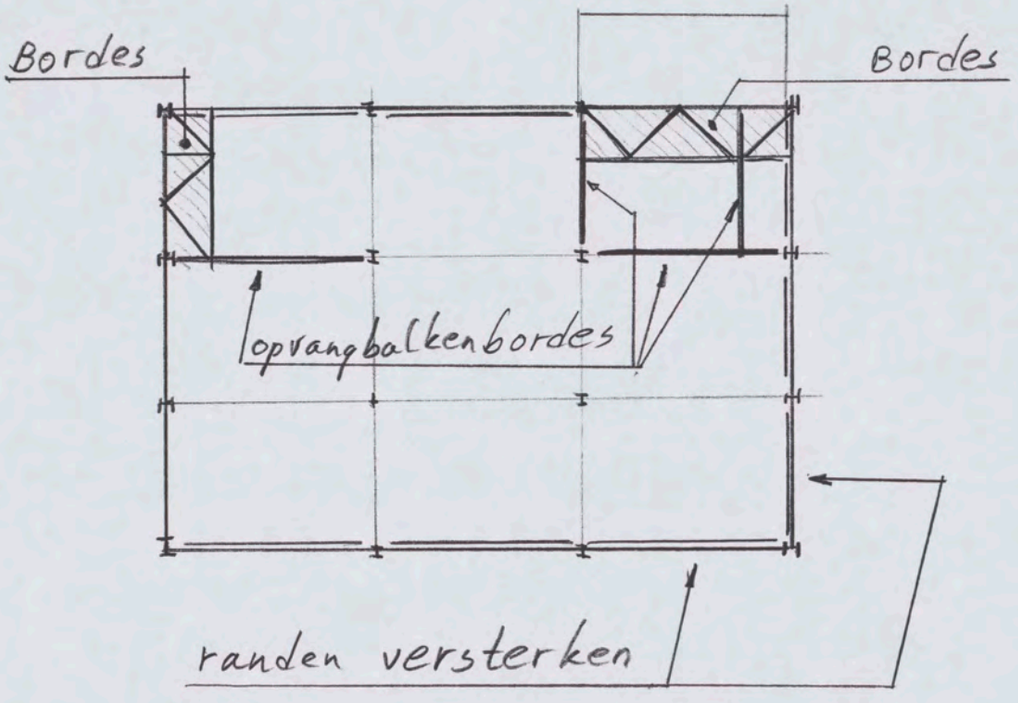
Te verwijderen krans op peil +4.000

bordessen +4.000

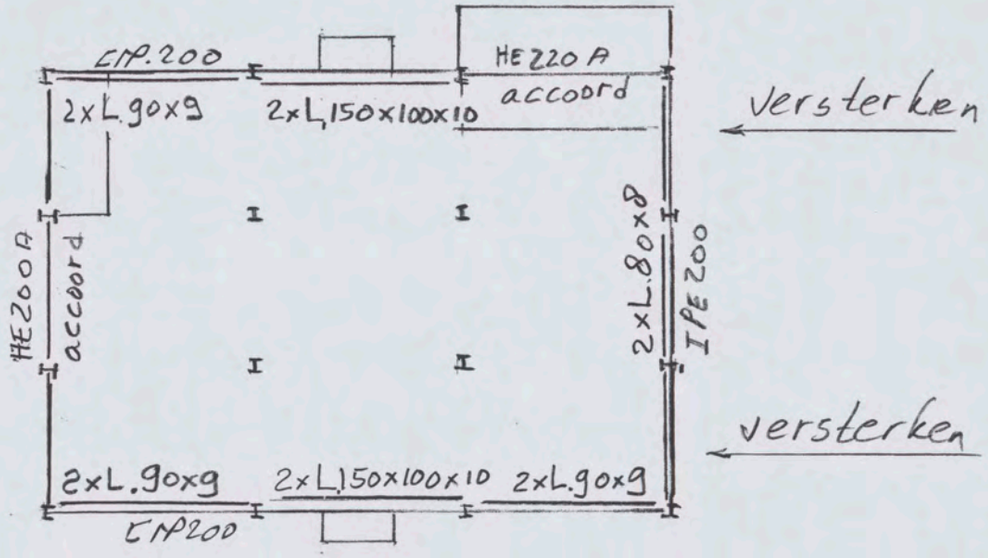


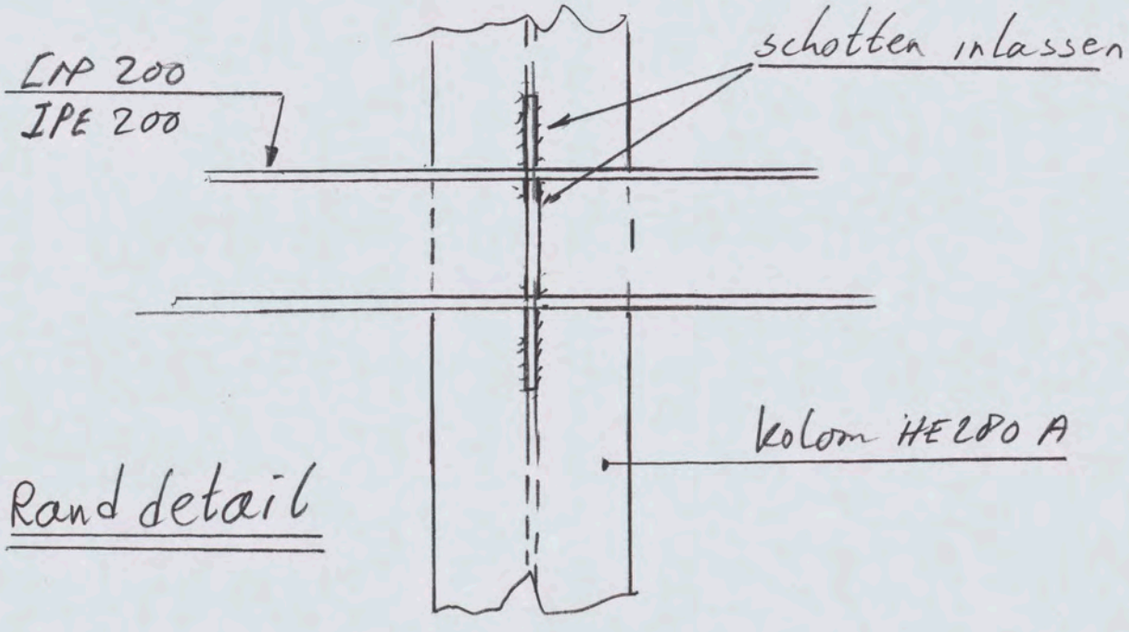
Nadat hoofdbalken van nieuwevloer +2.400 zijn aangebracht, bordessen +4.000 ondersteunen Als bordessen +4.000 zijn ondersteund kunnen de opvang balken bordes verwijderd worden.

Vervolgblad: 2.14

T.P.V. te verwijderen kraan + 4000

randbalken versterken

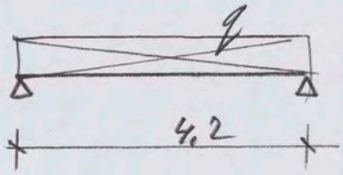




Rand detail

Opvang balk in gevel + 4000

draagende breedte = 4/2 = 2 m.



$q = 2 \times 1{,}2 \times 0{,}65 = 1{,}56$ kN/m'

stel max doorbuiging 1/500 ℓ = 8,4 mm

