

TRAVE SU 3 APPOGGI (u.d.m.: [m],[kN])

SYSTEM

L= 1

:

C

JOINTS

1	Y=	.0	Z=	0.	:	per travata, serve solo modif. Y
2	Y=	4.0	Z=	0.	:	
3	Y=	5.0	Z=	0.	:	
4	Y=	6.0	Z=	0.	:	

:

C

RESTRAINTS

1, 4	R=1,0,0,0,1,1	:	la struttura giace nel piano zy
1	R=1,1,1,0,1,1	:	
2	R=1,1,1,0,1,1	:	appoggio in fondazione
4	R=1,1,1,0,1,1	:	

:

C

FRAME

NM= 1 NL= 1 : n.materiali & sezioni; n.carichi distrib.

1	A=39.1E-4	I=3892E-8	E=2E8	:	esatti, da profil., per spostam.!
1	WL=0.00000,-0.0,0.00000	:	carico distrib.traversi (v."NSL")		

1, 1, 2 M=1 NSL=0 LP=3,0

2, 2, 3 M=1 NSL=0 LP=3,0

3, 3, 4 M=1 NSL=0 LP=3,0

:

C

LOADS

3 L=1 F=0.,0.,-100.

:

F R A M E E L E M E N T F O R C E S

ELT AXIAL TORQ	LOAD COND	AXIAL DIST		1-2 PLANE		1-3 PLANE	
		FORCE	ENDI	SHEAR	MOMENT	SHEAR	MOMENT
1	1	.00					
			.0	-3.12	.00		
			4.0	-3.12	-12.50		
2	1	.00					
			.0	56.25	-12.50		
			1.0	56.25	43.75		
3	1	.00					
			.0	-43.75	43.75		
			1.0	-43.75	.00		

FILE:t3a.SOL

TRAVE SU 3 APPOGGI (u.d.m.: [m],[kN]

)

J O I N T D I S P L A C E M E N T S

LOAD CONDITION 1 - DISPLACEMENTS "U" AND ROTATIONS "R"

JOINT	U(Y)	U(Z)	R(X)
1	.000000	.000000	.001071
2	.000000	.000000	-.002141
3	.000000	-.001740	-.000134
4	.000000	.000000	.002676

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PROGRAM:SAP

90/FILE:t3a.SOL

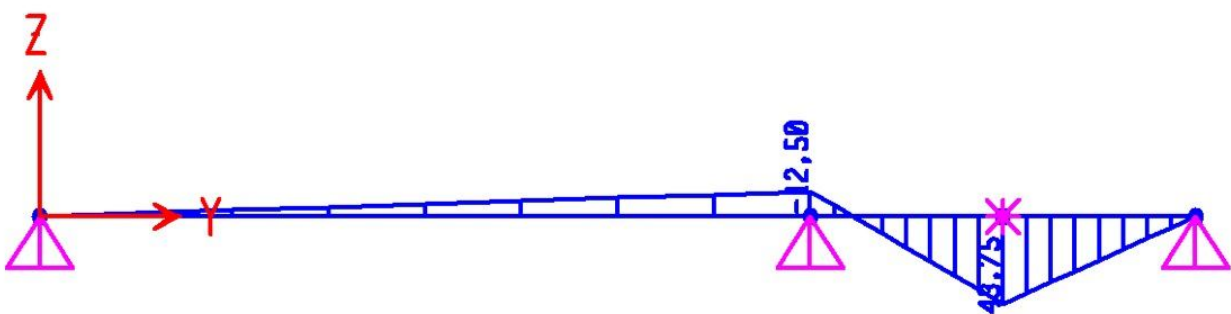
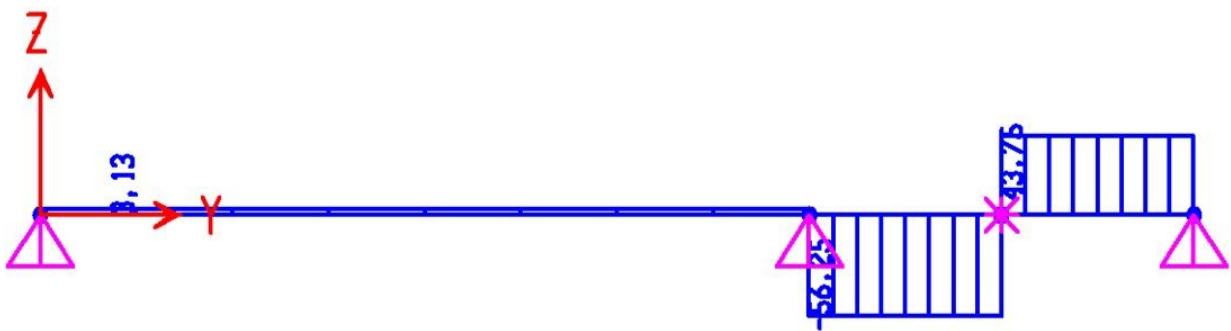
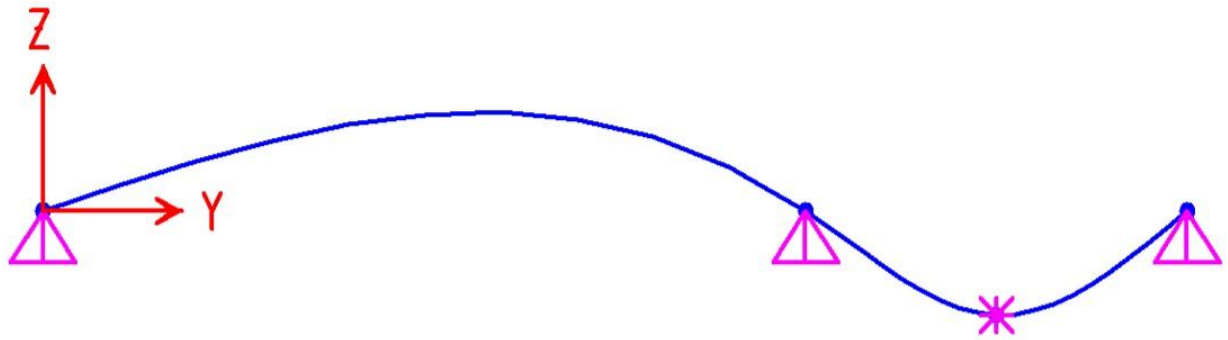
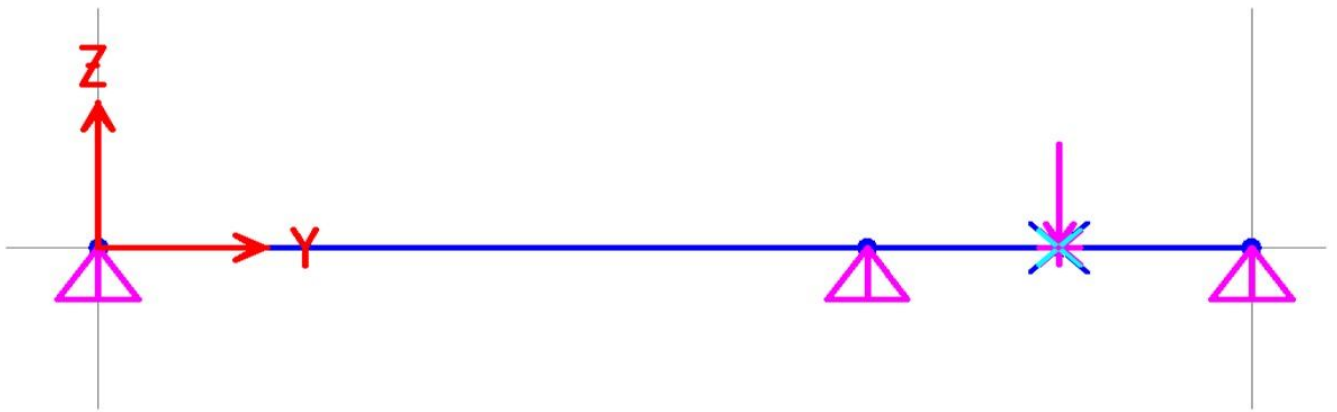
TRAVE SU 3 APPOGGI (u.d.m.: [m],[kN]

