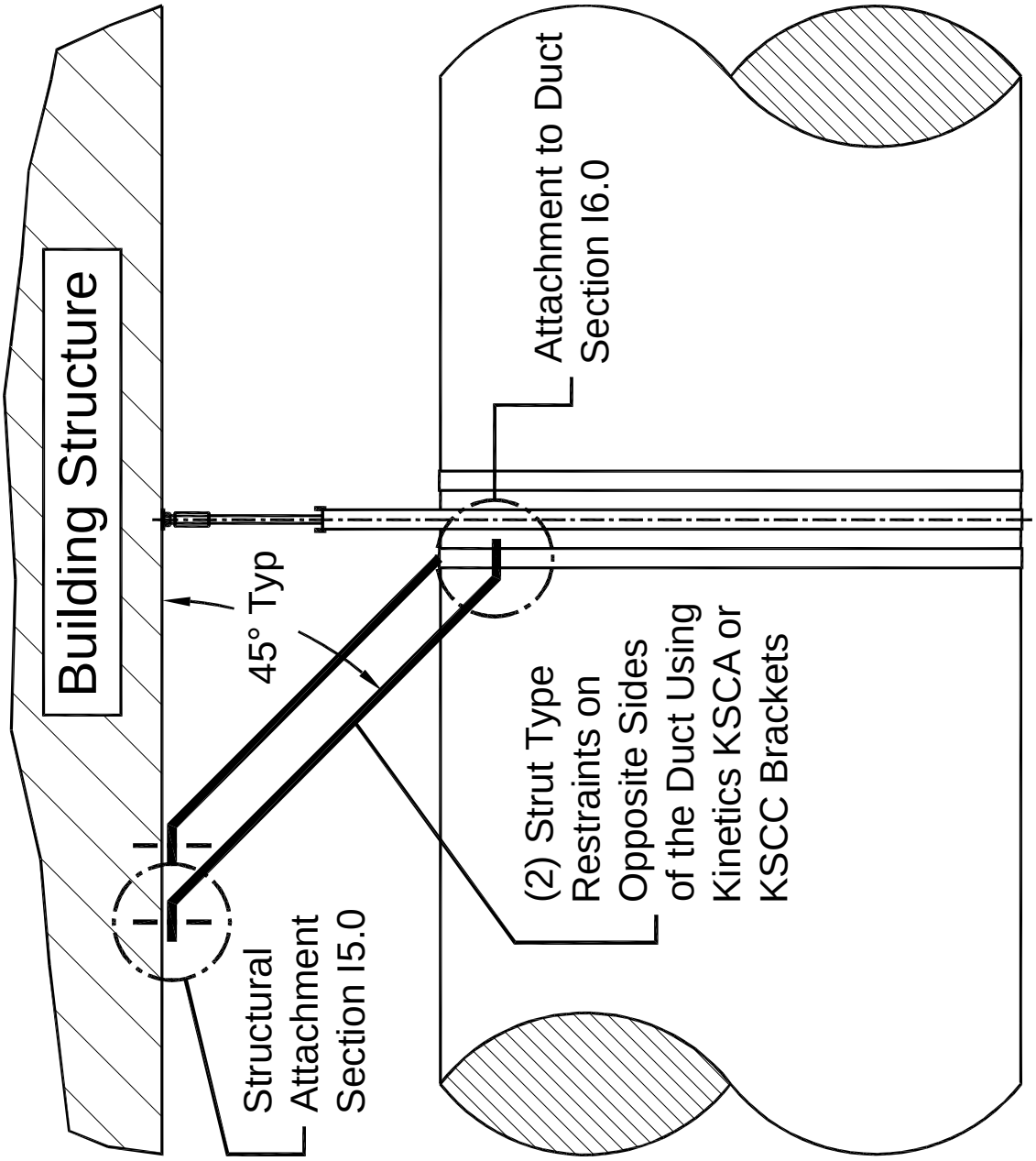
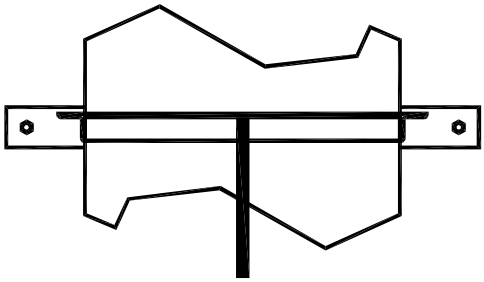
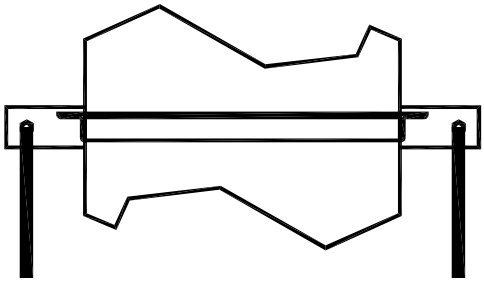


Figure I7-76; Longitudinal (L) Strut Type Restraint Schematic for Round Duct Supported by One Hanger Rod – One Restraint on each Side of the Duct ,Adjacent to the Hanger Rod, and Attached to Band Clamps

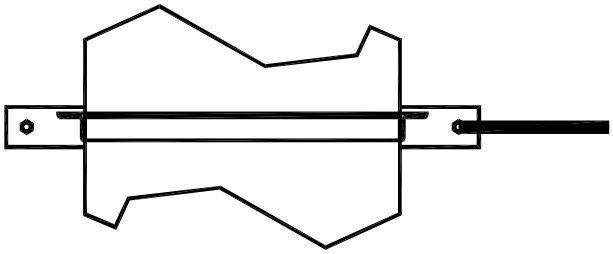
KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com



