Part 13

Program **BEAMPROGRAM6666**

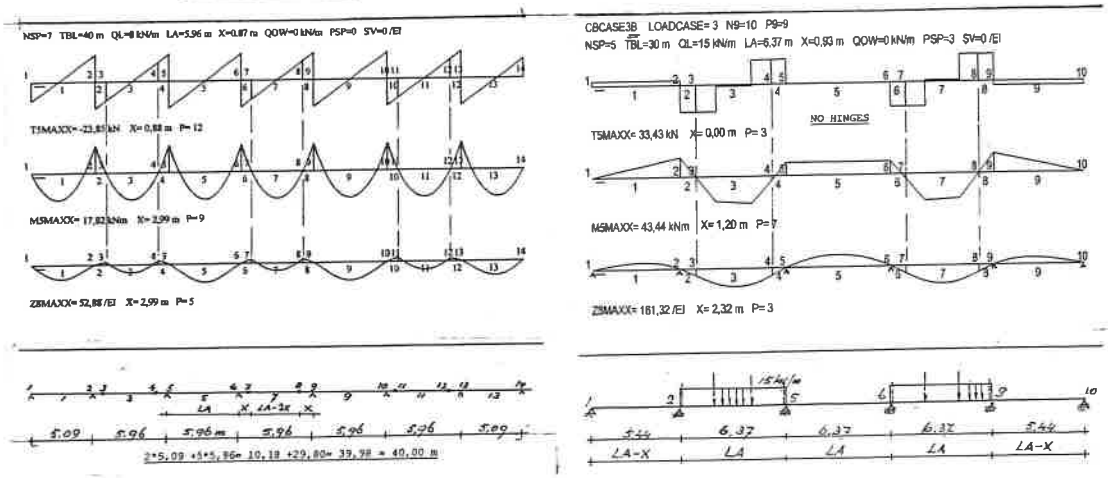
Continuous beams. 1 -21

With hinges, each span with equal meximum bending moments, determinate beam,
CBCASE1A, CBCASE2A and CBCASE3A.

Same continuous beam, without hinges.
CBCASE1B, CBCASE2B and CBCASE3B. indeterminate beam.

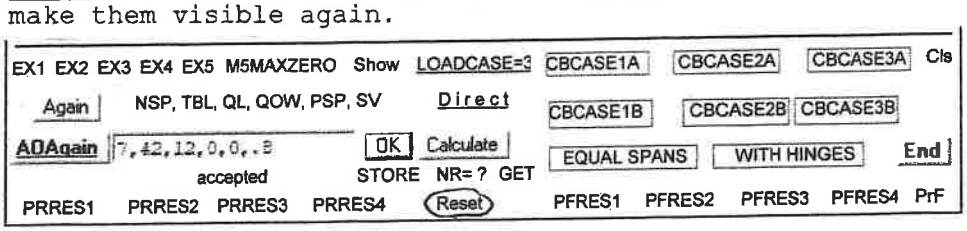
With a few data to put in,
NSP number of spans, TBL total length m,
QL uniformly distributed load kN/m,
QOW own weight kN/m, PSP for indirect loading
and SVI for spring supports.
STORE NR= ? GET to store these data.

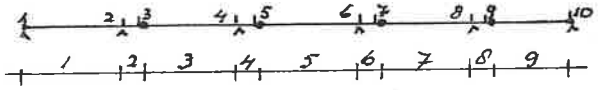
Continuous beam with EQUAL SPANS, without hinges,
same beam WITH HINGES at moment zero points.



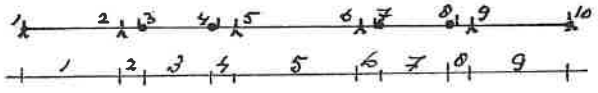
The form with at the bottom the controls to be explained on the following pages with examples.

Reset When controls disappear click Reset to make them visible again.

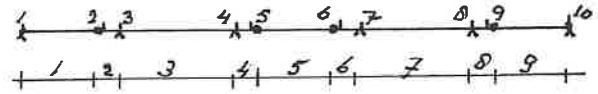




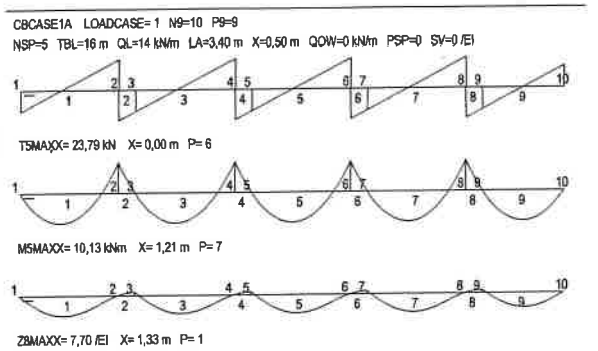
CBCASE1A,

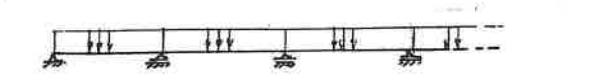


CBCASE2A



CBCASE3A.



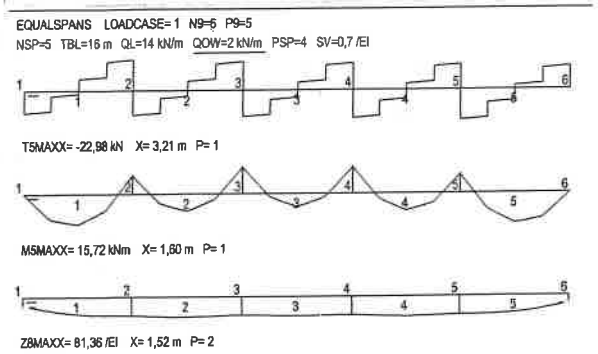


LOADCASE=1

LOADCASE=2

LOADCASE=3

Indirect



BEAMPROGRAM6666B, controls and assumptions.

Here below some information, examples will explain more in detail.

Continuous hinge beams statically determinate. with equal support and span moments, see next page.
Three different continuous beams with different places of the hinges, examples on the left with NSP=5 spans, with joint and member numbering, N9=10 joints, P9=9 members/beams.
NSP mainly 3, 5 etc.

CBCASE1A, CBCASE2A and CBCASE3A.

Same hinge beams statically **in**determinate,

CBCASE1B, CBCASE2B and CBCASE3B, no hinges.

Three possible load csases with LOADCASE=?, does not work in all cases...
LOADCASE=1, LOADCASE=2 and LOADCASE=3.

Show shows the data on the form, not always enough space... Successiv clicks with different font names.

Continuous beam with equal spans
without hinges and with hinges.

Left bottom printer print controls to print results with given font name.
PRRES1 Courier New
PRRES2 Arial Narrow

PRRES3 Times New Roman
PRRES4 Microsoft Sans Serif

Right bottom form print controls.
PFRES1 Courier New
PFRES2 MS Sans Serif

PFRES3 Times Ne Roman
PFRES4 Arial

PrF to print the form itself with results.

M5MAXZERO prints on the form for each member the moment zero and maximum bending moments.

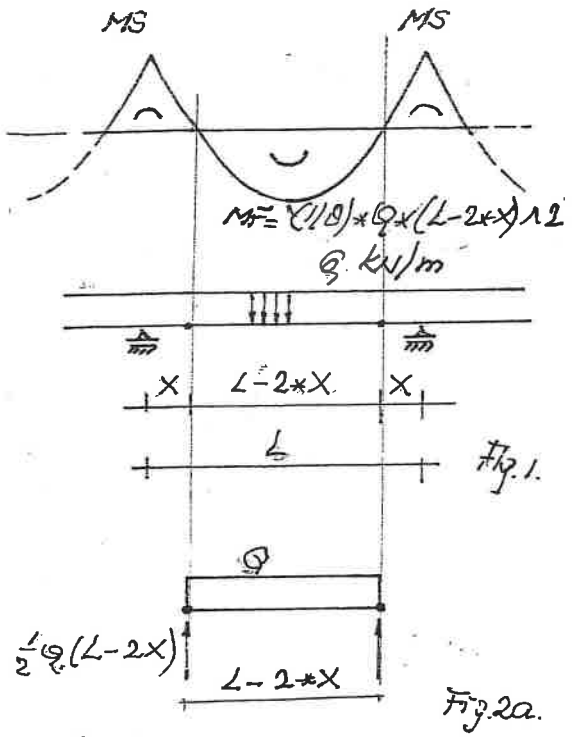
NSP number of spans
TBL total lenth
QL disributed beam loads
QOW own weight
PSP dividing number of the distribution load
SV1 support spring constant in EI
(sometimes printed /EI...)

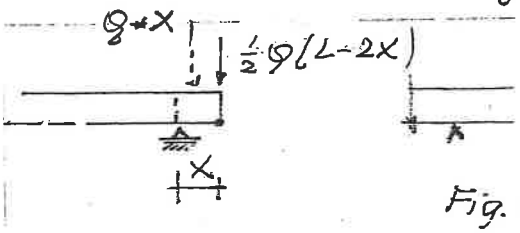
EX1 to EX5 with these data. When clicking such control the data appear in the large text box TSTRING to be accepted with a click on OK.

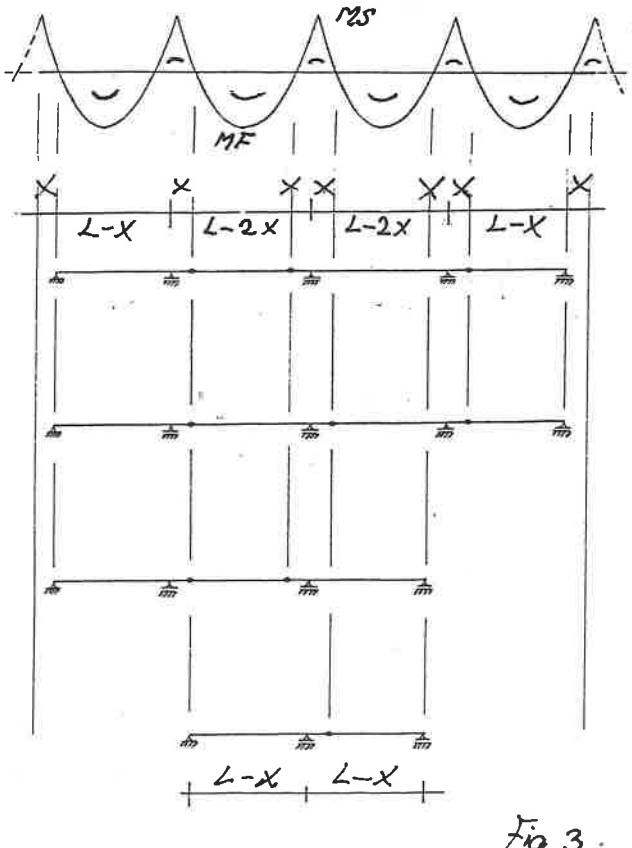
Again to make all calculated vertical joint displacements UV(I)=0 and all joint rotations UR(I)=0.
AOAgain to start all over again.

STORE NR=? GET to store the six data.

/







Statically determinate continuous hing beams.

Fig.1 and fig.3.
A coninuous beam over more than two supports can be carried out as a statically determinate beam by placing sufficient neceassary hinges. Next one may take care that the bending moments MS at the supports are as large as the maximum field moments MF between the supports. Wanting to satisfie this demand the relation between the indicated distances LA and X have to be determined.

Fig.2a.
This beam is statically determinate, at both ends the bending moment is zero. The maximum bending moment

$$MF\frown = (1/8)*Q*(L-2*X)^2$$

$$= (1/8)*Q*(L^2-4*L*X+4*X^2)$$

$$= (1/8)*Q*L^2 -(1/2)*Q*L*X +(1/2)*Q*X^2$$

Fig.2b.
At the support arises a bending moment due to the distributed load and the hinge force,

$$MS\frown = Q*X*(1/2)*X+(1/2)*Q*(L-2*X)*X$$

$$= (1/2)*Q*X^2 +(1/2)*Q*L*X -Q*X^2$$

$$= (1/2)*Q*L*X -(1/2)*Q*X^2$$

With $MF\frown = MS\frown$ follows

$$(1/8)*Q*L^2-(1/2)*Q*L*X+(1/2)*Q*X^2=$$

$$(1/2)*Q*L*X -(1/2)*Q*X^2 \quad \text{or}$$

$$Q*X^2-Q*L*X+(1/8)*Q*L^2=0 \quad \text{and /Q then}$$

$$X^2-L*X+(1/2)*L^2=0 \quad \text{from which}$$

$$\frac{-(-L) +/- Sqr((-L)^2-4*1*(1/8)*L^2)}{2*1}$$

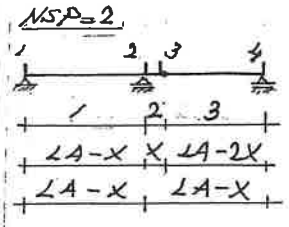
$$X = L/2 +/- (L/4)*Sqr(2) = 0,500*L +/- 0,354*L$$

from which

$$X = 0,146*L \qquad (\text{and } X = 0,854*L)$$

Figure 3 shows several possibilities.
The first and last span width between two supports is always 0,854*L, and the others L.On next pages L will be called LA.
The hinges must be placed in such way that the whole construction is stable, ofcourse. on the following pages three statically determinate possibilities with hinges will be worked out, also the same continuous beam without the hinges, the statically indeterminate beam.

Of the statically determinate continuous beam a displacement of a support does not influence the bending moment diagram, of the indeterminate beam it will.



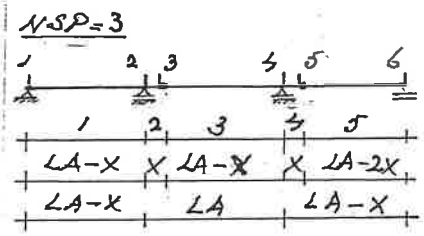


Fig.1.

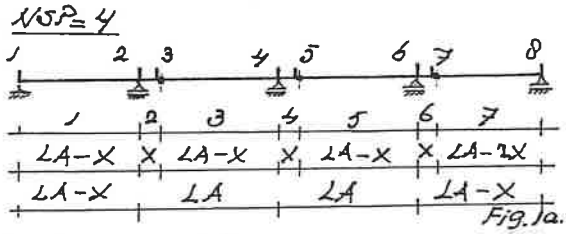
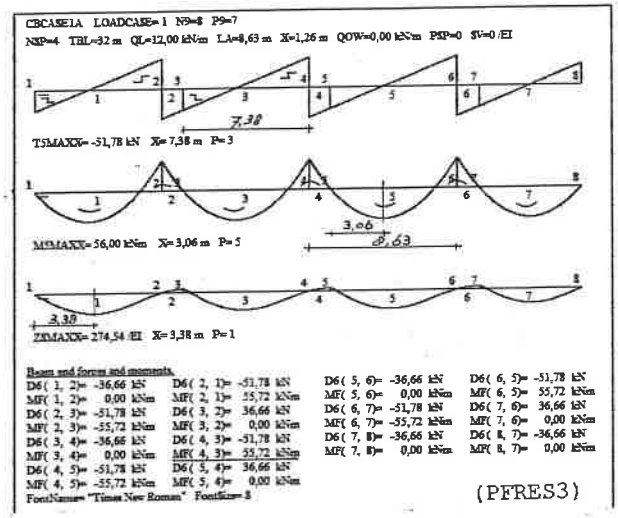
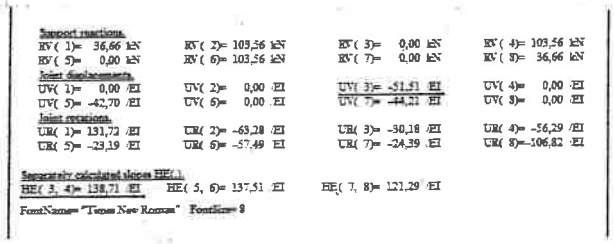


Fig.1a.



(PFRES3)



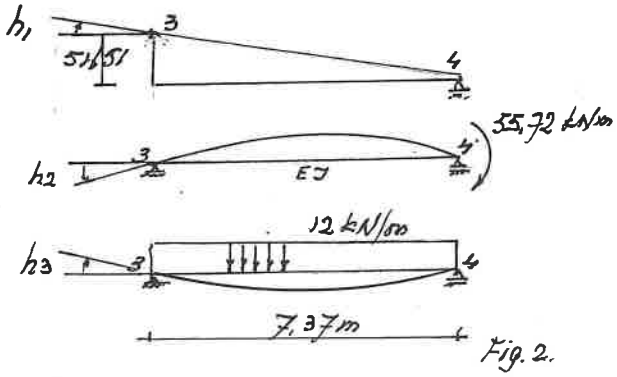


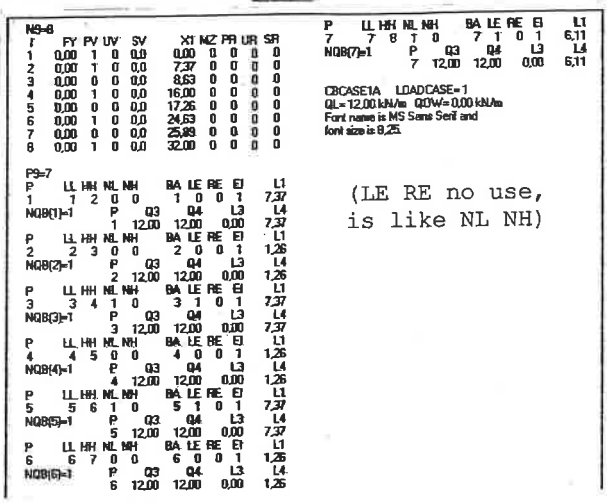
Fig.2.

BEAMPROGRAM666

Examples with CBCASE1A.

Fig.1.
NSP= 4 spans TBL= 32 m total length
QL= 12 kN/m distributed load
QQW= 0 kN/m no own weight
PSP= 0 no division of distributed load
SVI= 0 no spring supports

To type in TSTRING in the given order 4,32,12,0,0,0 Enter, below appears 'accepted'. Click LOADCASE to LOADCASE 1 and (In)Direct to Direct and CBCASE1A. All necessary data are shown with a click on Show.



N9=8

I	FV	FV	UV	SV	XI	MZ	PR	UR	SR
1	0,00	1	0	0,0	0,00	0	0	0	0
2	0,00	1	0	0,0	7,37	0	0	0	0
3	0,00	0	0	0,0	8,63	0	0	0	0
4	0,00	1	0	0,0	16,00	0	0	0	0
5	0,00	0	0	0,0	17,26	0	0	0	0
6	0,00	1	0	0,0	24,63	0	0	0	0
7	0,00	0	0	0,0	25,89	0	0	0	0
8	0,00	1	0	0,0	32,00	0	0	0	0

P9=7

P	LL	HH	NL	NH	BA	LE	RE	EI	L1
1	1	2	0	0	1	0	0	1	7,37
NQB(1)=1			P	Q3	Q4		L3		L4
			1	12,00	12,00		0,00		7,37
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
2	2	3	0	0	2	0	0	1	1,26
NQB(2)=1			P	Q3	Q4		L3		L4
			2	12,00	12,00		0,00		1,26
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
3	3	4	1	0	3	1	0	1	7,37
NQB(3)=1			P	Q3	Q4		L3		L4
			3	12,00	12,00		0,00		7,37
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
4	4	5	0	0	4	0	0	1	1,26
NQB(4)=1			P	Q3	Q4		L3		L4
			4	12,00	12,00		0,00		1,26
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
5	5	6	1	0	5	1	0	1	7,37
NQB(5)=1			P	Q3	Q4		L3		L4
			5	12,00	12,00		0,00		7,37
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
6	6	7	0	0	6	0	0	1	1,26
NQB(6)=1			P	Q3	Q4		L3		L4
			6	12,00	12,00		0,00		1,26

P	LL	HH	NL	NH	BA	LE	RE	EI	L1
7	7	8	1	0	7	1	0	1	6,11
NQB(7)=1			P	Q3	Q4		L3		L4
			7	12,00	12,00		0,00		6,11

CBCASE1A LOADCASE= 1
QL= 12,00 kN/m QOW= 0,00 kN/m
Font name is MS Sans Serif and
font size is 8,25.

(LE RE no use, is like NL NH)

Click Calculate and PFRES3 to get the diagrams and member end fores D6(,) and moments MF(,) printed with font Times New Roman.

Another click on PFRES3 shows again D6(,) and MF(,), next click shows again the diagrams, and the joint reactions RV(I), the vertical joint displacements UV(I), the joint rotations UR(I) and the separately calculated member end rotations, slope deflections, HE(,) shown on the left.

See joint 3. Fig.1a.
Left of joint 3 is drawn the little vertical line to indicate its a 'real' joint of which the rotation, UR(3) is calculated UR(3)=-30,18/EI, that's to the left.
At the place of the hinge, member end 3 of beam 3, arises a slope deflection HE(3,4) which is separately calculated as follows.
The vertical displacement is UV(3)=-51,51/EI, not downward as assumed but upward.

Fig.2.

Check of HE(3,4)= 138,71/EI, to the right.

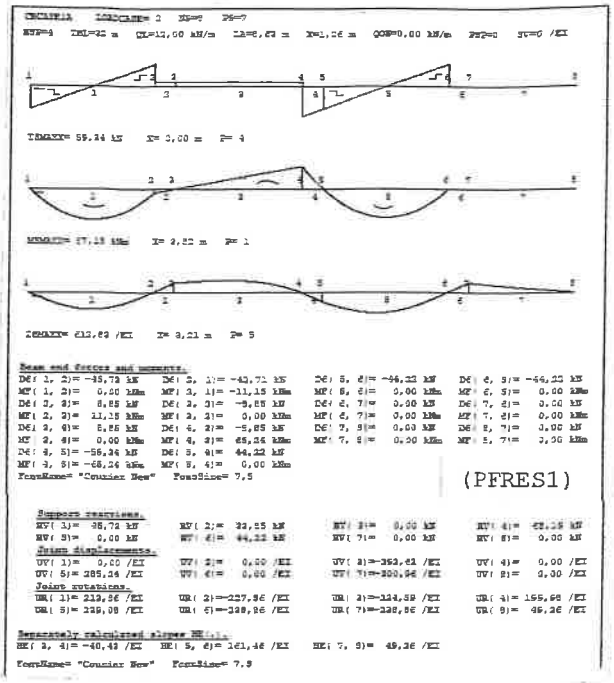
h1 = 51,51/7,37= 6,99/EI

h2 =(55,72*7,37)/6EI= 68,44/EI

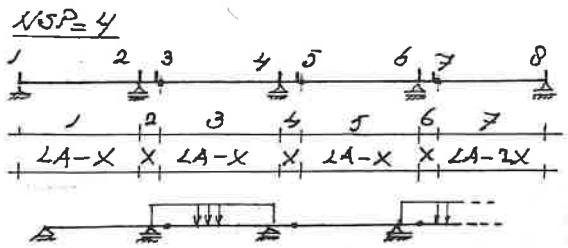
h3 = (12*7,37^3)/24EI= 200,16/EI

h = (200,16+6,99-68,44)/EI= 138,71/EI ok

LOADCASE=2



(PFRES1)



LOADCASE=3

CBCASE1A LOADCASE=3 N9=8 P9=7
NSP=4 TBL=32 m QL=12,00 kN/m LA=8,63 m X=1,26 m QOW=0,00 kN/m PSP=0 SV=0 /EI
T5MAXX= 60,63 kN X= 0,00 m P= 2
M5MAXX= 86,31 kNm X= 3,80 m P= 3
ZBMAXX= 619,05 /EI X= 3,34 m P= 3

Beam end forces and moments.

DB(1, 2)=	9,07 kN	DB(2, 1)=	-9,07 kN	DB(5, 6)=	7,56 kN	DB(6, 5)=	-7,56 kN
MF(1, 2)=	0,00 kNm	MF(2, 1)=	66,87 kNm	MF(5, 6)=	0,00 kNm	MF(6, 5)=	55,72 kNm
DB(2, 3)=	60,63 kN	DB(3, 2)=	45,51 kN	DB(6, 7)=	-51,78 kN	DB(7, 6)=	36,66 kN
MF(2, 3)=	-66,87 kNm	MF(3, 2)=	0,00 kNm	MF(6, 7)=	-55,72 kNm	MF(7, 6)=	0,00 kNm
DB(3, 4)=	-45,51 kN	DB(4, 3)=	-42,93 kN	DB(7, 8)=	-36,66 kN	DB(8, 7)=	-36,66 kN
MF(3, 4)=	0,00 kNm	MF(4, 3)=	-9,53 kNm	MF(7, 8)=	0,00 kNm	MF(8, 7)=	0,00 kNm
DB(4, 5)=	7,56 kN	DB(5, 4)=	-7,56 kN				
MF(4, 5)=	9,53 kNm	MF(5, 4)=	0,00 kNm				

FontName= "MS Sans Serif" FontSize= 8

Support reactions.