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R E A C T I O N S A N D A P P L I E D F O R C E S

LOAD CONDITION 1 - FORCES "F" AND MOMENTS "M"

JOINT	F(Z)	M(X)
1	-3.1250	.0000
2	59.3750	.0000
3	-100.0000	.0000
4	43.7500	.0000
TOTAL	-.7105E-14	.2197E-13



TRAVE SU 3 APPOGGI (u.d.m. : [m], [kN])

J O I N T D I S P L A C E M E N T S

JOINT	LOAD	U1	U2	U3	R1	R2
R3						
1	1	0,0000	0,0000	0,0000	1,071E-03	0,0000
2	1	0,0000	0,0000	0,0000	-2,141E-03	0,0000
3	1	0,0000	0,0000	-1,740E-03	-1,338E-04	0,0000
4	1	0,0000	0,0000	0,0000	2,676E-03	0,0000

TRAVE SU 3 APPOGGI (u.d.m. : [m], [kN])

J O I N T R E A C T I O N S

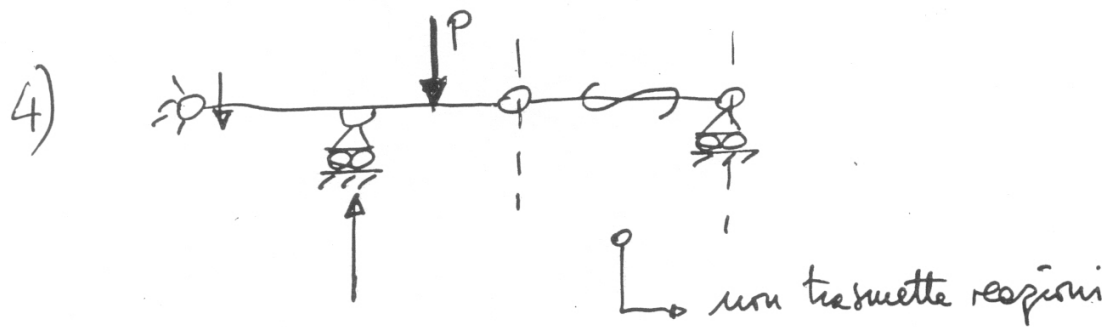
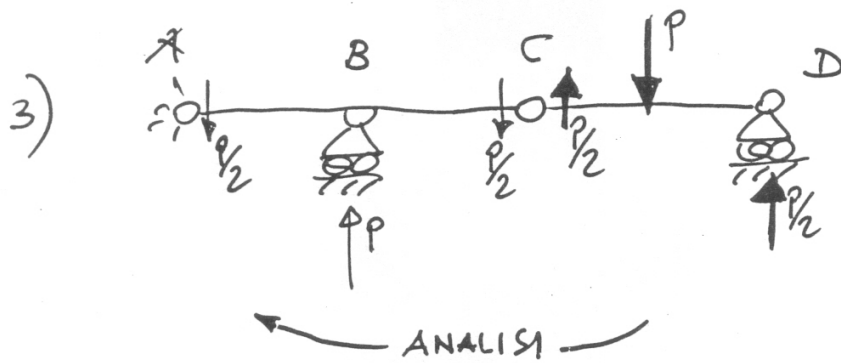
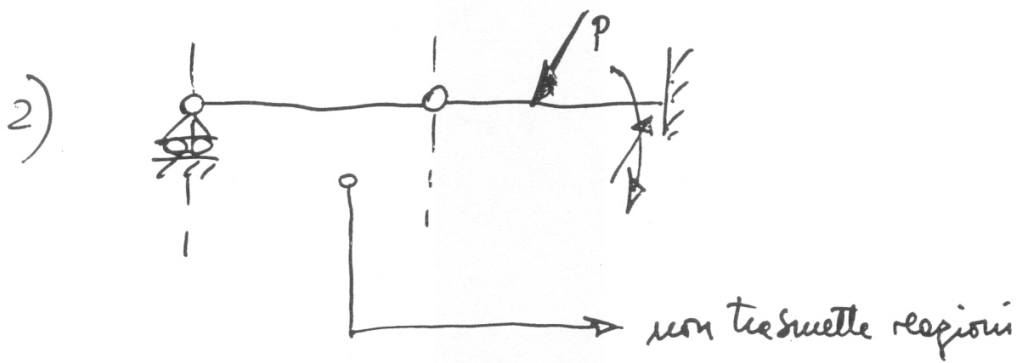
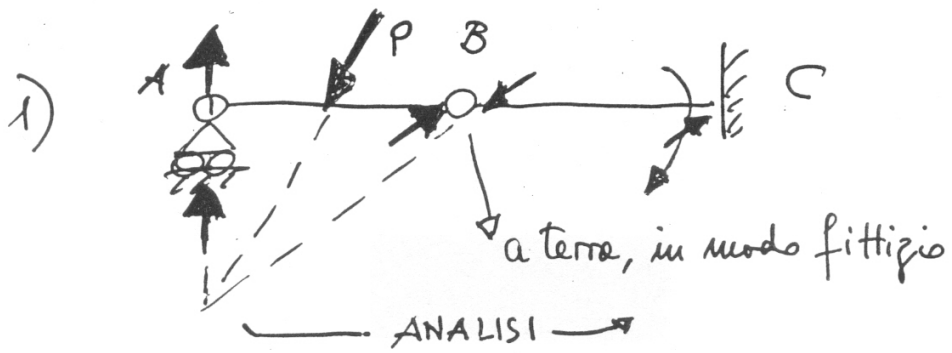
JOINT	LOAD	F1	F2	F3	M1	M2
M3						
1	1	0,0000	0,0000	-3,1250	0,0000	0,0000
2	1	0,0000	0,0000	59,3750	0,0000	0,0000
3	1	0,0000	0,0000	0,0000	0,0000	0,0000
4	1	0,0000	0,0000	43,7500	0,0000	0,0000