Sheet A2 - View C
Longitudinal (L)
Restraint
Plan View
Option #2



Sheet A2 - View C
Longitudinal (L)
Restraint
Plan View
Option #1

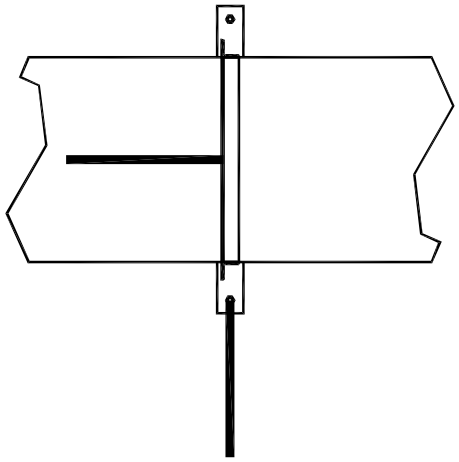


Sheet A2 - View C
Transverse (T)
Restraint
Plan View

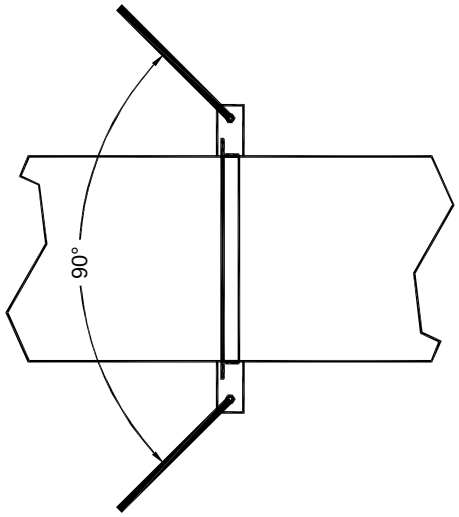
Figure I7-77; Transverse (T) and Longitudinal (L) Basic Plan View Restraint Arrangements for Duct Being Restrained with Strut Type Restraints – Note: The Longitudinal (L) Restraint Cables in Longitudinal Restraint Options #1 & #2 are Arranged to Prevent Twisting of the Duct

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada

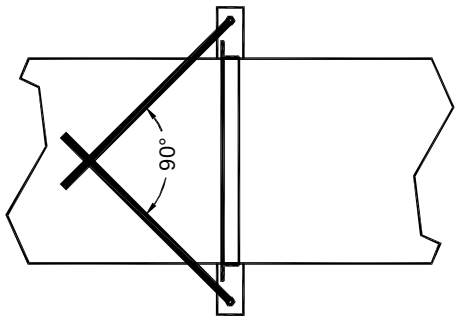
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com



Sheet A2 - View D
Longitudinal & Transverse
(TL) Restraint
Plan View
Option #3



Sheet A2 - View D
Longitudinal & Transverse
(TL) Restraint
Plan View
Option #2



Sheet A2 - View D
Longitudinal &Transverse
(TL) Restraint
Plan View
Option #1

Figure I7-78; Combined Transverse & Longitudinal (TL) Basic Plan View Restraint Arrangements for Duct Being Restrained with Strut Type Restraints – Note: The Restraint Cables in Options #1, #2, & #3 are Arranged to Prevent Twisting of the Duct

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

I7.10 – Strut Restraint Schematics for Floor/Roof Mounted Pipe:

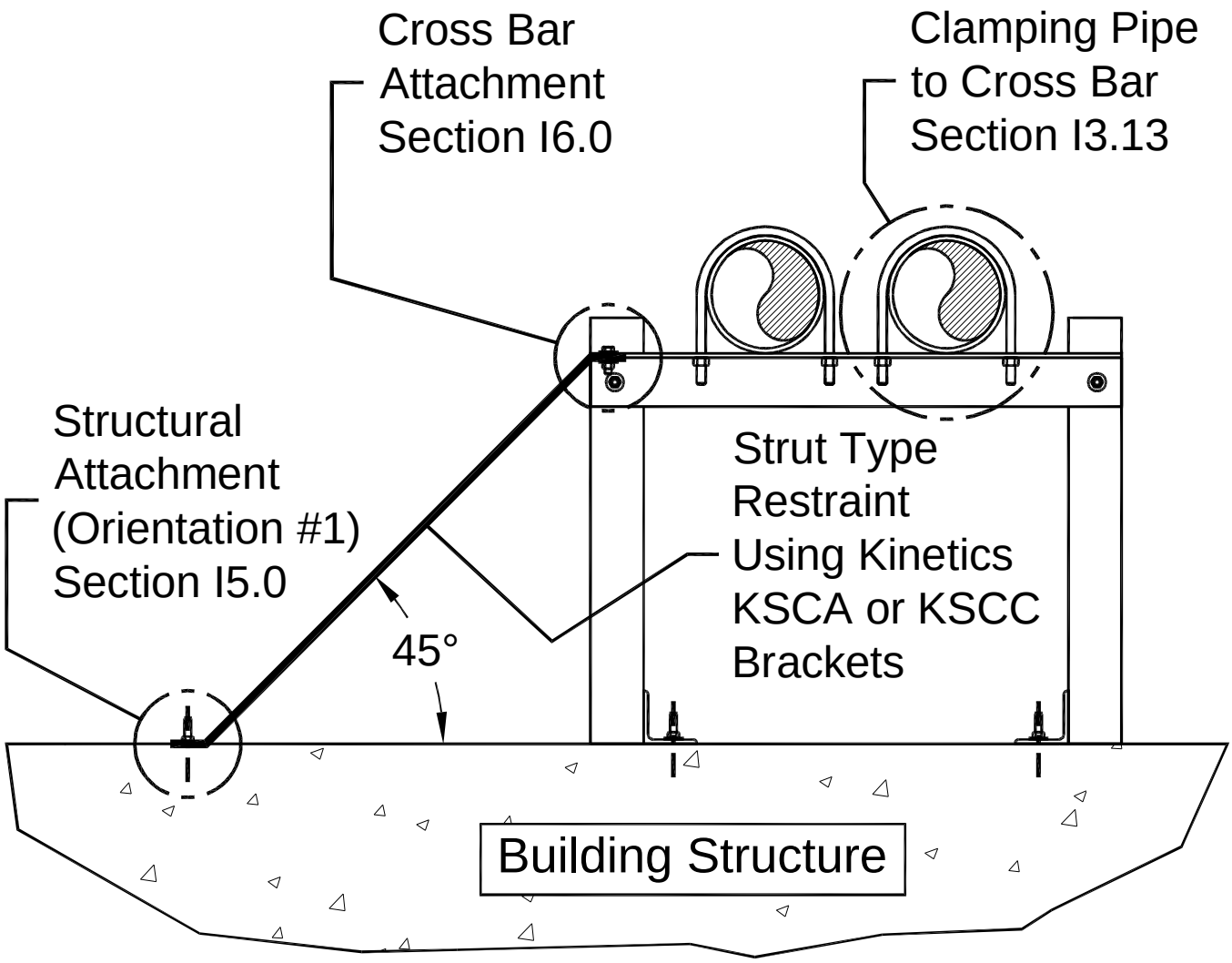


Figure I7-79; Transverse (T) Strut Type Restraint Schematic for Floor/Roof Mounted Pipe – Side Strut at a 45° Angle

