

# Pipe supports Finding the type and settings in CAEPIPE for support from

# Lisega

# SSG-standard

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## 1. Disclaimer

The objective of this document is to provide guidelines on how to model various supports including information on settings in CAEPIPE.

The user of CAEPIPE piping software is responsible for model setup, selection of pipe supports and to check the validity of calculated results.

The information in this document may be obsolete or change at any time without notice and it is up to the user of the CAEPIPE piping software to carefully read the update notes coming with each program update or revision.

# 2. Trademarks

Lisega is the trademark of Lisega SE, Gerhard-Liesegang-Straße 1, 27404 Zeven, Germany (www.lisega.de)

SSG is the trademark of the SSG Standard Solutions Group, Skönsbergsvägen 3, 856 41 Sundsvall, Sweden (www.ssgsolutions.com)

Rörklammerfabriken is a manufacturer of pipe supports following the SSG standard.

Address:

Rörklammerfabriken AB, Box 31, 241 21 Eslöv, Sweden, www.rorklammerfabriken.se

# 3. Figures used in this document

Pictures showing Lisega components taken from the Lisega product catalogue and are shown with courtesy of Lisega SE.

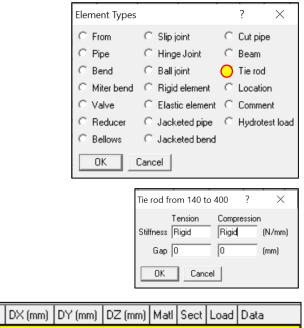
Pictures showing SSG components are taken from the webpage of Rörklammerfabriken AB with courtesy of SSG Standard Solutions Group and Rörklammerfabriken AB.

### 4. Lisega rigid link



## Rigid Link, Tie Rod

- Carries load in both tension and compression
- "Axial stiffness may be given and play in joints can be modelled
- Bending moments and torques are <u>not</u> restrained.
  - PX, PY and PZ= free
- This support is built as a component
- Menu items and sample input:



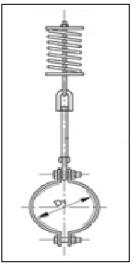
Node	Туре	DX (mm)	DY (mm)	DZ (mm)	Matl	Sect	Load	Data
Lisega	a rigid link							
140	From							
400	Tie rod	700						Anchor

# 5. Spring hanger, Lisega and SSG type 4

#### Lisega spring hanger



#### Spring hanger SSG type 4



CAEPIPE menus:

### Hanger, User Hanger

- Is working in vertical direction only.
- "Number of Hangers" specifies number of parallel supports installed at this location.
- "Connected to" option allows connection to other existing beam or pipe structures in model
- Bending moments and torques are not restrained.
  - PX, PY and PZ= free
- Automatic design according to spring manufacturers design rules is default.
- Data type "User Hanger" allows for specification of an existing spring hanger with known data

- Check the horizontal movement of the spring hangers to calculate the angulation of the hanger.
- Allowable angulation according to EN 13480 is 4°.

Data Types		? ×
C Anchor	🔵 Hanger	C Snubber
C Branch SIF	C Harmonic Load	C Spider
C Conc. Mass	C Jacket End Cap	C Threaded Joint
C Constant Support	C Limit Stop	C Time Varying Load
C Flange	O Nozzle	🔵 User Hanger
C Force	C Restraint	C User SIF
C Force Sp. Load	C Rod Hanger	⊂ Weld
C Guide	C Skewed Restrain	t 🔿 Generic Support
OK Cance	4	

Hanger at node 40	? ×
Tag	
Type Grinnell	▼
Number of Hangers	1
Load Variation	25 (%)
Hanger below	🗌 Short Range
Connected to	
Level Tag	~
OK Cancel	1
User Hanger at node 40	
User Hanger at node 40 Tag	
5	) × (N/mm)
Tag	(N/mm)
Tag Spring rate	(N/mm)
Tag Spring rate Number of hangers 1 Hanger load	(N/mm)
Tag Spring rate Number of hangers 1 Hanger load	(N/mm) (N)
Tag Spring rate Number of hangers 1 Hanger load 7 Load type : (a Connected to	(N/mm) (N)
Tag Spring rate Number of hangers 1 Hanger load 7 Load type : (a Connected to	(N/mm) (N) © Hot ◯ Cold

# 6. Spring Support, Lisega

Lisega spring support:



CAEPIPE menus:

### Hanger, User Hanger

- Is working in vertical direction only
- "Number of Hangers" specifies number of parallel supports installed at this location.
- Option "Hanger below" relates to spring support
- "Connected to" option allows connection to other existing beam or pipe structures in model
- Bending moments and torques are <u>not</u> restrained.
  - PX, PY and PZ= free
- Data type "User Hanger" allows for specification of an existing spring hanger with known data

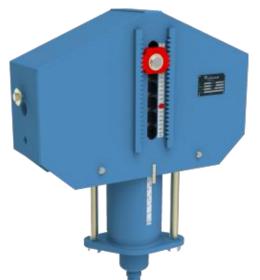
- The spring support normally acts as a sliding support having friction and can restrain lateral movement.
- Skios can provide information on how to model the spring support in detail including friction and lateral restraints.