RV(1)=	-9,07 kN	RV(2)=	69,71 kN	RV(3)=	0,00 kN	RV(4)=	35,37 kN
RV(5)=	0,00 kN	RV(6)=	59,34 kN	RV(7)=	0,00 kN	RV(8)=	36,66 kN

Joint displacements.

UV(1)=	0,00 /EI	UV(2)=	0,00 /EI	UV(3)=	241,11 /EI	UV(4)=	0,00 /EI
UV(5)=	-327,94 /EI	UV(6)=	0,00 /EI	UV(7)=	256,75 /EI	UV(8)=	0,00 /EI

Joint rotations.

UR(1)=	-82,14 /EI	UR(2)=	164,28 /EI	UR(3)=	204,40 /EI	UR(4)=	-256,27 /EI
UR(5)=	-262,28 /EI	UR(6)=	181,37 /EI	UR(7)=	214,47 /EI	UR(8)=	-156,07 /EI

Separately calculated slopes HE(,).

HE(3, 4)=	179,14 /EI	HE(5, 6)=	-23,94 /EI	HE(7, 8)=	72,03 /EI

FontName= "MS Sans Serif" FontSize= 8

(PFRES2)

CBCASE1B LOADCASE=3 N9=8 P9=7
NSP=4 TBL=32 m QL=12,00 kN/m LA=8,63 m X=1,26 m QOW=0,00 kN/m PSP=0 SV=0 /EI
T5MAXX= 53,42 kN X= 0,00 m P= 2
M5MAXX= 68,44 kNm X= 3,20 m P= 3
ZBMAXX= 462,97 /EI X= 3,13 m P= 3

no hinges

Beam end forces and moments.

DB(1, 2)=	6,85 kN	DB(2, 1)=	-6,85 kN	DB(5, 6)=	-0,99 kN	DB(6, 5)=	0,99 kN
MF(1, 2)=	0,00 kNm	MF(2, 1)=	50,46 kNm	MF(5, 6)=	-35,06 kNm	MF(6, 5)=	27,74 kNm
DB(2, 3)=	-53,42 kN	DB(3, 2)=	38,30 kN	DB(6, 7)=	-47,99 kN	DB(7, 6)=	32,86 kN
MF(2, 3)=	-50,46 kNm	MF(3, 2)=	-7,32 kNm	MF(6, 7)=	-27,74 kNm	MF(7, 6)=	-23,19 kNm
DB(3, 4)=	-38,30 kN	DB(4, 3)=	-50,14 kN	DB(7, 8)=	-32,86 kN	DB(8, 7)=	-40,46 kN
MF(3, 4)=	7,32 kNm	MF(4, 3)=	36,31 kNm	MF(7, 8)=	23,19 kNm	MF(8, 7)=	0,00 kNm
DB(4, 5)=	-0,99 kN	DB(5, 4)=	0,99 kN				
MF(4, 5)=	-36,31 kNm	MF(5, 4)=	35,06 kNm				

FontName= "MS Sans Serif" FontSize= 8

Support reactions.

RV(1)=	-6,85 kN	RV(2)=	60,27 kN	RV(3)=	0,00 kN	RV(4)=	51,13 kN
RV(5)=	0,00 kN	RV(6)=	46,99 kN	RV(7)=	0,00 kN	RV(8)=	40,46 kN

Joint displacements.

UV(1)=	0,00 /EI	UV(2)=	0,00 /EI	UV(3)=	179,71 /EI	UV(4)=	0,00 /EI
UV(5)=	-153,38 /EI	UV(6)=	0,00 /EI	UV(7)=	173,62 /EI	UV(8)=	0,00 /EI

Joint rotations.

UR(1)=	-61,99 /EI	UR(2)=	123,98 /EI	UR(3)=	149,15 /EI	UR(4)=	-144,34 /EI
UR(5)=	-99,38 /EI	UR(6)=	132,01 /EI	UR(7)=	132,88 /EI	UR(8)=	-166,09 /EI

FontName= "MS Sans Serif" FontSize= 8

CBCASE1A LOADCASE2 N9=6 P9=7

NSP=4 TBL=32 QL=12 QOW=0 PSP=0 SVI=0
Starting all over again, AOAgain.
4,32,12,0,0,0 Enter. 'accepted'
Next clicking LOADCASE2, Direct, CBCASE1A, Calculate and PFRES1, font Courier New.

When going on with the preceding page, data still in TSTRING. Click Again, to make all UV(I) and UR(I) zero.
Next click OK, LOADCASE2, Calculate and PFRES1, first print on the left. Two clicks more for Support reactions, Joint displacements and Joint rotations and HE(,).

CBCASE1A LOADCASE3 N9=6 P9=7
Starting all over again or going on as follows.
Click Again, OK, LOADCASE3, Calculate, PFRES2.
Second print. With M5MAXZERO one will find
LOADCASE1 M5MAXX= 56,00 kNm
LOADCASE2 M5MAXX= 87,15 kNm
LOADCASE3 M5MAXX= 86,31 kNm

With CBEAM1B there are no hinges between first and last support.

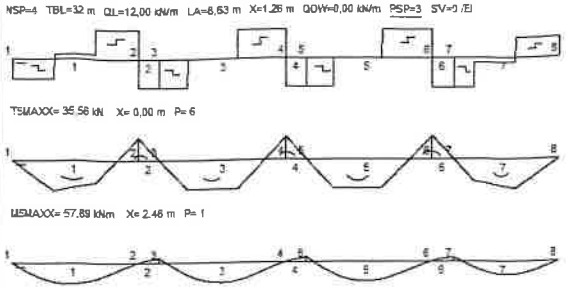
NSP=4 TBL=32 QL=12 QOW=0 PSP=0 SVI=0
Starting all over again, AOAgain.
4,32,12,0,0,0 Enter. 'accepted'

Next LOADCASE3, Direct, CBCASE1B, Calculate and PFRES2, print here below.

CBCASE1A	CBCASE1B
MF(3,2)= 0,00 kNm	MF(3,2)= -7,32 kNm
MF(5,4)= 0,00 kNm	MF(5,4)= 35,06 kNm
MF(7,6)= 0,00 kNm	MF(7,6)= -23,19 kNm

MF(3,2)= -7,32 kNm, small comparing with the other values scarcely visible in the bending moment diagram. M5MAXX= 68,44 kNm

CBCASE1A LOADCASE= 1 N9=8 P9=7
NSP=4 TBL=32 m QL=12,00 kN/m LA=8,63 m X=1,26 m QOW=0,00 kN/m PSP=3 SV=0 /EI



TSMAXX= 35,56 kN X= 0,00 m P= 6

MSMAXX= 57,89 kNm X= 2,46 m P= 1

ZBMAXX= 272,84 /EI X= 3,43 m P= 1

Beam end forces and moments.

D6(1, 2)= -23,57 kN	D6(2, 1)= -35,39 kN	D6(5, 6)= -34,34 kN
MF(1, 2)= 0,00 kNm	MF(2, 1)= 43,53 kNm	MF(5, 6)= 0,00 kNm
D6(2, 3)= -34,55 kN	D6(3, 2)= 34,55 kN	D6(6, 7)= -35,56 kN
MF(2, 3)= -43,53 kNm	MF(3, 2)= 0,00 kNm	MF(6, 7)= -44,80 kNm
D6(3, 4)= -34,55 kN	D6(4, 3)= -34,49 kN	D6(7, 8)= -35,56 kN
MF(3, 4)= 0,00 kNm	MF(4, 3)= 43,27 kNm	MF(7, 8)= 0,00 kNm
D6(4, 5)= -34,34 kN	D6(5, 4)= 34,34 kN	
MF(4, 5)= -43,27 kNm	MF(5, 4)= 0,00 kNm	

FontName= "Arial" FontSize= 8

Support reactions.		
RV(1)= 38,31 kN	RV(2)= 101,94 kN	RV(3)= 0,00 kN
RV(5)= 0,00 kN	RV(6)= 102,26 kN	RV(7)= 0,00 kN
Joint displacements.		
UV(1)= 0,00 /EI	UV(2)= 0,00 /EI	UV(3)= -66,39 /EI
UV(5)= -64,86 /EI	UV(6)= 0,00 /EI	UV(7)= -59,56 /EI
Joint rotations.		
UR(1)= 124,45 /EI	UR(2)= -70,97 /EI	UR(3)= -43,55 /EI
UR(5)= -42,39 /EI	UR(6)= -68,09 /EI	UR(7)= -37,96 /EI

RV(4)= 103,35 kN		
RV(8)= 38,14 kN		
UV(4)= 0,00 /EI		
UV(8)= 0,00 /EI		
UR(4)= -69,65 /EI		
UR(8)= -95,26 /EI		

Separately calculated slopes HE( ):

HE(3, 4)= 154,54 /EI	HE(5, 6)= 152,45 /EI	HE(7, 8)= 123,70 /EI

FontName= "Arial" FontSize= 8

N9=8

I	FY	FV	UV	SV	X1	MZ	PR	UR	SR
1	14,74	1	0	0,0	0,00	0	0	0	0
2	14,74	1	0	0,0	7,37	0	0	0	0
3	0,00	0	0	0,0	8,63	0	0	0	0
4	17,26	1	0	0,0	16,00	0	0	0	0
5	0,00	0	0	0,0	17,26	0	0	0	0
6	17,26	1	0	0,0	24,63	0	0	0	0
7	0,00	0	0	0,0	25,89	0	0	0	0
8	0,00	1	0	0,0	32,00	0	0	0	0

P9=7

P	LL	HH	NL	NH	BA	LE	RE	EI	L1
1	1	2	0	0	1	0	0	1	7,37

NFB(1)=2

	I	F2	L2
1	29,48	2,46	
2	29,48	4,91	

P	LL	HH	NL	NH	BA	LE	RE	EI	L1
2	2	3	0	0	2	0	0	1	1,26
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
3	3	4	1	0	3	1	0	1	7,37
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
4	4	5	0	0	4	0	0	1	1,26
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
5	5	6	1	0	5	1	0	1	7,37

NFB(5)=2

	I	F2	L2
1	34,52	1,62	
2	34,52	4,49	

P	LL	HH	NL	NH	BA	LE	RE	EI	L1
6	6	7	0	0	6	0	0	1	1,26
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
7	7	8	1	0	7	1	0	1	6,11

CBCASE1A LOADCASE=2
QL=12,00 kN/m QOW=0,00 kN/m
Font name is MS Sans Serif and
font size is 8,25.

CBCASE1A and division of QL load.

NSP=4 TBL=32 QL=12 QOW=0 PSP=3 SVI=0
Starting all over again, AOAgain.
The length between two supports is divided into 3 parts, PSP=3.

4,32,12,0,3,0 Enter. 'accepted'
Next clicking LOADCASE1, InDirect, CBCASE1A, Calculate and PFRES4, font Arial.
First print with results of the calculation.

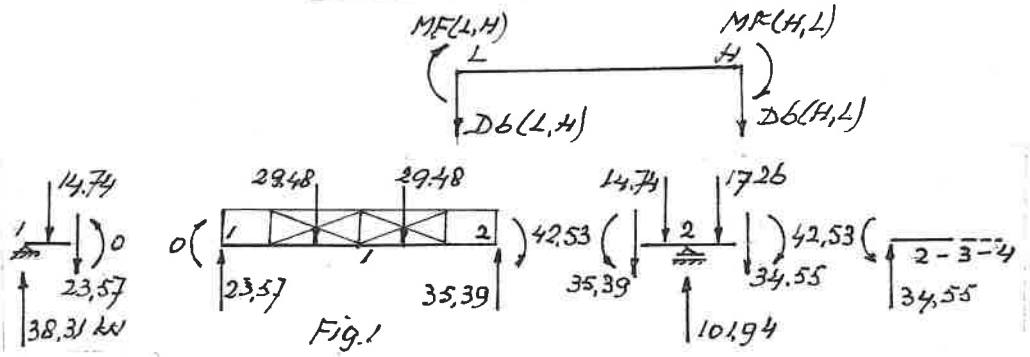
Fig.1.

Between support 1 and 2, LA-X=8,63-1,26= 7,37 m
Point loads on beam 1, (7,37*12)/3= 29,48 kN,
half of 29,48= 14,74 kN
on support 1 and on support 2.

Member end force D6(1,2)= -23,57 kN, negative answer, so not as assumed downward but upward, on support 1 as large as but opposite directed.
Member end force D6(2,1)= -35,39 kN, yes, upward, on suppot 2 as large as but downward.

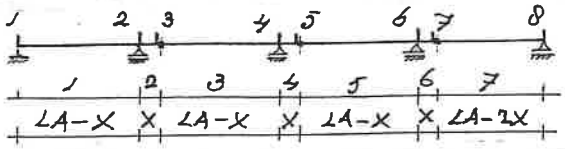
'Beam' 2-3 between support 2 and 4, LA= 8,63 m.
Point loads (8,63*12)/3= 34,52 kN,
half of 34,52= 17,26 kN
on support 2 and 4.

Equilibrium checks, ok.

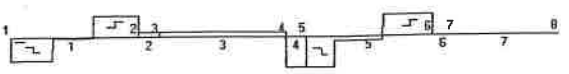


Left bottom print with LOADCASE=2.

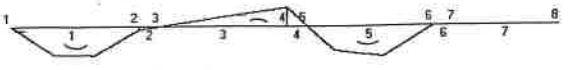
Here below with LOADCASE3, looks strange, but correct. Just try with NSP=5 and see which span is loaded with LOADCASE3.



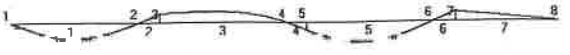
CBCASE1A LOADCASE=2 N9=8 P9=7
NSP=4 TBL=32 m QL=12,00 kN/m LA=8,63 m X=1,26 m QOW=0,00 kN/m PSP=3 SV=0 /EI



TSMAXX= 40,42 kN X= 0,00 m P= 4



MSMAXX= 82,14 kNm X= 4,50 m P= 5



ZBMAXX= 567,15 /EI X= 3,26 m P= 5

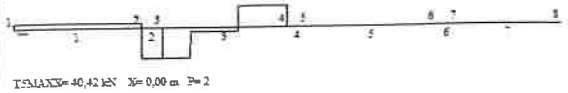
Beam end forces and moments.

D6(1, 2)= -30,66 kN	D6(2, 1)= -28,30 kN	D6(5, 6)= -40,42 kN
MF(1, 2)= 0,00 kNm	MF(2, 1)= -8,71 kNm	MF(5, 6)= 0,00 kNm
D6(2, 3)= 6,91 kN	D6(3, 2)= -6,91 kN	D6(6, 7)= 0,00 kN
MF(2, 3)= 8,71 kNm	MF(3, 2)= 0,00 kNm	MF(6, 7)= 0,00 kNm
D6(3, 4)= 6,91 kN	D6(4, 3)= -6,91 kN	D6(7, 8)= 0,00 kN
MF(3, 4)= 0,00 kNm	MF(4, 3)= 50,93 kNm	MF(7, 8)= 0,00 kNm
D6(4, 5)= -40,42 kN	D6(5, 4)= 40,42 kN	
MF(4, 5)= -50,93 kNm	MF(5, 4)= 0,00 kNm	

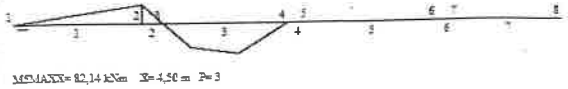
FontName= "MS Sans Serif" FontSize= 8

D6(6, 5)= -28,62 kN		
MF(6, 5)= 0,00 kNm		
D6(7, 6)= 0,00 kN		
MF(7, 6)= 0,00 kNm		
D6(8, 7)= 0,00 kN		
MF(8, 7)= 0,00 kNm		

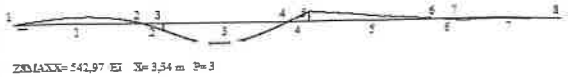
CBCASE1A LOADCASE= 3 N9=8 P9=7
NSP=4 TBL=32 m QL=12,00 kN/m LA=8,63 m X=1,26 m QOW=0,00 kN/m PSP=3 SV=0 EI



TSMAXX= 40,42 kN X= 0,00 m P= 2



MSMAXX= 82,14 kNm X= 4,50 m P= 3



ZBMAXX= 542,97 EI X= 3,54 m P= 3

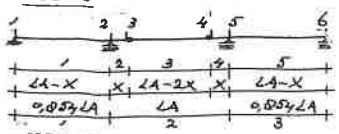
Beam end forces and moments.

D6(1, 2)= 6,91 kN	D6(2, 1)= -6,91 kN	D6(5, 6)= 0,00 kN
MF(1, 2)= 0,00 kNm	MF(2, 1)= 50,93 kNm	MF(5, 6)= 0,00 kNm
D6(2, 3)= -40,42 kN	D6(3, 2)= 40,42 kN	D6(6, 7)= 0,00 kN
MF(2, 3)= -50,93 kNm	MF(3, 2)= 0,00 kNm	MF(6, 7)= 0,00 kNm
D6(3, 4)= -40,42 kN	D6(4, 3)= -28,62 kN	D6(7, 8)= 0,00 kN
MF(3, 4)= 0,00 kNm	MF(4, 3)= 0,00 kNm	MF(7, 8)= 0,00 kNm
D6(4, 5)= 0,00 kN	D6(5, 4)= 0,00 kN	
MF(4, 5)= 0,00 kNm	MF(5, 4)= 0,00 kNm	

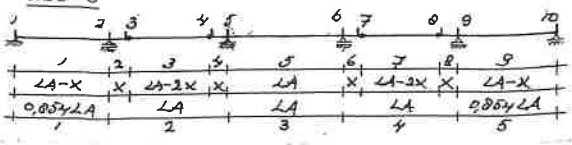
FontName= "Times New Roman" FontSize= 8

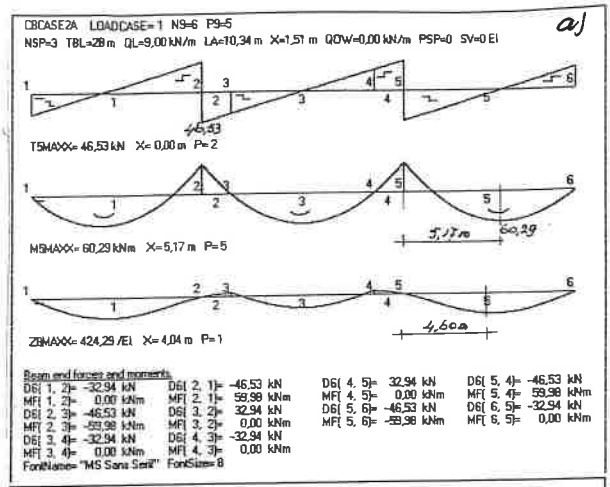
D6(6, 5)= 0,00 kN		
MF(6, 5)= 0,00 kNm		
D6(7, 6)= 0,00 kN		
MF(7, 6)= 0,00 kNm		
D6(8, 7)= 0,00 kN		
MF(8, 7)= 0,00 kNm		

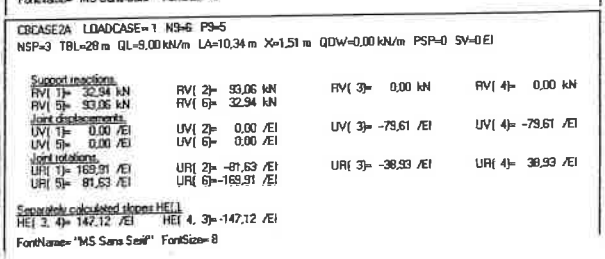
NSP=3

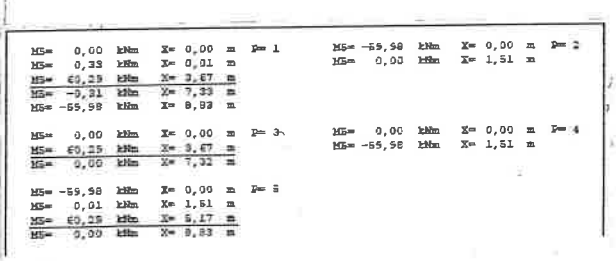


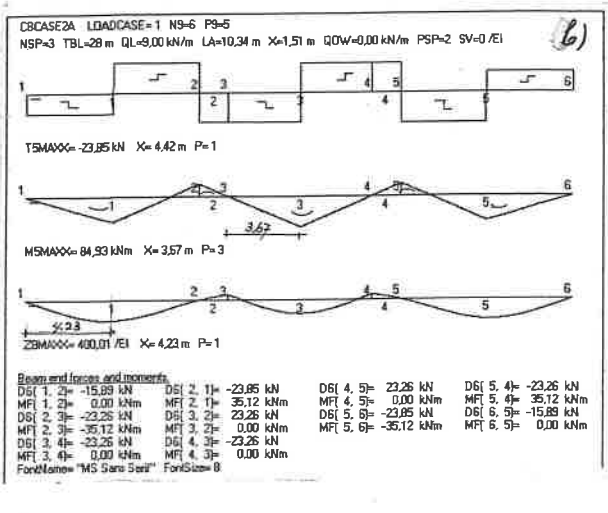
NSP=5











CBCASE2A LOADCASE=1 N9=4 P9=3

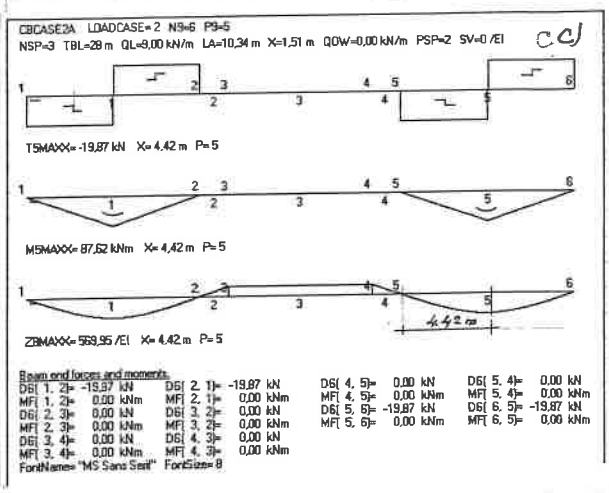
NSP=3 TBL=28 QL=9 QOW=0 PSP=0 SVI=0
Starting all over again, AOAgain.

a) First print.
3,28,9,0,0,0 Enter. 'accepted'
Next clicking LOADCASE=**1**, Direct, CBCASE2A, Calculate and PFRES2, font MS Sans Serif.

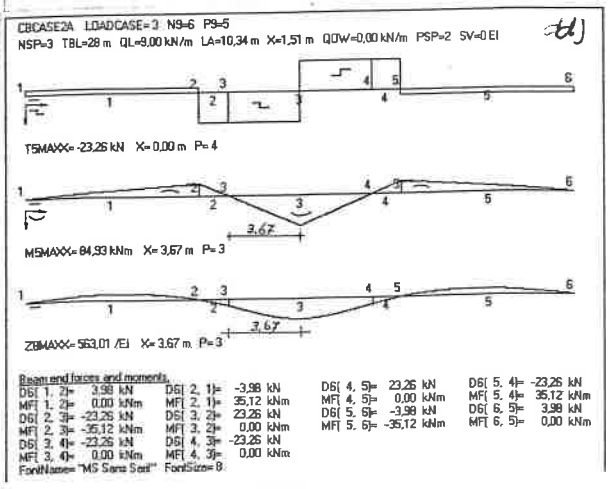
Click M5MAXZERO, print below first print, with zero and max moments. Bexause of symmetry, and hinges at special places, three times a maximum moment of 60,29 kNm.
And click another two times PFRES2.
b) Second print, left bottom.
Click Again, for NSP=2 click at wanted place in TSTRING and change the text into 3,28,9.0.**2**.0, click OK, or Enter, Indirect, CBCASE2A and Calculate, PFRES2.
c) Third print, going on.
Click Again, LOADCASE=**2**, CBCASE2A, Calculate and PFRES2.

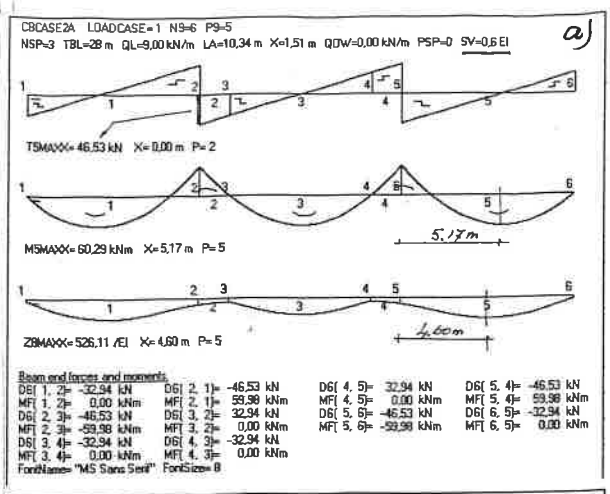
d) Fourth print. Click Again, LOADCASE=3U, CBCASE2A, Calculate and PFRES2.