$I_{ben} = \frac{4{,}2^3}{8{,}4}\left[6{,}2 \times 4{,}2 \times 1{,}56\right] = 358$ cm^4

IPE 200 $I_z = 142$ cm^4 versterken



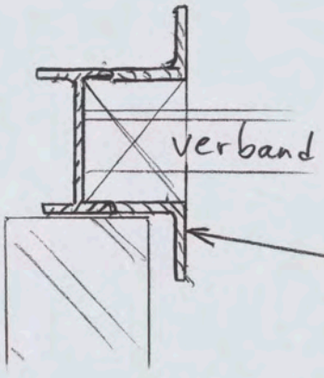
versterken met IPE 140

$I_y = 541$ cm^4

ketting lassen

of [NP.140

Voorstel I
niet toepasser

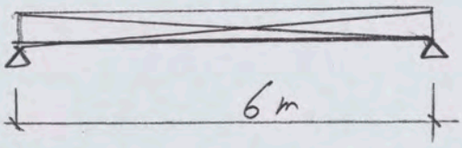


voorstel II toepassen

Vervolgblad: 2.16

Opvang balk in gevel +. 4,000

draagende breedte = 4/2 = 2 m.

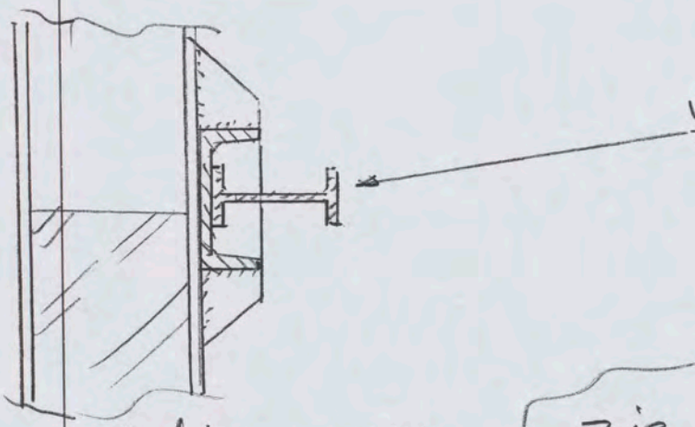


$q = 2 \times 1{,}2 \times 0{,}65 = 1{,}56$ kN/m'

stel max doorbuiging 1/600 l

$I_{ben} = \frac{6^3}{10}[6{,}2 \times 6 \times 1{,}56] = 1253{,}5$ cm^4

[NP. 200 I_z = 148 cm^4 (versterken)