Data Types			?	$\times$
C Anchor	Hanger	С	Snubber	
C Branch SIF	C Harmonic Load	$^{\circ}$	Spider	
C Conc. Mass	C Jacket End Cap	$^{\circ}$	Threaded	Joint
C Constant Support	C Limit Stop	$^{\circ}$	Time Varyi	ng Load
C Flange	C Nozzle	0	User Hang	jer
C Force	C Restraint	Ō	User SIF	
C Force Sp. Load	C Rod Hanger	$^{\circ}$	Weld	
C Guide	C Skewed Restrain	t O	Generic Si	upport
OK Cance	1			

Hanger	at node 50	?	$\times$
Tag			
Туре	Grinnell		-
Numbe	er of Hangers	1	
L	oad Variation	25	[%]
ΡH	anger below	🔲 Sh	ort Range
C	Connected to		
	Level Tag		Ŧ
ОК	Cance	Í.	
User Han	iger at node 2		X
User Han	ger at node 2 Tag		×
User Han			(N/mm)
	Tag [	50	
	Tag Spring rate	50	
	Tag Spring rate per of hangers	50	(N/mm) (N)
Numb	Tag Spring rate Spring rate Hanger load	50	(N/mm) (N)
Numb	Tag   Spring rate   Her of hangers   Hanger load   Load type : { Connected to	50	(N/mm) (N) Cold
Numb	Tag Spring rate ber of hangers Hanger load Load type : ( Connected to	50 1	(N/mm) (N) Cold

# 7. Constant hanger, Lisega

Lisega constant hanger



#### CAEPIPE menus:

### Constant Support, Force

- Is working in vertical direction only providing a constant lifting force independent of the vertical movement.
- "Number of Hangers" specifies the number of parallel supports installed at this location
- "Connected to" option allows connection to other existing beam or pipe structures in the model
- Bending moments and torques are <u>not</u> restrained.
  - PX, PY and PZ= free
  - Caepipe calculates the vertical force required to carry the mass of the piping
- Use data type "Force" for an existing constant hanger with known lifting force

- Check the horizontal movement of the constant hangers to calculate the angulation of the hanger.
- Allowable angulation according to EN 13480 is 4°.

Data Types			? >	<
C Anchor	C Hanger	С	Snubber	
C Branch SIF	C Harmonic Load	C	Spider	
C Conc. Mass	C Jacket End Cap	C	Threaded Join	ł
Constant Support	C Limit Stop	С	Time Varying L	.oad
C Flange	C Nozzle	С	User Hanger	
- Force	C Restraint	С	User SIF	
C Force Sp. Load	C Rod Hanger	С	Weld	
C Guide	C Skewed Restraint	0	Generic Suppo	ort
OK Cance				

Constant Support at node 40	$\times$
Tag	
Number of 1	
Connected to	
Level Tag	
OK Cancel	

Force at nod	e 40		×
FX	FY	FZ	(N)
MX	MY	MZ	(Nm)
Add to V	V+P 🔿 Add	l to T1	
C Add to T	2		
OK	Cancel		

### 8. Constant Support, Lisega

Lisega constant support:

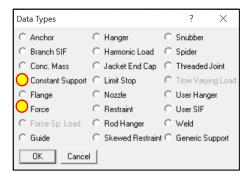


#### CAEPIPE menus:

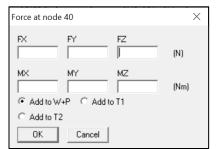
### Constant support, Force

- Is working in vertical direction only
- "Number of Hangers" specifies number of parallel supports installed at this location.
- "Connected to" option allow connection to other existing beam or pipe structures in model
- Bending moments and torques are not restrained.
  - PX, PY and PZ= free
- Use data type "Force" for an existing constant support with known lifting force.

- The spring support normally acts as a sliding support having friction and can restrain lateral movement.
- Skios can provide input how to model the spring support in detail including friction and lateral restraints.