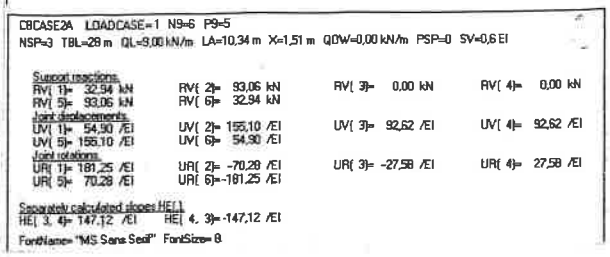
NSP=3 TBL=28 QL=9 QOW=0 PSP=**2** SVI=0
LOADCASE=**2** Indirect CBCASE2A

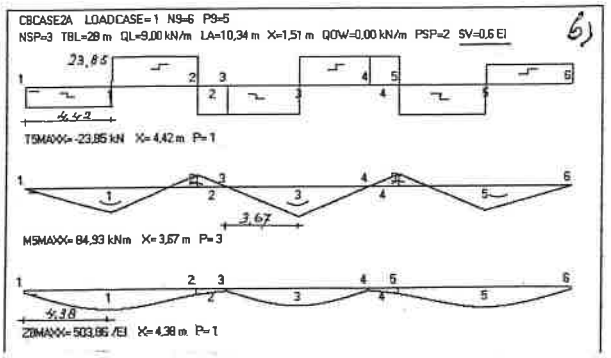


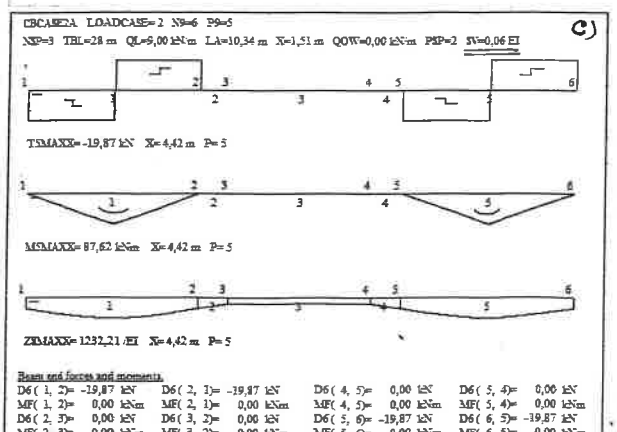
NSP=3 TBL=28 QL=9 QOW=0 PSP=**2** SVI=0
LOADCASE=**3** Indirect CBCASE2A

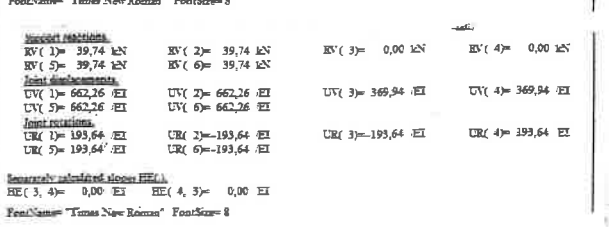












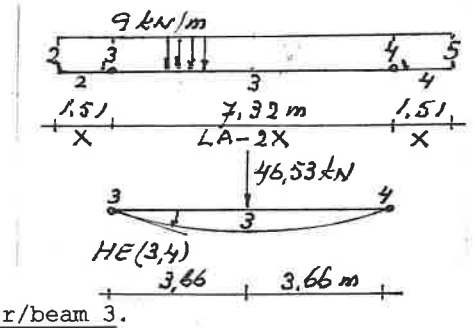
CBCASE2A N9=4 P9=3
Like the cont. beam of the preceding page.
Now with support spring constant SVI= 0.6 EI.
NSP=3 TBL=28 QL=9 QOW=0 PSP=0 SVI=0.6
Starting all over again, AOAgain.

First Print.
Change the TSTRING text, thus
3,28,9,0,0,**0.6** Enter, 'accepted', or click OK.
'accepted', LOADCASE=**1**, Direct, CBCASE2A,
Calculate and PFRES2, font MS Sans Serif.
Shear force and bending moment diagrams like first print prec. page. Bending is the same but total deformation is different.

Second print. With PSP=2. Click Again.
Click Again, for PSP=2 change the TSTRING text,
3,28,9,0,**2**,.6 Enter or OK,
LOADCASE=**1**, Indirect, CBCASE2A,
Calculate and PFRES2.

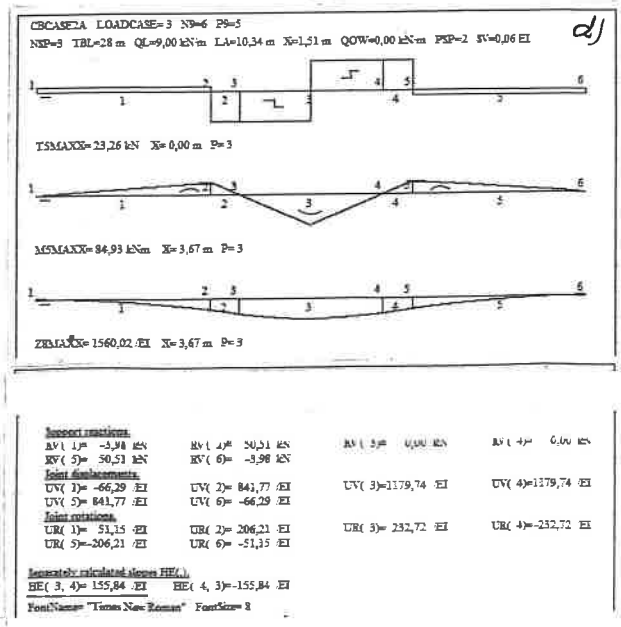
Third print. Click Again.
With SVI=0.06 EI, displacements 'larger'.
3,28,9,0,**2,.06** Enter or OK, LOADCASE=**2** etc.

Fourth print. Click Again.
3,28,9,0,**2,.06** Enter or OK, LOADCASE=**3**,
etc. Indirect, CBCASE2A, etc.



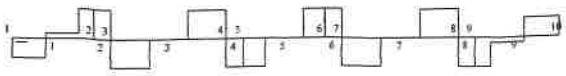
Member/beam 3.
UV(3)=UV(4)= 1179,74/EI, horizontal beam, in the middle loaded with (10,34*9)/2= 46,53 kN.

HE(3,4)= (46,53*7,32^2)/16EI= 155,82/EI
The slope below found is HE(3,4)= 155,84/EI ok

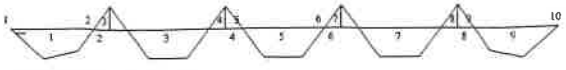


CBCASE3A LOADCASE= 1 N9=10 P9=9

NSP=5 TBL=36 m QL=11 kN/m LA=7,65 m X=1,12 m QOW=0 kN/m PSP=3 SV=0 /EI



T5MAXX= -28,88 kN X= 0,00 m P= 2



M5MAXX= 41,36 kNm X= 2,18 m P= 1

Z8MAXX= 212,71 /EI X= 3,82 m P= 7

CBCASE3A

Beam end forces and moments.

D6(1, 2)= -19,01 kN	D6(2, 1)= -28,88 kN	D6(6, 7)= 28,04 kN	D6(7, 6)= -28,04 kN
MF(1, 2)= 0,00 kNm	MF(2, 1)= 0,00 kNm	MF(6, 7)= 0,00 kNm	MF(7, 6)= 31,30 kNm
D6(2, 3)= 28,88 kN	D6(3, 2)= -28,88 kN	D6(7, 8)= -27,91 kN	D6(8, 7)= -28,16 kN
MF(2, 3)= 0,00 kNm	MF(3, 2)= 32,24 kNm	MF(7, 8)= -31,30 kNm	MF(8, 7)= 32,24 kNm

Support reactions.

RV(1)= 30,98 kN	RV(2)= 0,00 kN	RV(3)= 83,03 kN	RV(4)= 83,99 kN
RV(5)= 0,00 kN	RV(6)= 0,00 kN	RV(7)= 83,99 kN	RV(8)= 83,03 kN
RV(9)= 0,00 kN	RV(10)= 30,98 kN		

Joint displacements.

UV(1)= 0,00 /EI	UV(2)= -53,67 /EI	UV(3)= 0,00 /EI	UV(4)= 0,00 /EI
UV(5)= -55,40 /EI	UV(6)= -55,40 /EI	UV(7)= 0,00 /EI	UV(8)= 0,00 /EI
UV(9)= -53,67 /EI	UV(10)= 0,00 /EI		

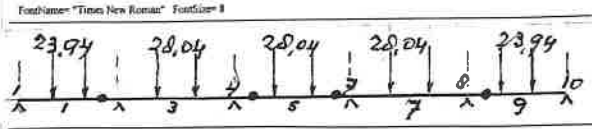
Joint rotations.

UR(1)= 57,05 /EI	UR(2)= 42,08 /EI	UR(3)= 60,08 /EI	UR(4)= -61,28 /EI
UR(5)= -43,80 /EI	UR(6)= 43,80 /EI	UR(7)= 61,28 /EI	UR(8)= -60,08 /EI
UR(9)= -42,08 /EI	UR(10)= -57,05 /EI		

Separately calculated slopes HE(,).

HE(2, 1)= -82,57 /EI	HE(5, 6)= 79,95 /EI	HE(6, 5)= -79,95 /EI	HE(9,10)= 82,57 /EI

FontName= "Times New Roman" FontSize= 8



N9=10

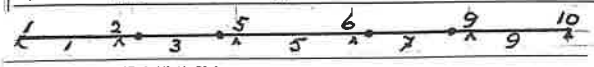
I	FY	PV	UV	SV	X1	MZ	PR	UR	SR
1	11,97	1	1	0,0	0,00	0	0	0	0
2	25,98	1	0	0,0	6,53	0	0	0	0
3	0,00	0	0	0,0	7,65	0	0	0	0
4	0,00	0	0	0,0	13,06	0	0	0	0
5	28,04	1	0	0,0	14,18	0	0	0	0
6	28,04	1	0	0,0	21,82	0	0	0	0
7	0,00	0	0	0,0	22,94	0	0	0	0
8	0,00	0	0	0,0	28,35	0	0	0	0
9	25,99	1	0	0,0	29,47	0	0	0	0
10	11,97	1	0	0,0	36,00	0	0	0	0

P9=9

P	LL	HH	NL	NH	BA	LE	RE	EI	L1
1	1	2	0	0	1	0	0	1	6,53
NFB(1)=2			1	FZ	L2				
			1	23,94	2,18				
			2	23,94	4,35				
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
2	2	3	0	0	2	0	0	1	1,12
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
3	3	4	0	0	3	0	0	1	5,41
NFB(3)=2			1	FZ	L2				
			1	28,04	1,43				
			2	28,04	3,98				
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
4	4	5	0	0	4	0	0	1	1,12
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
5	5	6	0	0	5	0	0	1	7,65
NFB(5)=2			1	FZ	L2				
			1	28,04	2,55				
			2	28,04	5,10				
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
6	6	7	0	0	6	0	0	1	1,12

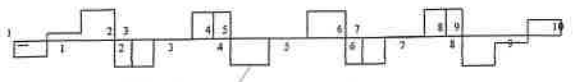
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
7	7	8	0	0	7	0	0	1	5,41
NFB(7)=2			1	FZ	L2				
			1	28,04	1,43				
			2	28,04	3,98				
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
8	8	9	0	0	8	0	0	1	1,12
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
9	9	10	0	0	9	0	0	1	6,53
NFB(9)=2			1	FZ	L2				
			1	23,94	2,18				
			2	23,94	4,35				

CBCASE3B LOADCASE= 1
QL= 11,00 kN/m QOW= 0,00 kN/m
Font name is Arial and
font size is 8,25.

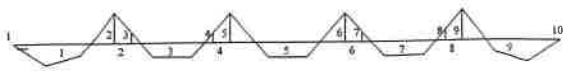


CBCASE3B LOADCASE= 1 N9=10 P9=9

NSP=5 TBL=36 m QL=11 kN/m LA=7,65 m X=1,12 m QOW=0 kN/m PSP=3 SV=0 /EI



T5MAXX= 31,57 kN X= 0,00 m P= 9



M5MAXX= -49,82 kNm X= 1,12 m P= 8

Z8MAXX= 107,31 /EI X= 2,80 m P= 1

CBCASE3B

Beam end forces and moments.

D6(1, 2)= -16,31 kN	D6(2, 1)= -31,57 kN	D6(6, 7)= -27,70 kN	D6(7, 6)= 27,70 kN
MF(1, 2)= 0,00 kNm	MF(2, 1)= 49,82 kNm	MF(6, 7)= -47,21 kNm	MF(7, 6)= 16,29 kNm
D6(2, 3)= -28,38 kN	D6(3, 2)= 28,38 kN	D6(7, 8)= -27,70 kN	D6(8, 7)= -28,38 kN
MF(2, 3)= -49,82 kNm	MF(3, 2)= 18,14 kNm	MF(7, 8)= -16,29 kNm	MF(8, 7)= 18,14 kNm

Support reactions.

RV(1)= 28,29 kN	RV(2)= 85,94 kN	RV(3)= 0,00 kN	RV(4)= 0,00 kN
RV(5)= 83,77 kN	RV(6)= 83,77 kN	RV(7)= 0,00 kN	RV(8)= 0,00 kN
RV(9)= 85,94 kN	RV(10)= 28,29 kN		

Joint displacements.

UV(1)= 0,00 /EI	UV(2)= 0,00 /EI	UV(3)= 18,88 /EI	UV(4)= 21,13 /EI
UV(5)= 0,00 /EI	UV(6)= 0,00 /EI	UV(7)= 21,13 /EI	UV(8)= 18,88 /EI
UV(9)= 0,00 /EI	UV(10)= 0,00 /EI		

Joint rotations.

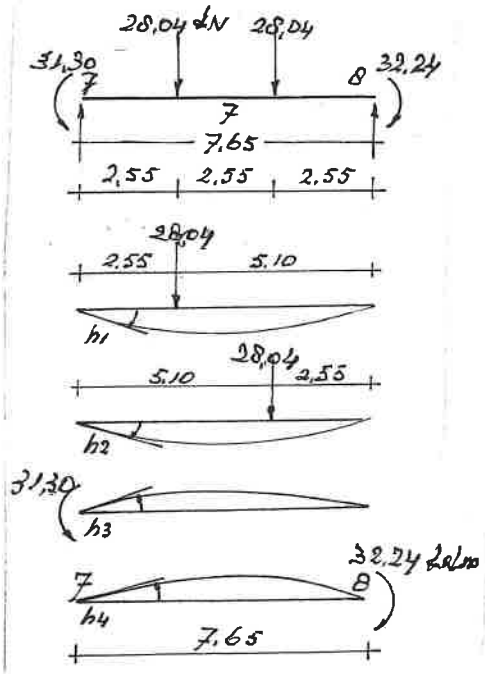
UR(1)= 59,22 /EI	UR(2)= -5,00 /EI	UR(3)= 32,94 /EI	UR(4)= -33,78 /EI
UR(5)= 1,67 /EI	UR(6)= -1,67 /EI	UR(7)= 33,78 /EI	UR(8)= -32,94 /EI
UR(9)= 5,00 /EI	UR(10)= -59,22 /EI		

FontName= "Times New Roman" FontSize= 8

CBCASE3A N9=10 P9=9

NSP=5 TBL=36 QL=11 QOW=0 PSP=3 SVI=0
AOAgain.
5,36,11,0,3,0 Enter or OK,
LOADCASE=1, Indirect, CBCASE3A, Show for the data print,
Calculate, and PRRES3 for a printer print. Some results on the left print are omitted. Next papa shows real size printer print.

Here below member 7.
Member load forces (7,65*11)/3= 28,04 kN.
A check of joint rotation UR(7)= 61,28/EI.
With the formula the slope deflections, member end rotations, of four cases can be calculated Load forces and member end moments drawn with their real directions, then the bending of the member is drawn to see the 'direction' of the angles h1, h2, h3 and h4.



h1= (28,04*2,55*5,10)*(7,65+5,10)/(6*7,65*EI)
= 101,29/EI

h2= (28,04*2,55*5,10)*(7,65+2,55)/(6*7,65*EI)
= 81,04/EI

h3= (31,30*7,65)/3EI= 79,82/EI

H4= (32,24*7,65)/6EI= 41,11/EI

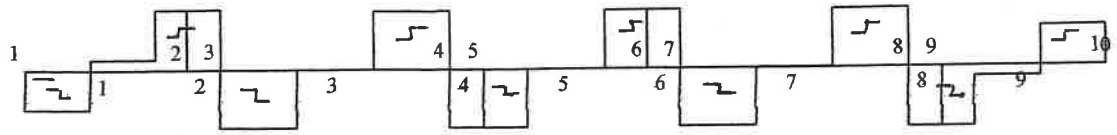
h= (101,29+81,04 -79,82-41,11)/EI= 61,40/EI ok

The third print on the left. Going on with Again, CBCASE3B, Calculate and PRRES3. Shear force diagram with some lines at places where hinges are like those of CADRAW2A.

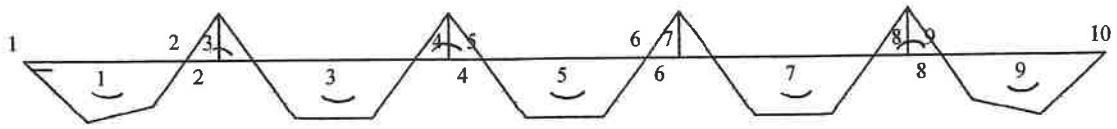
When clicking CBCASE2B in stead of CBCASE3B the same diagrams appears... just done like that. Both prints give same results because CBCASE2A and CBCASE3A are equal except the places of the hinges.

CBCASE3A LOADCASE= 1 N9=10 P9=9

NSP=5 TBL=36 m QL=11 kN/m LA=7,65 m X=1,12 m QOW=0 kN/m PSP=3 SV=0 /EI



T5MAXX= -28,88 kN X= 0,00 m P= 2



M5MAXX= 41,36 kNm X= 2,18 m P= 1

Z8MAXX= 212,71 /EI X= 3,82 m P= 7

Beam end forces and moments.

D6(1, 2)= -19,01 kN	D6(2, 1)= -28,88 kN	D6(6, 7)= 28,04 kN	D6(7, 6)= -28,04 kN
MF(1, 2)= 0,00 kNm	MF(2, 1)= 0,00 kNm	MF(6, 7)= 0,00 kNm	MF(7, 6)= 31,30 kNm
D6(2, 3)= 28,88 kN	D6(3, 2)= -28,88 kN	D6(7, 8)= -27,91 kN	D6(8, 7)= -28,16 kN
MF(2, 3)= 0,00 kNm	MF(3, 2)= 32,24 kNm	MF(7, 8)= -31,30 kNm	MF(8, 7)= 32,24 kNm
D6(3, 4)= -28,16 kN	D6(4, 3)= -27,91 kN	D6(8, 9)= -28,88 kN	D6(9, 8)= 28,88 kN
MF(3, 4)= -32,24 kNm	MF(4, 3)= 31,30 kNm	MF(8, 9)= -32,24 kNm	MF(9, 8)= 0,00 kNm
D6(4, 5)= -28,04 kN	D6(5, 4)= 28,04 kN	D6(9,10)= -28,88 kN	D6(10, 9)= -19,01 kN
MF(4, 5)= -31,30 kNm	MF(5, 4)= 0,00 kNm	MF(9,10)= 0,00 kNm	MF(10, 9)= 0,00 kNm
D6(5, 6)= -28,04 kN	D6(6, 5)= -28,04 kN		
MF(5, 6)= 0,00 kNm	MF(6, 5)= 0,00 kNm		

Support reactions.

RV(1)= 30,98 kN	RV(2)= 0,00 kN	RV(3)= 83,03 kN	RV(4)= 83,99 kN
RV(5)= 0,00 kN	RV(6)= 0,00 kN	RV(7)= 83,99 kN	RV(8)= 83,03 kN
RV(9)= 0,00 kN	RV(10)= 30,98 kN		

Joint displacements.

UV(1)= 0,00 /EI	UV(2)= -53,67 /EI	UV(3)= 0,00 /EI	UV(4)= 0,00 /EI
UV(5)= -55,40 /EI	UV(6)= -55,40 /EI	UV(7)= 0,00 /EI	UV(8)= 0,00 /EI
UV(9)= -53,67 /EI	UV(10)= 0,00 /EI		

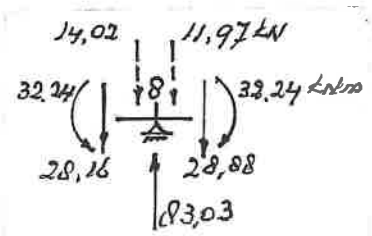
Joint rotations.

UR(1)= 57,05 /EI	UR(2)= 42,08 /EI	UR(3)= 60,08 /EI	UR(4)= -61,28 /EI
UR(5)= -43,80 /EI	UR(6)= 43,80 /EI	UR(7)= 61,28 /EI	UR(8)= -60,08 /EI
UR(9)= -42,08 /EI	UR(10)= -57,05 /EI		

Separately calculated slopes HE(,).

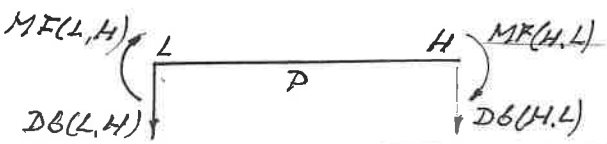
HE(2, 1)= -82,57 /EI	HE(5, 6)= 79,95 /EI	HE(6, 5)= -79,95 /EI	HE(9,10)= 82,57 /EI

FontName= "Times New Roman" FontSize= 8



Support 8.

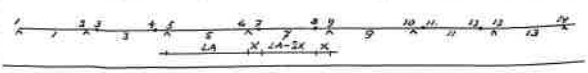
D6(8,7)= -28,16 kN	28,04/2= 14,02 kN
D6(8,9)= -28,88 kN	23,94/2= 11,97 kN
MF(8,7)= 32,24 kNm	MF(8,9)= -32,24 k



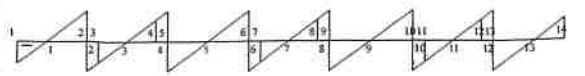
Forces and moments drawn with their real directions.

Equilibrium? Yes!

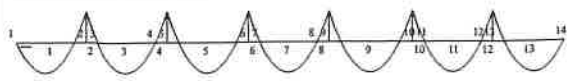
NSP=7 TBL=40 QL=8 QOW=0 PSP=0 SVI=0
CBCASE2A Direct LOADCASE=1



CBCASE2A LOADCASE= 1 N9=14 P9=13
NSP=7 TBL=40 m QL=8 kN/m LA=5,96 m X=0,87 m QOW=0 kN/m PSP=0 SV=0 /EI



T5MAXX= -23,85 kN X= 0,88 m P= 12



M5MAXX= 17,82 kNm X= 2,99 m P= 9

Z8MAXX= 52,88 /EI X= 2,99 m P= 5

Beam end forces and moments.

D6(1, 2)= -16,89 kN	D6(2, 1)= -23,85 kN	D6(8, 9)= 16,89 kN	D6(9, 8)= -23,85 kN
MF(1, 2)= 0,00 kNm	MF(2, 1)= 17,73 kNm	MF(8, 9)= 0,00 kNm	MF(9, 8)= 17,73 kNm
D6(2, 3)= -23,85 kN	D6(3, 2)= 16,89 kN	D6(9,10)= -23,85 kN	D6(10, 9)= -23,85 kN
MF(2, 3)= -17,73 kNm	MF(3, 2)= 0,00 kNm	MF(9,10)= -17,73 kNm	MF(10, 9)= 17,73 kNm
D6(3, 4)= -16,89 kN	D6(4, 3)= -16,89 kN	D6(10,11)= -23,85 kN	D6(11,10)= 16,89 kN
MF(3, 4)= 0,00 kNm	MF(4, 3)= 0,00 kNm	MF(10,11)= -17,73 kNm	MF(11,10)= 0,00 kNm
D6(4, 5)= 16,89 kN	D6(5, 4)= -23,85 kN	D6(11,12)= -16,89 kN	D6(12,11)= -16,89 kN
MF(4, 5)= 0,00 kNm	MF(5, 4)= 17,73 kNm	MF(11,12)= 0,00 kNm	MF(12,11)= 0,00 kNm
D6(5, 6)= -23,85 kN	D6(6, 5)= -23,85 kN	D6(12,13)= 16,89 kN	D6(13,12)= -23,85 kN
MF(5, 6)= -17,73 kNm	MF(6, 5)= 17,73 kNm	MF(12,13)= 0,00 kNm	MF(13,12)= 17,73 kNm
D6(6, 7)= -23,85 kN	D6(7, 6)= 16,89 kN	D6(13,14)= -23,85 kN	D6(14,13)= -16,89 kN
MF(6, 7)= -17,73 kNm	MF(7, 6)= 0,00 kNm	MF(13,14)= -17,73 kNm	MF(14,13)= 0,00 kNm
D6(7, 8)= -16,89 kN	D6(8, 7)= -16,89 kN		
MF(7, 8)= 0,00 kNm	MF(8, 7)= 0,00 kNm		

Support reactions.