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

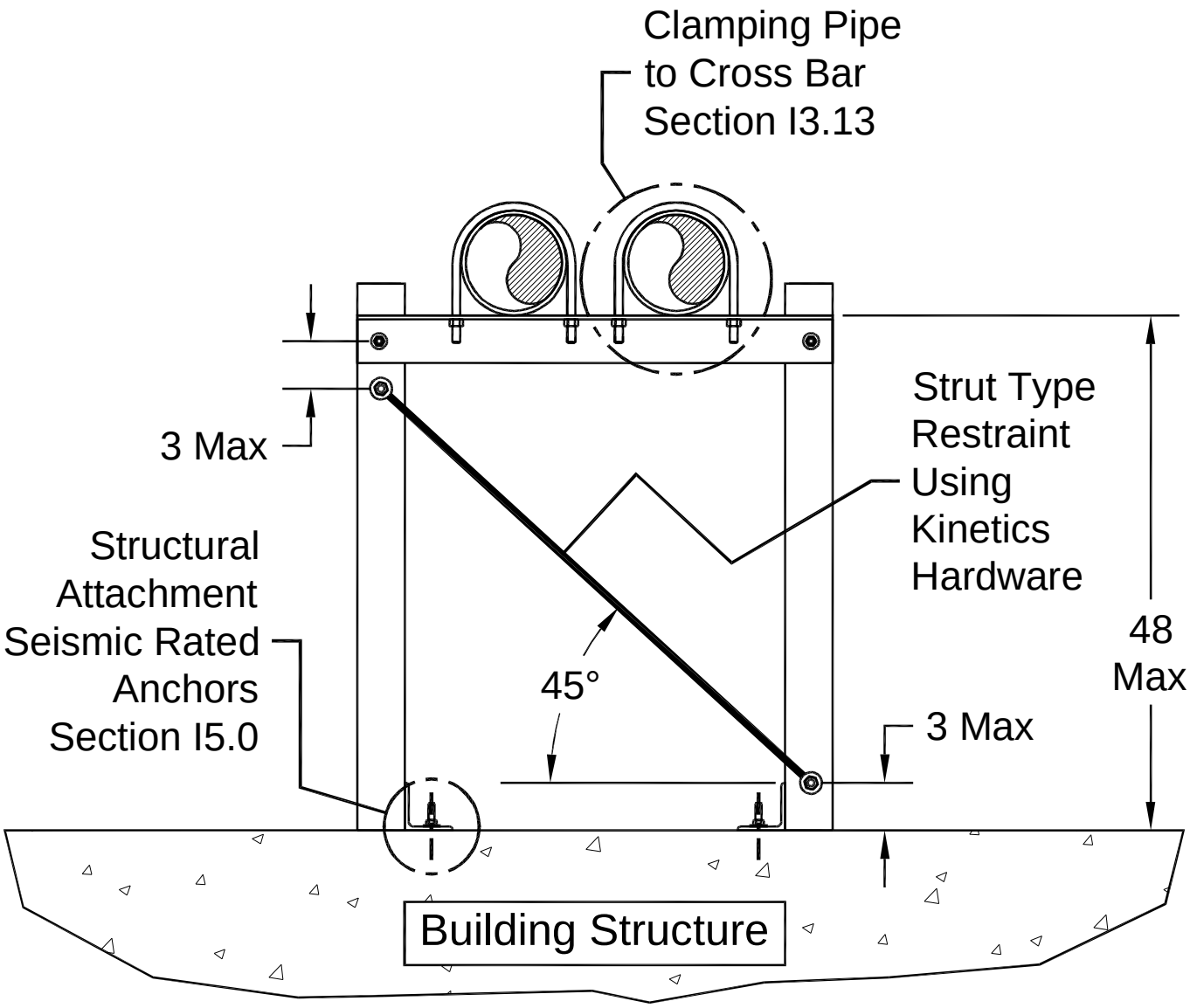


Figure I7-80; Transverse (T) Strut Type Restraint Schematic for Floor/Roof Mounted Pipe – Cross Brace Strut at a 45° Angle