Constant Support at node 40	$\times$
Tag Number of 1	
Connected to	
Level Tag 📃 🚽	
OK Cancel	

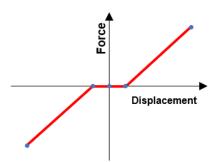


### 9. Lisega Shock absorber



### Shock absorber

- Component is active in dynamic analysis only. The shock absorber allows slow • thermal movements within a specified range but restricts fast movements due to fast dynamic events.
  - Eigenfrequency analysis: Only the stiffnesses for both system and spring rate are considered.
  - Linear dynamics: Same as for eigenfrequency analysis.
  - The force displacement characteristics for the real-life component is shown below



- Carries load in both tension and compression. •
- Bending moments and torques are not restrained.
  - PX, PY and PZ= free.
- The shock absorber has no mass.
- Viscous effect is not considered This support is built • as a component
- Menu items and sample input: •

Node Type

140

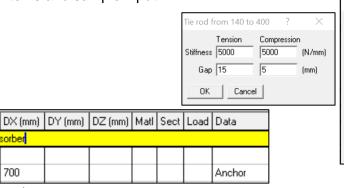
400

Lisega shock absorber

700

From

Tie rod



Element Types		? ×
C From	<ul> <li>Slip joint</li> </ul>	C Cut pipe
C Pipe	C Hinge Joint	C Beam
C Bend	C Ball joint	🔾 Tie rod
C Miter bend	C Rigid element	C Location
C Valve	C Elastic element	C Comment
C Reducer	C Jacketed pipe	C Hydrotest load
C Bellows	$\ensuremath{\mathbb{C}}$ Jacketed bend	
ОК	Cancel	

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### 10. Lisega Damper



#### CAEPIPE menus:

### Snubber

- Component is active in dynamic analysis only. The damper allows slow thermal movements but restricts fast movements due to fast dynamic events.
  - Eigenfrequency analysis: Only the stiffnesses for spring rates are considered.
  - Linear dynamics: Same as for eigenfrequency analysis.
- Carries load in both positive and negative direction.
- The damper has no mass.
- Viscous effects are not considered in dynamic analysis
- "Connected to" option allows connection to other existing beam or pipe structures in model

#### Data Types ? $\times$ C Anchor C Hanger C Snubber C Branch SIF C Harmonic Load C Spider C Conc. Mass C Jacket End Cap C Threaded Joint C Constant Support C Limit Stop C Time Varying Load C Nozzle C Flange C User Hanger C Force C Restraint O User SIF C Force Sp. Load C Rod Hanger C Weld C Guide ○ Skewed Restraint ○ Generic Support OK Cancel

Snubber at node 310	$\times$
Tag Stiffness Rigid (N/mm)	
Direction Y comp Z comp	
Connected to	
Level Tag 📃 🚽	
OK Cancel	

#### Comment:

The damper is a viscous damper with very small or virtually no backlash effect.

## 11. Lisega Visco Damper



#### CAEPIPE menus:

### Snubber

- Component is active in dynamic analysis only. The damper allows slow thermal movements but restricts fast movements due to fast dynamic events.
  - Eigenfrequency analysis: Only the stiffnesses for spring rates are considered.
  - Linear dynamics: Same as for eigenfrequency analysis.
- Bending moments and torques are <u>not</u> restrained.
  - PX, PY and PZ= free.
- Carries load in both positive and negative direction simultaneously.
- The main advantage of the visco damper is, that there is no play/gap in the connection to the piping. This means that the visco damper also prevents small movements.
- Sample CAEPIPE input:

Node	Туре	DX (mm)	DY (mm)	DZ (mm)	Matl	Sect	Load	Data
Lisega	a visco dan	nper						
140	Location							Snubber
140	Location							Snubber
140	Location							Snubber

X-direction

Direct X co

#### Y-direction

### Z-direction

at node 140 $ imes$	Snubber at node 140	× Snubber at node 140
Tag	Tag	Tag
Stilfness Rigid (N/mm)	Stiffness Rigid (N/mm)	Stiffness Rigid (N/m
np Y comp Z comp 0 0	Direction X comp 0 Y comp 2 comp 1 0	p Z Comp Z Comp Z 0 1
ected to	Connected to	Connected to
evel Tag 📃 👻	Level Tag 📃 🚽	Level Tag 📃 🚽
Cancel	OK Cancel	OK. Cancel
	<u></u>	

Data Types				? ×
C Anchor	C	Hanger	$\bigcirc$	Snubber
C Branch SIF	C	Harmonic Load	C	Spider
C Conc. Mass	C	Jacket End Cap	C	Threaded Joint
C Constant Support	С	Limit Stop	С	Time Varying Load
C Flange	С	Nozzle	С	User Hanger
C Force	C	Restraint	C	User SIF
C Force Sp. Load	C	Rod Hanger	C	Weld
C Guide	С	Skewed Restrain	C	Generic Support
OK Cancel				

# 12. Lisega Rod support, SSG type 1, 2 & 3

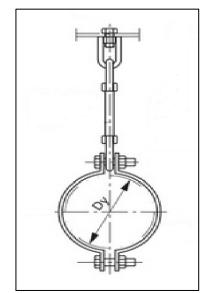


#### CAEPIPE menu:

### **Rod Hanger**

- Rod Hanger
- The support can carry downward acting loads only, behaves like a chain or a rope.

