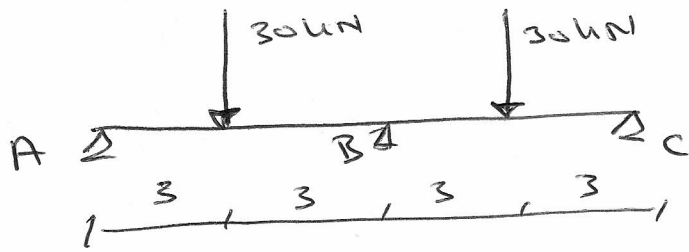
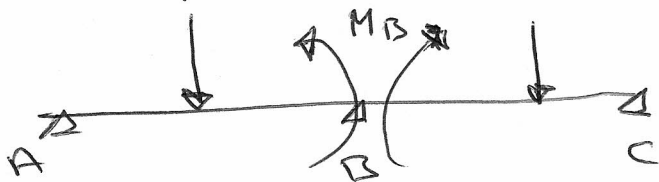


UEV, week 4-7, opgave 4.2.



Gaop vergelijking: $\varphi_{BLi} = \varphi_{Bre}$



Deel AB

① $\varphi_{BLi_1} = \frac{Fl^2}{16EI} = \frac{30 \times 6^2}{16EI} = \frac{67.5}{EI} \text{ rad}$

② $\varphi_{BLi_2} = \frac{MBl}{3EI} = \frac{MB \cdot 6}{3EI} = \frac{2MB}{EI}$

$\varphi_{BLi_{\text{total}}} = \frac{67.5}{EI} + \frac{2MB}{EI}$

Deel B-C

① $\varphi_{Bre_1} = -\frac{67.5}{EI} \text{ rad}$

② $\varphi_{Bre_2} = -\frac{2MB}{EI}$

$\varphi_{Bre_{\text{tot}}} = -\frac{67.5}{EI} - \frac{2MB}{EI}$

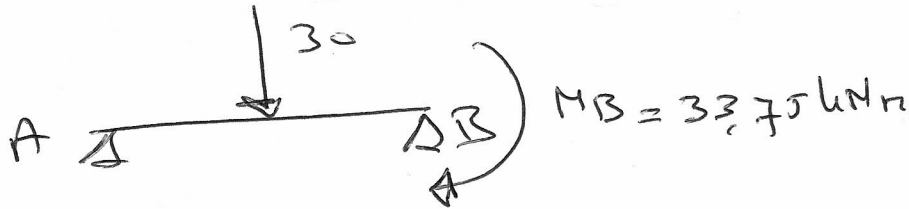
$\varphi_{BLi} = \varphi_{Bre}$

$67.5 + 2MB = -67.5 - 2MB$

$135 = -4MB \Rightarrow MB = -33.75 \text{ kNm}$
(tekenverandering)