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

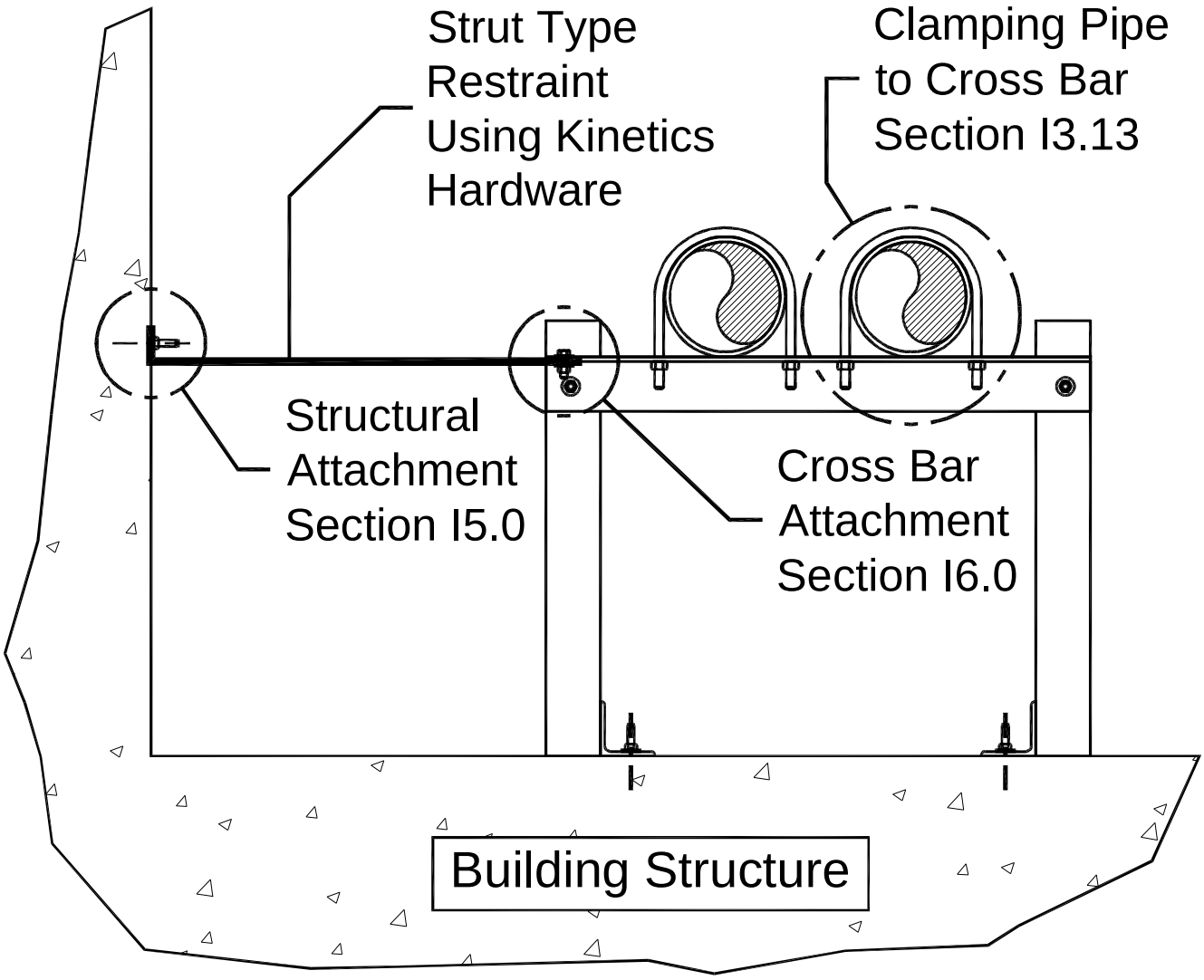


Figure I7-81; Transverse (T) Strut Type Restraint Schematic for Floor/Roof Mounted Pipe – Horizontal Strut

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada

Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

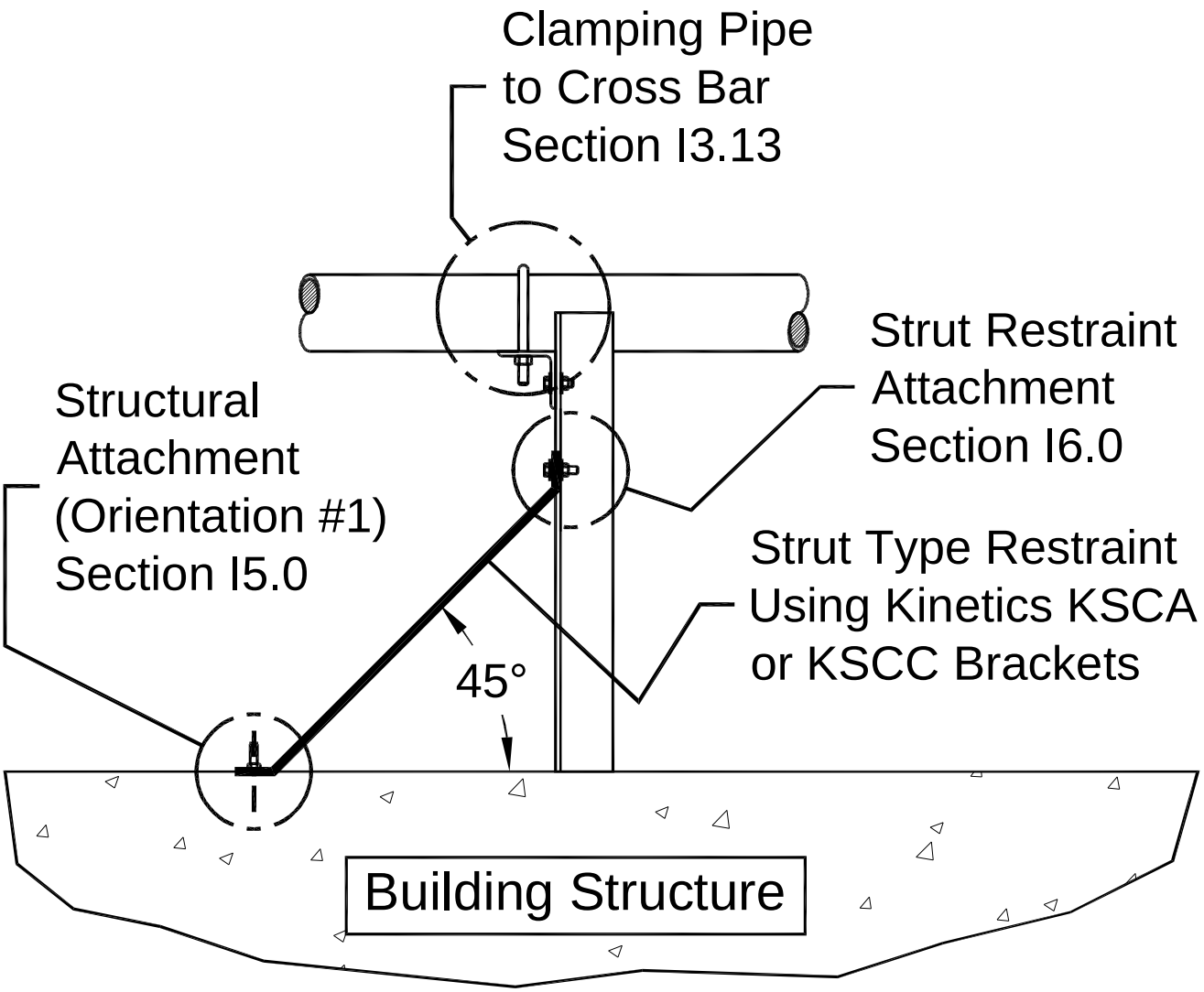


Figure I7-82; Longitudinal (L) Strut Type Restraint Schematic for Floor/Roof Mounted Pipe – Strut Attached to the Floor Stand or Support at a 45° Angle