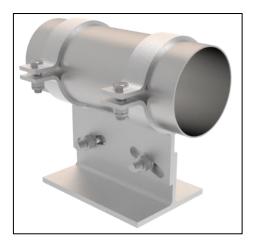
- "Connected to" option allows connection to other existing beam or pipe structures in model
- Check the horizontal movement of the rod hangers to calculate the angulation of the hanger.
- Allowable angulation according to EN 13480 is 4°.

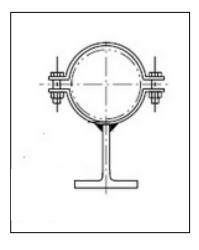


Data Types			? ×
C Anchor	C Hanger	С	Snubber
C Branch SIF	C Harmonic Load	С	Spider
C Conc. Mass	C Jacket End Cap	С	Threaded Joint
C Constant Support	C Limit Stop	С	Time Varying Load
C Flange	C Nozzle	С	User Hanger
C Force	C Restraint	С	User SIF
C Force Sp. Load	Rod Hanger	С	Weld
Guide	C Skewed Restraint	С	Generic Support
OK Cance	1		

Rod Hanger at node 140 $$
Tag
Number of 1
Connected to
Level Tag 📃 🚽
OK Cancel

# 13. Lisega Sliding shoe, SSG type 11





CAEPIPE menu:

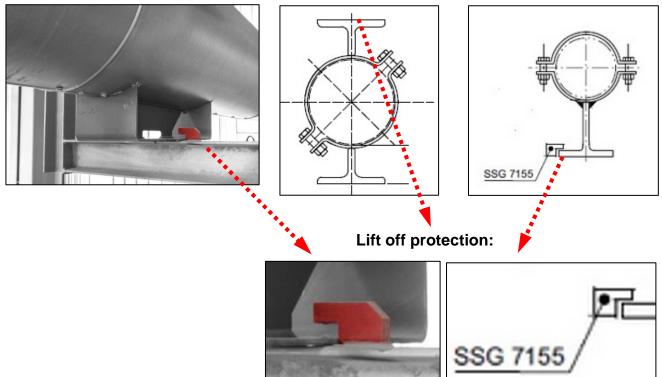
Limit Stop

- Limit Stop.
  - Active in vertical direction only, all other translations and rotations are free (PX, PY and PZ= free).
- "Connected to" option allows connection to other existing beam or pipe structures in model
- Coefficient of friction steel steel shall be μ=0.3 according to EN 13480 chapter 13.7.
- Stiffness is the stiffness of secondary steel and pipe fittings.

Data Types			? ×
C Anchor	C Hanger	С	Snubber
C Branch SIF	C Harmonic Load	С	Spider
Conc. Mass	C Jacket End Cap	C	Threaded Joint
Constant Support	C Limit Stop	С	Time Varying Load
C Flange	C Nozzle	С	User Hanger
C Force	C Restraint	С	User SIF
C Force Sp. Load	C Rod Hanger	С	Weld
Guide	C Skewed Restrain	tO	Generic Support
OK Cance	4		

Limit stop at node 140	$\times$
Tag	
Upper limit (mm)	
Lower limit 0.000 (mm)	
Direction	
X comp         Y comp         Z comp           1.000         1.000         1.000	ŗ
Friction coefficient	
Stiffness Rigid (N/mm)	
Connected to	
Level Tag 📃 🚽	
Axial Sheary Shearz	
OK Cancel Vertical	

# 14. Lisega Sliding shoe, SSG type 12 &13



CAEPIPE menus:

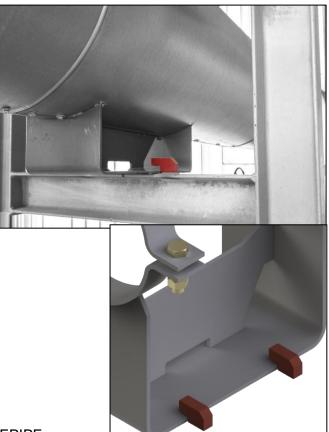
### Limit Stop

- Limit Stop.
  - Active in vertical direction only, all other translations and rotations are free (PX, PY and PZ= free).
  - Specifying a value for "Upper limit" will restrain upward movement.
     In figures below a gap of 2 mm is defined for upward movement of the piping.
  - Note that the "hook" and SSG 7155 vertical restraint can restrain lateral movement if the lateral movements are large.
- "Connected to" option allows connection to other existing beam or pipe structures in model
- Coefficient of friction steel steel shall be μ=0.3 according to EN 13480 chapter 13.7.
- Stiffness is the stiffness of secondary steel and pipe fittings.