RV(1)= 16,89 kN	RV(2)= 47,70 kN	RV(3)= 0,00 kN	RV(4)= 0,00 kN
RV(5)= 47,70 kN	RV(6)= 47,70 kN	RV(7)= 0,00 kN	RV(8)= 0,00 kN
RV(9)= 47,70 kN	RV(10)= 47,70 kN	RV(11)= 0,00 kN	RV(12)= 0,00 kN
RV(13)= 47,70 kN	RV(14)= 16,89 kN		

Joint displacements.

UV(1)= 0,00 /EI	UV(2)= 0,00 /EI	UV(3)= -7,83 /EI	UV(4)= -11,21 /EI
UV(5)= 0,00 /EI	UV(6)= 0,00 /EI	UV(7)= -11,21 /EI	UV(8)= -11,21 /EI
UV(9)= 0,00 /EI	UV(10)= 0,00 /EI	UV(11)= -11,21 /EI	UV(12)= -7,83 /EI
UV(13)= 0,00 /EI	UV(14)= 0,00 /EI		

Joint rotations.

UR(1)= 28,97 /EI	UR(2)= -13,92 /EI	UR(3)= -6,64 /EI	UR(4)= 18,52 /EI
UR(5)= 17,80 /EI	UR(6)= -17,80 /EI	UR(7)= -10,52 /EI	UR(8)= 10,52 /EI
UR(9)= 17,80 /EI	UR(10)= -17,80 /EI	UR(11)= -10,52 /EI	UR(12)= 6,64 /EI
UR(13)= 13,92 /EI	UR(14)= -28,97 /EI		

Separately calculated slopes HE(.).

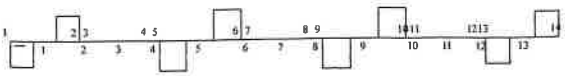
HE(3, 4)= 24,28 /EI	HE(4, 3)= -25,88 /EI	HE(7, 8)= 25,08 /EI	HE(8, 7)= -25,08 /EI
HE(11,12)= 25,88 /EI	HE(12,11)= -24,28 /EI		

FontName= "Times New Roman" FontSize= 8

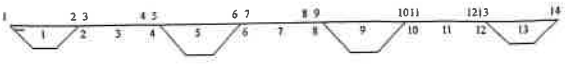
Example CBCASE2A,

NSP=7 TBL=40 QL=8 QOW=0 PSP=3 SVI=0.6
CBCASE2A Indirect LOADCASE=2

CBCASE2A LOADCASE= 2 N9=14 P9=13
NSP=7 TBL=40 m QL=8 kN/m LA=5,96 m X=0,87 m QOW=0 kN/m PSP=3 SV=0,6 /EI



T5MAXX= -15,90 kN X= 3,98 m P= 5



M5MAXX= 31,61 kNm X= 1,99 m P= 5

Z8MAXX= 159,42 /EI X= 2,99 m P= 9

Beam end forces and moments.

D6(1, 2)= -13,58 kN	D6(2, 1)= -13,58 kN	D6(8, 9)= 0,00 kN	D6(9, 8)= 0,00 kN
MF(1, 2)= 0,00 kNm	MF(2, 1)= 0,00 kNm	MF(8, 9)= 0,00 kNm	MF(9, 8)= 0,00 kNm
D6(2, 3)= 0,00 kN	D6(3, 2)= 0,00 kN	D6(9,10)= -15,90 kN	D6(10, 9)= -15,90 kN
MF(2, 3)= 0,00 kNm	MF(3, 2)= 0,00 kNm	MF(9,10)= 0,00 kNm	MF(10, 9)= 0,00 kNm
D6(3, 4)= 0,00 kN	D6(4, 3)= 0,00 kN	D6(10,11)= 0,00 kN	D6(11,10)= 0,00 kN
MF(3, 4)= 0,00 kNm	MF(4, 3)= 0,00 kNm	MF(10,11)= 0,00 kNm	MF(11,10)= 0,00 kNm
D6(4, 5)= 0,00 kN	D6(5, 4)= 0,00 kN	D6(11,12)= 0,00 kN	D6(12,11)= 0,00 kN
MF(4, 5)= 0,00 kNm	MF(5, 4)= 0,00 kNm	MF(11,12)= 0,00 kNm	MF(12,11)= 0,00 kNm
D6(5, 6)= -15,90 kN	D6(6, 5)= -15,90 kN	D6(12,13)= 0,00 kN	D6(13,12)= 0,00 kN
MF(5, 6)= 0,00 kNm	MF(6, 5)= 0,00 kNm	MF(12,13)= 0,00 kNm	MF(13,12)= 0,00 kNm
D6(6, 7)= 0,00 kN	D6(7, 6)= 0,00 kN	D6(13,14)= -13,58 kN	D6(14,13)= -13,58 kN
MF(6, 7)= 0,00 kNm	MF(7, 6)= 0,00 kNm	MF(13,14)= 0,00 kNm	MF(14,13)= 0,00 kNm
D6(7, 8)= 0,00 kN	D6(8, 7)= 0,00 kN		
MF(7, 8)= 0,00 kNm	MF(8, 7)= 0,00 kNm		

Support reactions.

RV(1)= 20,37 kN	RV(2)= 20,37 kN	RV(3)= 0,00 kN	RV(4)= 0,00 kN
RV(5)= 23,85 kN	RV(6)= 23,85 kN	RV(7)= 0,00 kN	RV(8)= 0,00 kN
RV(9)= 23,85 kN	RV(10)= 23,85 kN	RV(11)= 0,00 kN	RV(12)= 0,00 kN
RV(13)= 20,37 kN	RV(14)= 20,37 kN		

Joint displacements.

UV(1)= 33,95 /EI	UV(2)= 33,95 /EI	UV(3)= -0,12 /EI	UV(4)= -14,94 /EI
UV(5)= 39,75 /EI	UV(6)= 39,75 /EI	UV(7)= -14,94 /EI	UV(8)= -14,94 /EI
UV(9)= 39,75 /EI	UV(10)= 39,75 /EI	UV(11)= -14,94 /EI	UV(12)= -0,12 /EI
UV(13)= 33,95 /EI	UV(14)= 33,95 /EI		

Joint rotations.

UR(1)= 39,13 /EI	UR(2)= -39,13 /EI	UR(3)= -39,13 /EI	UR(4)= 62,82 /EI
UR(5)= 62,82 /EI	UR(6)= -62,82 /EI	UR(7)= -62,82 /EI	UR(8)= 62,82 /EI
UR(9)= 62,82 /EI	UR(10)= -62,82 /EI	UR(11)= -62,82 /EI	UR(12)= 39,13 /EI
UR(13)= 39,13 /EI	UR(14)= -39,13 /EI		

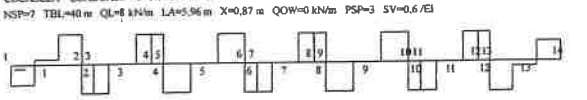
Separately calculated slopes HE(.).

HE(3, 4)= -3,51 /EI	HE(4, 3)= -3,51 /EI	HE(7, 8)= 0,00 /EI	HE(8, 7)= 0,00 /EI
HE(11,12)= 3,51 /EI	HE(12,11)= 3,51 /EI		

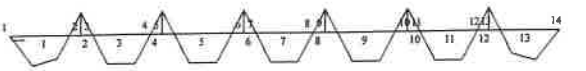
FontName= "Times New Roman" FontSize= 8

NSP=7 TBL=40 QL=8 QOW=0 PSP=3 SVI=0.6
CBCASE2A Indirect LOADCASE=1

CBCASE2A LOADCASE= 1 N9=14 P9=13
NSP=7 TBL=40 m QL=8 kN/m LA=5,96 m X=0,87 m QOW=0 kN/m PSP=3 SV=0,6 /EI



T5MAXX= 16,30 kN X= 0,00 m P= 13



M5MAXX= 18,43 kNm X= 1,70 m P= 1

Z8MAXX= 137,65 /EI X= 2,99 m P= 9

Beam end forces and moments.

D6(1, 2)= -10,86 kN	D6(2, 1)= -16,30 kN	D6(8, 9)= 15,90 kN	D6(9, 8)= -15,90 kN
MF(1, 2)= 0,00 kNm	MF(2, 1)= 13,84 kNm	MF(8, 9)= 0,00 kNm	MF(9, 8)= 13,84 kNm
D6(2, 3)= -15,90 kN	D6(3, 2)= 15,90 kN	D6(9,10)= -15,90 kN	D6(10, 9)= -15,90 kN
MF(2, 3)= -13,84 kNm	MF(3, 2)= 0,00 kNm	MF(9,10)= -13,84 kNm	MF(10, 9)= 13,84 kNm
D6(3, 4)= -15,90 kN	D6(4, 3)= -15,90 kN	D6(10,11)= -15,90 kN	D6(11,10)= 15,90 kN
MF(3, 4)= 0,00 kNm	MF(4, 3)= 0,00 kNm	MF(10,11)= -13,84 kNm	MF(11,10)= 0,00 kNm
D6(4, 5)= 15,90 kN	D6(5, 4)= -15,90 kN	D6(11,12)= -15,90 kN	D6(12,11)= -15,90 kN
MF(4, 5)= 0,00 kNm	MF(5, 4)= 13,84 kNm	MF(11,12)= 0,00 kNm	MF(12,11)= 0,00 kNm
D6(5, 6)= -15,90 kN	D6(6, 5)= -15,90 kN	D6(12,13)= 15,90 kN	D6(13,12)= -15,90 kN
MF(5, 6)= -13,84 kNm	MF(6, 5)= 13,84 kNm	MF(12,13)= 0,00 kNm	MF(13,12)= 13,84 kNm
D6(6, 7)= -15,90 kN	D6(7, 6)= 15,90 kN	D6(13,14)= -16,30 kN	D6(14,13)= -10,86 kN
MF(6, 7)= -13,84 kNm	MF(7, 6)= 0,00 kNm	MF(13,14)= -13,84 kNm	MF(14,13)= 0,00 kNm
D6(7, 8)= -15,90 kN	D6(8, 7)= -15,90 kN		
MF(7, 8)= 0,00 kNm	MF(8, 7)= 0,00 kNm		

Support reactions.

RV(1)= 17,65 kN	RV(2)= 46,94 kN	RV(3)= 0,00 kN	RV(4)= 0,00 kN
RV(5)= 47,70 kN	RV(6)= 47,70 kN	RV(7)= 0,00 kN	RV(8)= 0,00 kN
RV(9)= 47,70 kN	RV(10)= 47,70 kN	RV(11)= 0,00 kN	RV(12)= 0,00 kN
RV(13)= 46,94 kN	RV(14)= 17,65 kN		

Joint displacements.

UV(1)= 29,42 /EI	UV(2)= 78,23 /EI	UV(3)= 76,47 /EI	UV(4)= 64,24 /EI
UV(5)= 79,51 /EI	UV(6)= 79,51 /EI	UV(7)= 64,24 /EI	UV(8)= 64,24 /EI
UV(9)= 79,51 /EI	UV(10)= 79,51 /EI	UV(11)= 64,24 /EI	UV(12)= 76,47 /EI
UV(13)= 78,23 /EI	UV(14)= 29,42 /EI		

Joint rotations.

UR(1)= 36,97 /EI	UR(2)= -6,04 /EI	UR(3)= -0,02 /EI	UR(4)= 15,52 /EI
UR(5)= 21,55 /EI	UR(6)= -21,55 /EI	UR(7)= -15,52 /EI	UR(8)= 15,52 /EI
UR(9)= 21,55 /EI	UR(10)= -21,55 /EI	UR(11)= -15,52 /EI	UR(12)= 0,02 /EI
UR(13)= 6,04 /EI	UR(14)= -36,97 /EI		

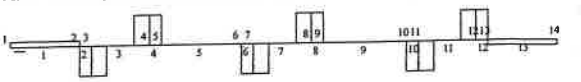
Separately calculated slopes HE(.).

HE(3, 4)= 24,68 /EI	HE(4, 3)= -30,47 /EI	HE(7, 8)= 27,57 /EI	HE(8, 7)= -27,57 /EI
HE(11,12)= 30,47 /EI	HE(12,11)= -24,68 /EI		

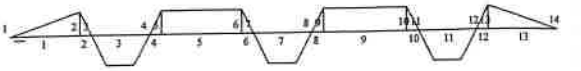
FontName= "Times New Roman" FontSize= 8

NSP=7 TBL=40 QL=8 QOW=0 PSP=3 SVI=0.6
CBCASE2A Indirect LOADCASE=3

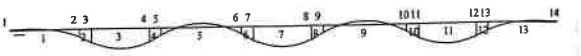
CBCASE2A LOADCASE= 3 N9=14 P9=13
NSP=7 TBL=40 m QL=8 kN/m LA=5,96 m X=0,87 m QOW=0 kN/m PSP=3 SV=0,6 /EI



T5MAXX= 15,90 kN X= 0,00 m P= 2



M5MAXX= 17,76 kNm X= 1,12 m P= 11



Z8MAXX= 115,07 /EI X= 2,12 m P= 7

Beam end forces and moments.

D6(1, 2)= 2,72 kN	D6(2, 1)= -2,72 kN	D6(8, 9)= 15,90 kN	D6(9, 8)= -15,90 kN
MF(1, 2)= 0,00 kNm	MF(2, 1)= 13,84 kNm	MF(8, 9)= 0,00 kNm	MF(9, 8)= 13,84 kNm
D6(2, 3)= -15,90 kN	D6(3, 2)= 15,90 kN	D6(9,10)= 0,00 kN	D6(10, 9)= 0,00 kN
MF(2, 3)= -13,84 kNm	MF(3, 2)= 0,00 kNm	MF(9,10)= -13,84 kNm	MF(10, 9)= 13,84 kNm
D6(3, 4)= -15,90 kN	D6(4, 3)= -15,90 kN	D6(10,11)= -15,90 kN	D6(11,10)= 15,90 kN
MF(3, 4)= 0,00 kNm	MF(4, 3)= 0,00 kNm	MF(10,11)= -13,84 kNm	MF(11,10)= 0,00 kNm
D6(4, 5)= 15,90 kN	D6(5, 4)= -15,90 kN	D6(11,12)= -15,90 kN	D6(12,11)= -15,90 kN
MF(4, 5)= 0,00 kNm	MF(5, 4)= 13,84 kNm	MF(11,12)= 0,00 kNm	MF(12,11)= 0,00 kNm
D6(5, 6)= 0,00 kN	D6(6, 5)= 0,00 kN	D6(12,13)= 15,90 kN	D6(13,12)= -15,90 kN
MF(5, 6)= -13,84 kNm	MF(6, 5)= 13,84 kNm	MF(12,13)= 0,00 kNm	MF(13,12)= 13,84 kNm
D6(6, 7)= -15,90 kN	D6(7, 6)= 15,90 kN	D6(13,14)= -2,72 kN	D6(14,13)= 2,72 kN
MF(6, 7)= -13,84 kNm	MF(7, 6)= 0,00 kNm	MF(13,14)= -13,84 kNm	MF(14,13)= 0,00 kNm
D6(7, 8)= -15,90 kN	D6(8, 7)= -15,90 kN		
MF(7, 8)= 0,00 kNm	MF(8, 7)= 0,00 kNm		

Support reactions.

RV(1)= -2,72 kN	RV(2)= 26,57 kN	RV(3)= 0,00 kN	RV(4)= 0,00 kN
RV(5)= 23,85 kN	RV(6)= 23,85 kN	RV(7)= 0,00 kN	RV(8)= 0,00 kN
RV(9)= 23,85 kN	RV(10)= 23,85 kN	RV(11)= 0,00 kN	RV(12)= 0,00 kN
RV(13)= 26,57 kN	RV(14)= -2,72 kN		

Joint displacements.

UV(1)= -4,53 /EI	UV(2)= 44,28 /EI	UV(3)= 76,59 /EI	UV(4)= 79,19 /EI
UV(5)= 39,75 /EI	UV(6)= 39,75 /EI	UV(7)= 79,19 /EI	UV(8)= 79,19 /EI
UV(9)= 39,75 /EI	UV(10)= 39,75 /EI	UV(11)= 79,19 /EI	UV(12)= 76,59 /EI
UV(13)= 44,28 /EI	UV(14)= -4,53 /EI		

Joint rotations.

UR(1)= -2,16 /EI	UR(2)= 33,09 /EI	UR(3)= 39,11 /EI	UR(4)= -47,30 /EI
UR(5)= -41,28 /EI	UR(6)= 41,28 /EI	UR(7)= 47,30 /EI	UR(8)= -47,30 /EI
UR(9)= -41,28 /EI	UR(10)= 41,28 /EI	UR(11)= 47,30 /EI	UR(12)= -39,11 /EI
UR(13)= -33,09 /EI	UR(14)= 2,16 /EI		

Separately calculated slopes HE(.).

HE(3, 4)= 28,19 /EI	HE(4, 3)= -26,96 /EI	HE(7, 8)= 27,57 /EI	HE(8, 7)= -27,57 /EI
HE(11,12)= 26,96 /EI	HE(12,11)= -28,19 /EI		

FontName= "Times New Roman" FontSize= 8

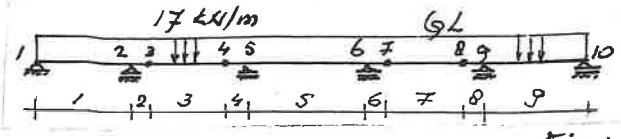
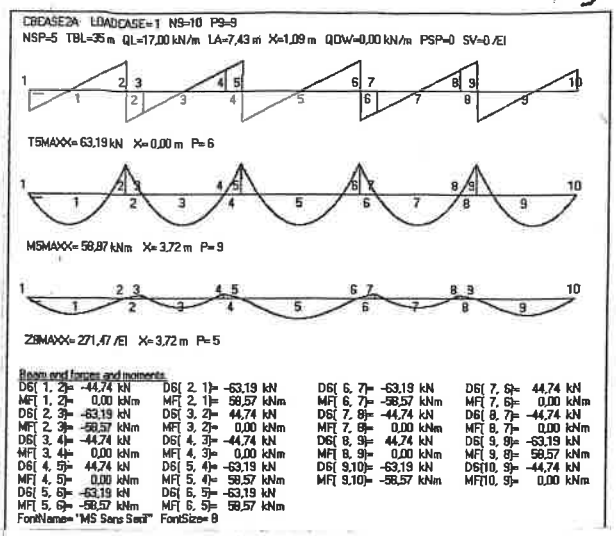
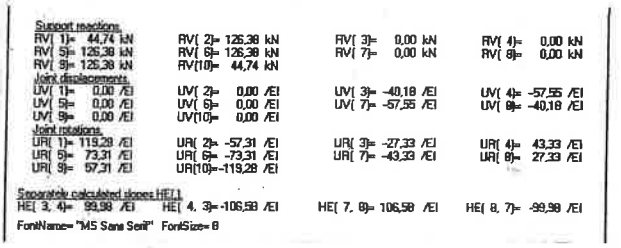


Fig.1.





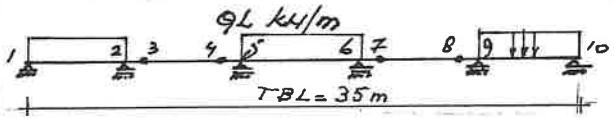
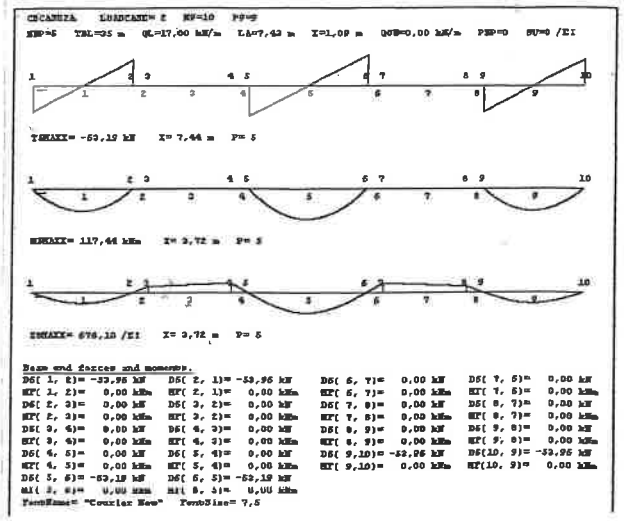
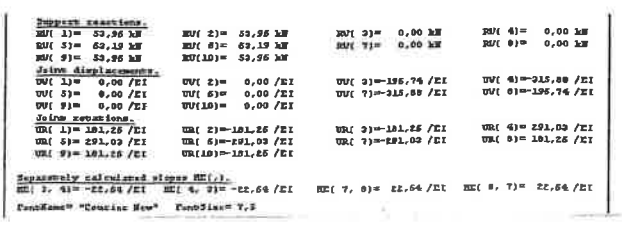


Fig.2.





Examples with CBCASE2A. EX1

Fig.1 with LOADCASE1.
NSP=5 spans TBL=35 m QL=17 kN/m
QOW=0 PSP=0 SVI=0

Click EX1, 5,35,17,0,0,0 appears in TSTRING, click OK to get 'accepted'.
Or 5,35,17,0,0,0 Enter, etc.

Click LOADCASE1, Direct, CBCASE2A, Calculate.
Click PFRES3 for the print on the left with font Times New Roman.

Fig.2, with LOADCASE2. Again!
With still the data of EX1 in TSTRING click Again to make all UV(I) and UR(I) zero.
Click OK, 'accepted'.

Click to LOADCASE2, Direct, Calculate, PFRES1, second print with font Courier New.

Fig.3. with LOADCASE3. Again!
Like LOADCASE2. PFRES4 with font Arial.
Support reactions RV(I) for this third case together are, 1 to 10,
-9,33 +72,42 +0 +0 +63,19 +63,19 +0 +0

+72,42 -9,23= 252,76 kN.

LA= 7,43 m from joi nt 2 to 5, see page
QL=17 kN/m, then 2*(7,43*17)= 252,62 kN ok

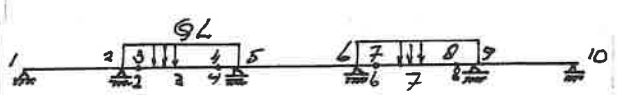
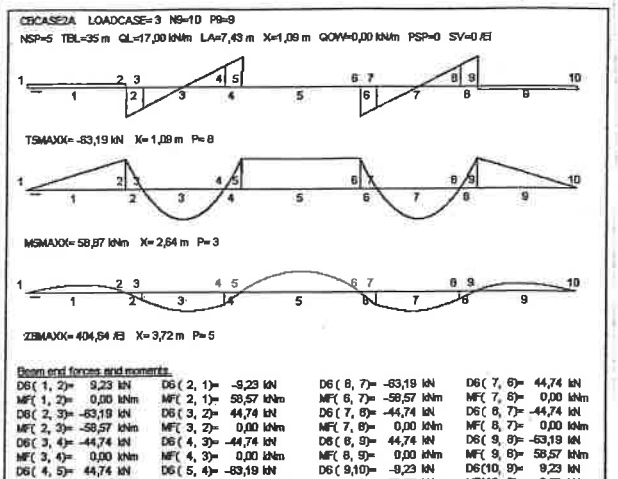
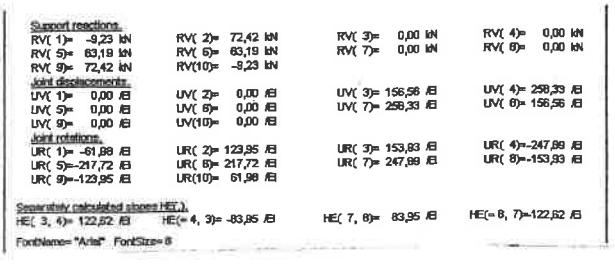
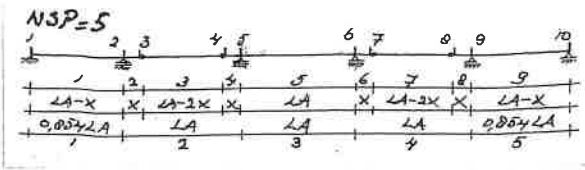


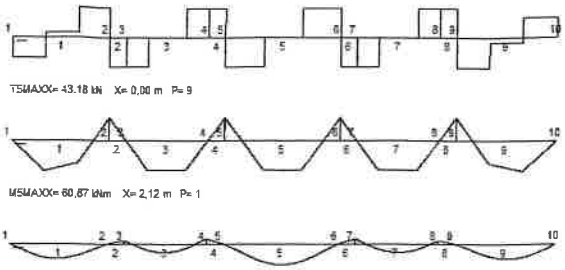
Fig.3.