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

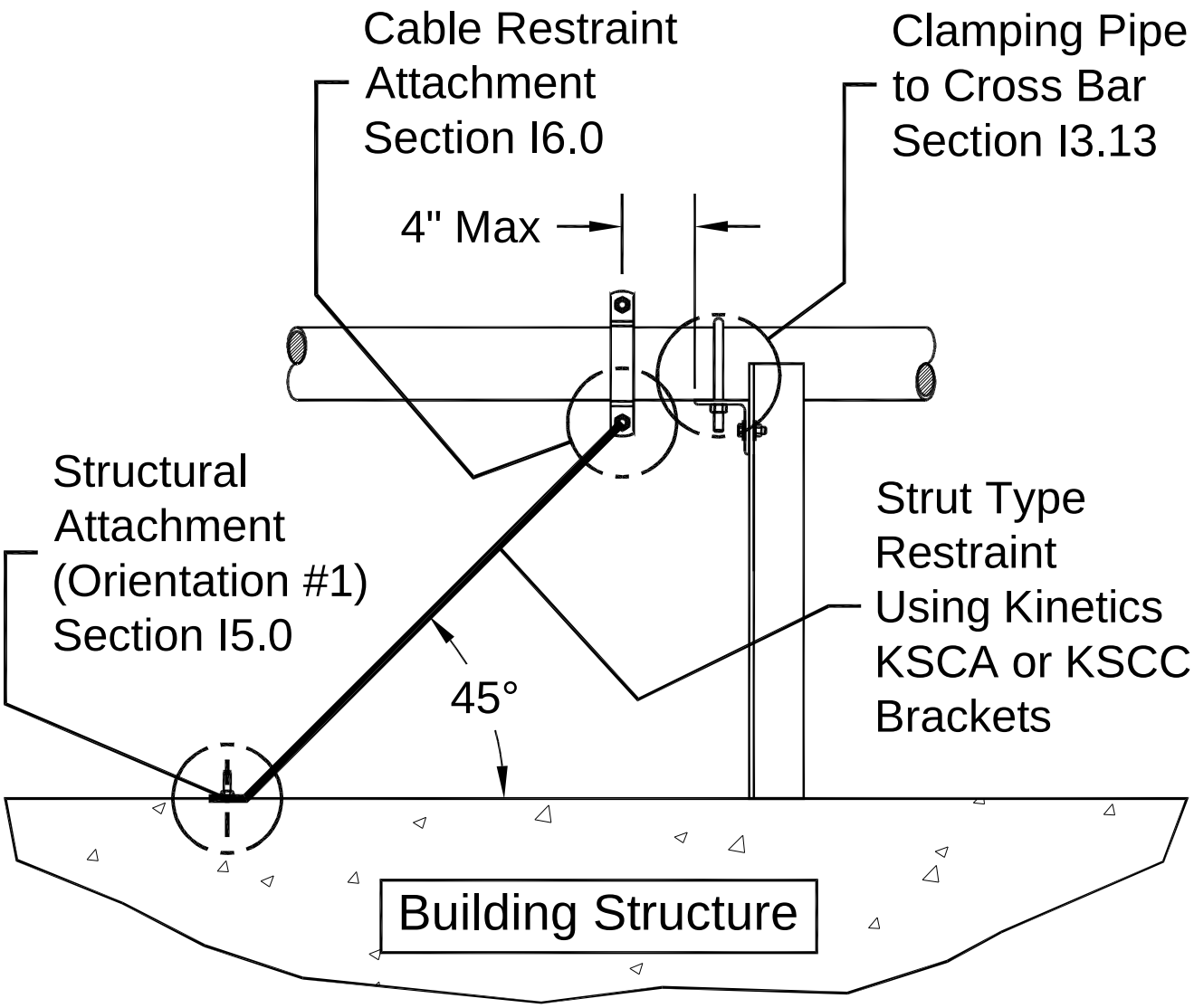


Figure I7-83; Longitudinal (L) Strut Type Restraint Schematic for Floor/Roof Mounted Pipe – Strut Attached to the Duct at a 45° Angle

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

I7.11 – Strut Restraint Schematics for Floor/Roof Mounted Duct:

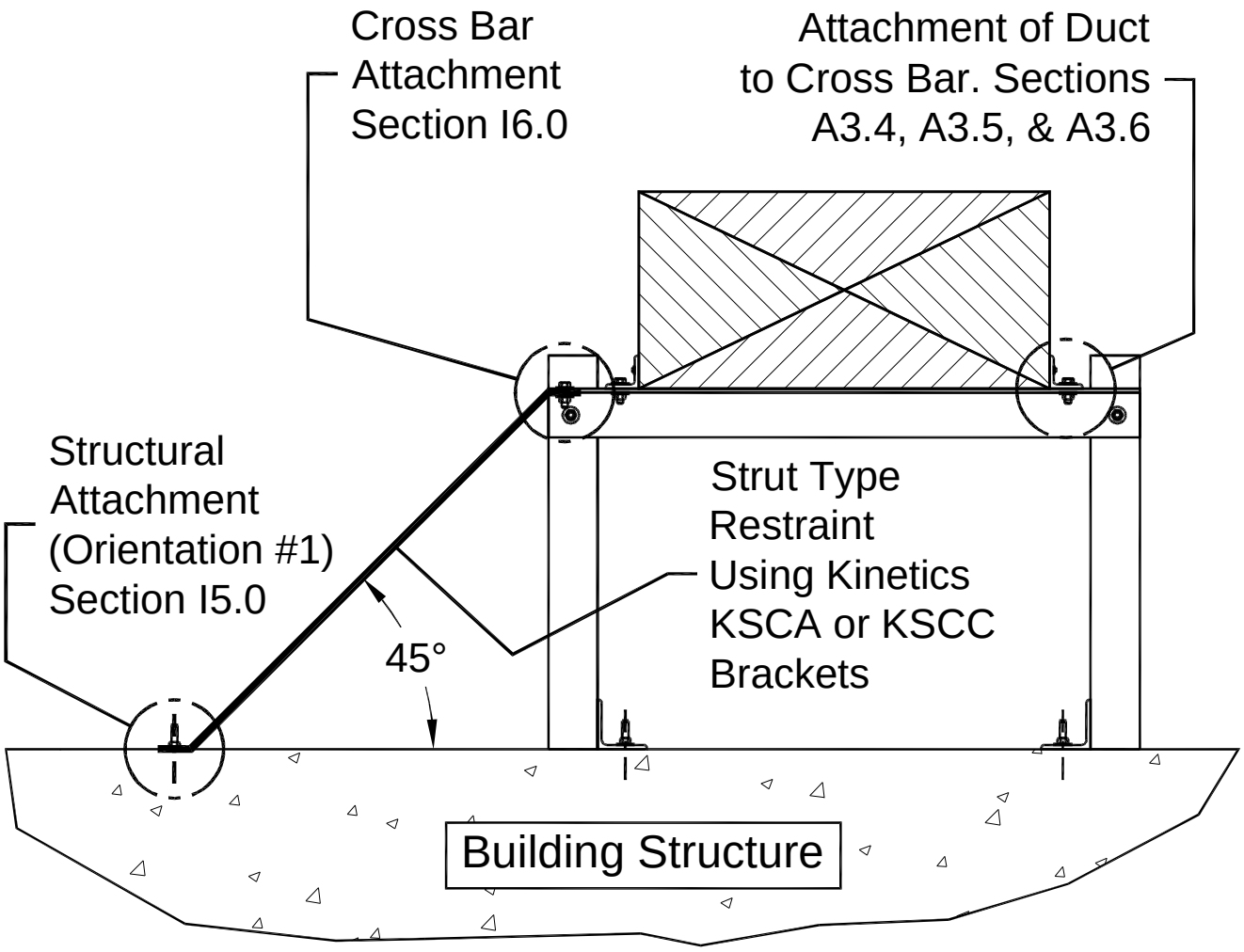


Figure I7-84; Transverse (T) Strut Type Restraint Schematic for Floor/Roof Mounted Duct – Side Strut at a 45° Angle

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

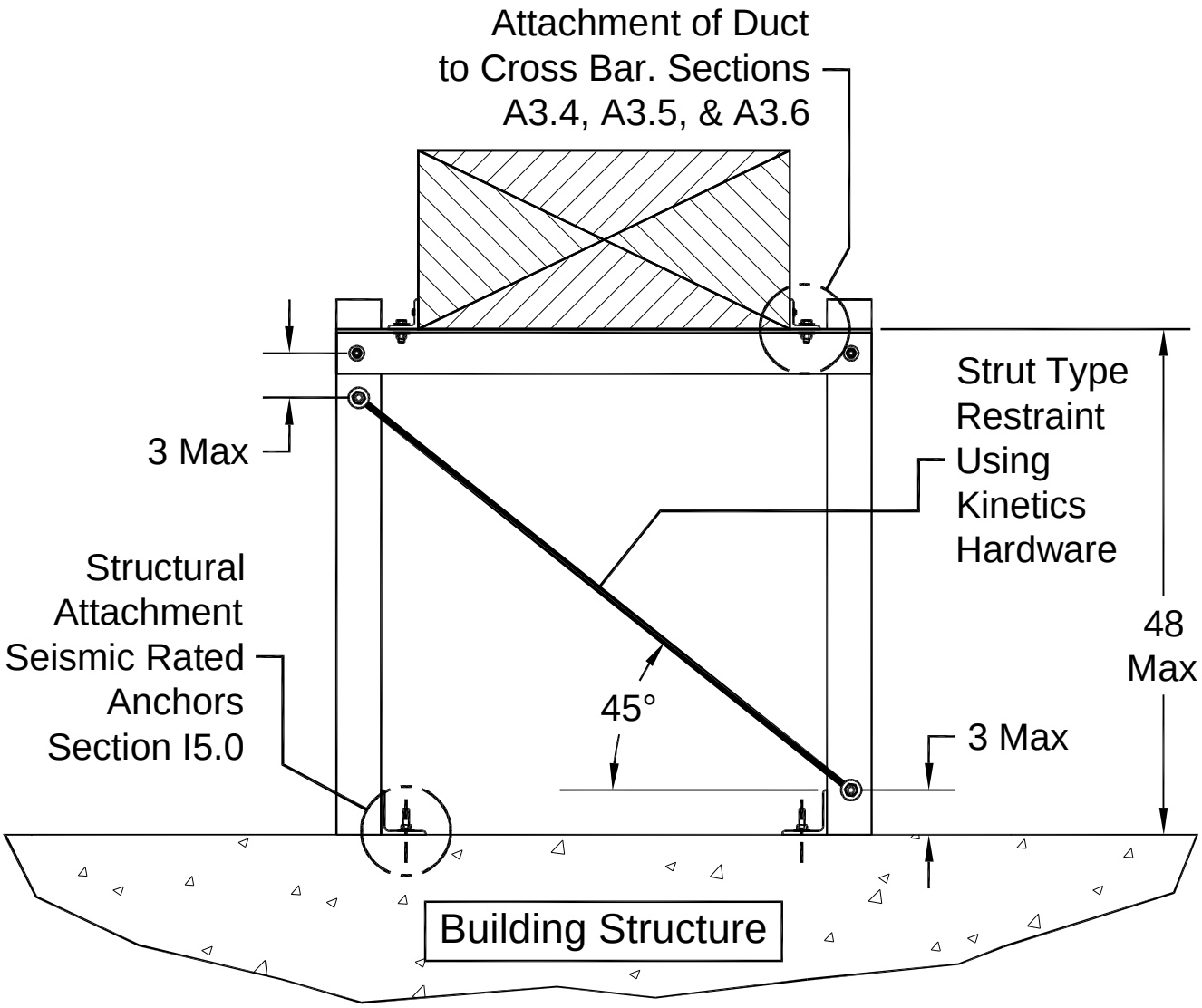


Figure I7- 85; Transverse (T) Strut Type Restraint Schematic for Floor/Roof Mounted Duct – Cross Brace Strut at a 45° Angle