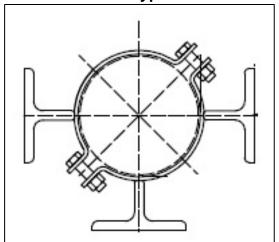
Data Types			? ×
C Anchor	C Hanger	$^{\circ}$	Snubber
C Branch SIF	C Harmonic Load	C	Spider
C Conc. Mass	C Jacket End Cap	C	Threaded Joint
C Constant Support	C Limit Stop	С	Time Varying Load
C Flange	C Nozzle	С	User Hanger
C Force	C Restraint	C	User SIF
C Force Sp. Load	C Rod Hanger	C	Weld
C Guide	C Skewed Restrain	tO	Generic Support
OK Cance	4		

Limit stop at node 140 $ imes$					
	Tag				
Upper	limit 2.0	(mm)			
Lower	limit 0.000	(mm)			
Direction					
× comp	Y comp	Z comp 1.000			
Friction coeffic	cient				
Stiff	ness Rigid	(N/mm)			
Connecte	ed to				
Level	Tag	<b>~</b>			
Axial	Shear y	Shear z			
OK	Cancel	Vertical			

# 15. Lisega Sliding shoe w. guide, SSG type 14



SSG type 14



Data Types				?	×
C Anchor	С	Hanger	C	Snubber	
O Branch SIF	С	Harmonic Load	С	Spider	
C Conc. Mass	С	Jacket End Cap	C	Threaded Jo	oint
C Constant Support	Ο	Limit Stop	С	Time Varying	g Load
C Flange	C	Nozzle	C	User Hange	r
C Force	С	Restraint	C	User SIF	
🔿 Force Sp. Load	С	Rod Hanger	C	Weld	
C Guide	С	Skewed Restraint	С	Generic Sup	port
OK Cancel					

CAEPIPE menus:

Limit Stop

- This support is built up by using Limit Stops
  - First limit stop is acting in vertical direction
  - Second limit stop is acting in horizontal direction
- Sample input is shown below for a pipe moving in X-direction, having a gap of 2 mm in lateral direction on both sides of pipe:

Node	Туре	DX (mm)	DY (mm)	DZ (mm)	Matl	Sect	Load	Data
Sliding	; shoe & lat	eral suppo	rt, SSG typ	e 14				
500		5000			M2	S1	L4	Limit stop
500	Location							Limit stop

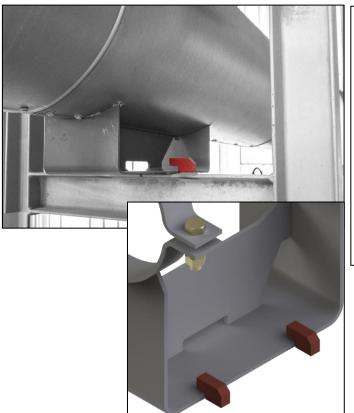
First limit stop acting in vertical direction:

Limit stop at	node 500		×
	Tag		
Uppe	r limit	(mm)	
Lowe	r limit 0.000	(mm)	
Direction			-
× comp	Y comp	Z comp 1.000	
Friction coeff	icient 0.3		
Stif	fness Rigid	(N/mm)	
Connect	ed to		
Leve	I Tag	Ŧ	
Axial	Shear y	Shear <u>z</u>	
OK	Cancel	⊻ertical	

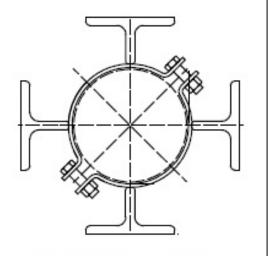
Second limit stop acting in horizontal direction:

Limit stop at r	node 500	×
	Tag	
Upper	limit 2	(mm)
Lower	limit -2	(mm)
Direction		
× comp	Y comp	Z comp
Friction coeffic	cient 0.3	
Stiff	ness Rigid	(N/mm)
Connecte	ed to	
Level	Tag	<b>~</b>
Axial	Shear y	Shear z
OK	Cancel	Vertical

# 16. Lisega Sliding shoe w. guide, SSG type 15



SSG type 15

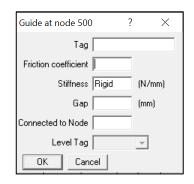


Data Types		? ×
C Anchor	C Hanger	C Snubber
C Branch SIF	C Harmonic Load	C Spider
Conc. Mass	C Jacket End Cap	C Threaded Joint
C Constant Support	C Limit Stop	C Time Varying Load
C Flange	C Nozzle	O User Hanger
C Force	C Restraint	O User SIF
C Force Sp. Load	C Rod Hanger	○ Weld
🔵 Guide	C Skewed Restrain	C Generic Support
OK Cance	1	