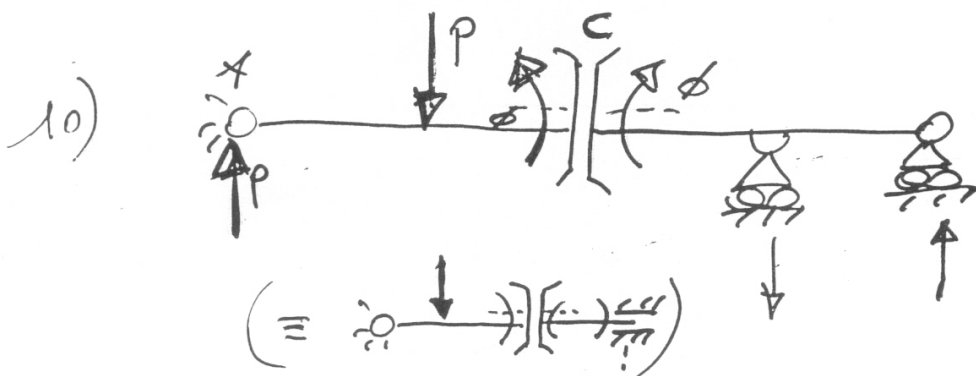
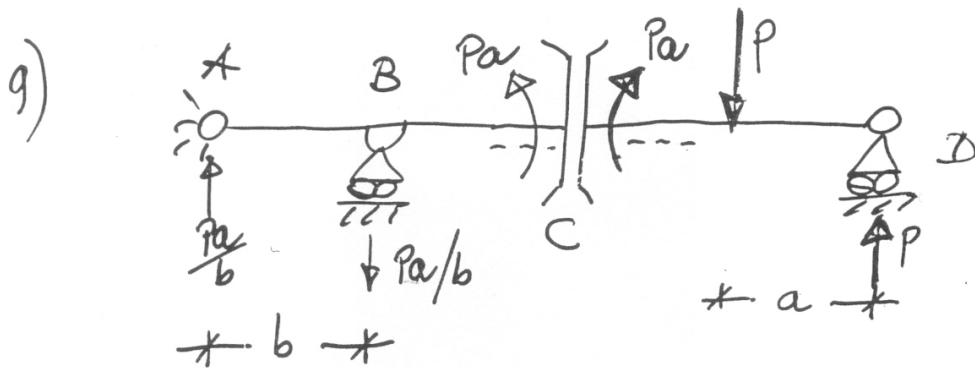
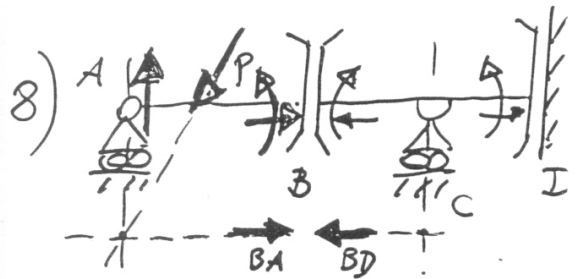
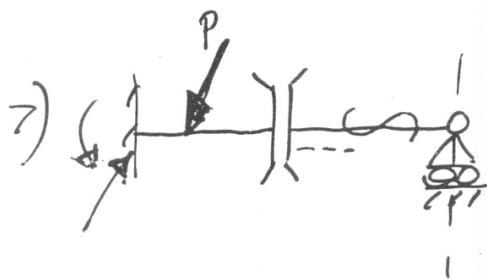
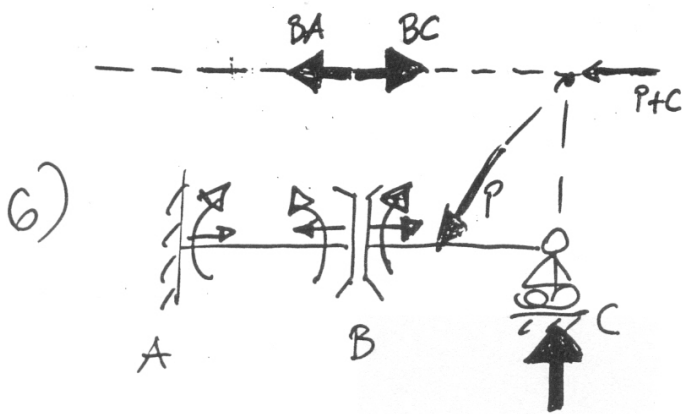
TRAVE SU 3 APPOGGI (u.d.m. : [m], [kN])

F R A M E E L E M E N T F O R C E S

FRAME	LOAD	LOC	P	V2	V3	T	M2
M3							
1	1	0,00	0,00	3,13	0,00	0,00	0,00
		1,00	0,00	3,13	0,00	0,00	0,00
		2,00	0,00	3,13	0,00	0,00	0,00
		3,00	0,00	3,13	0,00	0,00	0,00
		4,00	0,00	3,13	0,00	0,00	0,00
2	1	0,00	0,00	-56,25	0,00	0,00	0,00
		2,5E-01	0,00	-56,25	0,00	0,00	0,00
		5,0E-01	0,00	-56,25	0,00	0,00	0,00
		7,5E-01	0,00	-56,25	0,00	0,00	0,00
		1,00	0,00	-56,25	0,00	0,00	0,00
3	1	0,00	0,00	43,75	0,00	0,00	0,00

32,81	2,5E-01	0,00	43,75	0,00	0,00	0,00
21,88	5,0E-01	0,00	43,75	0,00	0,00	0,00
10,94	7,5E-01	0,00	43,75	0,00	0,00	0,00
0,00	1,00	0,00	43,75	0,00	0,00	0,00





Estratto istruz. Frame per Release Code

nel ji jj M=msp_i, msp_j, i_{var} LP=n₁,n₂
LR=r₁,r₂,r₃,r₄,r₅,r₆ RE=r_i,r_j RZ=z
MS=m_i,m_j NSL=l₁,l₂,...,l_{nld}
G=n_g,n_{inc},g₁,g₂,g₃,g₄

r1	(25) [0]	End I, moment 3 release code
r2		End J, moment 3 release code
r3		Axial force release code
r4		End I, moment 2 release code
r5		End J, moment 2 release code
r6		Torsional moment release code

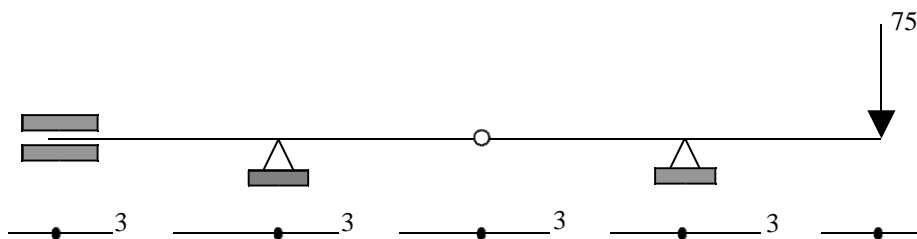
25. When more than one element connects to a joint and it is known that certain member forces at that joint of a particular element are zero, the release codes associated with those member forces of the element need to be activated. In the example shown in Figure IX-15, the diagonal element has a moment connection at End I and a pin connection at End J. All the other elements connecting to the node at End J are continuous. Therefore, in order to model the pin condition the Moment 3 at End J should be set to zero. This is achieved by defining the element release code set for the diagonal member as follows:

$$LR=0,1,0,0,0,0$$

A one (1) value for any of the release options r1 through r6 activates the corresponding release condition. A zero (0) will retain continuity.