Decl AB

$$\sum M \text{ to } A = 0$$

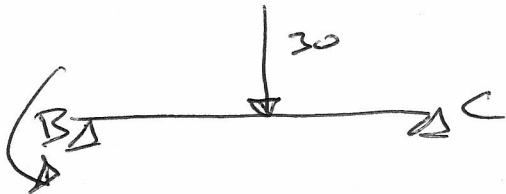


$$-(30 \times 3) - 33,75 + 6 B_v = 0$$

$$B_v = 20,63 \text{ kN}$$

$$A_v = 30 - 20,63 = 9,38 \text{ kN}$$

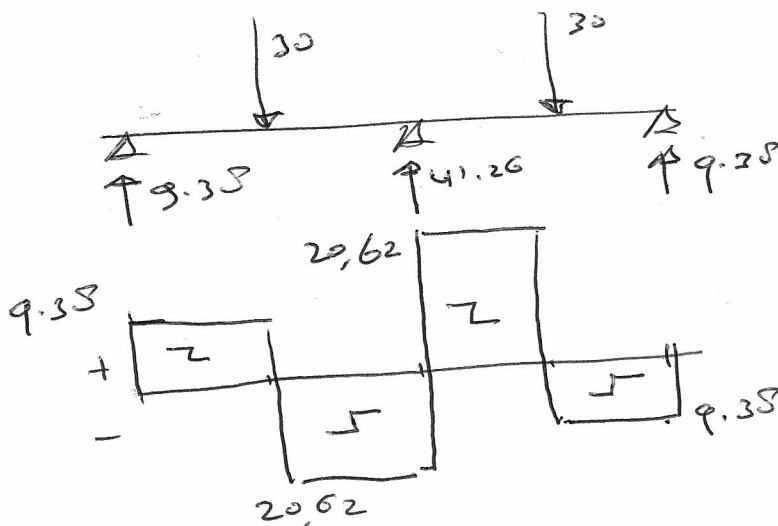
$$\sum M \text{ to } C = 0$$



$$(30 \times 3) + 33,75 - 6 B_v = 0$$

$$B_v = 20,63 \text{ kN}$$

$$C_v = 30 - 20,63 = 9,38 \text{ kN}$$

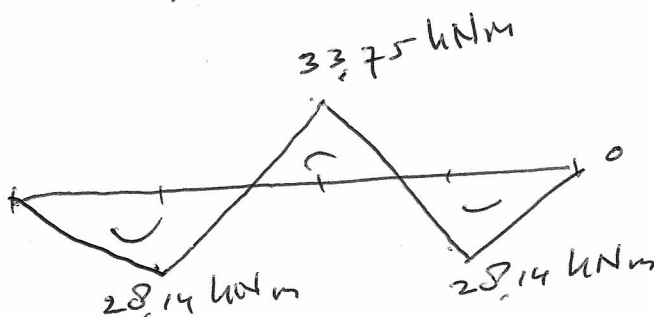


$$A_v = 9,38 \text{ kN}$$

$$B_v = 2(20,63) = 41,26 \text{ kN}$$

$$C_v = 9,38 \text{ kN}$$

$$\Rightarrow V_{\max} = 20,62 \text{ kN}$$



$$\Rightarrow M_{v1} = 28,14 \text{ kNm}$$

$$M_{SE} = -33,75 \text{ kNm}$$

$$M_{v2} = 28,14 \text{ kNm}$$

$$M_{\max} = 33,75 \text{ kNm}$$

Projectnaam	KEV	Projectnummer	opgave 4.2
Omschrijving	statisch onbepaalde liggers	Constructeur	docent
Opdrachtgever	roos	Eenheden	m, kN, kNm
Bestand	Y:\kopie van schijf\2009\Ribacs 2009\2010 - 2011\KEV\statisch onbepaalde ligger\Untitled.mxe		

Constructiegegevens

Projecttype	Knope	Staven	Opleggingen	Profielen	Bel.gev.	Bel.comb.
2D-Raamwerk	5	4	3	1	1	0

Staven

Staat	Knoop B	Scharnier B	Knoop E	Profiel	X-B	Z-B	X-E	Z-E	Lengte
S1	K1	NVM	K2	P1	0,000	0,000	3,000	0,000	3,000
S2	K2	NVM	K3	P1	3,000	0,000	6,000	0,000	3,000
S3	K3	NVM	K4	P1	6,000	0,000	9,000	0,000	3,000
S4	K4	NVM	K5	P1	9,000	0,000	12,000	0,000	3,000
-	-	-	-	-	m	m	m	m	m

Profielen

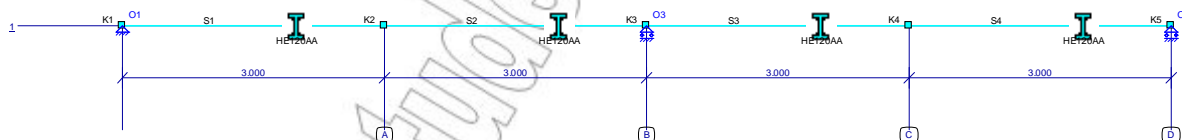
Profiel	Profielnaam	Oppervlakte	ly	Material	Hoek
P1	HE120AA	1.8552e-03	4.1336e-06	S235	0
-	-	m2	m4	-	°

Materialen

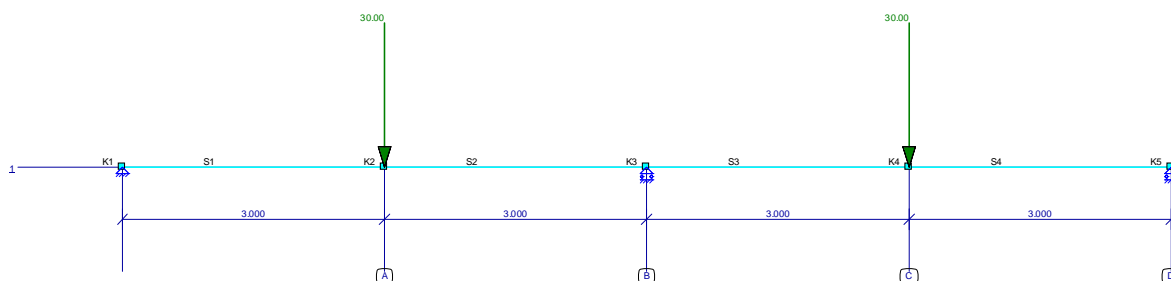
Materialnaam	Dichtheid	E-Modulus	Uitzettingcoeff
S235	78.50	2.1000e+08	12.0000e-06
-	kN/m3	kN/m2	C°m