### Guide

- Active in lateral directions only, axial translation and all rotations are free (PX, PY and PZ= free).
- Coefficient of friction steel steel shall be μ=0.3 according to EN 13480 chapter 13.7.
- Stiffness is the stiffness of secondary steel and pipe fittings
- Gap: this is a uniform radial gap around the circumference of the pipe.
  - Specifying a gap makes sense only for a vertical run.
  - For a horizontal run use modelling scheme according to SSG type 14 applying an upper limit on vertical limit stop.
- "Connected to" option allows connection to other existing beam or pipe structures in model



# 17. Lisega roller bearing support



CAEPIPE menus:

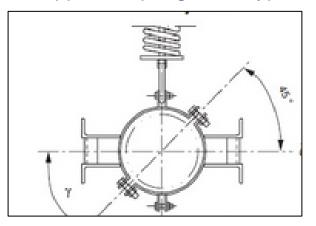
### Limit stop

- Active in vertical direction only. Axial translation and all rotations are free (PX, PY and PZ= free).
- Coefficient of friction must be set to zero:
- Use Limit Stop to restrain lateral movements, see SSG type 14 above.

Data Types		? ×
C Anchor	C Hanger	C Snubber
C Branch SIF	C Harmonic Load	C Spider
C Conc. Mass	O Jacket End Cap	C Threaded Joint
C Constant Support	C Limit Stop	C Time Varying Load
C Flange	Nozzle	C User Hanger
C Force	C Restraint	C User SIF
C Force Sp. Load	C Rod Hanger	C Weld
C Guide	C Skewed Restrain	t C Generic Support
OK Cance	el	

Limit stop at nod	e 500	×
Tag		
Upper limi		(mm)
Lower limi	0.000	(mm)
Direction		
X comp	Y comp	Z comp 1.000
Friction coefficient	: 0	,
Stiffness	Rigid	(N/mm)
Connected to		
Level Tag		I
Axial	Sheary	Shear <u>z</u>
ОК	Cancel	⊻ertical

### 18. Lateral support & spring, SSG type 17 & 18



CAEPIPE menus:

### Spring hanger with guide (optional)

This support is a combination of a spring hanger and limit stop acting in the lateral direction.

The pipe support in the top right picture, SSG type 17 - 18 is modelled as follows:

- 1. Create a spring hanger.
- 2. Use "Location" command and add a limit stop at the same node point.

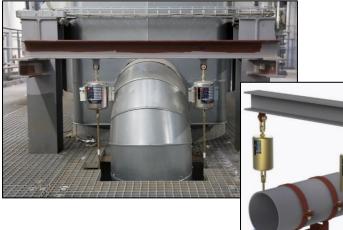
Sample input is shown for a pipe run moving in the X-direction:

SSG support type 17 & 18								
510		4000			М2	S1	L4	Hanger
510	Location							Limit stop

Hanger at node 510 ? ×	Limit stop at node 510 ×
Tag Type Lisega	Tag Upper limit 1 (mm) Lower limit -1 (mm)
Number of Hangers 1 Load Variation 25 (%)	Direction       X comp     Y comp       Z comp       1.0
Hanger below Short Range     Connected to	Friction coefficient 0.3 Stäffness Rigid (N/mm)
Level Tag v OK Cancel	Connected to Level Tag 🚽 Axial Sheary Shearz
	OK Cancel Vertical

Data Types		? ×
C Anchor	🔵 Hanger	C Snubber
C Branch SIF	C Harmonic Load	C Spider
C Conc. Mass	C Jacket End Cap	C Threaded Joint
C Constant Supp	oort 🔵 Limit Stop	C Time Varying Load
C Flange	C Nozzle	O User Hanger
C Force	C Restraint	C User SIF
C Force Sp. Loa	d 🔿 Rod Hanger	Weld
C Guide	C Skewed Restrain	it 🔿 Generic Support
OK Ca	ncel	

#### 19. Lisega spring support vert. pipe, SSG type 27 - 30



**CAEPIPE** menus:

+ Spring hanger with guide (optional)

This support is a combination of a spring hanger guide or a limit stop acting in lateral direction.

The pipe support in the top right picture, SSG type 27 - 30is modelled as follows:

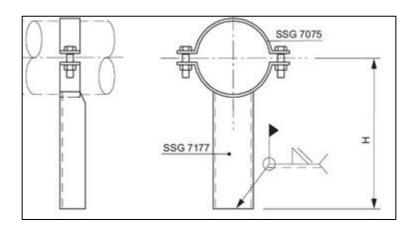
- 1. Create a spring hanger with option using two (2) spring hangers.
- 2. Use the "Location" command and add a guide or a limit stop at the same node point depending on which directions are to be restrained.