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

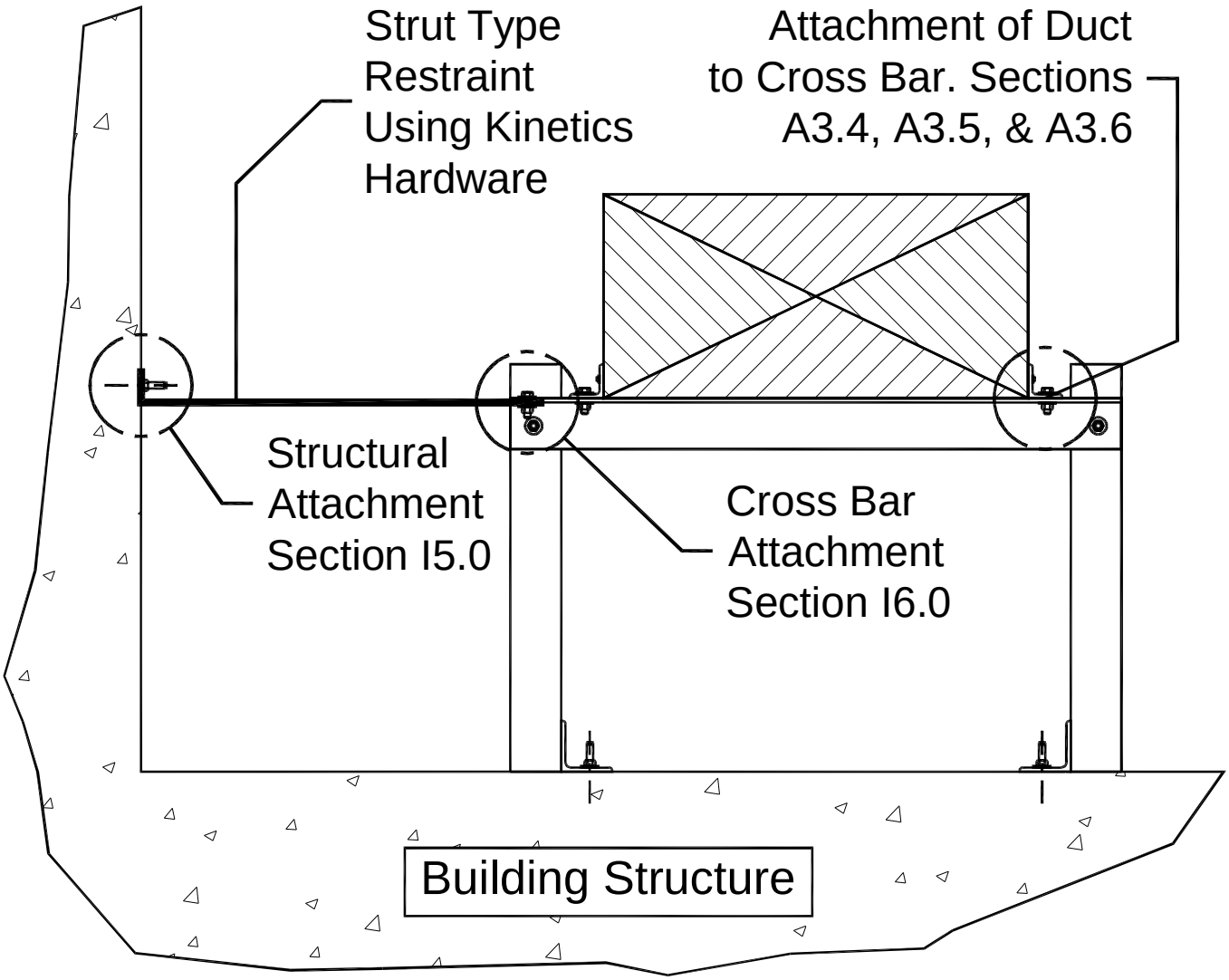


Figure I7-86; Transverse (T) Strut Type Restraint Schematic for Floor/Roof Mounted Duct – Horizontal Strut