versterken met IPE. 180

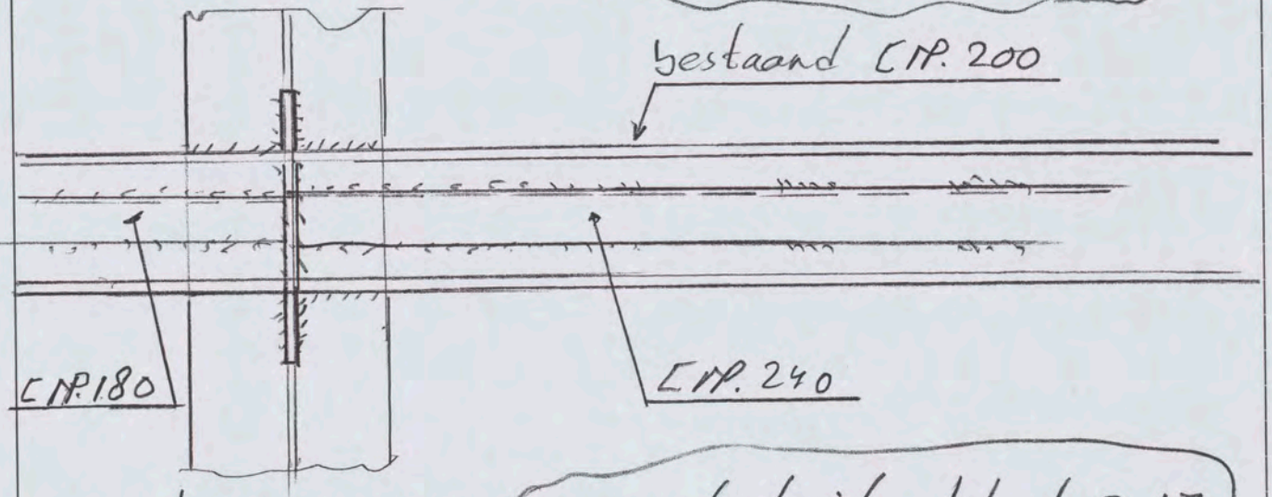
I_y = 1317 cm^4

ketting lassen

of [NP. 180

niet toepassen

zie details blad 2.17

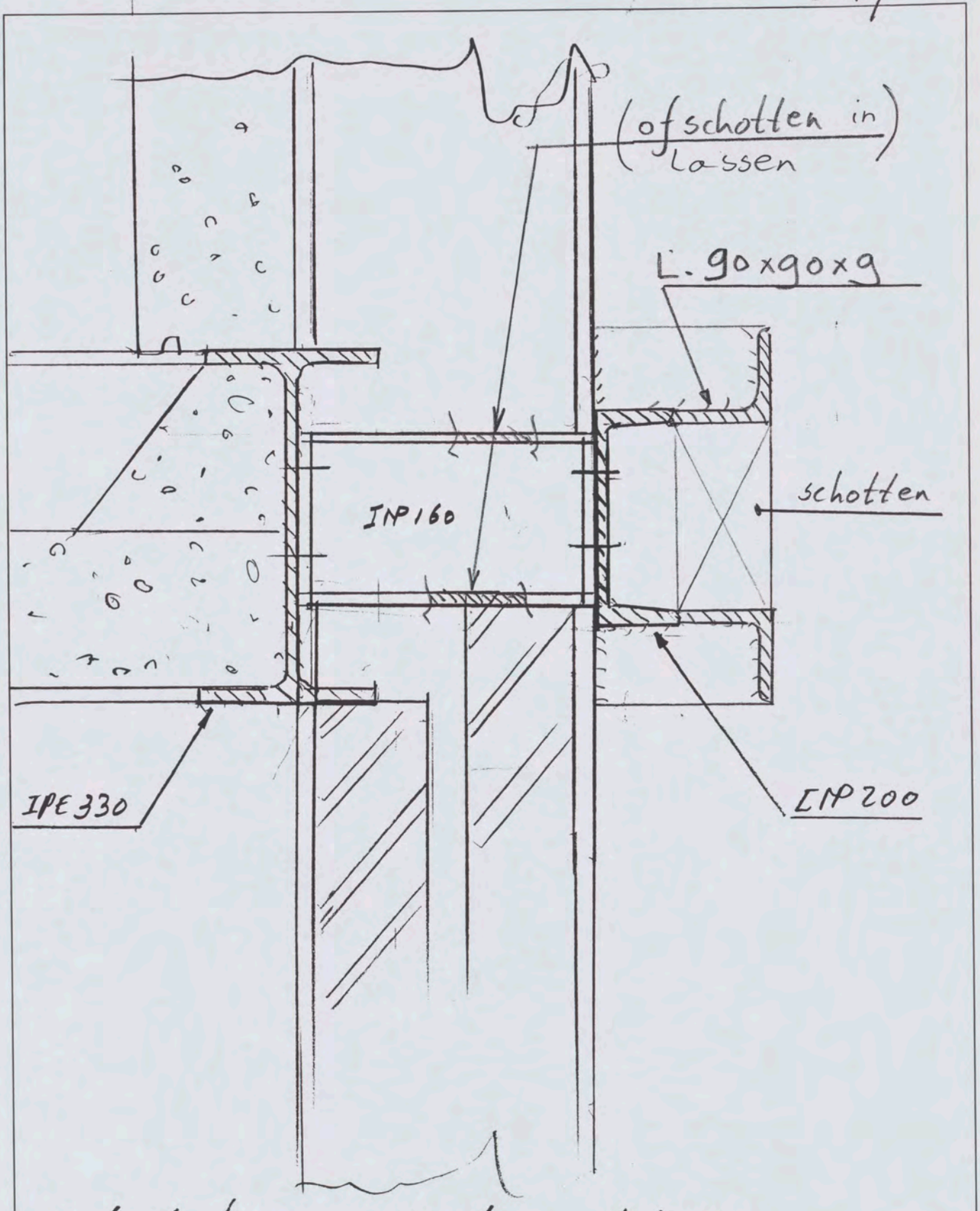


niet toepassen

zie details blad 2.17

91.156

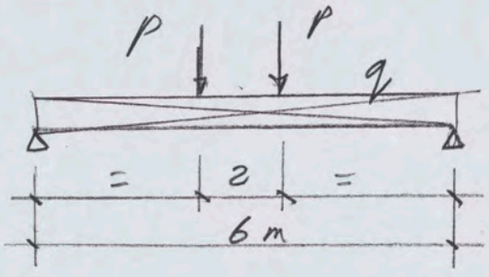
Vervolgblad: 2.17



Detail langs wand +4.000

91.156

Opvangbalk in gevel + 4.000
tgv. vent. schacht. + wind



$q = 1{,}56$ kN./m'

P vent. schacht

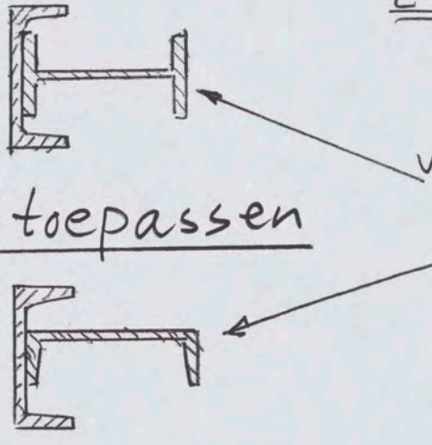
$P_1 = 10{,}2$ kN

max. doorbuiging $u = 1/600\,\ell = 10$ mm

I_{ben} tgv. vent.schacht $= \frac{6^3}{10}\left[2 \times 10{,}2 \times 8{,}3\right] = 3657\ cm^4$