Opleggingen

Oplegging	Knoop	X	Z	Yr	HoekYr
O1	K1	vast	vast	vrij	0
O3	K3	vrij	vast	vrij	0
O5	K5	vrij	vast	vrij	0
-	-	kN/m	kN/m	kNmrad	°



Afb. Geometrie 1



Afb. Lasten B.G.1 Permanent

Belastingsgevallen

Type	Beginwaarde	Eindwaarde	Beginafstand	Eindafstand	Richting	Staf of knoop
B.G.1: Permanent						
N	30,00					Z K2,K4
Som lasten	X:	0,00	kN Z:	60,00	kN	
-	-	-	-	m	m	- -

Belastingsgeval typen

Oplegg.	Staven	B.G.Type	Gunstig/Ong.	Element	Niveau	Veld	PsiK	PsiI
B.G.1	Permanent	Permanent	-		N.v.t.	N.v.t.		

Lastengenerator opties

Gebouwtype: Woning

Referentieperiode: 50

Veiligheidsklasse: 2

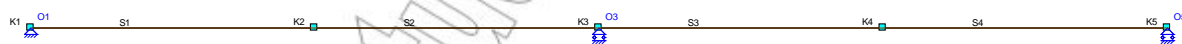
Combinatieregels:

NEN6702#6.3.3.1 Fig. 3

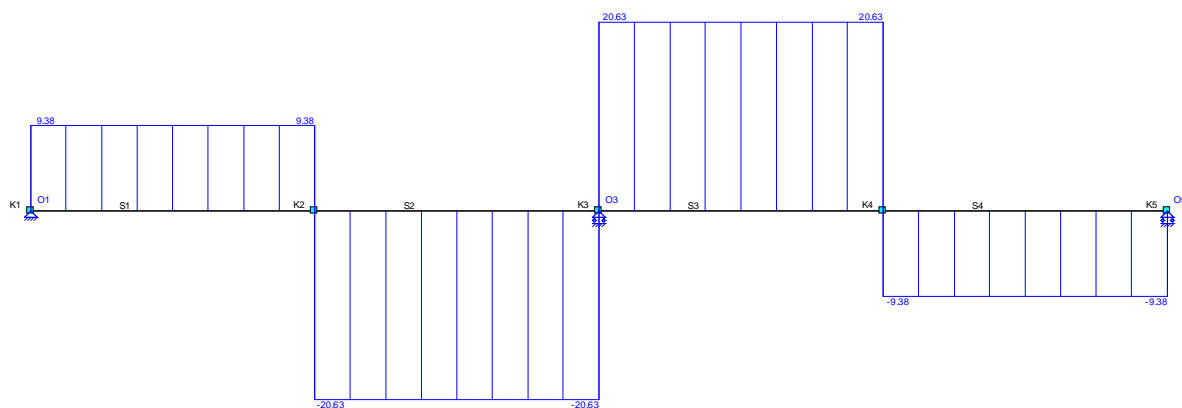
NEN6702#6.3.3.3

B.G. Knoopkrachten

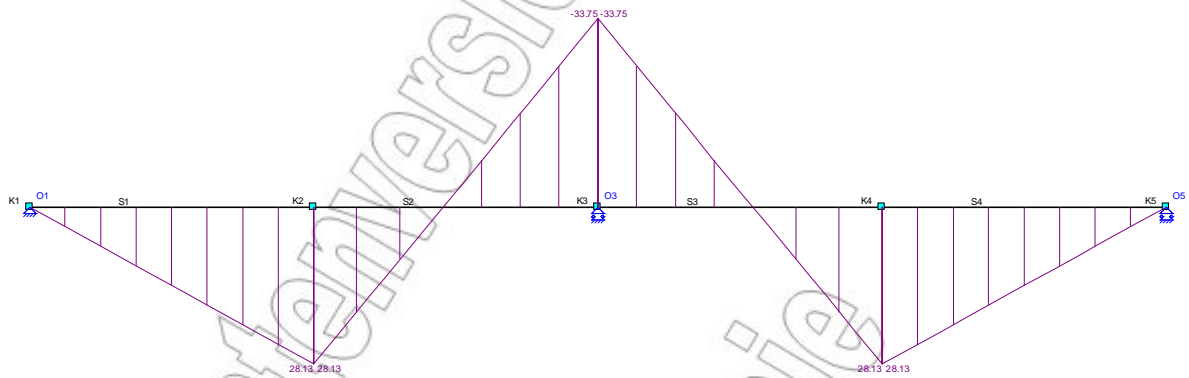
Staf	B.C.	Knoop	T/D	Nx	Vz	My
S1	B.G.1	B K1		0.00	-9.38	0.00
		E K2		0.00	9.38	28.13
S2	B.G.1	B K2		0.00	20.63	-28.13
		E K3		0.00	-20.63	-33.75
S3	B.G.1	B K3		0.00	-20.63	33.75
		E K4		0.00	20.63	28.13
S4	B.G.1	B K4		0.00	9.38	-28.13
		E K5		0.00	-9.38	0.00
-	-	-	-	kN	kN	kNm