Sample input is shown for a pipe run going in Z-direction: SSG support type 27 - 30 5 5

	PERSON OF	 				-			
10				5000	M2	S1	L4	Hanger	
10	Location							Guide	
		Hange	er at node 510	? ×		Guide at r	node 510	?	×
			ber of Hangers Load Variation	▼ 25 (%) Short Range	в	Connected	Tag Defficient C Stiffness F Gap 1 to Node evel Tag Cance	Rigid (N/m .0 (mm)	

Data Types			?	×			
C Anchor	🔾 Hanger	C	Snubber				
C Branch SIF	C Harmonic Load	C	Spider				
C Conc. Mass	C Jacket End Cap	C	Threaded	Joint			
C Constant Support	C Limit Stop	С	Time Varyi	ng Load			
C Flange	C Nozzle	C	User Hang	ler			
C Force	C Restraint	C	User SIF				
C Force Sp. Load	C Rod Hanger	C	Weld				
🔵 Guide	C Skewed Restraint	С	Generic Su	upport			
OK Cancel							

### 20. Pipe – beam connection, SSG type 31

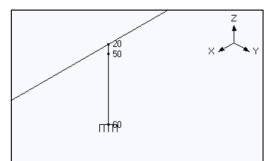


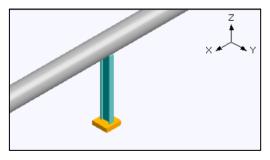
This pipe support is built as a structural beam connecting to the pipe:

Consider the following using this support:

- This support is not intended for large axial forces or displacements. Sliding between pipe clamp is not desired.
- The angulation of pipe must be small. Angle between beam pipe should be 90°.
- Create a rigid element within the pipe (between node 20 and node 50 in figure) to get a more correct stiffness of the beam-pipe connection. Otherwise, the support will be too flexible.
- Additional flexibility between pipe and beam can be defined using an "Elastic Element"
  - a. Stiffness values must be obtained by other means, for example by FE-analysis

Node	Туре	DX (mm)	DY (mm)	DZ (mm)	Matl	Sect	Load	Data			
Title =	Title = pipe supports										
10	From							Anchor			
20		6000			M1	350	L1				
30	Bend	5000			M1	350	L1				
40			5500		M1	350	L1	Anchor			
20	From										
50	Rigid			-175	M1	350	L1				
60	Beam			-1250	BM1	C200	BL1	Anchor			

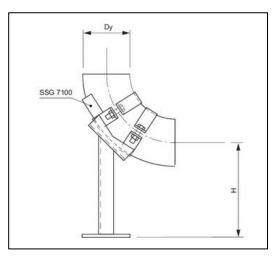




Node	Туре	DX (mm)	DY (mm)	DZ (mm)	Matl	Sect	Load	Data			
Title =	Title = pipe supports										
10	From							Anchor			
20		6000			M1	350	L1				
30	Bend	5000			M1	350	L1				
40			5500		M1	350	L1	Anchor			
20	From										
50	Rigid			-175	M1	350	L1				
51	Elastic				М1	350	L1				
60	Beam			-1250	BM1	C200	BL1	Anchor			

<ul> <li>Translational Stiffness</li></ul>	Rotational Stiffness (Nm/deg)
kx 1e20	kxx 3457
ky 1e20	kyy 1850
kz 1e20	kzz 7e5
Local x axis	Local y axis
× comp 1	× comp 0
Y comp 0	Y comp 1
Z comp 0	Z comp 0

#### 21. Trunnion support, SSG type 32



This pipe support is built as a structural beam connected to the pipe bend:

Consider the following using this support:

- This support is not intended for large horizontal • forces or displacements. Sliding between pipe and clamp is not allowed.
- The angulation of pipe must be small. .
- Create a rigid element within the bend (between • node 40B and node 50 in figure) to get a more correct stiffness of the beam-pipe connection. Otherwise, the support will be too flexible.
- Additional flexibility between pipe and beam • can be defined by using "Coupling"