$I_{ben.\ tot} = 1317 + 3657 = 4975\ cm^4$

[NP. 200 $I_z = 148\ cm^4$
versterken



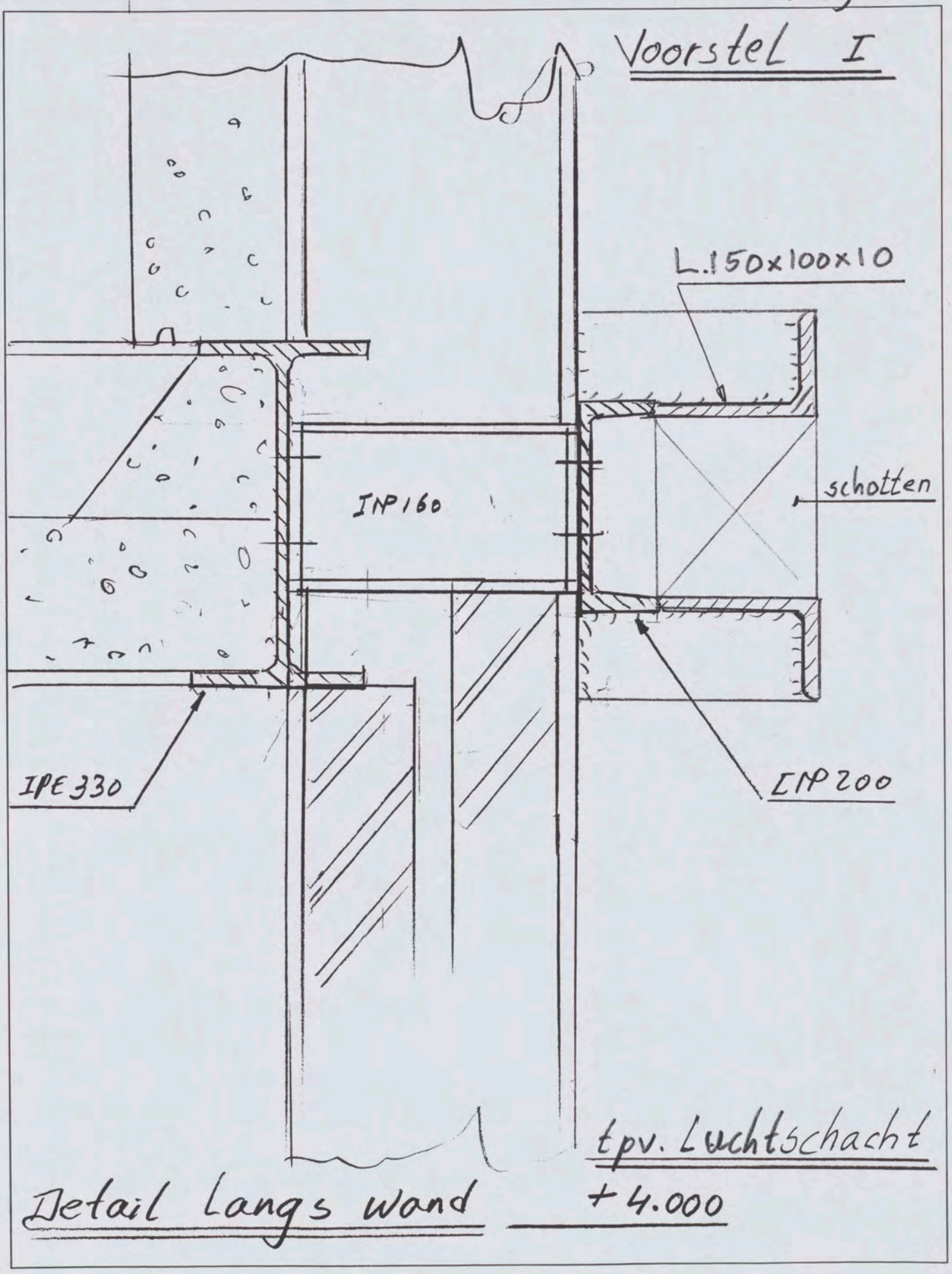
niet toepassen

versterken IPE 240
of [NP. 240
voorkeur.

$I_z = \pm 5000\ cm^4$
kettinglassen

zie details blad. 2.19 en (2.20)