SC20304:

Kn, m



sa20304 (u.d.m.: [m],[kN])

SYSTEM

L= 1

:

C

JOINTS

1 Y= .0 Z= 0. : per travata, serve solo modif. Y
2 Y= 3.0 Z= 0. :
3 Y= 6.0 Z= 0. :
4 Y= 9.0 Z= 0. :
5 Y= 12.0 Z= 0. :

:

C

RESTRAINTS

1, 5 R=1,0,0,0,1,1 : la struttura giace nel piano zy
1 R=1,1,1,1,1,1 : giunti in fondazione
2 R=1,1,1,0,1,1 : appoggio in fondazione
4 R=1,1,1,0,1,1 : "

:

C

FRAME

NM= 1 NL= 1 : n.materiali & sezioni; n.carichi distrib.

1 A=98.8E-4 I=33740E-8 E=2E8 : esatti, da profil., per spostam.!

1 WL=0.00000,0.0,0.00000 : carico distrib.traversi (v."NSL")

1, 1, 2 M=1 NSL=0 LP=3,0 : 1, c'e' cerniera

2, 2, 3 M=1 NSL=0 LP=3,0 LR=0,1

3, 3, 4 M=1 NSL=0 LP=3,0 LR=1,0

4, 4, 5 M=1 NSL=0 LP=3,0

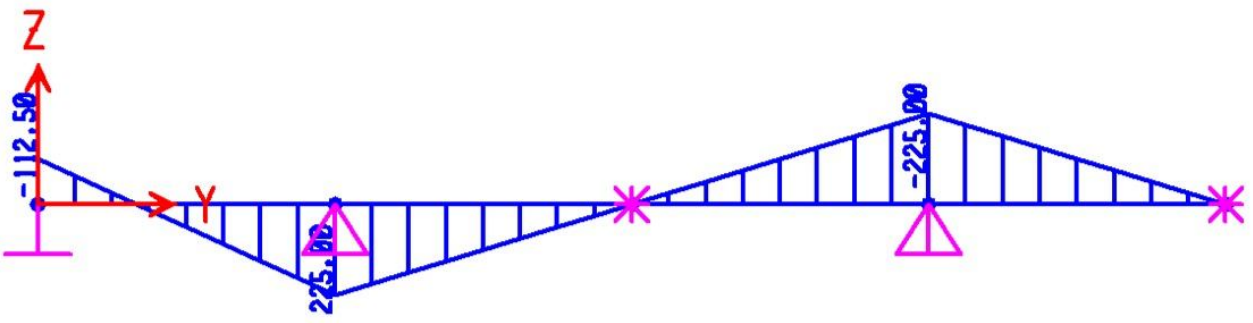
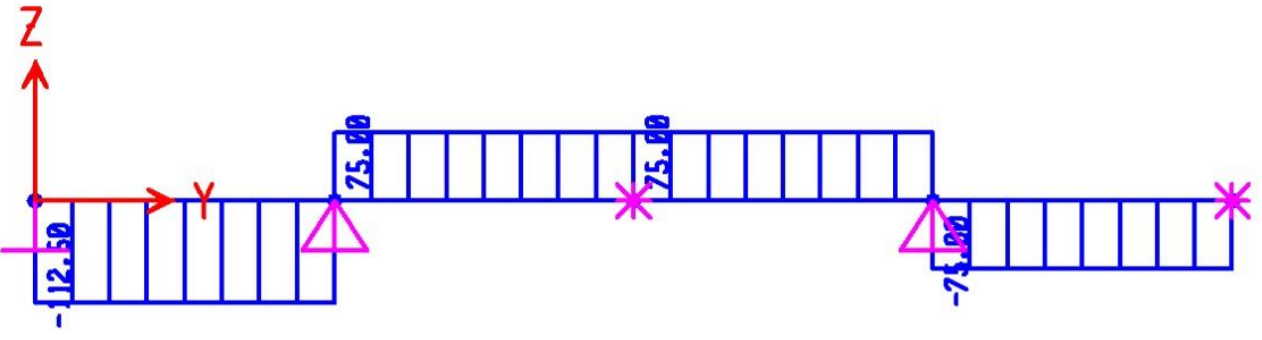
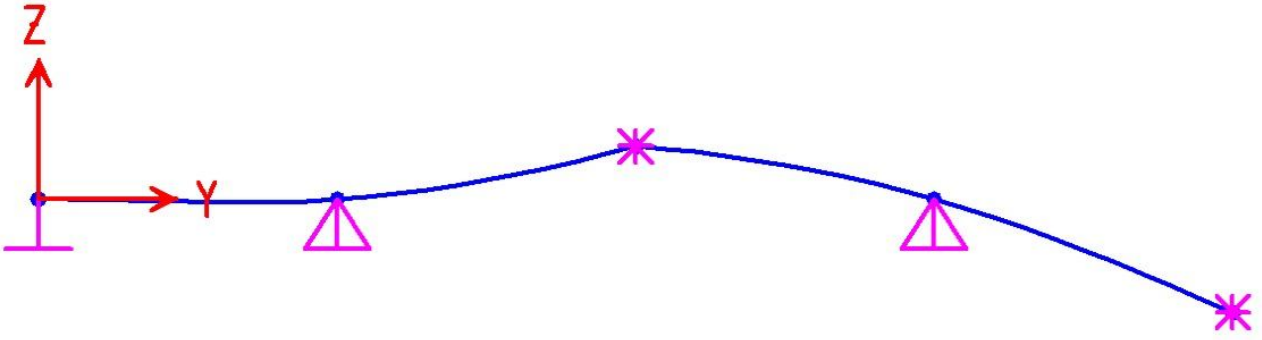
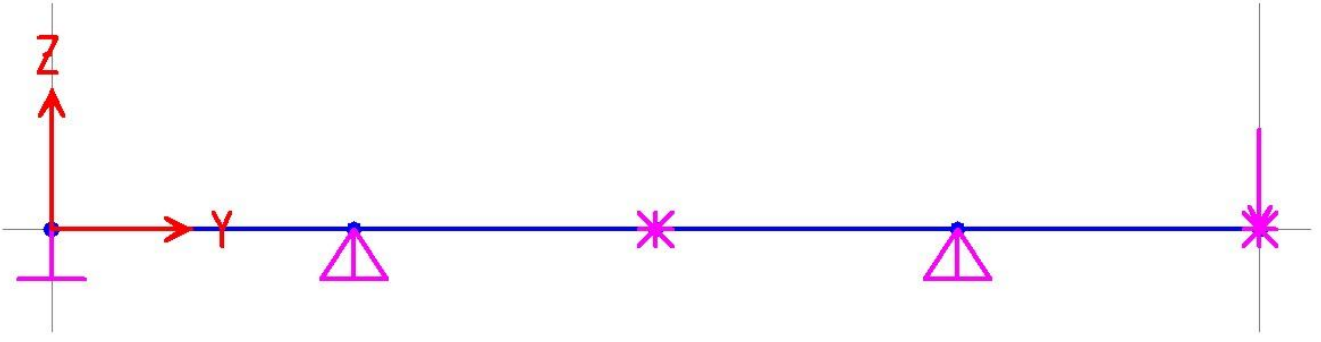
:

C

LOADS

5 L=1 F=0.,0.,-75.

:



56,25	2,25	0,00	75,00	0,00	0,00	0,00
0,00	3,00	0,00	75,00	0,00	0,00	0,00
3 1						
0,00	0,00	0,00	75,00	0,00	0,00	0,00
-56,25	7,5E-01	0,00	75,00	0,00	0,00	0,00
-112,50	1,50	0,00	75,00	0,00	0,00	0,00
-168,75	2,25	0,00	75,00	0,00	0,00	0,00
-225,00	3,00	0,00	75,00	0,00	0,00	0,00
4 1						
-225,00	0,00	0,00	-75,00	0,00	0,00	0,00
-168,75	7,5E-01	0,00	-75,00	0,00	0,00	0,00
-112,50	1,50	0,00	-75,00	0,00	0,00	0,00
-56,25	2,25	0,00	-75,00	0,00	0,00	0,00
0,00	3,00	0,00	-75,00	0,00	0,00	0,00

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1) Dimensionare la struttura seguente, utilizzando profilati in acciaio del tipo "IPE" (UNI 5398-64).

2) Assegnato un valore di 2×10^5 MPa al modulo di Young, si valuti lo spostamento nel punto C della struttura in 1).

SE29899 (u.d.m. : [m], [kN])

SYSTEM

L= 1

:

C

JOINTS

1	Y=	.0	Z=	0.	:	per travata, serve solo modif. Y
2	Y=	6.0	Z=	0.	:	
3	Y=	8.0	Z=	0.	:	
4	Y=	10.0	Z=	0.	:	
5	Y=	12.0	Z=	0.	:	
6	Y=	14.9	Z=	0.	:	LEGGERMENTE SPOSTATO (DAREBBE ERRORE)
7	Y=	15.0	Z=	0.	:	
8	Y=	18.0	Z=	0.	:	

:

C

RESTRAINTS

1, 8	R=1,0,0,0,1,1	:	la struttura giace nel piano zy
1	R=1,0,1,1,1,1	:	giunti in fondazione
7	R=1,1,1,0,1,1	:	appoggio in fondazione
8	R=1,1,1,1,1,1	:	incastro in fondazione

:

C

FRAME

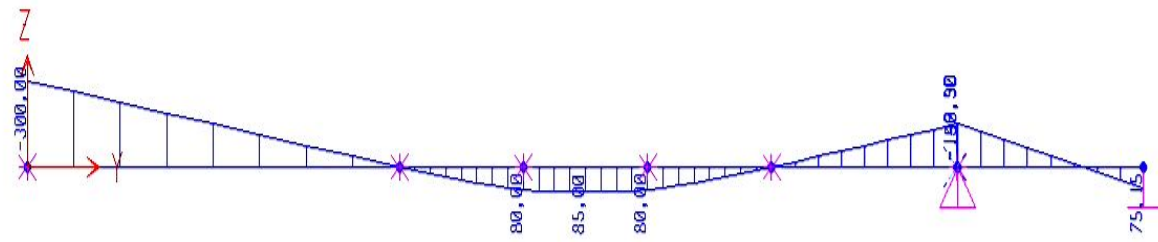
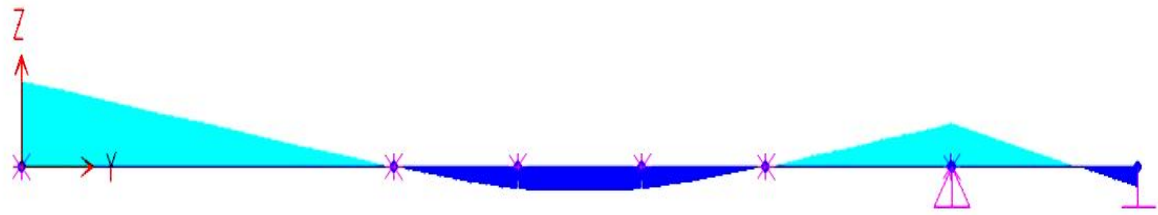
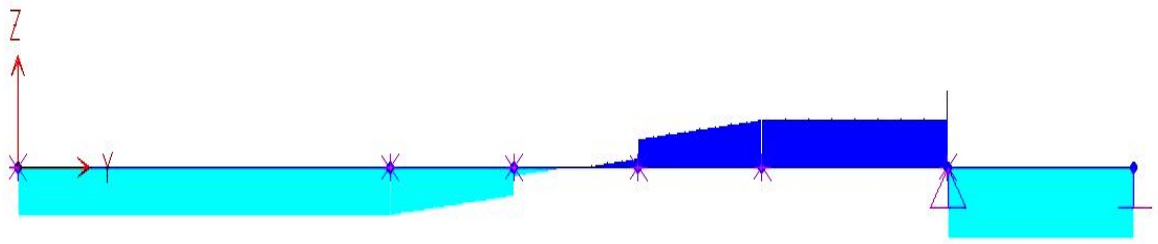
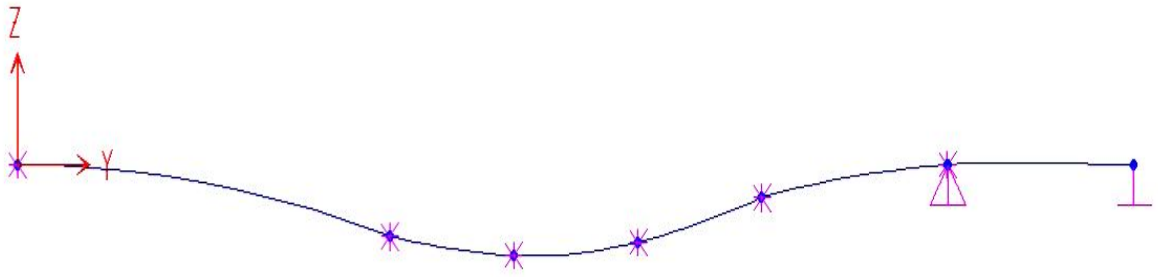
NM= 3	NL= 1	:	n.materiali & sezioni; n.carichi distrib.
1	A=116.E-4	I=48200E-8	E=2E8 : esatti, da profil., per spostam.!
2	A=84.5E-4	I=23130E-8	E=2E8 : esatti, da profil., per spostam.!
3	A=53.8E-4	I=8356E-8	E=2E8 : esatti, da profil., per spostam.!
1	WL= .00000,	- 10.,.00000	: carico distrib.traversi (v."NSL")
1, 1, 2	M=1	NSL=0	LP=3,0 LR=0,1 : 1, c'e' cerniera
2, 2, 3	M=3	NSL=1	LP=3,0 LR=1,0
3, 3, 4	M=3	NSL=1	LP=3,0
4, 4, 5	M=3	NSL=1	LP=3,0 LR=0,1
5, 5, 6	M=2	NSL=0	LP=3,0 LR=1,0
6, 6, 7	M=2	NSL=0	LP=3,0
7, 7, 8	M=2	NSL=0	LP=3,0