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

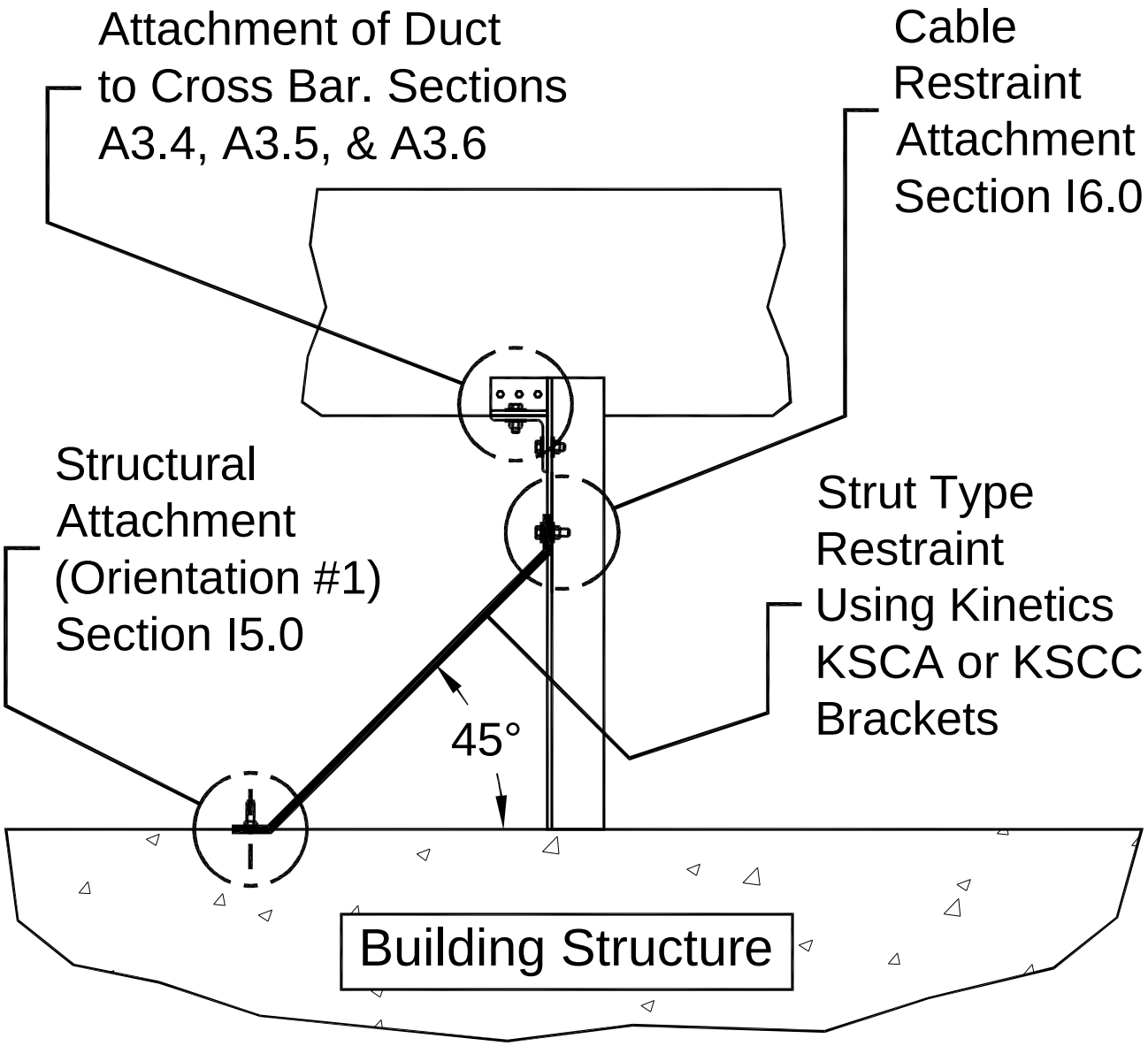


Figure I7-87; Longitudinal (L) Strut Type Restraint Schematic for Floor/Roof Mounted Duct – Strut Attached to the Floor Stand or Support at a 45° Angle

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

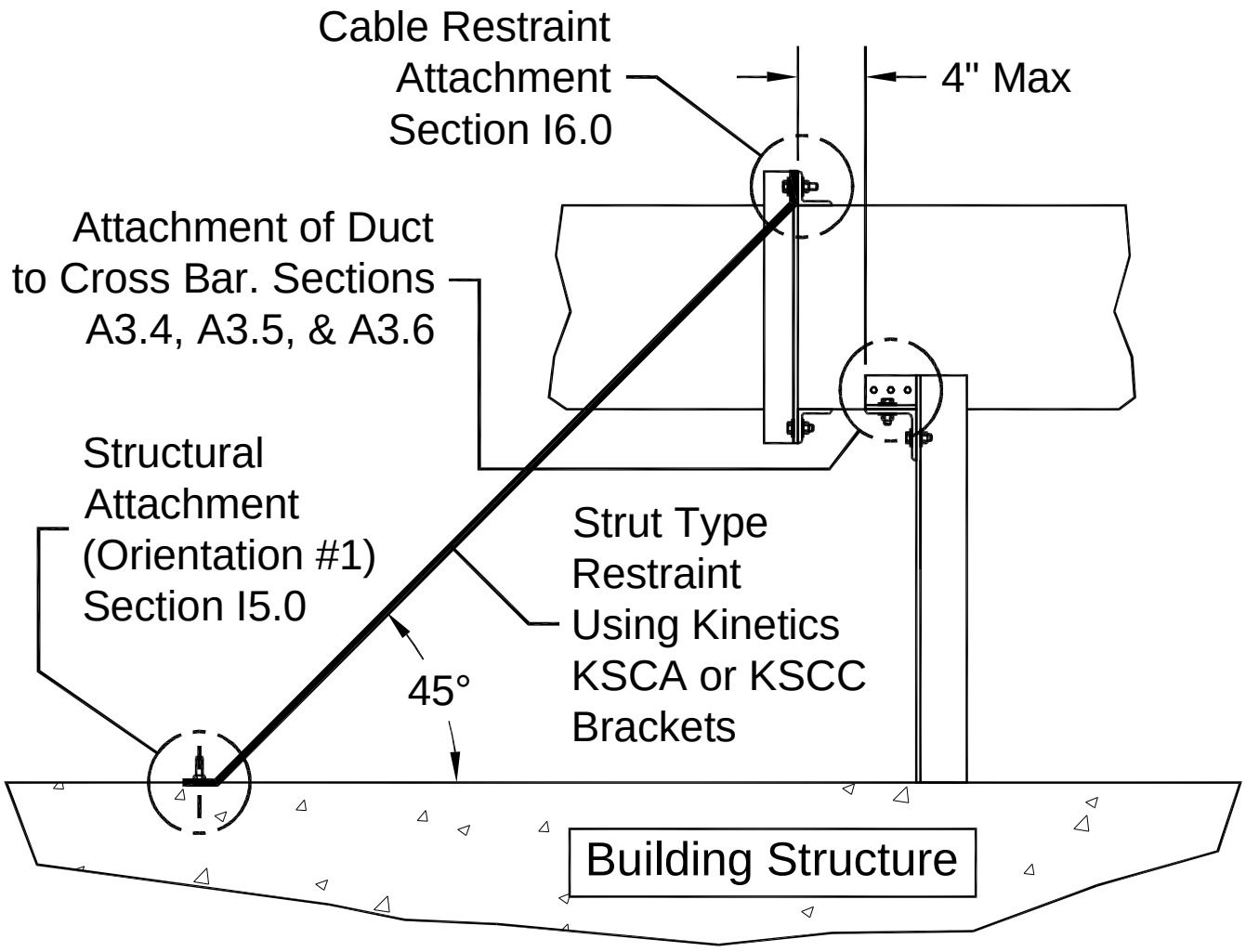


Figure I7-88; Longitudinal (L) Strut Type Restraint Schematic for Floor/Roof Mounted Duct – Strut Attached to the Duct at a 45° Angle

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com

I7.12 – Summary:

When using strut type restraints instead of cable restraints, it is very important to remember the following items.

1.) One strut type restraint will replace a pair of cable restraints.
2.) Strut type restraints increase the tensile loads on the hanger rods beyond the dead weight of the pipe or duct. ***Hanger rods and hanger attachments to structure may need to be changed!***
3.) When using Kinetics KSCA or KSCC brackets, the strut type restraints must be installed at a 45° angle measured from the horizontal.
4.) If ***one restraint location*** on a run of pipe or duct needs to be a strut type restraint, ***all of the restraints will need to be strut type restraints!***
5.) Help in selecting and evaluating strut sizes, hanger rod s, anchorage, and etc. may be found at www.kineticsnoise.com.

KINETICS Noise Control
Dublin, Ohio, USA ▪ Mississauga, Ontario, Canada
Toll Free (USA Only): 800-959-1229
International: 614-889-0480
FAX 614-889-0540
World Wide Web: www.kineticsnoise.com
E-mail: sales@kineticsnoise.com