CBCASE2A LOADCASE= 1 NS=10 PS=9
NSP=5 TBL=35 m QL=17,00 kN/m LA=7,43 m X=1,09 m QOW=0,00 kN/m PSP=2 SV=0 /EI



CBCASE2A LOADCASE1

Beam end forces and moments.

D6(1, 2)= -28,77 kN	D6(2, 1)= -43,18 kN	D6(6, 7)= -42,13 kN	D6(7, 8)= 42,13 kN
MF(1, 2)= 0,00 kNm	MF(2, 1)= 45,72 kNm	MF(6, 7)= -45,72 kNm	MF(7, 6)= 0,00 kNm
D6(2, 3)= -42,13 kN	D6(3, 2)= 42,13 kN	D6(7, 8)= -42,13 kN	D6(8, 7)= -42,13 kN
MF(2, 3)= -45,72 kNm	MF(3, 2)= 0,00 kNm	MF(7, 8)= 0,00 kNm	MF(8, 7)= 0,00 kNm
D6(3, 4)= -42,13 kN	D6(4, 3)= -42,13 kN	D6(8, 9)= 42,13 kN	D6(9, 8)= -42,13 kN
MF(3, 4)= 0,00 kNm	MF(4, 3)= 0,00 kNm	MF(8, 9)= 0,00 kNm	MF(9, 8)= 45,72 kNm
D6(4, 5)= 42,13 kN	D6(5, 4)= -42,13 kN	D6(9,10)= -43,18 kN	D6(10, 9)= -28,77 kN
MF(4, 5)= 0,00 kNm	MF(5, 4)= 45,72 kNm	MF(9,10)= -45,72 kNm	MF(10, 9)= 0,00 kNm
D6(5, 6)= -42,13 kN	D6(6, 5)= -42,13 kN		
MF(5, 6)= -45,72 kNm	MF(6, 5)= 45,72 kNm		

FontName= "Arial" FontSize= 8

NS=10

I	FY	PV	UV	SV	XI	MZ	PR	UR	SR
1	17,99	1	0	0,0	0,00	0	0	0	0
2	39,05	1	0	0,0	6,35	0	0	0	0
3	0,00	0	0	0,0	7,43	0	0	0	0
4	0,00	0	0	0,0	12,70	0	0	0	0
5	42,13	1	0	0,0	13,78	0	0	0	0
6	42,13	1	0	0,0	21,22	0	0	0	0
7	0,00	0	0	0,0	22,30	0	0	0	0
8	0,00	0	0	0,0	27,57	0	0	0	0
9	39,05	1	0	0,0	28,65	0	0	0	0
10	17,99	1	0	0,0	35,00	0	0	0	0

P	LL	HH	NL	NH	BA	LE	RE	EI	L1
1	1	2	0	0	1	0	0	1	6,35
NFB(1)=2			I		F2		L2		
			1		35,98		2,12		
			2		35,98		4,23		
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
2	2	3	0	0	2	0	0	1	1,09
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
3	3	4	1	1	3	1	1	1	5,26
NFB(3)=2			I		F2		L2		
			1		42,13		1,39		
			2		42,13		3,87		
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
4	4	5	0	0	4	0	0	1	1,09
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
5	5	6	0	0	5	0	0	1	7,43
NFB(5)=2			I		F2		L2		
			1		42,13		2,48		
			2		42,13		4,96		
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
6	6	7	0	0	6	0	0	1	1,09
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
7	7	8	1	1	7	1	1	1	5,26
NFB(7)=2			I		F2		L2		
			1		42,13		1,39		
			2		42,13		3,87		
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
8	8	9	0	0	8	0	0	1	1,09
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
9	9	10	0	0	9	0	0	1	6,35
NFB(9)=2			I		F2		L2		
			1		35,98		2,12		
			2		35,98		4,23		

PS=9

CBCASE2A LOADCASE= 1
QL= 17,00 kN/m QOW= 0,00 kN/m
Font name is Times New Roman and
font size is 8,25.

NS=8

I	FY	PV	UV	SV	XI	MZ	PR	UR	SR
1	14,74	1	0	0,0	0,00	0	0	0	0
2	14,74	1	0	0,0	7,37	0	0	0	0
3	0,00	0	0	0,0	8,63	0	0	0	0
4	0,00	0	0	0,0	14,74	0	0	0	0
5	17,26	1	0	0,0	16,00	0	0	0	0
6	17,26	1	0	0,0	24,63	0	0	0	0
7	0,00	0	0	0,0	25,89	0	0	0	0
8	0,00	0	0	0,0	32,00	0	0	0	0

P	LL	HH	NL	NH	BA	LE	RE	EI	L1
1	1	2	0	0	1	0	0	1	7,37
NFB(1)=2			I		F2		L2		
			1		29,48		2,46		
			2		29,48		4,91		
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
2	2	3	0	0	2	0	0	1	1,26
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
3	3	4	1	1	3	1	1	1	6,11
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
4	4	5	0	0	4	0	0	1	1,26
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
5	5	6	0	0	5	0	0	1	8,63
NFB(5)=2			I		F2		L2		
			1		34,52		2,88		
			2		34,52		5,75		
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
6	6	7	0	0	6	0	0	1	1,26
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
7	7	8	1	1	7	1	1	1	6,11
NFB(7)=2			I		F2		L2		
			1		34,52		1,62		
			2		34,52		4,49		

CBCASE2A LOADCASE= 2
QL= 12,00 kN/m QOW= 0,00 kN/m

I	FY	PV	UV	SV	XI	MZ	PR	UR	SR
1	0,00	1	0	0,0	0,00	0	0	0	0
2	17,26	1	0	0,0	7,37	0	0	0	0
3	0,00	0	0	0,0	8,63	0	0	0	0
4	0,00	0	0	0,0	14,74	0	0	0	0
5	17,26	1	0	0,0	16,00	0	0	0	0
6	17,26	1	0	0,0	24,63	0	0	0	0
7	0,00	0	0	0,0	25,89	0	0	0	0
8	0,00	0	0	0,0	32,00	0	0	0	0

P	LL	HH	NL	NH	BA	LE	RE	EI	L1
1	1	2	0	0	1	0	0	1	7,37
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
2	2	3	0	0	2	0	0	1	1,26
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
3	3	4	1	1	3	1	1	1	6,11
NFB(3)=2			I		F2		L2		
			1		34,52		1,62		
			2		34,52		4,49		
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
4	4	5	0	0	4	0	0	1	1,26
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
5	5	6	0	0	5	0	0	1	8,63
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
6	6	7	0	0	6	0	0	1	1,26
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
7	7	8	1	1	7	1	1	1	6,11
NFB(7)=2			I		F2		L2		
			1		34,52		1,62		
			2		34,52		4,49		

CBCASE2A LOADCASE= 3
QL= 12,00 kN/m QOW= 0,00 kN/m
Font name is MS Sans Serif and
font size is 8,25.

with 5,35,17,0,3,0

LOADCASE2 CBCASE2A LOADCASE3 CBCASE2A

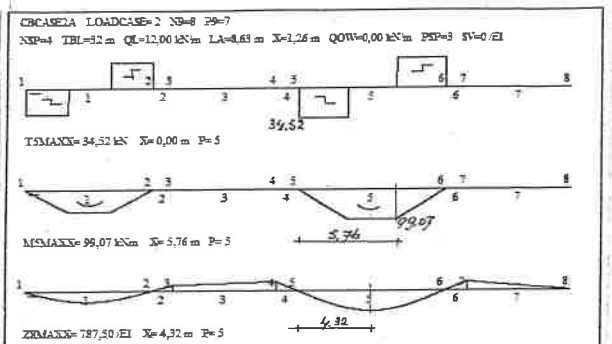
Like the example on the preceding page but with divided QL load with PSP=3, AOAgain.
5,35,17,0,3,0 Enter.
LOADCASE1, Indirect, CBCASE2A, Calculate and PFRES4.

Five times point loads are calculated, see the data print with Show below the first print, beam 1 and 9, lengths of LA-X=7,43-1,09= 6,34 m give point loads of 35,93 kN ≈ 35,98 kN, 'beam' 2-3-4 and 5 and 6-7-8, lenghs LA= 7,43 m give point loads of 42,10 kN ≈ 42,13 kN.

Two other cases with other start data, NSP=4 TBL=32 QL=12 QOW=0 PSP=3 SVI=0 4,32,12,0,3,0 Enter. Etc. See data print. LOADCASE2, CBCASE2A here below.

Last print for LOADCASE3, CBCASE2A.
'Beam' 2-3-4 and 6-7-8 with lengths LA= 8,63 m, point loads (8,63*12)/3= 34,52 kN.

CBCASE2A LOADCASE= 2 NS=8 PS=7
NSP=4 TBL=32 m QL=12,00 kN/m LA=8,63 m X=1,26 m QOW=0,00 kN/m PSP=3 SV=0 /EI



Beam end forces and moments.

D6(1, 2)= -29,48 kN	D6(2, 1)= -29,48 kN	D6(5, 6)= -34,52 kN	D6(6, 5)= -34,52 kN
MF(1, 2)= 0,00 kNm	MF(2, 1)= 0,00 kNm	MF(5, 6)= 0,00 kNm	MF(6, 5)= 0,00 kNm
D6(2, 3)= 0,00 kN	D6(3, 2)= 0,00 kN	D6(6, 7)= 0,00 kN	D6(7, 6)= 0,00 kN
MF(2, 3)= 0,00 kNm	MF(3, 2)= 0,00 kNm	MF(6, 7)= 0,00 kNm	MF(7, 6)= 0,00 kNm
D6(3, 4)= 0,00 kN	D6(4, 3)= 0,00 kN	D6(7, 8)= 0,00 kN	D6(8, 7)= 0,00 kN
MF(3, 4)= 0,00 kNm	MF(4, 3)= 0,00 kNm	MF(7, 8)= 0,00 kNm	MF(8, 7)= 0,00 kNm
D6(4, 5)= 0,00 kN	D6(5, 4)= 0,00 kN		
MF(4, 5)= 0,00 kNm	MF(5, 4)= 0,00 kNm		

FontName= "Times New Roman" FontSize= 8

CBCASE2A LOADCASE2

Support reactions.

RV(3)= 44,22 kN	RV(2)= 44,22 kN	RV(3)= 0,00 kN	RV(4)= 0,00 kN
RV(5)= 51,78 kN	RV(6)= 51,78 kN	RV(7)= 0,00 kN	RV(8)= 0,00 kN

Joint displacements.

UV(1)= 0,00 /EI	UV(2)= 0,00 /EI	UV(3)=-224,17 /EI	UV(4)=-359,92 /EI
UV(5)= 0,00 /EI	UV(6)= 0,00 /EI	UV(7)=-359,92 /EI	UV(8)= 0,00 /EI

Joint rotations.

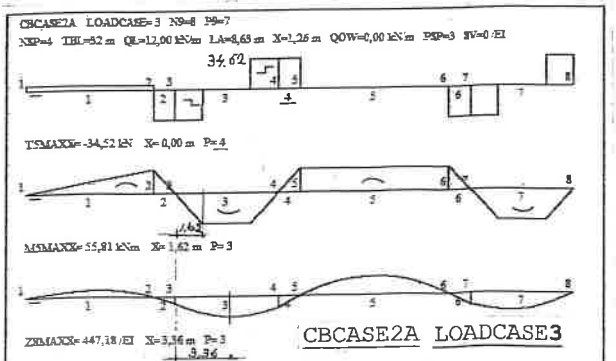
UR(1)= 177,92 /EI	UR(2)=-177,92 /EI	UR(3)=-177,92 /EI	UR(4)= 285,66 /EI
UR(5)= 285,66 /EI	UR(6)=-285,66 /EI	UR(7)=-285,66 /EI	UR(8)= 0,00 /EI

Separately calculated slopes HE( ).

HE(3, 4)= -22,22 /EI	HE(4, 3)= -22,22 /EI	HE(7, 8)= 58,91 /EI	HE(8, 7)= 58,91 /EI

FontName= "Times New Roman" FontSize= 8

CBCASE2A LOADCASE= 3 NS=8 PS=7
NSP=4 TBL=32 m QL=12,00 kN/m LA=8,63 m X=1,26 m QOW=0,00 kN/m PSP=3 SV=0 /EI

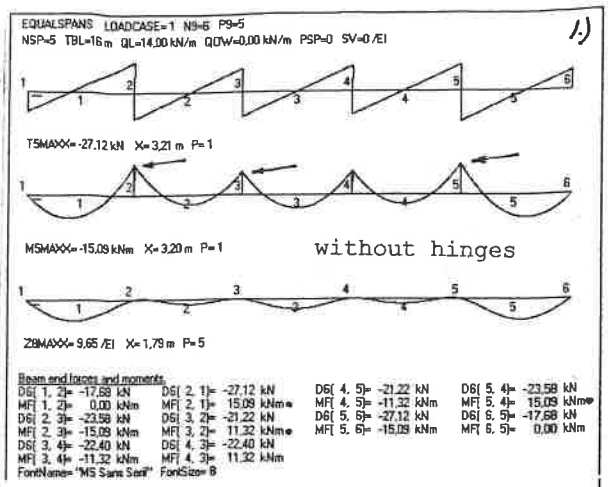


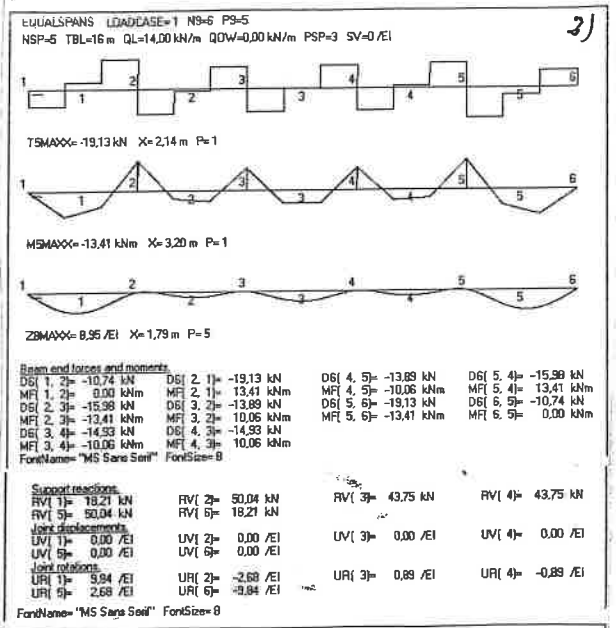
CBCASE2A LOADCASE3

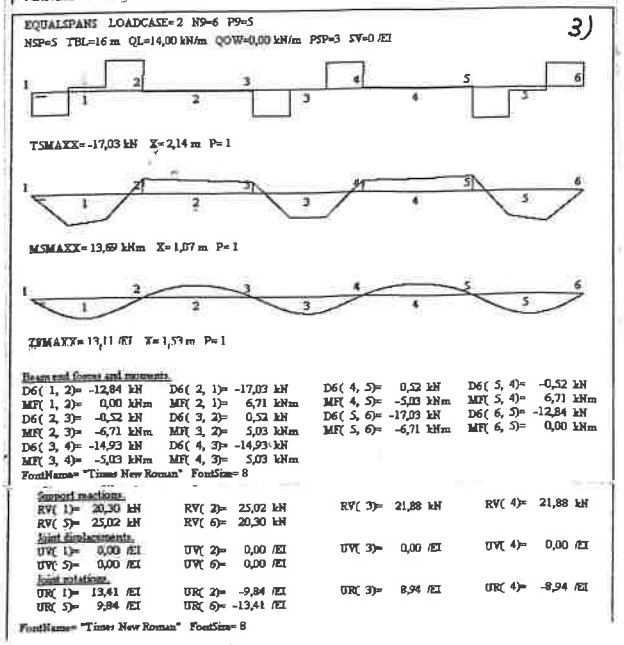
Beam end forces and moments.

D6(1, 2)= 5,90 kN	D6(2, 1)= -5,90 kN	D6(5, 6)= 0,00 kN	D6(6, 5)= 0,00 kN
MF(1, 2)= 0,00 kNm	MF(2, 1)= 43,49 kNm	MF(5, 6)= -43,49 kNm	MF(6, 5)= 43,49 kNm
D6(2, 3)= -34,52 kN	D6(3, 2)= 34,52 kN	D6(6, 7)= -34,52 kN	D6(7, 6)= 34,52 kN
MF(2, 3)= -43,49 kNm	MF(3, 2)= 0,00 kNm	MF(6, 7)= -43,49 kNm	MF(7, 6)= 0,00 kNm
D6(3, 4)= -34,52 kN	D6(4, 3)= -34,52 kN	D6(7, 8)= -34,52 kN	D6(8, 7)= -34,52 kN
MF(3, 4)= 0,00 kNm	MF(4, 3)= 0,00 kNm	MF(7, 8)= 0,00 kNm	MF(8, 7)= 0,00 kNm
D6(4, 5)= 34,52 kN	D6(5, 4)= -34,52 kN		
MF(4, 5)= 0,00 kNm	MF(5, 4)= 43,49 kNm		

FontName= "Times New Roman" FontSize= 8







Examples with EQUAL SPANS. EX2

First print.
NSP=5 spans TBL=16 m QL=14 kN/m
QOW=0 PSP=0 SVI=0

Click EX1, 5,16,14,0,0,0 appears in TSTRING, click OK to get 'accepted'.
Or 5,16,14,0,0,0 Enter, etc.

Click to LOADCASE1, Direct, next EQUAL SPANS, Calculate and PFRES2 to get the first print.

Second print. Click Again.
NSP=5 spans TBL=16 m QL=14 kN/m
QOW=0 PSP=3 SVI=0
Data of EX2 still in TSTRING, then change the zero of PSP=0 into PSP=3, and click OK.
Or 5,16,14,0,**3**,0 Enter, etc.

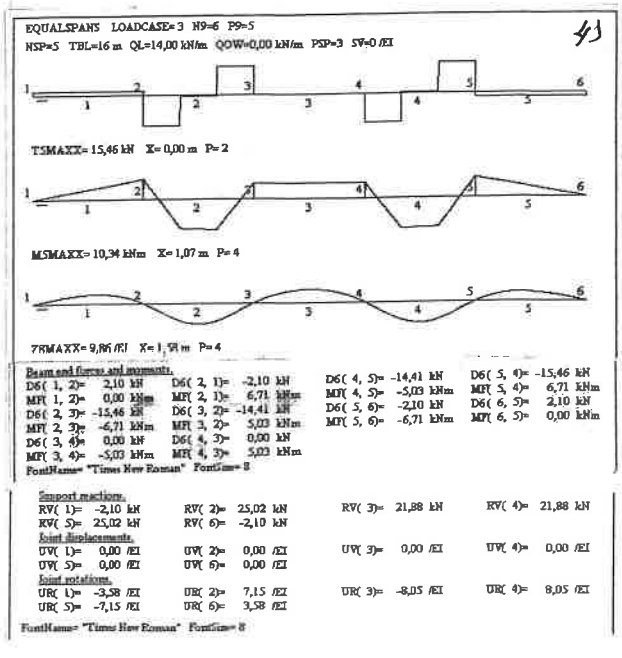
Click to LOADCASE1, Indirect, EQUAL SPANS and Calculate, PFRES2, second print.

Third print. Click Again.
Data in TSTRING the same, click OK.
Click to LOADCASE2, Indirect, EQUAL SPANS and Calculate, PFRES3 Times New Roman, third print.

Fourth print. Click Again.
Data in TSTRING the same. Click OK, necessary?
Click to LOADCASE3, Indirect, EQUAL SPANS and Calculate, PFRES3 Times New..., fourth print.

Remark. Joints at the beginning and end of the beam are assumed to be 'real' joints, therefore, see first print,
UR(1)= 11,07/EI and UR(6)= -11,07/EI.

The continuous beam in these examples is statically indeterminate. It can be made statically determinate by placing 'enough' hinges at moment zero points. That is done next page.



N9=6

I	FY	PV	UY	SV	X1	MZ	PR	UR	SR
1	0,00	1	0	0,0	0,00	0	0	0	0
2	0,00	1	0	0,0	3,20	0	0	0	0
3	0,00	1	0	0,0	6,40	0	0	0	0
4	0,00	1	0	0,0	9,60	0	0	0	0
5	0,00	1	0	0,0	12,80	0	0	0	0
6	0,00	1	0	0,0	16,00	0	0	0	0

P9=5

P	LL	HH	NL	NH	BA	LE	RE	EI	L1
1	1	2	0	0	1	0	0	1	3,20
NQB(1)=1			P		Q3		Q4		L3 L4
			1		14,00		14,00	0,00	3,20
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
2	2	3	0	0	2	0	0	1	3,20
NQB(2)=1			P		Q3		Q4		L3 L4
			2		14,00		14,00	0,00	3,20
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
3	3	4	0	0	3	0	0	1	3,20
NQB(3)=1			P		Q3		Q4		L3 L4
			3		14,00		14,00	0,00	3,20
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
4	4	5	0	0	4	0	0	1	3,20
NQB(4)=1			P		Q3		Q4		L3 L4
			4		14,00		14,00	0,00	3,20
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
5	5	6	0	0	5	0	0	1	3,20
NQB(5)=1			P		Q3		Q4		L3 L4
			5		14,00		14,00	0,00	3,20

EQUALSPANS LOADCASE= 1
QL= 14,00 kN/m QOW= 0,00 kN/m
Font name is Times New Roman and
font size is 8,25.

without hinges

N9=10

I	FY	PV	UY	SV	X1	MZ	PR	UR	SR
1	0,00	1	0	0,0	0,00	0	0	0	0
2	0,00	1	0	0,0	3,20	0	0	0	0
3	0,00	0	0	0,0	4,06	0	0	0	0
4	0,00	1	0	0,0	6,40	0	0	0	0
5	0,00	0	0	0,0	7,03	0	0	0	0
6	0,00	1	0	0,0	9,60	0	0	0	0
7	0,00	0	0	0,0	10,30	0	0	0	0
8	0,00	1	0	0,0	12,80	0	0	0	0
9	0,00	0	0	0,0	13,48	0	0	0	0
10	0,00	1	0	0,0	16,00	0	0	0	0

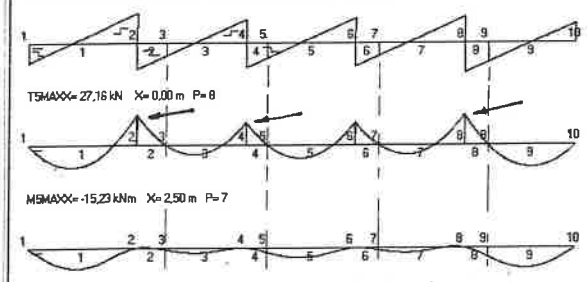
P9=9

P	LL	HH	NL	NH	BA	LE	RE	EI	L1
1	1	2	0	0	1	0	0	1	3,20
NQB(1)=1			P		Q3		Q4		L3 L4
			1		14,00		14,00	0,00	3,20
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
2	2	3	0	0	2	0	0	1	0,86
NQB(2)=1			P		Q3		Q4		L3 L4
			2		14,00		14,00	0,00	0,86
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
3	3	4	1	0	3	1	0	1	2,34
NQB(3)=1			P		Q3		Q4		L3 L4
			3		14,00		14,00	0,00	2,34
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
4	4	5	0	0	4	0	0	1	0,63
NQB(4)=1			P		Q3		Q4		L3 L4
			4		14,00		14,00	0,00	0,63
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
5	5	6	1	0	5	1	0	1	2,57
NQB(5)=1			P		Q3		Q4		L3 L4
			5		14,00		14,00	0,00	2,57
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
6	6	7	0	0	6	0	0	1	0,70
NQB(6)=1			P		Q3		Q4		L3 L4
			6		14,00		14,00	0,00	0,70
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
7	7	8	1	0	7	1	0	1	2,50
NQB(7)=1			P		Q3		Q4		L3 L4
			7		14,00		14,00	0,00	2,50
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
8	8	9	0	0	8	0	0	1	0,68
NQB(8)=1			P		Q3		Q4		L3 L4
			8		14,00		14,00	0,00	0,68
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
9	9	10	1	0	9	1	0	1	2,52
NQB(9)=1			P		Q3		Q4		L3 L4
			9		14,00		14,00	0,00	2,52

EQUALSPANSWH LOADCASE= 1
QL= 14,00 kN/m QOW= 0,00 kN/m
Font name is Times New Roman and
font size is 8,25.

with hinges

EQUALSPANSWH LOADCASE=1 N9=10 P9=9
NSP=5 TBL=16 m QL=14,00 kN/m QOW=0,00 kN/m PSP=0 SV=0 /EI



T9MAXX= 27,16 kN X= 0,00 m P= 8

M9MAXX= -15,23 kNm X= 2,50 m P= 7

Z9MAXX= 9,67 /EI X= 1,11 m P= 9

with hinges

Beam end forces and moments:

D6[1, 2]= -17,68 kN	D6[2, 1]= -27,12 kN	D6[6, 7]= -21,21 kN	D6[7, 6]= 11,41 kN
MF[1, 2]= 0,00 kNm	MF[2, 1]= 15,11 kNm •	MF[6, 7]= -11,42 kNm	MF[7, 6]= 0,00 kNm
D6[2, 3]= -23,59 kN	D6[3, 2]= 11,55 kN	D6[7, 8]= -11,41 kN	D6[8, 7]= -23,58 kN
MF[2, 3]= -15,11 kNm	MF[3, 2]= 0,00 kNm	MF[7, 8]= 0,00 kNm	MF[8, 7]= 15,23 kNm •
D6[3, 4]= -11,55 kN	D6[4, 3]= -21,21 kN	D6[8, 9]= -27,16 kN	D6[9, 8]= 17,64 kN
MF[3, 4]= 0,00 kNm	MF[4, 3]= 11,31 kNm •	MF[8, 9]= -15,23 kNm	MF[9, 8]= 0,00 kNm
D6[4, 5]= -22,37 kN	D6[5, 4]= 13,55 kN	D6[9,10]= -17,64 kN	D6[10, 9]= -17,64 kN
MF[4, 5]= -11,31 kNm	MF[5, 4]= 0,00 kNm	MF[9,10]= 0,00 kNm	MF[10, 9]= 0,00 kNm
D6[5, 6]= -13,55 kN	D6[6, 5]= -22,43 kN		
MF[5, 6]= 0,00 kNm	MF[6, 5]= 11,42 kNm		

FontName= "MS Sans Serif" FontSize= 8

Support reactions:

RV[1]= 17,68 kN	RV[2]= 50,71 kN	RV[3]= 0,00 kN	RV[4]= 43,58 kN
RV[5]= 0,00 kN	RV[6]= 43,64 kN	RV[7]= 0,00 kN	RV[8]= 50,75 kN
RV[9]= 0,00 kN	RV[10]= 17,64 kN		

Joint displacements:

UV[1]= 0,00 /EI	UV[2]= 0,00 /EI	UV[3]= 0,82 /EI	UV[4]= 0,00 /EI
UV[5]= 2,03 /EI	UV[6]= 0,00 /EI	UV[7]= 1,08 /EI	UV[8]= 0,00 /EI
UV[9]= 4,36 /EI	UV[10]= 0,00 /EI		

Joint rotations:

UR[1]= 11,06 /EI	UR[2]= -3,00 /EI	UR[3]= 2,75 /EI	UR[4]= 1,00 /EI
UR[5]= 4,27 /EI	UR[6]= -0,91 /EI	UR[7]= 2,68 /EI	UR[8]= 3,15 /EI
UR[9]= 7,96 /EI	UR[10]= -11,07 /EI		

Separately calculated slopes HE(.):

HE[3, 4]= 2,71 /EI	HE[5, 6]= 4,22 /EI	HE[7, 8]= 2,33 /EI	HE[9,10]= 7,60 /EI

FontName= "MS Sans Serif" FontSize= 8

Going on with EX2.