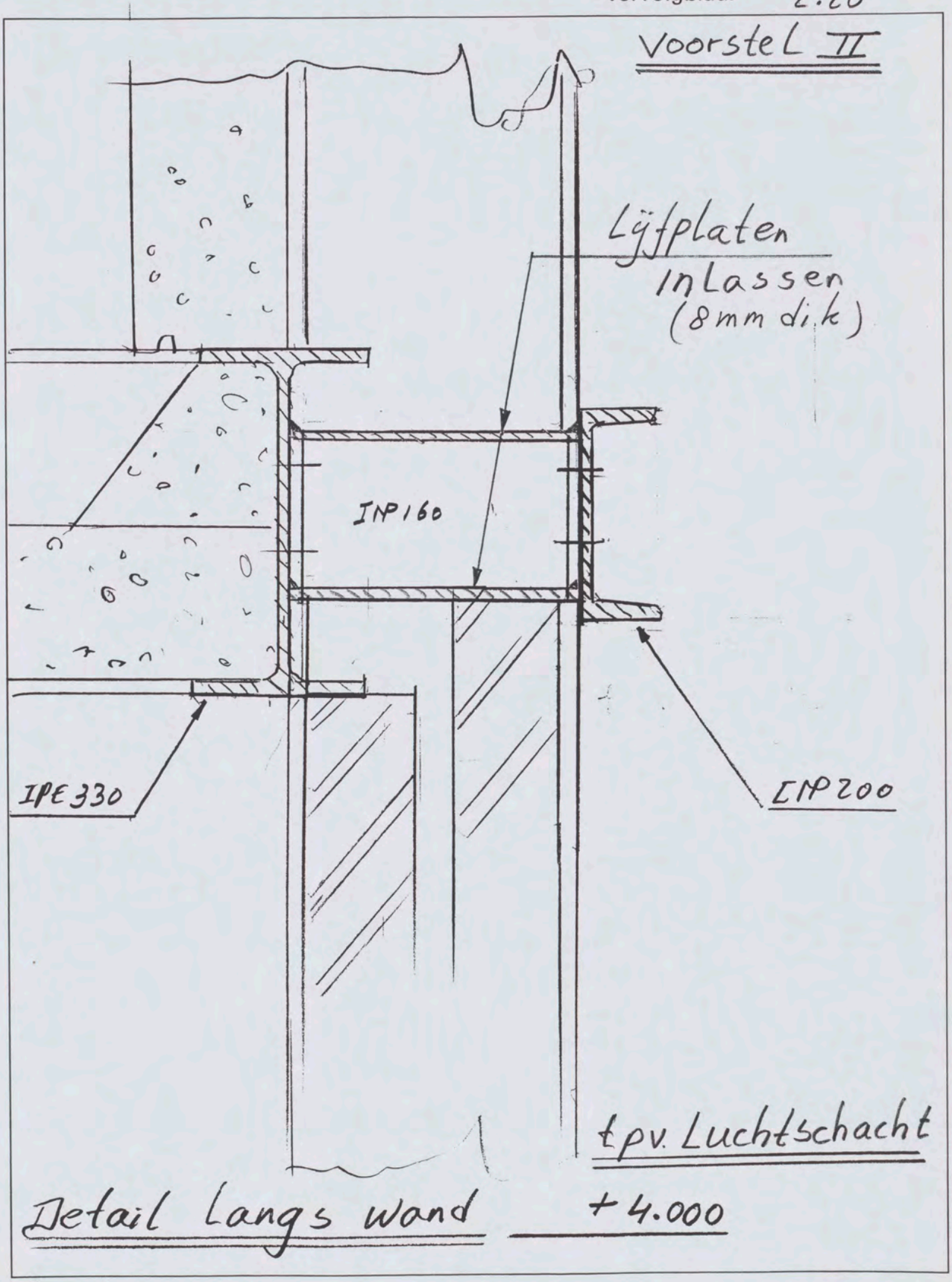
Vervolgblad: 2.19



91.156

Vervolgblad: 2.20

Voorstel II



t.p.v. Luchtschacht

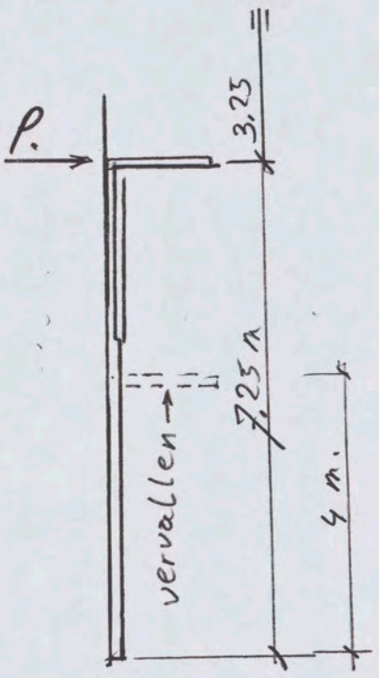
Detail langs wand

+4.000

91.156

Belasting op ring + 7.250 (per kolom.)

hoh. = 6 m



P. bestaand:

$\frac{10,5-4}{2} \times 6 \times 1,2 \times 0,88 =$

$= 20,6$ kN

P. extra.

1V m. vervallen kraans + 4.000

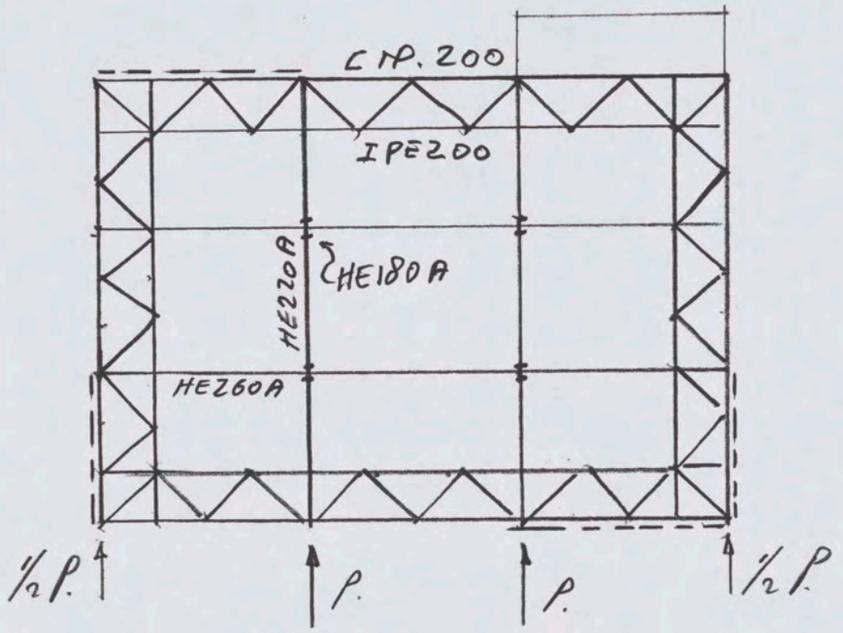
P. extra.