Node Type DX (mm) DY (mm) DZ (mm) Matl Sect Load Data

3500

425 М1 350 L1

1250 BM1 C200 BL1

5500

M1 350 L1

М1 350

M1 350 L1

M1 350 L1 Ancho

Title

10 From

20

30 40

45

40B

50

60 Bean 0003

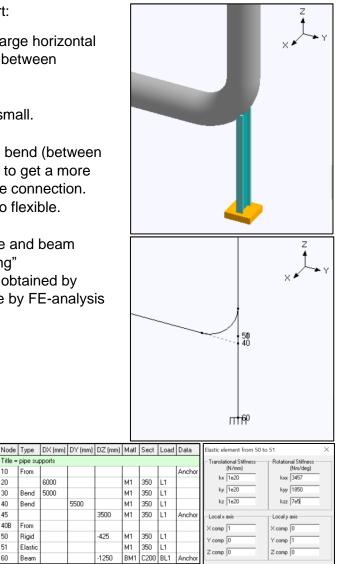
Bend 5000

Bend

From

Rigid

a. Stiffness values must be obtained by other means, for example by FE-analysis



OK Cancel

Title

10 From

20

30

40

45

40B From

50 Rigid

51 Elastic

60 Beam

Bend

Bend

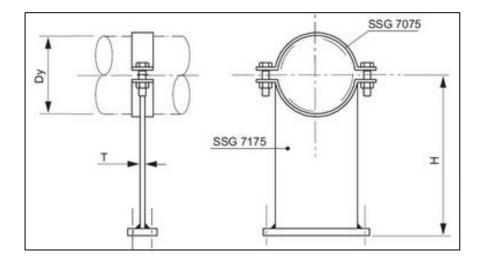
6000

5000

5500

-425

## 22. Axial flex plate support, SSG type 33 & 34

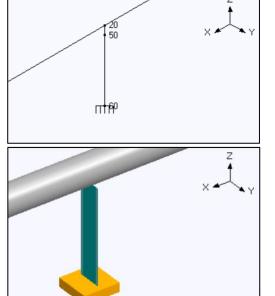


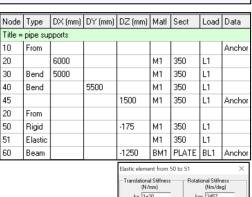
This pipe support is built as a structural beam connected to the pipe:

Consider the following using this support:

- This support is flexible in the axial direction and is stiff in the lateral and vertical directions.
- Create a rigid element within the pipe (between node 20 and node 50 in figure) to get a more correct stiffness of the beam-pipe connection. Otherwise, the support will be too flexible
- Additional flexibility between pipe and beam can be defined using "Coupling"
  - a. Stiffness values must be obtained by other means, for example by FE-analysis

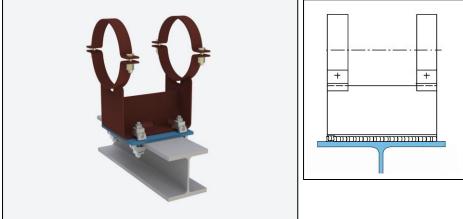
Node	Туре	DX (mm)	DY (mm)	DZ (mm)	Matl	Sect	Load	Data
Title = pipe supports								
10	From							Anchor
20		6000			M1	350	L1	
30	Bend	5000			M1	350	L1	
40	Bend		5500		M1	350	L1	
45				1500	M1	350	L1	Anchor
20	From							
50	Rigid			-175	M1	350	L1	
60	Beam			-1250	BM1	PLATE	BL1	Anchor

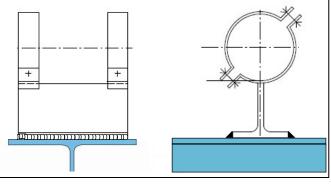




Translational Stiffness (N/mm)	Rotational Stiffness (Nm/deg)
kx 1e20	kж 3457
ky 1e20	kyy 1850
kz 1e20	kzz 7e5
Local x axis	Local y axis
× comp 1	× comp 0
Y comp 0	Y comp 1
Z comp 0	Z comp 0
2 comp  0	2 comp  0
OK Cancel	

## 23. Lisega anchor support, SSG type 35 & 36





CAEPIPE menus:

Lisega anchor support, SSG type 35 & 36

Rigid support, Anchor

- 1. All translations and rotations are restrained
- 2. Stiffness values can be specified for all degrees of freedom
- 3. It is not possible to specify any gaps for any direction or rotation

Data Types			?	$\times$
Anchor	C Hanger	С	Snubber	
C Branch SIF	C Harmonic Load	C	Spider	
C Conc. Mass	C Jacket End Cap	$\mathbb{C}$	Threaded J	loint
C Constant Support	C Limit Stop	С	Time Varyir	ng Load
C Flange	C Nozzle	С	User Hang	er
C Force	C Restraint	С	User SIF	
C Force Sp. Load	C Rod Hanger	C	Weld	
C Guide	C Skewed Restrain	C	Generic Su	ipport
OK Cance				

Anchor at node 220			?	$\times$		
Tag	Level Ta	- ,		Ţ		
Translational stiffness (N/mm) KX KY KZ Rigid Rigid Rigid	Rotation KXX Rigid	nal stiffness KYY Rigid	(Nm/deg) KZZ Rigid			
Releases for hanger selection $\square imes$	ПΥП	z⊡××		ZZ		
OK Cancel Displaceme	ents 🔽	Rigid 🕅	Anchor in F	Pipe LCS		
-						
S	Specified [	Displacem	ents for A	nchor at n	ode 220	
	Load T1	× (mm)	Y (mm)	Z (mm)	XX (deg)	ſ
	T2					ſ
	Seismic					ſ
:	Settlement					ſ
	OK	Cance	🗌 🗆 Dis	splacement	s in Pipe LC	s

?

YY (deg) ZZ (deg)

 $\times$