NSP=5 spans TBL=16 m QL=14 kN/m
QOW=0 PSP=0 SVI=0
AOAgain. Next like done on the prec.page.
Click EX2, 5,16,14,0,0,0 appears in TSTRING,
click OK to get 'accepted'.

Click to LOADCASE1, Direct, next EQUAL SPANS
and then Show to get the data on the left.
Next Calculate, main calculation of UV(I) and
UR(I), and of moment zero points.

Placing hinges.
Click Again to make all UV(I) and UR(I) zero
and click **WITH HINGES** to make hinges at bending
moment zero points. Like CBCASE1A page 3 .
Click Show, see the second print
Next Calculate and PFRES2 to get the results
shown on the left, third click gives the other
results, RV(I) etc.
When looking at shear force and bending moment
diagram it looks like CBCASE1A.

Comparing some results, see prec. page.

Without hinges.	With hinges.
MF(2,1)= 15,09 kNm	MF(2,1)= 15,11 kNm
MF(3,2)= 11,32 kNm	MF(4,3)= 11,31 kNm
MF(5,4)= 15,09 kNm	MF(8,7)= 15,23 kNm etc.
D6(3,2)=-21,22 kN	D6(4,3)=-21,21 kN
D6(3,4)=-22,40 kN	D6(4,5)=-22,37 kN

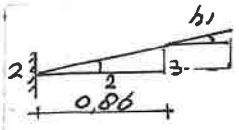
Shear forces and bending moments are the same,
hinges are placed at moment zero points!
The bending of the beams is the same but becau-
se of the hinges is the total deformation dif-
ferent.

UR(1)= 11,07 /EI	UR(1)= 11,06 /EI
UR(2)= -3,02 /EI	UR(2)= -3,00 /EI
UR(3)= 1,01 /EI	UR(4)= 1,00 /EI
UR(4)= -1,01 /EI	UR(6)= -0,91 /EI

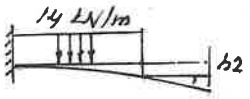
The support reactions are the same for both
cases. The 'real' joints at the places of the
hinges are given as reactions, RV(3)=0 ....

Member 2, member end 3 seen as a 'real' joint,
joint rotation UR(3)= 2,75/EI. Check it.
UR(2)= -3,00/EI, that's to the left.

D6(3,2)= 11,55 kN
P=2 length 0,86 m, see the second data print.

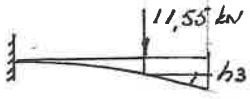


h1= 3,00/EI



h2=(14*0,86^3)/6EI=

1,48/EI

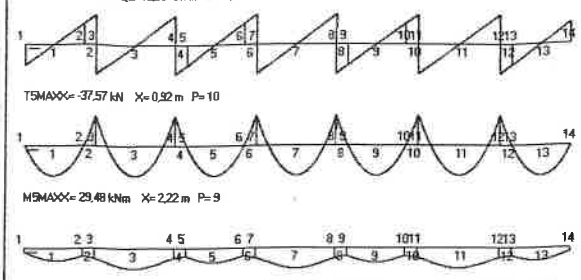


h3=(11,55*0.86^2)/2EI=

4,27/EI

h = (1,48 +4,27 -3,00)= 2,75/EI ok

CBCASE3A LOADCASE=1 NS=14 PS=13
NSP=7 TBL=42 m QL=12,00 kN/m LA=6,26 m X=0,91 m QOW=0,00 kN/m PSP=0 SV=0,8 /EI



T5MAXX= -37,57 kN X= 0,92 m P= 10

M5MAXX= 29,48 kNm X= 2,22 m P= 9

Z8MAXX= 190,33 /EI X= 3,14 m P= 11 CBCASE3A LOADCASE1

Beam end forces and moments.

D6(1, 2)=	-26,60 kN	D6(2, 1)=	-26,60 kN	D6(8, 9)=	-37,57 kN	D6(9, 8)=	26,60 kN
MF(1, 2)=	0,00 kNm	MF(2, 1)=	0,00 kNm	MF(8, 9)=	-29,33 kNm	MF(9, 8)=	0,00 kNm
D6(2, 3)=	26,60 kN	D6(3, 2)=	-37,57 kN	D6(9,10)=	-26,60 kN	D6(10, 9)=	-26,60 kN
MF(2, 3)=	0,00 kNm	MF(3, 2)=	29,33 kNm	MF(9,10)=	0,00 kNm	MF(10, 9)=	0,00 kNm
D6(3, 4)=	-37,57 kN	D6(4, 3)=	-37,57 kN	D6(10,11)=	26,60 kN	D6(11,10)=	-37,57 kN
MF(3, 4)=	-29,33 kNm	MF(4, 3)=	29,33 kNm	MF(10,11)=	0,00 kNm	MF(11,10)=	29,33 kNm
D6(4, 5)=	-37,57 kN	D6(5, 4)=	26,60 kN	D6(11,12)=	-37,57 kN	D6(12,11)=	-37,57 kN
MF(4, 5)=	-29,33 kNm	MF(5, 4)=	0,00 kNm	MF(11,12)=	-29,33 kNm	MF(12,11)=	29,33 kNm
D6(5, 6)=	-26,60 kN	D6(6, 5)=	-26,60 kN	D6(12,13)=	-37,57 kN	D6(13,12)=	26,60 kN
MF(5, 6)=	0,00 kNm	MF(6, 5)=	0,00 kNm	MF(12,13)=	-29,33 kNm	MF(13,12)=	0,00 kNm
D6(6, 7)=	26,60 kN	D6(7, 6)=	-37,57 kN	D6(13,14)=	-26,60 kN	D6(14,13)=	-26,60 kN
MF(6, 7)=	0,00 kNm	MF(7, 6)=	29,33 kNm	MF(13,14)=	0,00 kNm	MF(14,13)=	0,00 kNm
D6(7, 8)=	-37,57 kN	D6(8, 7)=	-37,57 kN				
MF(7, 8)=	-29,33 kNm	MF(8, 7)=	29,33 kNm				

FontName= "MS Sans Serif" FontSize= 8

Support reactions.

RV(1)=	26,60 kN	RV(2)=	0,00 kN	RV(3)=	75,13 kN	RV(4)=	75,13 kN
RV(5)=	0,00 kN	RV(6)=	0,00 kN	RV(7)=	75,13 kN	RV(8)=	75,13 kN
RV(9)=	0,00 kN	RV(10)=	0,00 kN	RV(11)=	75,13 kN	RV(12)=	75,13 kN
RV(13)=	0,00 kN	RV(14)=	26,60 kN				

Joint displacements.

UV(1)=	33,25 /EI	UV(2)=	73,48 /EI	UV(3)=	93,92 /EI	UV(4)=	93,92 /EI
UV(5)=	73,48 /EI	UV(6)=	73,48 /EI	UV(7)=	93,92 /EI	UV(8)=	93,92 /EI
UV(9)=	73,48 /EI	UV(10)=	73,48 /EI	UV(11)=	93,92 /EI	UV(12)=	93,92 /EI
UV(13)=	73,48 /EI	UV(14)=	33,25 /EI				

Joint rotations.

UR(1)=	52,63 /EI	UR(2)=	18,27 /EI	UR(3)=	30,91 /EI	UR(4)=	-30,91 /EI
UR(5)=	-18,27 /EI	UR(6)=	18,27 /EI	UR(7)=	30,91 /EI	UR(8)=	-30,91 /EI
UR(9)=	-18,27 /EI	UR(10)=	18,27 /EI	UR(11)=	30,91 /EI	UR(12)=	-30,91 /EI
UR(13)=	-18,27 /EI	UR(14)=	-52,63 /EI				

Separately calculated slopes HE( )

HE(2, 1)=	-34,48 /EI	HE(5, 6)=	43,56 /EI	HE(6, 5)=	-43,56 /EI	HE(9,10)=	43,56 /EI
HE(10, 9)=	-43,56 /EI	HE(13,14)=	34,48 /EI				

Reset PFRES2 PrF

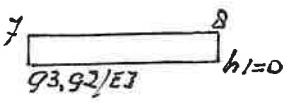
Example with springy supports. EX3

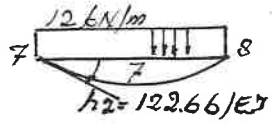
NSP=7 spans TBL=42 m QL=12 kN/m
QOW=0 PSP=3 SVI=0.8
In TSTRING 7,42,12,0,0,.8 Enter,

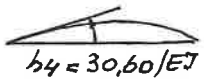
Click to LOADCASE1, Direct, CBCASE3A and Calculate, PFRES2, font MS Sans Serif.

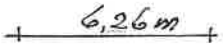
member 7
UV(7)= 93,92/EI UV(8)= 93,92/EI

h2= (12*6,26^3)/24EI= 122,66/EI







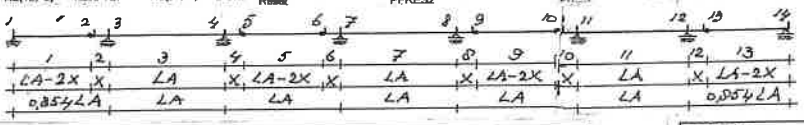


h3= (29,33*6,26)/3EI= 61,20/EI

h4= (29,33*6,26)/6EI= 30,60/EI

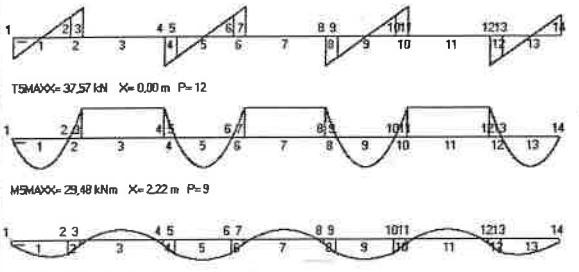
h = 122,66-61,30-30,60)/EI= 30,86/Ei
UR(7)= 30,91/EI ok

Don't forget Again.



NSP=7 CBCASE3A

CBCASE3A LOADCASE=2 NS=14 PS=13
NSP=7 TBL=42 m QL=12,00 kN/m LA=6,26 m X=0,91 m QOW=0,00 kN/m PSP=0 SV=0,8 /EI



T5MAXX= 37,57 kN X= 0,00 m P= 12

M5MAXX= 29,48 kNm X= 2,22 m P= 9

Z8MAXX= 199,04 /EI X= 2,22 m P= 9 CBCASE3A LOADCASE2

Support reactions.

RV(1)=	26,60 kN	RV(2)=	0,00 kN	RV(3)=	37,57 kN	RV(4)=	37,57 kN
RV(5)=	0,00 kN	RV(6)=	0,00 kN	RV(7)=	37,57 kN	RV(8)=	37,57 kN
RV(9)=	0,00 kN	RV(10)=	0,00 kN	RV(11)=	37,57 kN	RV(12)=	37,57 kN
RV(13)=	0,00 kN	RV(14)=	26,60 kN				

Joint displacements.

UV(1)=	33,25 /EI	UV(2)=	138,71 /EI	UV(3)=	46,96 /EI	UV(4)=	46,96 /EI
UV(5)=	138,71 /EI	UV(6)=	138,71 /EI	UV(7)=	46,96 /EI	UV(8)=	46,96 /EI
UV(9)=	138,71 /EI	UV(10)=	138,71 /EI	UV(11)=	46,96 /EI	UV(12)=	46,96 /EI
UV(13)=	138,71 /EI	UV(14)=	33,25 /EI				

Joint rotations.

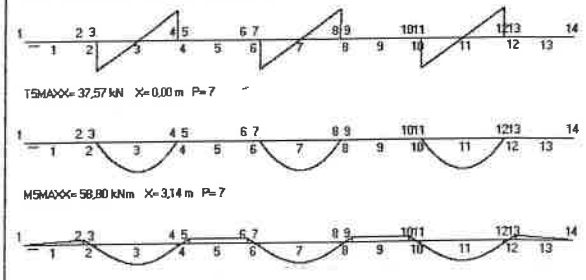
UR(1)=	67,35 /EI	UR(2)=	-104,45 /EI	UR(3)=	-91,81 /EI	UR(4)=	91,81 /EI
UR(5)=	104,45 /EI	UR(6)=	-104,45 /EI	UR(7)=	-91,81 /EI	UR(8)=	91,81 /EI
UR(9)=	104,45 /EI	UR(10)=	-104,45 /EI	UR(11)=	-91,81 /EI	UR(12)=	91,81 /EI
UR(13)=	104,45 /EI	UR(14)=	-67,35 /EI				

Separately calculated slopes HE( )

HE(2, 1)=	-19,76 /EI	HE(5, 6)=	43,56 /EI	HE(6, 5)=	-43,56 /EI	HE(9,10)=	43,56 /EI
HE(10, 9)=	-43,56 /EI	HE(13,14)=	19,76 /EI				

Reset PFRES2 PrF

CBCASE3A LOADCASE=3 NS=14 PS=13
NSP=7 TBL=42 m QL=12,00 kN/m LA=6,26 m X=0,91 m QOW=0,00 kN/m PSP=0 SV=0,8 /EI



T5MAXX= 37,57 kN X= 0,00 m P= 7

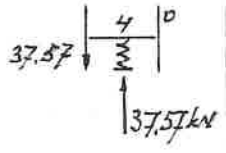
M5MAXX= 58,80 kNm X= 3,14 m P= 7

Z8MAXX= 287,09 /EI X= 3,14 m P= 11 CBCASE3A LOADCASE3

Beam end forces and moments.

D6(1, 2)=	0,00 kN	D6(2, 1)=	0,00 kN	D6(8, 9)=	0,00 kN	D6(9, 8)=	0,00 kN
MF(1, 2)=	0,00 kNm	MF(2, 1)=	0,00 kNm	MF(8, 9)=	0,00 kNm	MF(9, 8)=	0,00 kNm
D6(2, 3)=	0,00 kN	D6(3, 2)=	0,00 kN	D6(9,10)=	0,00 kN	D6(10, 9)=	0,00 kN
MF(2, 3)=	0,00 kNm	MF(3, 2)=	0,00 kNm	MF(9,10)=	0,00 kNm	MF(10, 9)=	0,00 kNm
D6(3, 4)=	-37,57 kN	D6(4, 3)=	-37,57 kN	D6(10,11)=	0,00 kN	D6(11,10)=	0,00 kN
MF(3, 4)=	0,00 kNm	MF(4, 3)=	0,00 kNm	MF(10,11)=	0,00 kNm	MF(11,10)=	0,00 kNm
D6(4, 5)=	0,00 kN	D6(5, 4)=	0,00 kN	D6(11,12)=	-37,57 kN	D6(12,11)=	-37,57 kN
MF(4, 5)=	0,00 kNm	MF(5, 4)=	0,00 kNm	MF(11,12)=	0,00 kNm	MF(12,11)=	0,00 kNm
D6(5, 6)=	0,00 kN	D6(6, 5)=	0,00 kN	D6(12,13)=	0,00 kN	D6(13,12)=	0,00 kN
MF(5, 6)=	0,00 kNm	MF(6, 5)=	0,00 kNm	MF(12,13)=	0,00 kNm	MF(13,12)=	0,00 kNm
D6(6, 7)=	0,00 kN	D6(7, 6)=	0,00 kN	D6(13,14)=	0,00 kN	D6(14,13)=	0,00 kN
MF(6, 7)=	0,00 kNm	MF(7, 6)=	0,00 kNm	MF(13,14)=	0,00 kNm	MF(14,13)=	0,00 kNm
D6(7, 8)=	-37,57 kN	D6(8, 7)=	-37,57 kN				
MF(7, 8)=	0,00 kNm	MF(8, 7)=	0,00 kNm				

FontName= "MS Sans Serif" FontSize= 8



D6(4,3)= -37,57 kN
D6(4,5)= 0 kN
UV(I)= 46,96/EI
RV(4)= 37,57 kN
F= SVI(I)*UV(I)
37,57= 0,8*46,96= 37,57 !

Support reactions.

RV(1)=	0,00 kN	RV(2)=	0,00 kN	RV(3)=	37,57 kN	RV(4)=	37,57 kN
RV(5)=	0,00 kN	RV(6)=	0,00 kN	RV(7)=	37,57 kN	RV(8)=	37,57 kN
RV(9)=	0,00 kN	RV(10)=	0,00 kN	RV(11)=	37,57 kN	RV(12)=	37,57 kN
RV(13)=	0,00 kN	RV(14)=	0,00 kN				

Joint displacements.

UV(1)=	0,00 /EI	UV(2)=	-65,23 /EI	UV(3)=	46,96 /EI	UV(4)=	46,96 /EI
UV(5)=	-65,23 /EI	UV(6)=	-65,23 /EI	UV(7)=	46,96 /EI	UV(8)=	46,96 /EI
UV(9)=	-65,23 /EI	UV(10)=	-65,23 /EI	UV(11)=	46,96 /EI	UV(12)=	46,96 /EI
UV(13)=	-65,23 /EI	UV(14)=	0,00 /EI				

Joint rotations.

UR(1)=	-14,71 /EI	UR(2)=	122,73 /EI	UR(3)=	122,73 /EI	UR(4)=	-122,73 /EI
UR(5)=	-122,73 /EI	UR(6)=	122,73 /EI	UR(7)=	122,73 /EI	UR(8)=	-122,73 /EI
UR(9)=	-122,73 /EI	UR(10)=	122,73 /EI	UR(11)=	122,73 /EI	UR(12)=	-122,73 /EI
UR(13)=	-122,73 /EI	UR(14)=	14,71 /EI				

Separately calculated slopes HE( )

HE(2, 1)=	-14,71 /EI	HE(5, 6)=	0,00 /EI	HE(6, 5)=	0,00 /EI	HE(9,10)=	0,00 /EI
HE(10, 9)=	0,00 /EI	HE(13,14)=	14,71 /EI				

Reset PFRES2 PrF

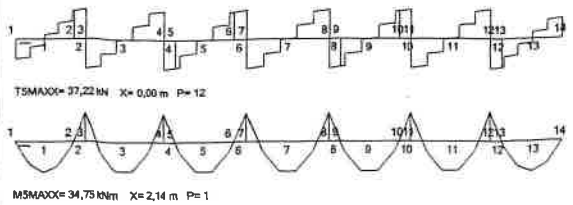
Support reactions.

RV(1)=	0,00 kN	RV(2)=	0,00 kN	RV(3)=	37,57 kN	RV(4)=	37,57 kN
RV(5)=	0,00 kN	RV(6)=	0,00 kN	RV(7)=	37,57 kN	RV(8)=	37,57 kN
RV(9)=	0,00 kN	RV(10)=	0,00 kN	RV(11)=	37,57 kN	RV(12)=	37,57 kN
RV(13)=	0,00 kN	RV(14)=	0,00 kN				

Joint displacements.

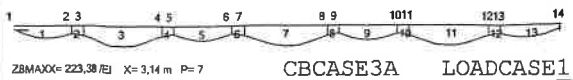
UV(1)=	0,00 /EI	UV(2)=	-65,23 /EI	UV(3)=	46,96 /EI	UV(4)=	46,96 /EI
UV(5)=	-65,23 /EI	UV(6)=	-65,23 /EI	UV(7)=	46,96 /EI	UV(8)=	46,96 /EI
UV(9)=	-65,23 /EI	UV(10)=	-65,23 /EI	UV(11)=	46,96 /EI	UV(12)=	46,96 /EI
UV(13)=	-65,23 /EI	UV(14)=	0,00 /EI				

CBCASE3A LOADCASE= 1 N9=14 P9=13
NSP=7 TBL=42 m QL=12 kN/m LA=6,26 m X=0,91 m QOW=2 kN/m PSP=5 SV=0,8 /EI 1)



T5MAXX= 37,22 kN X= 0,00 m P= 12

M5MAXX= 34,75 kNm X= 2,14 m P= 1



Z8MAXX= 223,38 /EI X= 3,14 m P= 7 CBCASE3A LOADCASE1

Beam end forces and moments.

D6(1, 2)=	-24,81 kN	D6(2, 1)=	-35,39 kN	D6(8, 9)=	-36,31 kN	D6(9, 8)=	34,49 kN
MF(1, 2)=	0,00 kNm	MF(2, 1)=	0,00 kNm	MF(8, 9)=	-32,36 kNm	MF(9, 8)=	0,00 kNm
D6(2, 3)=	35,39 kN	D6(3, 2)=	-37,22 kN	D6(9,10)=	-34,49 kN	D6(10, 9)=	-34,49 kN
MF(2, 3)=	0,00 kNm	MF(3, 2)=	33,19 kNm	MF(9,10)=	0,00 kNm	MF(10, 9)=	0,00 kNm
D6(3, 4)=	-38,45 kN	D6(4, 3)=	-36,18 kN	D6(10,11)=	34,49 kN	D6(11,10)=	-36,31 kN
MF(3, 4)=	-33,19 kNm	MF(4, 3)=	32,36 kNm	MF(10,11)=	0,00 kNm	MF(12,11)=	32,36 kNm
D6(4, 5)=	-36,31 kN	D6(5, 4)=	34,49 kN	D6(11,12)=	-36,18 kN	D6(12,11)=	-36,45 kN
MF(4, 5)=	-32,36 kNm	MF(5, 4)=	0,00 kNm	MF(11,12)=	-32,36 kNm	MF(12,11)=	33,19 kNm
D6(5, 6)=	-34,49 kN	D6(6, 5)=	-34,49 kN	D6(12,13)=	-37,22 kN	D6(13,12)=	35,39 kN
MF(5, 6)=	0,00 kNm	MF(6, 5)=	0,00 kNm	MF(12,13)=	-33,19 kNm	MF(13,12)=	0,00 kNm
D6(6, 7)=	34,49 kN	D6(7, 6)=	-36,31 kN	D6(13,14)=	-35,39 kN	D6(14,13)=	-24,81 kN
MF(6, 7)=	0,00 kNm	MF(7, 6)=	32,36 kNm	MF(13,14)=	0,00 kNm	MF(14,13)=	0,00 kNm
D6(7, 8)=	-36,31 kN	D6(8, 7)=	-36,31 kN				
MF(7, 8)=	-32,36 kNm	MF(8, 7)=	32,36 kNm				

Support reactions.