:

C

LOADS

3	L=1	F=0.,0.,-20.
4	L=1	F=0.,0.,-20.
6	L=1	F=0.,0.,-30.



SE29899 (u.d.m.: [m], [kN])

JOINT DISPLACEMENTS
TRANSLATIONS AND ROTATIONS, IN GLOBAL COORDINATES

LOAD 1 -----

JOINT	UX	UY	UZ	RX	RY	RZ
1	.000000	.000000	.000000	.000000	.000000	.000000
2	.000000	.000000	-0.037344	.000000	.000000	.000000
3	.000000	.000000	-0.047330	-0.001602	.000000	.000000
4	.000000	.000000	-0.040561	0.008371	.000000	.000000
5	.000000	.000000	-0.017038	.000000	.000000	.000000
6	.000000	.000000	-2.45E-05	0.002469	.000000	.000000
7	.000000	.000000	.000000	0.002437	.000000	.000000
8	.000000	.000000	.000000	.000000	.000000	.000000

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SE29899 (u.d.m.: [m], [kN])

APPLIED LOADS
FORCES AND MOMENTS ACTING ON JOINTS, IN GLOBAL COORDINATES

LOAD 1 -----

JOINT	FX	FY	FZ	MX	MY	MZ
2	.000000	.000000	-7.500000	.000000	.000000	.000000
3	.000000	.000000	-42.500000	1.666667	.000000	.000000
4	.000000	.000000	-42.500000	-1.666667	.000000	.000000
5	.000000	.000000	-7.500000	.000000	.000000	.000000
6	.000000	.000000	-30.000000	.000000	.000000	.000000

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SE29899 (u.d.m.: [m], [kN])

RESTRAINT FORCES (REACTIONS)
FORCES AND MOMENTS ACTING ON JOINTS, IN GLOBAL COORDINATES

LOAD 1 -----

JOINT	FX	FY	FZ	MX	MY	MZ
1	.000000	.000000	50.000000	300.000000	.000000	.000000
2	.000000	.000000	.000000	.000000	.000000	.000000
3	.000000	.000000	.000000	.000000	.000000	.000000
4	.000000	.000000	.000000	.000000	.000000	.000000
5	.000000	.000000	.000000	.000000	.000000	.000000
6	.000000	.000000	.000000	.000000	.000000	.000000
7	.000000	.000000	155.150000	.000000	.000000	.000000
8	.000000	.000000	-75.150000	75.150000	.000000	.000000

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SE29899 (u.d.m.: [m], [kN])