Afb. B.G.1: Permanent Normaalkracht (Nx)



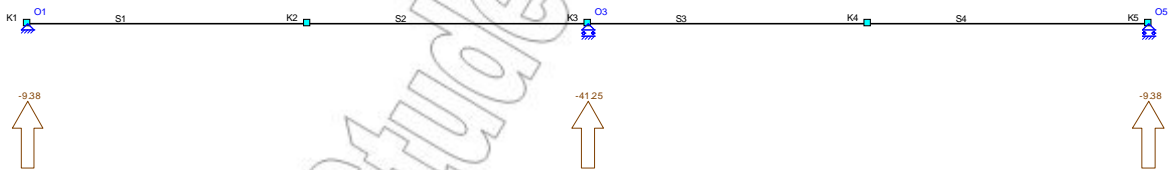
Afb. B.G.1: Permanent Dwarskracht (Vz)



Afb. B.G.1: Permanent Momenten (My)

B.G. Staafkrachten

Staaf	B.C.	Mb	Mmax	xMmax	Me	x-M0	x-M0 T/D	Nmax	Vb	Vmax	Ve
S1	B.G.1	0.00			28.13	0.000	0.000	0.00	9.38	9.38	9.38
S2	B.G.1	28.13			-33.75	1.363	0.000	0.00	-20.63	-20.63	-20.63
S3	B.G.1	-33.75			28.13	1.637	0.000	0.00	20.63	20.63	20.63
S4	B.G.1	28.13			0.00	0.000	0.000	0.00	-9.38	-9.38	-9.38
-	-	kNm	kNm	m	kNm	m	m -	kN	kN	kN	kN



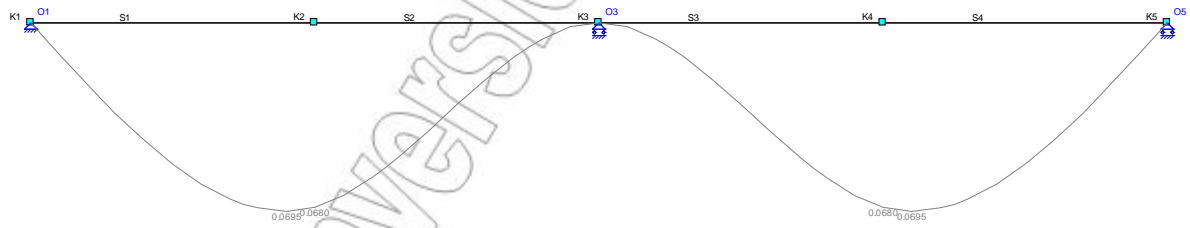
Afb. B.G.1: Permanent Oplegreacties

B.G. Oplegreacties

B.C.	Oplegging	Knoop	X	Z	My
B.G.1	O1	K1	0.00	-9.38	0.00
	O3	K3	0.00	-41.25	0.00
	O5	K5	0.00	-9.38	0.00
	Som Reacties		0.00	-60.00	
	Som Lasten		0.00	60.00	
-	-	-	kN	kN	kNm

B.G. Doorbuigingen

Staaf	B.C.	Knoop Begin		Staaf				Knoop Eind	
		X	Z	Z'afst	Z'	Z' glb dist	Z' glb	X	Z
S1	B.G.1	0,000	0,000	1,800	0,0187	2,700	0,0695	0,000	0,068
S2	B.G.1	0,000	0,068	2,250	-0,0077	0,000	0,0680	0,000	0,000
S3	B.G.1	0,000	0,000	0,750	-0,0077	3,000	0,0680	0,000	0,068
S4	B.G.1	0,000	0,068	1,200	0,0187	0,300	0,0695	0,000	0,000
-	-	m	m	m	m	m	m	m	m



Afb. B.G.1: Permanent Verplaatsingen

B.G. Knoopverplaatsingen

Knoop	B.C.	X	Z	Ry
K1	B.G.1	0.0000	0.0000	-38.880e-03
K2		0.0000	0.0680	9.720e-03
K3		0.0000	0.0000	-0.000e-03
K4		0.0000	0.0680	-9.720e-03
K5		0.0000	0.0000	38.880e-03
-	-	m	m	rad