$\left(\frac{7,25}{2} - \frac{3,25}{2}\right) \times 6 \times 1,2 \times 0,71 =$

$= 10,3$ kN

toename 50%

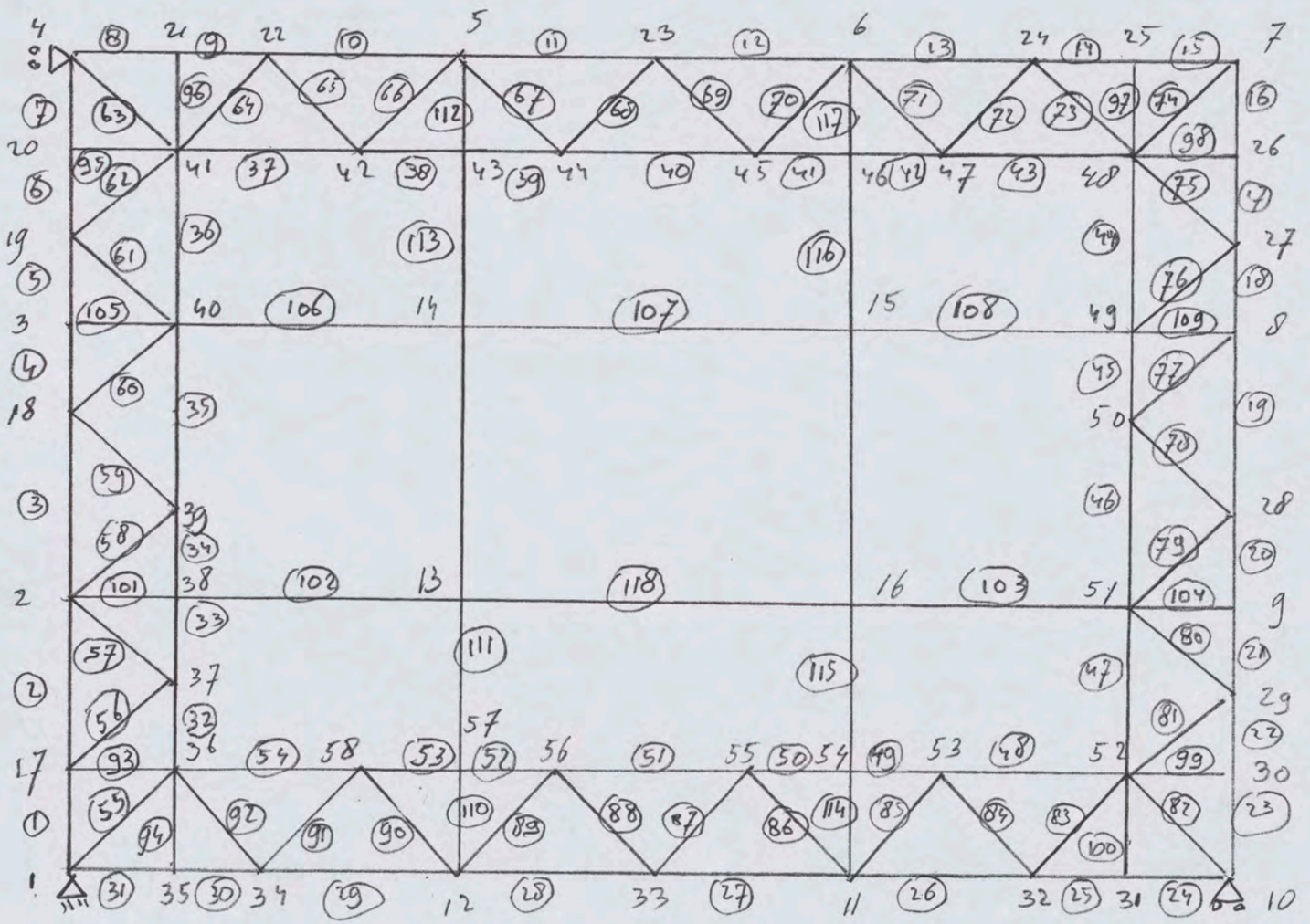
krans +7.250 (vloervlak)
krans voor/achter werken samen



Omdat balken in vloervlak doorlopen werken voor en achter vakwerk samen.

$P_r = 20,6 + 10,3 = 30,9$ kN rep

zie comp. berekening bijlage I
krans accoord

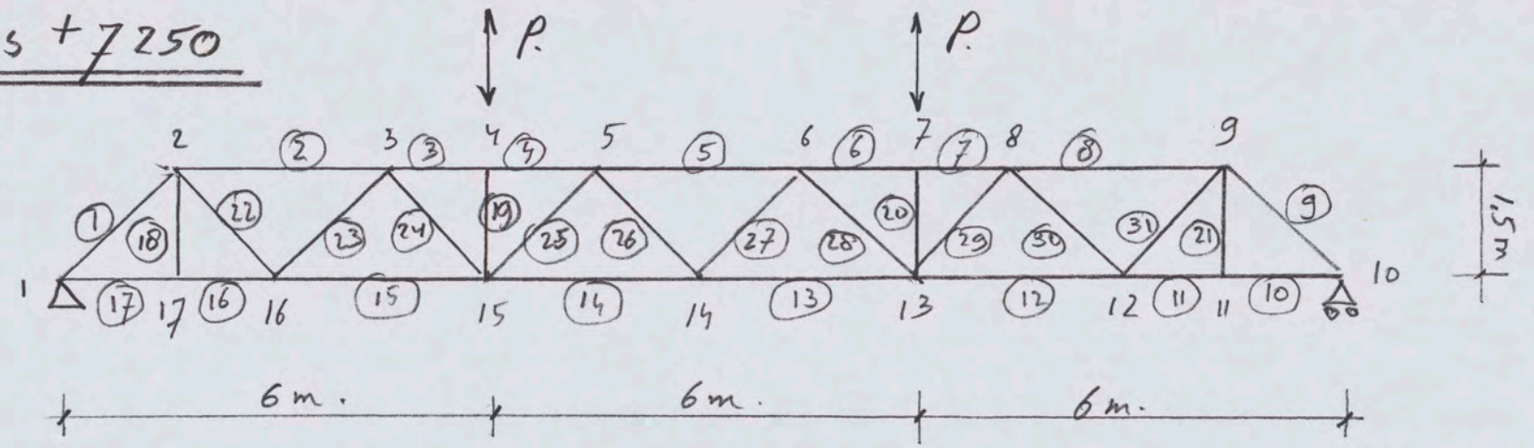


stab. krans +7.250

Vervolgblad: 2.23.