GLOBAL FORCE BALANCE
TOTAL FORCE AND MOMENT AT THE ORIGIN, IN GLOBAL COORDINATES

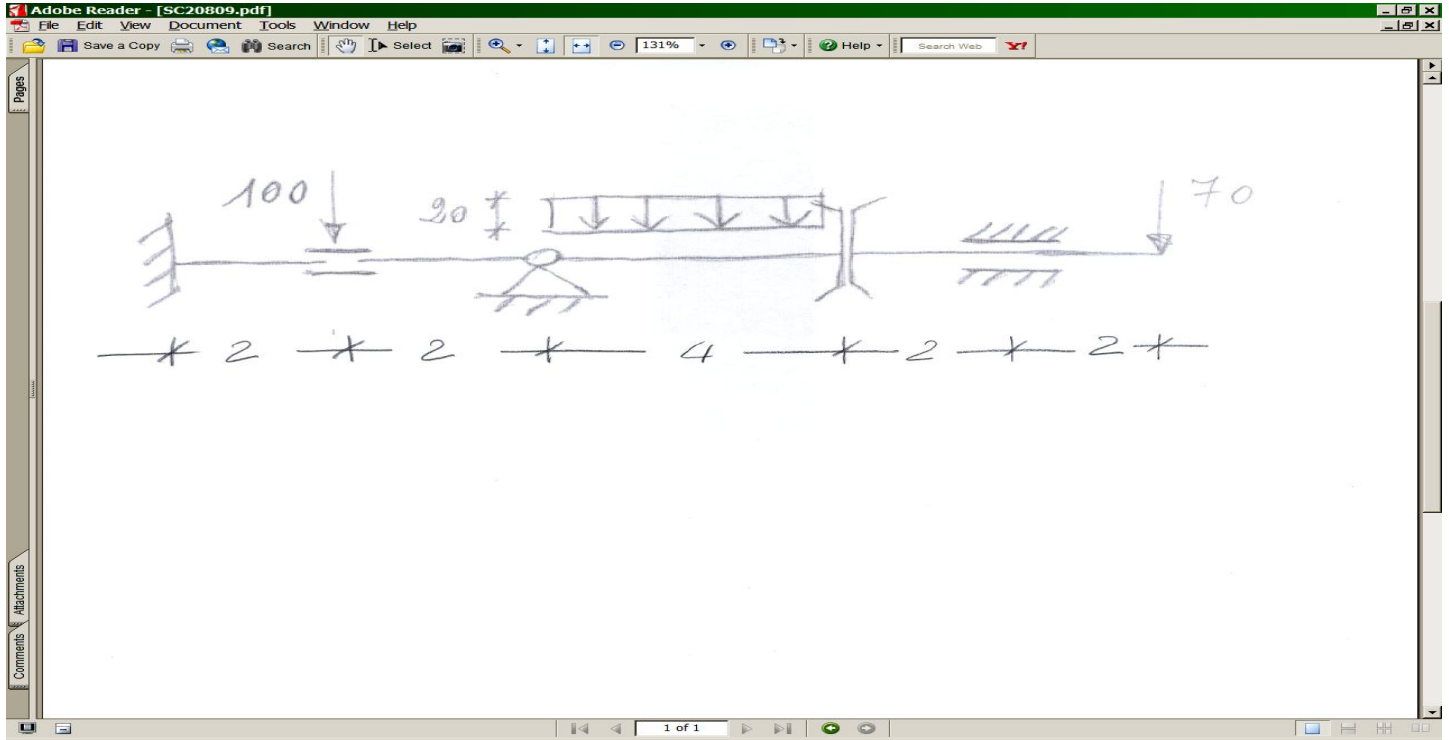
LOAD 1 -----

	FX	FY	FZ	MX	MY	MZ
APPLIED	.000000	.000000	-130.000000	-1349.700	.000000	.000000
REACTNS	.000000	.000000	130.000000	1349.700	.000000	.000000
TOTAL	.000000	.000000	7.36E-10	1.10E-08	.000000	.000000

SE29899 (u.d.m.: [m], [kN])

FRAME ELEMENT INTERNAL FORCES

ELEM	1	=====	LENGTH =	6.000000				
LOAD	1	-----						
REL DIST		P	V2	V3	T	M2	M3	
0.00000		.000000	-50.000000	.000000	.000000	.000000	-300.000000	
0.25000		.000000	-50.000000	.000000	.000000	.000000	-225.000000	
0.50000		.000000	-50.000000	.000000	.000000	.000000	-150.000000	
0.75000		.000000	-50.000000	.000000	.000000	.000000	-75.000000	
1.00000		.000000	-50.000000	.000000	.000000	.000000	1.63E-13	
ELEM	2	=====	LENGTH =	2.000000				
LOAD	1	-----						
REL DIST		P	V2	V3	T	M2	M3	
0.00000		.000000	-50.000000	.000000	.000000	.000000	.000000	
0.25000		.000000	-45.000000	.000000	.000000	.000000	23.750000	
0.50000		.000000	-40.000000	.000000	.000000	.000000	45.000000	
0.75000		.000000	-35.000000	.000000	.000000	.000000	63.750000	
1.00000		.000000	-30.000000	.000000	.000000	.000000	80.000000	
ELEM	3	=====	LENGTH =	2.000000				
LOAD	1	-----						
REL DIST		P	V2	V3	T	M2	M3	
0.00000		.000000	-10.000000	.000000	.000000	.000000	80.000000	
0.25000		.000000	-5.000000	.000000	.000000	.000000	83.750000	
0.50000		.000000	-3.91E-14	.000000	.000000	.000000	85.000000	
0.75000		.000000	5.000000	.000000	.000000	.000000	83.750000	
1.00000		.000000	10.000000	.000000	.000000	.000000	80.000000	
ELEM	4	=====	LENGTH =	2.000000				
LOAD	1	-----						
REL DIST		P	V2	V3	T	M2	M3	
0.00000		.000000	30.000000	.000000	.000000	.000000	80.000000	
0.25000		.000000	35.000000	.000000	.000000	.000000	63.750000	
0.50000		.000000	40.000000	.000000	.000000	.000000	45.000000	
0.75000		.000000	45.000000	.000000	.000000	.000000	23.750000	
1.00000		.000000	50.000000	.000000	.000000	.000000	-5.68E-14	
ELEM	5	=====	LENGTH =	2.990000				
LOAD	1	-----						
REL DIST		P	V2	V3	T	M2	M3	
0.00000		.000000	50.000000	.000000	.000000	.000000	.000000	
0.25000		.000000	50.000000	.000000	.000000	.000000	-37.375000	
0.50000		.000000	50.000000	.000000	.000000	.000000	-74.750000	
0.75000		.000000	50.000000	.000000	.000000	.000000	-112.125000	
1.00000		.000000	50.000000	.000000	.000000	.000000	-149.500000	
ELEM	6	=====	LENGTH =	0.010000				
LOAD	1	-----						
REL DIST		P	V2	V3	T	M2	M3	
0.00000		.000000	80.000000	.000000	.000000	.000000	-149.500000	
0.25000		.000000	80.000000	.000000	.000000	.000000	-149.700000	
0.50000		.000000	80.000000	.000000	.000000	.000000	-149.900000	
0.75000		.000000	80.000000	.000000	.000000	.000000	-150.100000	
1.00000		.000000	80.000000	.000000	.000000	.000000	-150.300000	
ELEM	7	=====	LENGTH =	3.000000				
LOAD	1	-----						
REL DIST		P	V2	V3	T	M2	M3	
0.00000		.000000	-75.150000	.000000	.000000	.000000	-150.300000	
0.25000		.000000	-75.150000	.000000	.000000	.000000	-93.937500	
0.50000		.000000	-75.150000	.000000	.000000	.000000	-37.575000	
0.75000		.000000	-75.150000	.000000	.000000	.000000	18.787500	
1.00000		.000000	-75.150000	.000000	.000000	.000000	75.150000	



SC20809 SAP90, trave continua (u.d.m.: [m],[kN])

SYSTEM

L= 1

:
C

JOINTS

1	Y=	.0	Z=	0.	:	per travata, serve solo modif. Y
2	Y=	2.0	Z=	0.	:	
3	Y=	4.0	Z=	0.	:	
4	Y=	8.0	Z=	0.	:	

:
C

RESTRAINTS

1,4	R=1,0,0,0,1,1	:	la struttura giace nel piano zy
1	R=1,1,1,1,1,1	:	incastro in fondazione
3	R=1,1,1,0,1,1	:	appoggio in fondazione
4	R=1,1,0,1,1,1	:	pattino in fondazione (COME SE LO FOSSE)