RV(1)=	31,22 kN	RV(2)=	0,00 kN	RV(3)=	87,80 kN	RV(4)=	87,52 kN
RV(5)=	0,00 kN	RV(6)=	0,00 kN	RV(7)=	87,86 kN	RV(8)=	87,86 kN
RV(9)=	0,00 kN	RV(10)=	0,00 kN	RV(11)=	87,52 kN	RV(12)=	87,80 kN
RV(13)=	0,00 kN	RV(14)=	31,22 kN				

Joint displacements.

UV(1)=	39,03 /EI	UV(2)=	86,48 /EI	UV(3)=	109,50 /EI	UV(4)=	109,41 /EI
UV(5)=	85,35 /EI	UV(6)=	84,74 /EI	UV(7)=	109,57 /EI	UV(8)=	109,57 /EI
UV(9)=	84,74 /EI	UV(10)=	85,35 /EI	UV(11)=	109,41 /EI	UV(12)=	109,50 /EI
UV(13)=	86,48 /EI	UV(14)=	39,03 /EI				

Joint rotations.

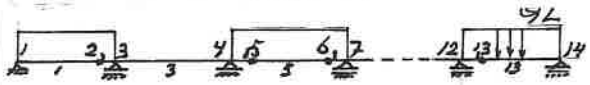
UR(1)=	59,62 /EI	UR(2)=	20,18 /EI	UR(3)=	35,22 /EI	UR(4)=	-36,11 /EI
UR(5)=	-21,45 /EI	UR(6)=	22,30 /EI	UR(7)=	36,96 /EI	UR(8)=	-36,96 /EI
UR(9)=	-22,30 /EI	UR(10)=	21,45 /EI	UR(11)=	36,11 /EI	UR(12)=	-35,22 /EI
UR(13)=	-20,18 /EI	UR(14)=	-59,62 /EI				

Separately calculated slopes HE(.).

HE(2, 1)=	-38,94 /EI	HE(5, 6)=	51,49 /EI	HE(6, 5)=	-51,76 /EI	HE(9,10)=	51,76 /EI
HE(10, 9)=	-51,49 /EI	HE(13,14)=	38,94 /EI				

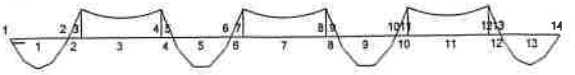
FontName= "Microsoft Sans Serif" FontSize= 8

Vertical resultant of QL=12 and QOW=2,
6,26*12 + (6,26+2*0,91)*2 =
75,12 + 16,16 = 91,28 kN.

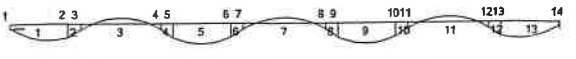


CBCASE3A LOADCASE= 2 N9=14 P9=13
NSP=7 TBL=42 m QL=12 kN/m LA=6,26 m X=0,91 m QOW=2 kN/m PSP=5 SV=0,8 /EI 2)

T5MAXX= -37,22 kN X= 0,92 m P= 2



M5MAXX= 34,75 kNm X= 2,14 m P= 1



Z8MAXX= 216,85 /EI X= 2,22 m P= 5 CBCASE3A LOADCASE2

Beam end forces and moments.

D6(1, 2)=	-24,81 kN	D6(2, 1)=	-35,39 kN	D6(8, 9)=	-36,31 kN	D6(9, 8)=	34,49 kN
MF(1, 2)=	0,00 kNm	MF(2, 1)=	0,00 kNm	MF(8, 9)=	-32,36 kNm	MF(9, 8)=	0,00 kNm
D6(2, 3)=	35,39 kN	D6(3, 2)=	-37,22 kN	D6(9,10)=	-34,49 kN	D6(10, 9)=	-34,49 kN
MF(2, 3)=	0,00 kNm	MF(3, 2)=	33,19 kNm	MF(9,10)=	0,00 kNm	MF(10, 9)=	0,00 kNm
D6(3, 4)=	-6,39 kN	D6(4, 3)=	-6,13 kN	D6(10,11)=	34,49 kN	D6(11,10)=	-36,31 kN
MF(3, 4)=	-33,19 kNm	MF(4, 3)=	32,36 kNm	MF(10,11)=	0,00 kNm	MF(11,10)=	32,36 kNm
D6(4, 5)=	-36,31 kN	D6(5, 4)=	34,49 kN	D6(11,12)=	-6,13 kN	D6(12,11)=	-6,39 kN
MF(4, 5)=	-32,36 kNm	MF(5, 4)=	0,00 kNm	MF(11,12)=	-32,36 kNm	MF(12,11)=	33,19 kNm
D6(5, 6)=	-34,49 kN	D6(6, 5)=	-34,49 kN	D6(12,13)=	-37,22 kN	D6(13,12)=	35,39 kN
MF(5, 6)=	0,00 kNm	MF(6, 5)=	0,00 kNm	MF(12,13)=	-33,19 kNm	MF(13,12)=	0,00 kNm
D6(6, 7)=	34,49 kN	D6(7, 6)=	-36,31 kN	D6(13,14)=	-35,39 kN	D6(14,13)=	-24,81 kN
MF(6, 7)=	0,00 kNm	MF(7, 6)=	32,36 kNm	MF(13,14)=	0,00 kNm	MF(14,13)=	0,00 kNm
D6(7, 8)=	-6,26 kN	D6(8, 7)=	-6,26 kN				
MF(7, 8)=	-32,36 kNm	MF(8, 7)=	32,36 kNm				

Support reactions.

RV(1)=	31,22 kN	RV(2)=	0,00 kN	RV(3)=	87,80 kN	RV(4)=	87,52 kN
RV(5)=	0,00 kN	RV(6)=	0,00 kN	RV(7)=	87,86 kN	RV(8)=	87,86 kN
RV(9)=	0,00 kN	RV(10)=	0,00 kN	RV(11)=	87,52 kN	RV(12)=	87,80 kN
RV(13)=	0,00 kN	RV(14)=	31,22 kN				

Joint displacements.

UV(1)=	39,03 /EI	UV(2)=	86,48 /EI	UV(3)=	109,50 /EI	UV(4)=	109,41 /EI
UV(5)=	85,35 /EI	UV(6)=	84,74 /EI	UV(7)=	109,57 /EI	UV(8)=	109,57 /EI
UV(9)=	84,74 /EI	UV(10)=	85,35 /EI	UV(11)=	109,41 /EI	UV(12)=	109,50 /EI
UV(13)=	86,48 /EI	UV(14)=	39,03 /EI				

Joint rotations.

UR(1)=	59,62 /EI	UR(2)=	20,18 /EI	UR(3)=	35,22 /EI	UR(4)=	-36,11 /EI
UR(5)=	-21,45 /EI	UR(6)=	22,30 /EI	UR(7)=	36,96 /EI	UR(8)=	-36,96 /EI
UR(9)=	-22,30 /EI	UR(10)=	21,45 /EI	UR(11)=	36,11 /EI	UR(12)=	-35,22 /EI
UR(13)=	-20,18 /EI	UR(14)=	-59,62 /EI				

Separately calculated slopes HE(.).

HE(2, 1)=	-38,94 /EI	HE(5, 6)=	51,49 /EI	HE(6, 5)=	-51,76 /EI	HE(9,10)=	51,76 /EI
HE(10, 9)=	-51,49 /EI	HE(13,14)=	38,94 /EI				

FontName= "Microsoft Sans Serif" FontSize= 8

Reset and e.g. PRRES1 for a printer.print like shown here, PFRES1 for a form print.

Examples with CBCASE3A. EX4

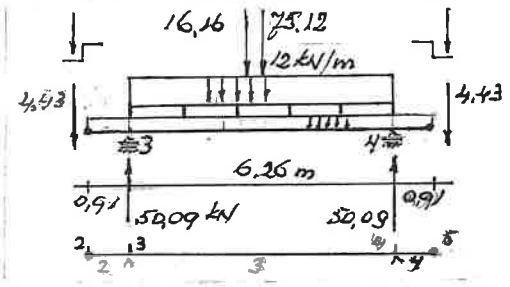
NSP=7 spans TBL=42 m QL=12 kN/m
QOW=2 kN/m PSP=5 SVI=0.8
In TSTRING 7,42,12,2,5,.8 Enter. (is click OK)

Or click EX4, OK etc.

First print.
Click to LOADCASE1, Indirect, and CBCASE3A, Calculate, PFRES2.
With HE(2,1)= -38,94/EI and UR(2)= 20,18/EI.

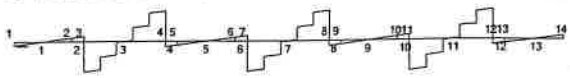
Second print.
Click Again, LOADCASE1 to LOADCASE2, CBCASE3A, Calculate and PFRES2.
PFRES2.
With HE(2,1)= -25,24/EI and UR(2)= -97,64/EI.

Third print.
Click Again, LOADCASE2 to LOADCASE3, CBCASE3A, Calculate and PFRES2.
With HE(2,1)= -19,45/EI and UR(2)= -122,97/EI.

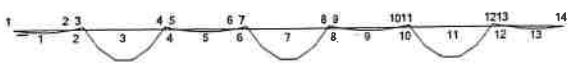


D6(2,3)= 4,43 kN D6(5,4)= 4,43 kN
RV(3)= 50,09 kN RV(4)= 50,09 kN
91,28 +4,43+4,43 -50,09-50,09= -0,04 kN ok

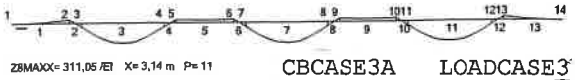
CBCASE3A LOADCASE= 3 N9=14 P9=13
NSP=7 TBL=42 m QL=12 kN/m LA=6,26 m X=0,91 m QOW=2 kN/m PSP=5 SV=0,8 /EI 3)



T5MAXX= 36,31 kN X= 0,00 m P= 7



M5MAXX= 61,36 kNm X= 3,14 m P= 7



Z8MAXX= 311,05 /EI X= 3,14 m P= 11 CBCASE3A LOADCASE3

Beam end forces and moments.

D6(1, 2)=	-4,43 kN	D6(2, 1)=	-4,43 kN	D6(8, 9)=	-6,26 kN	D6(9, 8)=	4,43 kN
MF(1, 2)=	0,00 kNm	MF(2, 1)=	0,00 kNm	MF(8, 9)=	-4,89 kNm	MF(9, 8)=	0,00 kNm
D6(2, 3)=	4,43 kN	D6(3, 2)=	-6,26 kN	D6(9,10)=	-4,43 kN	D6(10, 9)=	-4,43 kN
MF(2, 3)=	0,00 kNm	MF(3, 2)=	4,89 kNm	MF(9,10)=	0,00 kNm	MF(10, 9)=	0,00 kNm
D6(3, 4)=	-36,31 kN	D6(4, 3)=	-36,31 kN	D6(10,11)=	4,43 kN	D6(11,10)=	-6,26 kN
MF(3, 4)=	-4,89 kNm	MF(4, 3)=	4,89 kNm	MF(10,11)=	0,00 kNm	MF(11,10)=	4,89 kNm
D6(4, 5)=	-6,26 kN	D6(5, 4)=	4,43 kN	D6(11,12)=	-36,31 kN	D6(12,11)=	-36,31 kN
MF(4, 5)=	-4,89 kNm	MF(5, 4)=	0,00 kNm	MF(11,12)=	-4,89 kNm	MF(12,11)=	4,89 kNm
D6(5, 6)=	-4,43 kN	D6(6, 5)=	-4,43 kN	D6(12,13)=	-6,26 kN	D6(13,12)=	4,43 kN
MF(5, 6)=	0,00 kNm	MF(6, 5)=	0,00 kNm	MF(12,13)=	-4,89 kNm	MF(13,12)=	0,00 kNm
D6(6, 7)=	4,43 kN	D6(7, 6)=	-6,26 kN	D6(13,14)=	-4,43 kN	D6(14,13)=	-4,43 kN
MF(6, 7)=	0,00 kNm	MF(7, 6)=	4,89 kNm	MF(13,14)=	0,00 kNm	MF(14,13)=	0,00 kNm
D6(7, 8)=	-36,31 kN	D6(8, 7)=	-36,31 kN				
MF(7, 8)=	-4,89 kNm	MF(8, 7)=	4,89 kNm				

Support reactions.

RV(1)=	4,43 kN	RV(2)=	0,00 kN	RV(3)=	50,09 kN	RV(4)=	50,09 kN
RV(5)=	0,00 kN	RV(6)=	0,00 kN	RV(7)=	50,09 kN	RV(8)=	50,09 kN
RV(9)=	0,00 kN	RV(10)=	0,00 kN	RV(11)=	50,09 kN	RV(12)=	50,09 kN
RV(13)=	0,00 kN	RV(14)=	4,43 kN				

Joint displacements.

UV(1)=	5,54 /EI	UV(2)=	-48,50 /EI	UV(3)=	62,61 /EI	UV(4)=	62,61 /EI
UV(5)=	-48,50 /EI	UV(6)=	-48,50 /EI	UV(7)=	62,61 /EI	UV(8)=	62,61 /EI
UV(9)=	-48,50 /EI	UV(10)=	-48,50 /EI	UV(11)=	62,61 /EI	UV(12)=	62,61 /EI
UV(13)=	-48,50 /EI	UV(14)=	5,54 /EI				

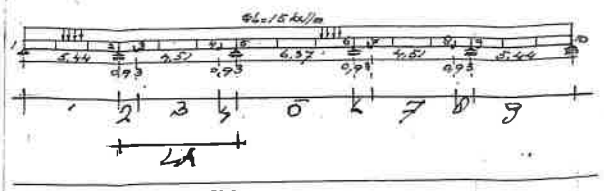
Joint rotations.

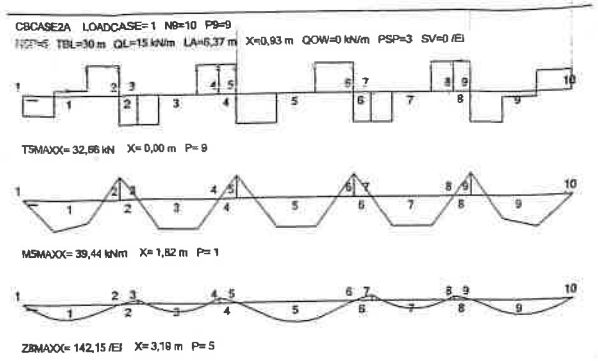
UR(1)=	-4,93 /EI	UR(2)=	120,86 /EI	UR(3)=	122,97 /EI	UR(4)=	-122,97 /EI
UR(5)=	-120,86 /EI	UR(6)=	120,86 /EI	UR(7)=	122,97 /EI	UR(8)=	-122,97 /EI
UR(9)=	-120,86 /EI	UR(10)=	120,86 /EI	UR(11)=	122,97 /EI	UR(12)=	-122,97 /EI
UR(13)=	-120,86 /EI	UR(14)=	4,93 /EI				

Separately calculated slopes HE(.).

HE(2, 1)=	-19,45 /EI	HE(5, 6)=	7,26 /EI	HE(6, 5)=	-7,26 /EI	HE(9,10)=	7,26 /EI
HE(10, 9)=	-7,26 /EI	HE(13,14)=	19,45 /EI				

FontName= "Microsoft Sans Serif" FontSize= 8





Beam end forces and moments.

D6(1, 2)= -21,75 kN	D6(2, 1)= -32,86 kN	D6(6, 7)= -31,86 kN	D6(7, 6)= 31,86 kN
MF(1, 2)= 0,00 kNm	MF(2, 1)= 29,64 kNm	MF(6, 7)= -29,64 kNm	MF(7, 6)= 0,00 kNm
D6(2, 3)= -31,86 kN	D6(3, 2)= 31,86 kN	D6(7, 8)= -31,86 kN	D6(8, 7)= -31,86 kN
MF(2, 3)= -29,64 kNm	MF(3, 2)= 0,00 kNm	MF(7, 8)= 0,00 kNm	MF(8, 7)= 0,00 kNm
D6(3, 4)= -31,86 kN	D6(4, 3)= -31,86 kN	D6(8, 9)= 31,86 kN	D6(9, 8)= -31,86 kN
MF(3, 4)= 0,00 kNm	MF(4, 3)= 0,00 kNm	MF(8, 9)= 0,00 kNm	MF(9, 8)= 29,64 kNm
D6(4, 5)= 31,86 kN	D6(5, 4)= -31,86 kN	D6(9,10)= -32,65 kN	D6(10, 9)= -21,76 kN
MF(4, 5)= 0,00 kNm	MF(5, 4)= 29,64 kNm	MF(9,10)= -29,64 kNm	MF(10, 9)= 0,00 kNm
D6(5, 6)= -31,86 kN	D6(6, 5)= -31,86 kN		
MF(5, 6)= -29,64 kNm	MF(6, 5)= 29,84 kNm		

Support reactions.

RV(1)= 35,37 kN	RV(2)= 94,05 kN	RV(3)= 0,00 kN	RV(4)= 0,00 kN
RV(5)= 95,58 kN	RV(6)= 95,58 kN	RV(7)= 0,00 kN	RV(8)= 0,00 kN
RV(9)= 94,05 kN	RV(10)= 35,37 kN		

Joint displacements.

UV(1)= 0,00 /EI	UV(2)= 0,00 /EI	UV(3)= -24,72 /EI	UV(4)= -37,32 /EI
UV(5)= 0,00 /EI	UV(6)= 0,00 /EI	UV(7)= -37,32 /EI	UV(8)= -24,72 /EI
UV(9)= 0,00 /EI	UV(10)= 0,00 /EI		

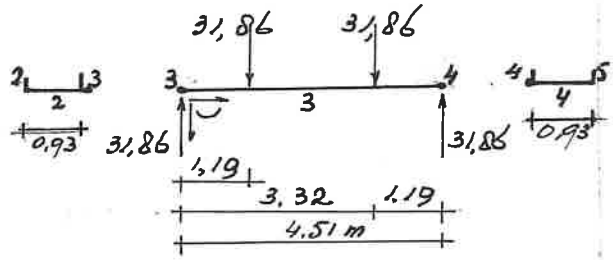
Joint rotations.

UR(1)= 62,64 /EI	UR(2)= -35,76 /EI	UR(3)= -21,97 /EI	UR(4)= 35,52 /EI
UR(5)= 49,30 /EI	UR(6)= -49,30 /EI	UR(7)= 35,52 /EI	UR(8)= 21,97 /EI
UR(9)= 35,76 /EI	UR(10)= -62,64 /EI		

Separately calculated slopes HE(,).

HE(3, 4)= 60,30 /EI	HE(4, 3)= -65,88 /EI	HE(7, 8)= 65,88 /EI	HE(8, 7)= -60,30 /EI

FontName= "Microsoft Sans Serif" FontSize= 8



N9=10

I	FY	PV	UV	SV	XI	MZ	PR	UR	SR
1	13,60	1	0	0,0	0,00	0	0	63	0
2	29,53	1	0	0,0	5,44	0	0	-36	0
3	0,00	0	-25	0,0	6,37	0	0	-22	0
4	0,00	0	-37	0,0	10,88	0	0	36	0
5	31,86	1	0	0,0	11,81	0	0	49	0
6	31,86	1	0	0,0	18,29	0	0	-49	0
7	0,00	0	-37	0,0	19,12	0	0	-36	0
8	0,00	0	-25	0,0	23,63	0	0	22	0
9	29,53	1	0	0,0	24,56	0	0	36	0
10	13,60	1	0	0,0	30,00	0	0	-63	0

P9=9

P	LL	HH	NL	NH	BA	LE	RE	EI	L1
1	1	2	0	0	1	0	0	1	5,44
NFB(1)=2			1	F2	L2				
			1	27,21	1,81				
			2	27,21	3,63				
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
2	2	3	0	0	2	0	0	1	0,93
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
3	3	4	1	1	3	1	1	1	4,51
NFB(3)=2			1	F2	L2				
			1	31,86	1,19				
			2	31,86	3,32				
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
4	4	5	0	0	4	0	0	1	0,93
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
5	5	6	0	0	5	0	0	1	6,37
NFB(5)=2			1	F2	L2				
			1	31,86	2,32				
			2	31,86	4,25				
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
6	6	7	0	0	6	0	0	1	0,93
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
7	7	8	1	1	7	1	1	1	4,51
NFB(7)=2			1	F2	L2				
			1	31,86	1,19				
			2	31,86	3,32				
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
8	8	9	0	0	8	0	0	1	0,93
P	LL	HH	NL	NH	BA	LE	RE	EI	L1
9	9	10	0	0	9	0	0	1	5,44
NFB(9)=2			1	F2	L2				
			1	27,21	1,81				
			2	27,21	3,63				

CBCASE2A LOADCASE= 1
QL= 15,00 kN/m QOW= 0,00 kN/m
Font name is Times New Roman and font size is 8,25.

EX1 EX2 EX3 EX4 EX5 M5MAXZERO Show LOADCASE=1 CBCASE1A CBCASE2A CBCASE3A Cls
Again NSP, TBL, QL, QOW, PSP, SV Indirect CBCASE1B CBCASE2B CBCASE3B
AOAgain 5,30,15,0,3,.8 OK Calculate
accepted STORE NR=1 GET EQUAL SPANS WITH HINGES End
PRRES1 PRRES2 PRRES3 PRRES4 Reset PFRES1 PFRES2 PFRES3 PFRES4 PrF

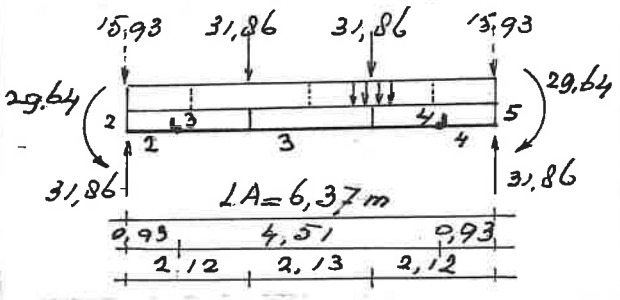
Example with CBCASE2A. EX5

NSP=5 spans TBL=30 m QL=15 kN/m
QOW=0 PSP=3 SVI=0.8
AOAgain.
In TSTRING 5,30,15,0,3,.8 Enter, 'accepted'.
Or click EX5, OK, 'accepted'.

Click to LOADCASE1, Indirect, CBCASE2A and Show to get the data shown bottom left.
Next Calculate and to get results with the printer click PRRES4, shown on the left.

Fig.
Member 3,
Lentgh LA-2*X= 6,37-2*0,93= 4,51 m,
hinges at member ends.
(6,37*15)/3= 31,86 kN
Assumptions member end forces D6(,) downward.
D6(3,4)= -31,86 kN D6(4,3)= -81,36 kN
Both negative answer, so not as assumed downward but upward.

Fig.
Members 2, 3 and 4.
Lenth LA=6,37 m.
D6(2,3)= -31,86 kN D6(5,4)= -31,86 kN
Member end moments MF(,) assumed to the right.
MF(2,3)= -29,64 kNm, negative answer, so not as assumed to the right but to the left.
MF(5,4)= 29,54 kNm, positive answer, so as assumed to the right.