:
C

FRAME

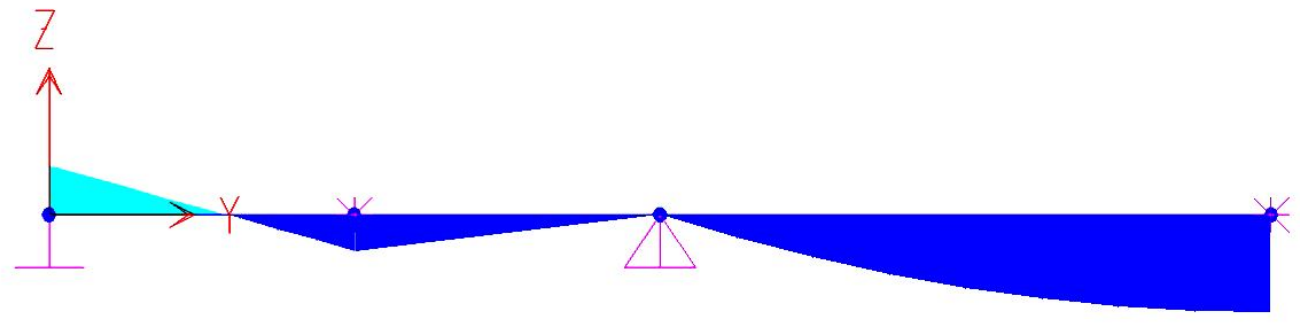
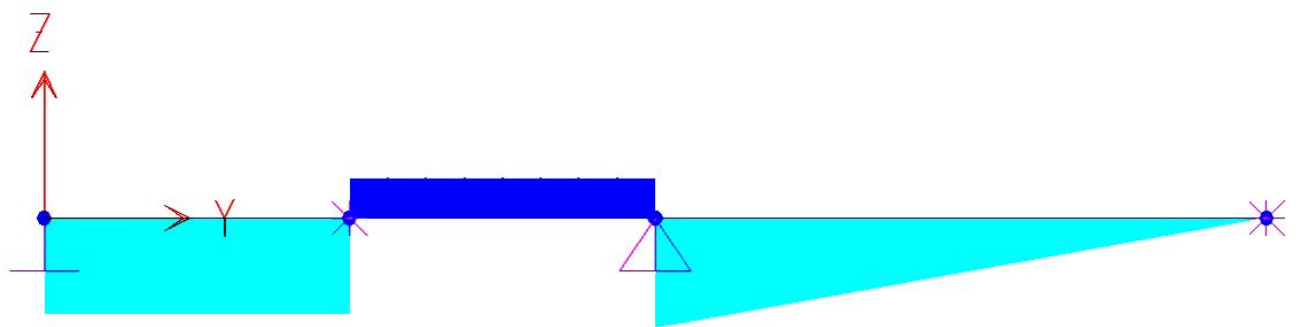
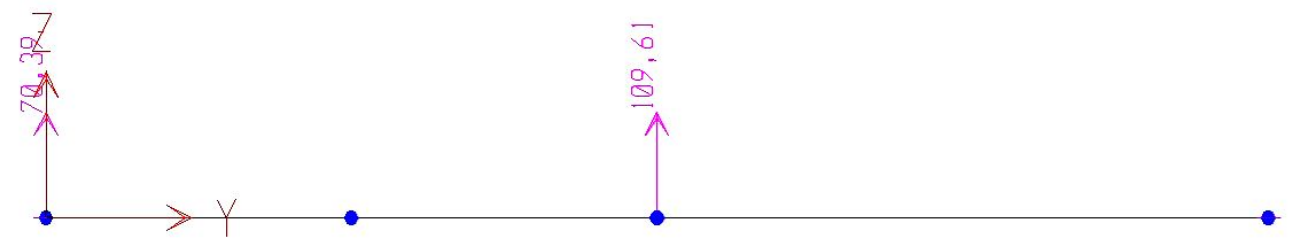
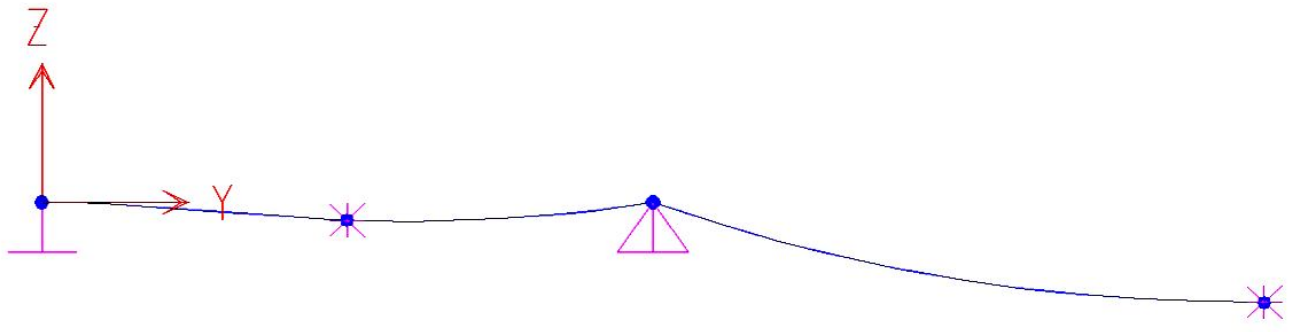
NM= 3 NL= 1 : n.materiali & sezioni; n.carichi distrib.

1	A=116.E-4	I=48200E-8	E=2E8	:	TENTATIVO
2	A=84.5E-4	I=23130E-8	E=2E8	:	
3	A=53.8E-4	I=8356E-8	E=2E8	:	"
1	WL= .00000,-20.,.00000	:	carico distrib.traversi (v."NSL")		
1, 1, 2	M=1	NSL=0	LP=3,0		
2, 2, 3	M=3	NSL=0	LP=3,0	LR=0,1	: 1, c'e' cerniera
3, 3, 4	M=3	NSL=1	LP=3,0	LR=1,0	

:
C

LOADS

2 L=1 F=0.,0.,-100.
:



1 VOLTA IPOSTATICA:

```
LA20809  SAP90, trave continua ( u.d.m.: [m],[kN] )
SYSTEM
L= 1
:
C
JOINTS
1  Y=  .0    Z=  0.  :   per travata, serve solo modif. Y
2  Y=  2.0   Z=  0.  :
3  Y=  4.0   Z=  0.  :
4  Y=  8.0   Z=  0.  :
:
C
RESTRAINTS
1,4  R=1,0,0,0,1,1  :   la struttura giace nel piano zy
1    R=1,1,1,0,1,1  :   appoggio in fondazione
4    R=1,1,0,1,1,1  :   pattino in fondazione
:
C
FRAME
NM= 3  NL= 1  : n.materiali & sezioni; n.carichi distrib.
1    A=116.E-4  I=48200E-8  E=2E8  :
2    A=84.5E-4  I=23130E-8  E=2E8  :
3    A=53.8E-4  I=8356E-8   E=2E8  :
1    WL= .00000,-20.,.00000 : carico distrib.traversi (v."NSL")
1, 1, 2    M=1    NSL=0    LP=3,0
2, 2, 3    M=3    NSL=0    LP=3,0  LR=0,1 : 1, c'e' cerniera
3, 3, 4    M=3    NSL=1    LP=3,0  LR=1,0
:
C
LOADS
2  L=1  F=0.,0.,-100.
:
```

Analysis Incomplete Due to Errors

LOCATED AT X = .000000, Y = 8.000000, Z = .000000,
STIFFNESS MATRIX DIAGONAL VALUE = 783.375000

*** ERROR ***

EXCESSIVE LOSS OF ACCURACY DURING THE SOLUTION OF EQUATIONS,
THE STRUCTURE IS UNSTABLE OR ILL-CONDITIONED

IMMEDIATELY FATAL ERROR - ANALYSIS TERMINATED

ANALYSIS INCOMPLETE !!

2012/05/02 16:20:52