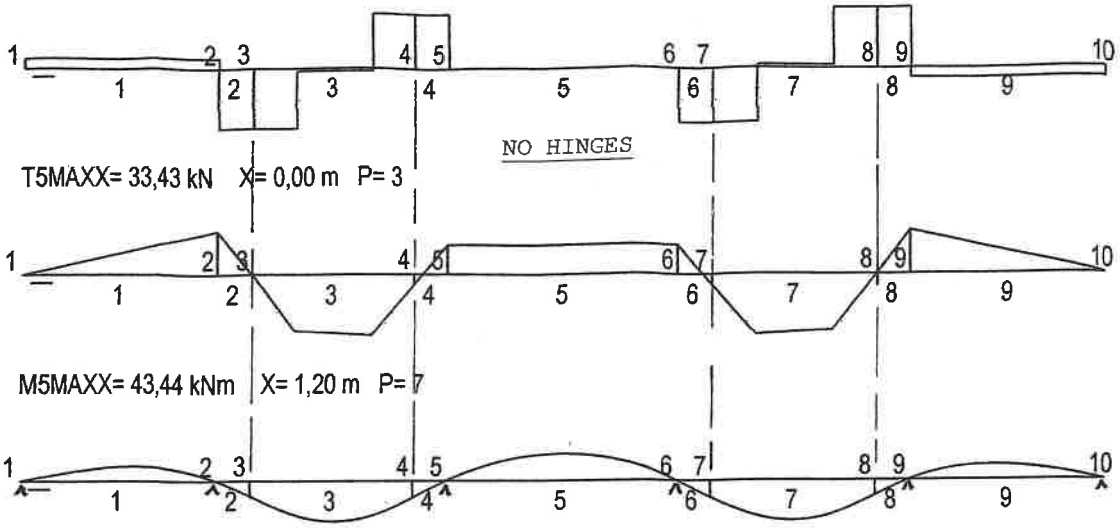
Click M5MAXZERO to get the print here below.
M5MAXX= 39,44 kN 1,82 m member P=1.

member 2
M5= 0,00 kNm at 0,00 m from member end 2
M5=-29,64 kNm at 0,93 m
member 3
M5= 0,00 kNm at 0,00 m from member end 3
M5= 38,03 kNm at 1,20 m ('is' 1,19 m)
M5= 0,00 kNm at 4,51 m

M5=	0,00	kNm	X=	0,00	m	P= 1	M5=	-29,64	kNm	X=	0,00	m	P= 2
M5=	39,44	kNm	X=	1,82	m		M5=	0,00	kNm	X=	0,93	m	
M5=	-0,19	kNm	X=	4,64	m								
M5=	-29,64	kNm	X=	5,44	m								
M5=	0,00	kNm	X=	0,00	m	P= 3	M5=	0,00	kNm	X=	0,00	m	P= 4
M5=	38,03	kNm	X=	1,20	m		M5=	-29,64	kNm	X=	0,93	m	
M5=	0,00	kNm	X=	4,51	m								
M5=	-29,64	kNm	X=	0,00	m	P= 5	M5=	-29,64	kNm	X=	0,00	m	P= 6
M5=	0,31	kNm	X=	0,94	m		M5=	0,00	kNm	X=	0,93	m	
M5=	38,03	kNm	X=	2,13	m								
M5=	-0,26	kNm	X=	5,45	m								
M5=	-29,64	kNm	X=	6,37	m								
M5=	0,00	kNm	X=	0,00	m	P= 7	M5=	0,00	kNm	X=	0,00	m	P= 8
M5=	38,03	kNm	X=	1,20	m		M5=	-0,32	kNm	X=	0,01	m	
M5=	0,00	kNm	X=	4,51	m		M5=	-29,64	kNm	X=	0,93	m	
M5=	-29,64	kNm	X=	0,00	m	P= 9							
M5=	0,08	kNm	X=	0,91	m								
M5=	39,49	kNm	X=	3,63	m								
M5=	0,00	kNm	X=	5,44	m								

CBCASE3B LOADCASE= 3 N9=10 P9=9

NSP=5 TBL=30 m QL=15 kN/m LA=6,37 m X=0,93 m QOW=0 kN/m PSP=3 SV=0 /EI



Z8MAXX= 161,32 /EI X= 2,32 m P= 3

Beam end forces and moments.

D6(1, 2)= 5,67 kN	D6(2, 1)= -5,67 kN	D6(6, 7)= -30,30 kN	D6(7, 6)= 30,30 kN
MF(1, 2)= 0,00 kNm	MF(2, 1)= 30,87 kNm	MF(6, 7)= -20,90 kNm	MF(7, 6)= -7,29 kNm
D6(2, 3)= -33,43 kN	D6(3, 2)= 33,43 kN	D6(7, 8)= -30,30 kN	D6(8, 7)= -33,43 kN
MF(2, 3)= -30,87 kNm	MF(3, 2)= -0,23 kNm	MF(7, 8)= 7,29 kNm	MF(8, 7)= -0,23 kNm
D6(3, 4)= -33,43 kN	D6(4, 3)= -30,30 kN	D6(8, 9)= 33,43 kN	D6(9, 8)= -33,43 kN
MF(3, 4)= 0,23 kNm	MF(4, 3)= -7,29 kNm	MF(8, 9)= 0,23 kNm	MF(9, 8)= 30,87 kNm
D6(4, 5)= 30,30 kN	D6(5, 4)= -30,30 kN	D6(9,10)= -5,67 kN	D6(10, 9)= 5,67 kN
MF(4, 5)= 7,29 kNm	MF(5, 4)= 20,90 kNm	MF(9,10)= -30,87 kNm	MF(10, 9)= 0,00 kNm
D6(5, 6)= 0,00 kN	D6(6, 5)= 0,00 kN		
MF(5, 6)= -20,90 kNm	MF(6, 5)= 20,90 kNm		

Support reactions.

RV(1)= -5,67 kN	RV(2)= 55,03 kN	RV(3)= 0,00 kN	RV(4)= 0,00 kN
RV(5)= 46,23 kN	RV(6)= 46,23 kN	RV(7)= 0,00 kN	RV(8)= 0,00 kN
RV(9)= 55,03 kN	RV(10)= -5,67 kN		

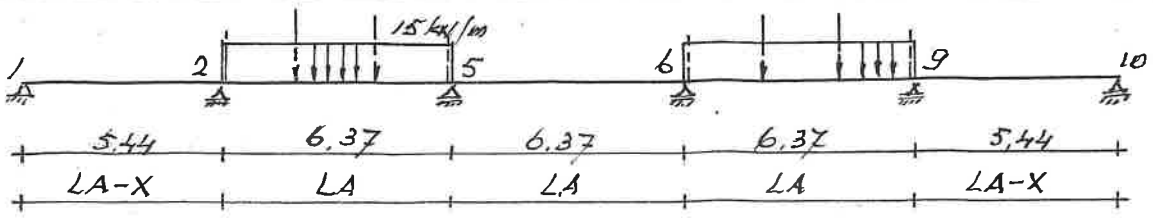
Joint displacements.

UV(1)= 0,00 /EI	UV(2)= 0,00 /EI	UV(3)= 60,96 /EI	UV(4)= 66,92 /EI
UV(5)= 0,00 /EI	UV(6)= 0,00 /EI	UV(7)= 66,92 /EI	UV(8)= 60,96 /EI
UV(9)= 0,00 /EI	UV(10)= 0,00 /EI		

Joint rotations.

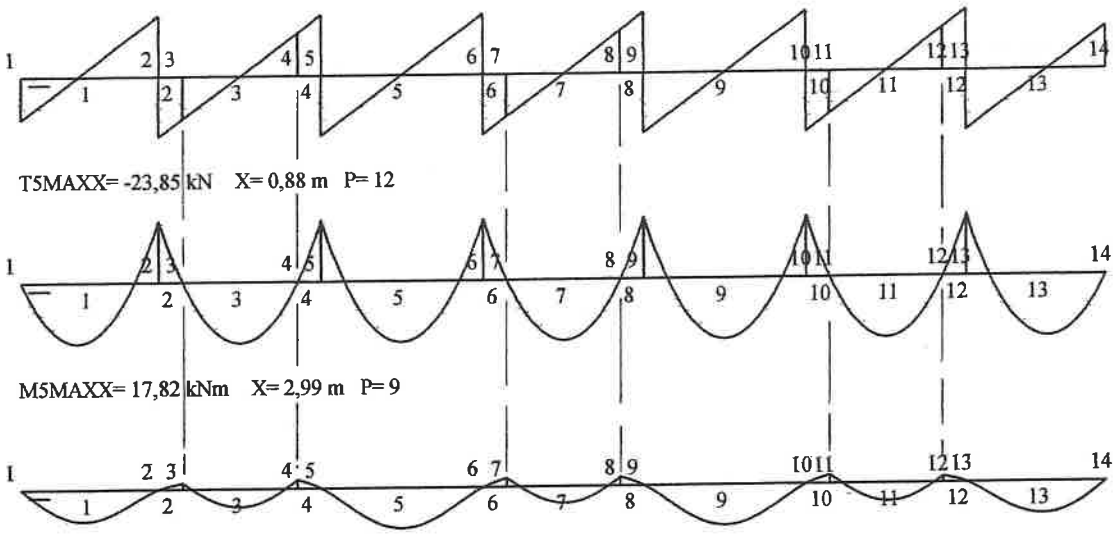
UR(1)= -27,99 /EI	UR(2)= 55,99 /EI	UR(3)= 70,24 /EI	UR(4)= -72,91 /EI
UR(5)= -66,58 /EI	UR(6)= 66,58 /EI	UR(7)= 72,91 /EI	UR(8)= -70,24 /EI
UR(9)= -55,99 /EI	UR(10)= 27,99 /EI		

FontName= "Arial Narrow" FontSize= 10



CBCASE2A LOADCASE= 1 N9=14 P9=13

NSP=7 TBL=40 m QL=8 kN/m LA=5,96 m X=0,87 m QOW=0 kN/m PSP=0 SV=0 /EI



T5MAXX= -23,85 kN X= 0,88 m P= 12

M5MAXX= 17,82 kNm X= 2,99 m P= 9

Z8MAXX= 52,88 /EI X= 2,99 m P= 5

Beam end forces and moments.

D6(1, 2)= -16,89 kN	D6(2, 1)= -23,85 kN	D6(8, 9)= 16,89 kN	D6(9, 8)= -23,85 kN
MF(1, 2)= 0,00 kNm	MF(2, 1)= 17,73 kNm	MF(8, 9)= 0,00 kNm	MF(9, 8)= 17,73 kNm
D6(2, 3)= -23,85 kN	D6(3, 2)= 16,89 kN	D6(9,10)= -23,85 kN	D6(10, 9)= -23,85 kN
MF(2, 3)= -17,73 kNm	MF(3, 2)= 0,00 kNm	MF(9,10)= -17,73 kNm	MF(10, 9)= 17,73 kNm
D6(3, 4)= -16,89 kN	D6(4, 3)= -16,89 kN	D6(10,11)= -23,85 kN	D6(11,10)= 16,89 kN
MF(3, 4)= 0,00 kNm	MF(4, 3)= 0,00 kNm	MF(10,11)= -17,73 kNm	MF(11,10)= 0,00 kNm
D6(4, 5)= 16,89 kN	D6(5, 4)= -23,85 kN	D6(11,12)= -16,89 kN	D6(12,11)= -16,89 kN
MF(4, 5)= 0,00 kNm	MF(5, 4)= 17,73 kNm	MF(11,12)= 0,00 kNm	MF(12,11)= 0,00 kNm
D6(5, 6)= -23,85 kN	D6(6, 5)= -23,85 kN	D6(12,13)= 16,89 kN	D6(13,12)= -23,85 kN
MF(5, 6)= -17,73 kNm	MF(6, 5)= 17,73 kNm	MF(12,13)= 0,00 kNm	MF(13,12)= 17,73 kNm
D6(6, 7)= -23,85 kN	D6(7, 6)= 16,89 kN	D6(13,14)= -23,85 kN	D6(14,13)= -16,89 kN
MF(6, 7)= -17,73 kNm	MF(7, 6)= 0,00 kNm	MF(13,14)= -17,73 kNm	MF(14,13)= 0,00 kNm
D6(7, 8)= -16,89 kN	D6(8, 7)= -16,89 kN		
MF(7, 8)= 0,00 kNm	MF(8, 7)= 0,00 kNm		

Support reactions.

RV(1)= 16,89 kN	RV(2)= 47,70 kN	RV(3)= 0,00 kN	RV(4)= 0,00 kN
RV(5)= 47,70 kN	RV(6)= 47,70 kN	RV(7)= 0,00 kN	RV(8)= 0,00 kN
RV(9)= 47,70 kN	RV(10)= 47,70 kN	RV(11)= 0,00 kN	RV(12)= 0,00 kN
RV(13)= 47,70 kN	RV(14)= 16,89 kN		

Joint displacements.

UV(1)= 0,00 /EI	UV(2)= 0,00 /EI	UV(3)= -7,83 /EI	UV(4)= -11,21 /EI
UV(5)= 0,00 /EI	UV(6)= 0,00 /EI	UV(7)= -11,21 /EI	UV(8)= -11,21 /EI
UV(9)= 0,00 /EI	UV(10)= 0,00 /EI	UV(11)= -11,21 /EI	UV(12)= -7,83 /EI
UV(13)= 0,00 /EI	UV(14)= 0,00 /EI		

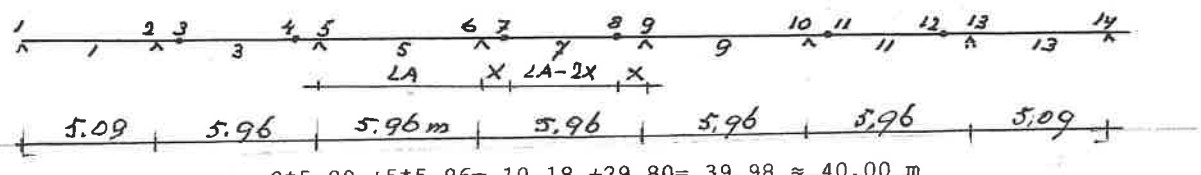
Joint rotations.

UR(1)= 28,97 /EI	UR(2)= -13,92 /EI	UR(3)= -6,64 /EI	UR(4)= 10,52 /EI
UR(5)= 17,80 /EI	UR(6)= -17,80 /EI	UR(7)= -10,52 /EI	UR(8)= 10,52 /EI
UR(9)= 17,80 /EI	UR(10)= -17,80 /EI	UR(11)= -10,52 /EI	UR(12)= 6,64 /EI
UR(13)= 13,92 /EI	UR(14)= -28,97 /EI		

Separately calculated slopes HE(,).

HE(3, 4)= 24,28 /EI	HE(4, 3)= -25,88 /EI	HE(7, 8)= 25,08 /EI	HE(8, 7)= -25,08 /EI
HE(11,12)= 25,88 /EI	HE(12,11)= -24,28 /EI		

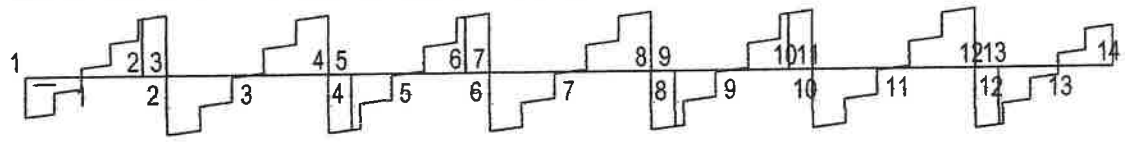
FontName= "Times New Roman" FontSize= 8



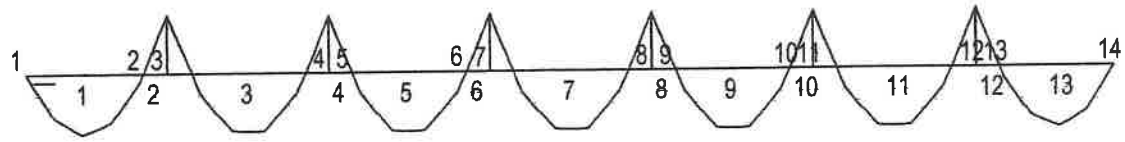
2*5,09 +5*5,96= 10,18 +29,80= 39,98 ≈ 40,00 m

CBCASE3A LOADCASE= 1 N9=14 P9=13

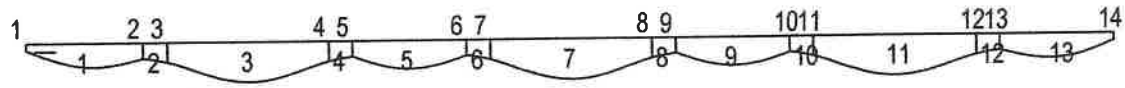
NSP=7 TBL=42 m QL=12 kN/m LA=6,26 m X=0,91 m QOW=2 kN/m PSP=5 SV=0,8 /EI



T5MAXX= 37,22 kN X= 0,00 m P= 12



M5MAXX= 34,75 kNm X= 2,14 m P= 1



Z8MAXX= 223,38 /EI X= 3,14 m P= 7

Beam end forces and moments.

D6(1, 2)= -24,81 kN	D6(2, 1)= -35,39 kN	D6(8, 9)= -36,31 kN	D6(9, 8)= 34,49 kN
MF(1, 2)= 0,00 kNm	MF(2, 1)= 0,00 kNm	MF(8, 9)= -32,36 kNm	MF(9, 8)= 0,00 kNm
D6(2, 3)= 35,39 kN	D6(3, 2)= -37,22 kN	D6(9,10)= -34,49 kN	D6(10, 9)= -34,49 kN
MF(2, 3)= 0,00 kNm	MF(3, 2)= 33,19 kNm	MF(9,10)= 0,00 kNm	MF(10, 9)= 0,00 kNm
D6(3, 4)= -36,45 kN	D6(4, 3)= -36,18 kN	D6(10,11)= 34,49 kN	D6(11,10)= -36,31 kN
MF(3, 4)= -33,19 kNm	MF(4, 3)= 32,36 kNm	MF(10,11)= 0,00 kNm	MF(11,10)= 32,36 kNm
D6(4, 5)= -36,31 kN	D6(5, 4)= 34,49 kN	D6(11,12)= -36,18 kN	D6(12,11)= -36,45 kN
MF(4, 5)= -32,36 kNm	MF(5, 4)= 0,00 kNm	MF(11,12)= -32,36 kNm	MF(12,11)= 33,19 kNm
D6(5, 6)= -34,49 kN	D6(6, 5)= -34,49 kN	D6(12,13)= -37,22 kN	D6(13,12)= 35,39 kN
MF(5, 6)= 0,00 kNm	MF(6, 5)= 0,00 kNm	MF(12,13)= -33,19 kNm	MF(13,12)= 0,00 kNm
D6(6, 7)= 34,49 kN	D6(7, 6)= -36,31 kN	D6(13,14)= -35,39 kN	D6(14,13)= -24,81 kN
MF(6, 7)= 0,00 kNm	MF(7, 6)= 32,36 kNm	MF(13,14)= 0,00 kNm	MF(14,13)= 0,00 kNm
D6(7, 8)= -36,31 kN	D6(8, 7)= -36,31 kN		
MF(7, 8)= -32,36 kNm	MF(8, 7)= 32,36 kNm		

Support reactions.

RV(1)= 31,22 kN	RV(2)= 0,00 kN	RV(3)= 87,60 kN	RV(4)= 87,52 kN
RV(5)= 0,00 kN	RV(6)= 0,00 kN	RV(7)= 87,66 kN	RV(8)= 87,66 kN
RV(9)= 0,00 kN	RV(10)= 0,00 kN	RV(11)= 87,52 kN	RV(12)= 87,60 kN
RV(13)= 0,00 kN	RV(14)= 31,22 kN		

Joint displacements.

UV(1)= 39,03 /EI	UV(2)= 86,48 /EI	UV(3)= 109,50 /EI	UV(4)= 109,41 /EI
UV(5)= 85,35 /EI	UV(6)= 84,74 /EI	UV(7)= 109,57 /EI	UV(8)= 109,57 /EI
UV(9)= 84,74 /EI	UV(10)= 85,35 /EI	UV(11)= 109,41 /EI	UV(12)= 109,50 /EI
UV(13)= 86,48 /EI	UV(14)= 39,03 /EI		

Joint rotations.

UR(1)= 59,62 /EI	UR(2)= 20,18 /EI	UR(3)= 35,22 /EI	UR(4)= -36,11 /EI
UR(5)= -21,45 /EI	UR(6)= 22,30 /EI	UR(7)= 36,96 /EI	UR(8)= -36,96 /EI
UR(9)= -22,30 /EI	UR(10)= 21,45 /EI	UR(11)= 36,11 /EI	UR(12)= -35,22 /EI
UR(13)= -20,18 /EI	UR(14)= -59,62 /EI		

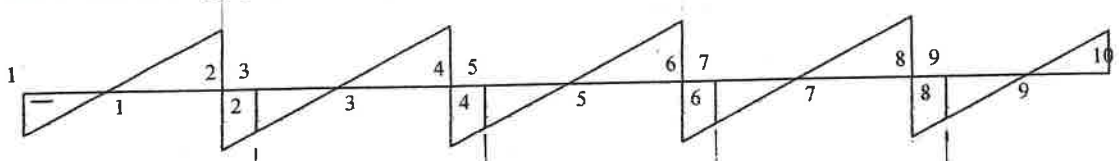
Separately calculated slopes HE(,).

HE(2, 1)= -38,94 /EI	HE(5, 6)= 51,49 /EI	HE(6, 5)= -51,76 /EI	HE(9,10)= 51,76 /EI
HE(10, 9)= -51,49 /EI	HE(13,14)= 38,94 /EI		

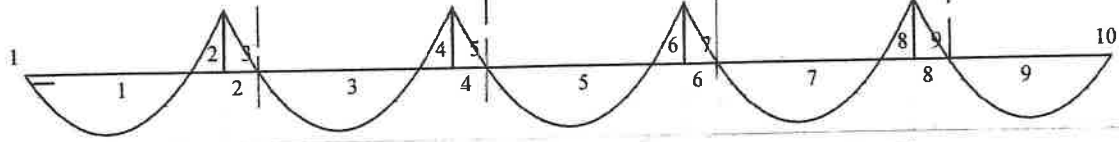
FontName= "Arial Narrow" FontSize= 10

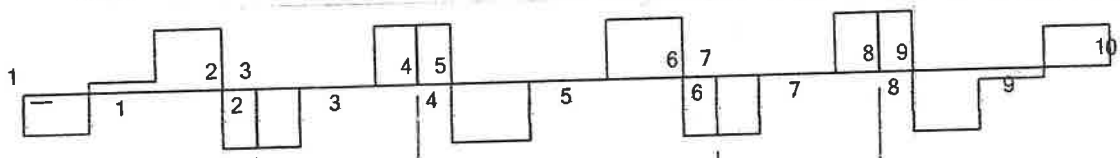
CBCASE1A LOADCASE= 1 N9=10 P9=9

NSP=5 TBL=16 m QL=14 kN/m LA=3,40 m X=0,50 m QOW=0 kN/m PSP=0 SV=0 /EI

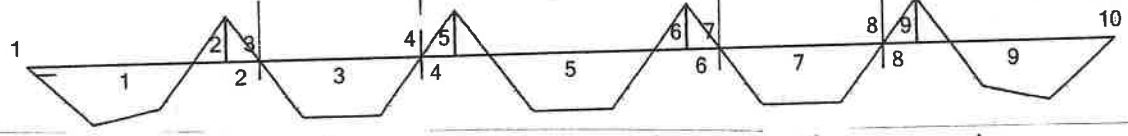


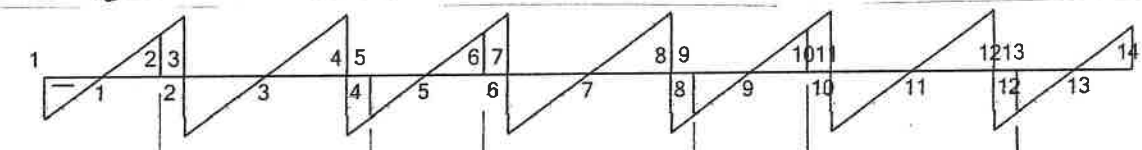
T5MAXX= 23,79 kN X= 0,00 m P= 6



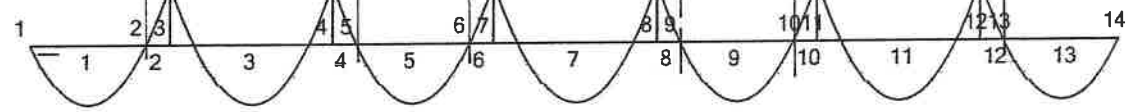


T5MAXX= 32,66 kN X= 0,00 m P= 9

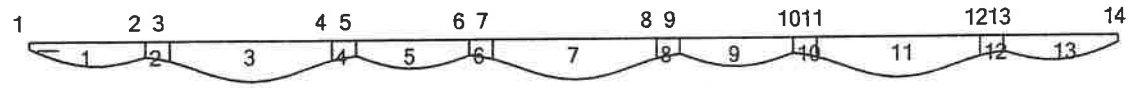




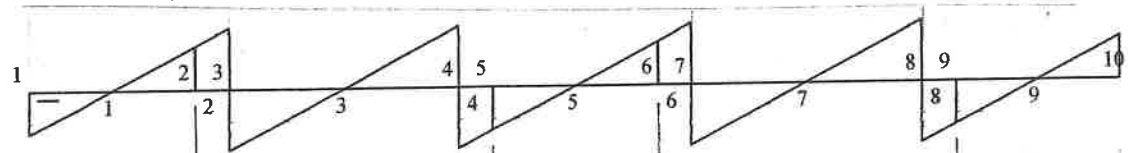
T5MAXX= -43,83 kN X= 0,92 m P= 2



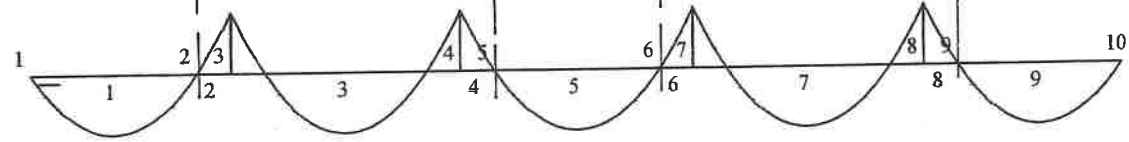
M5MAXX= 34,39 kNm X= 2,22 m P= 1



Z8MAXX= 222,05 /EI X= 3,14 m P= 11



T5MAXX= -23,79 kN X= 3,40 m P= 3



M5MAXX= 10,13 kNm X= 1,70 m P= 3