91.156

krans +7250



P. rep = 30,9 kN. zie blad 2.22

zie comp. berekening bijlage II

krans accoord

Bordes Ligger stab. krans +7250

Vervolgblad: 2.24

91.156

Vervolgblad: 3.0

shell Intern. chem. bv Amsterdam

statische berekening geb. 11C

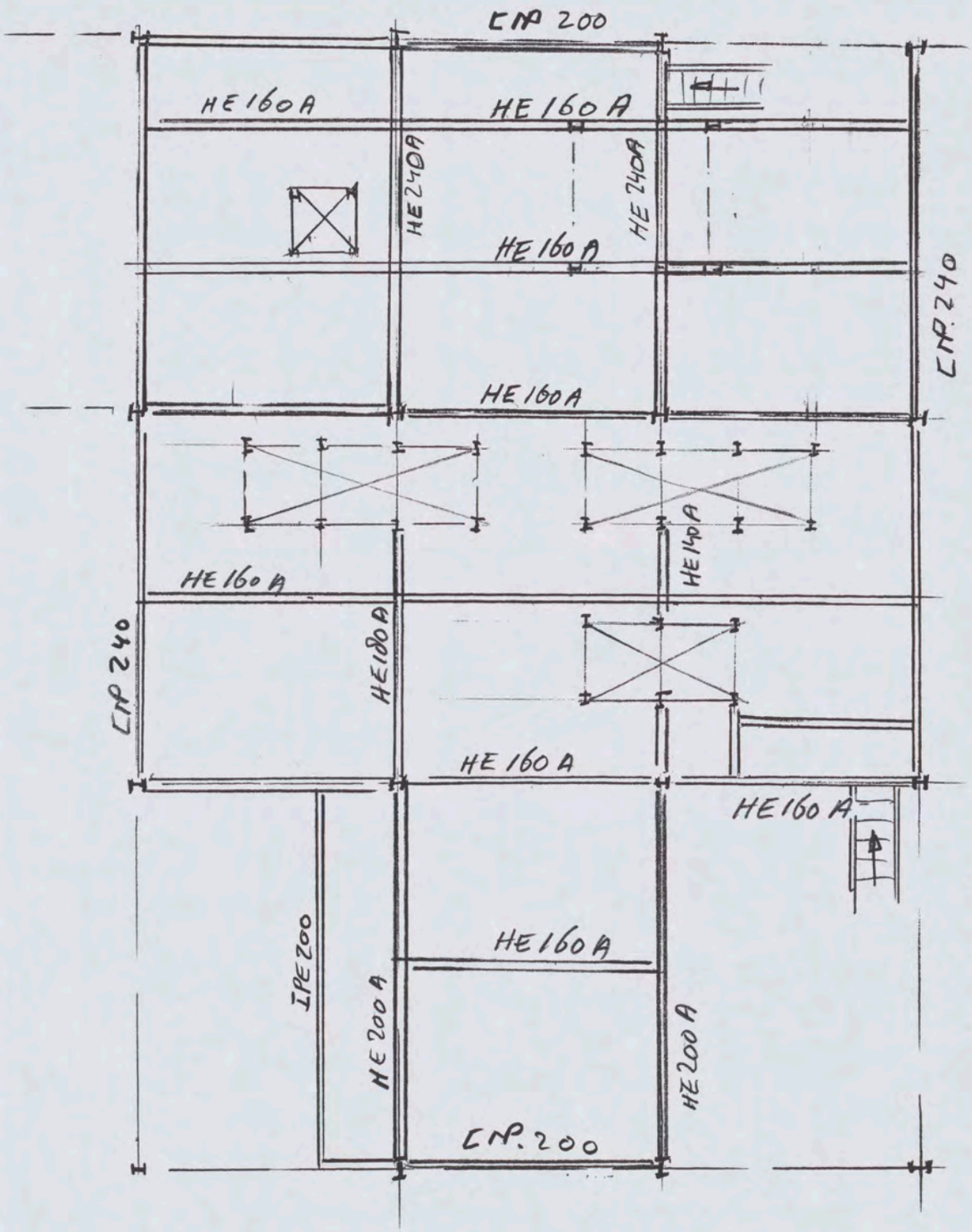
vloer + 2.400

vloer + 4.800

Vervolgblad: 3.1

Hall 11C vloer + 2400

hoofd balken

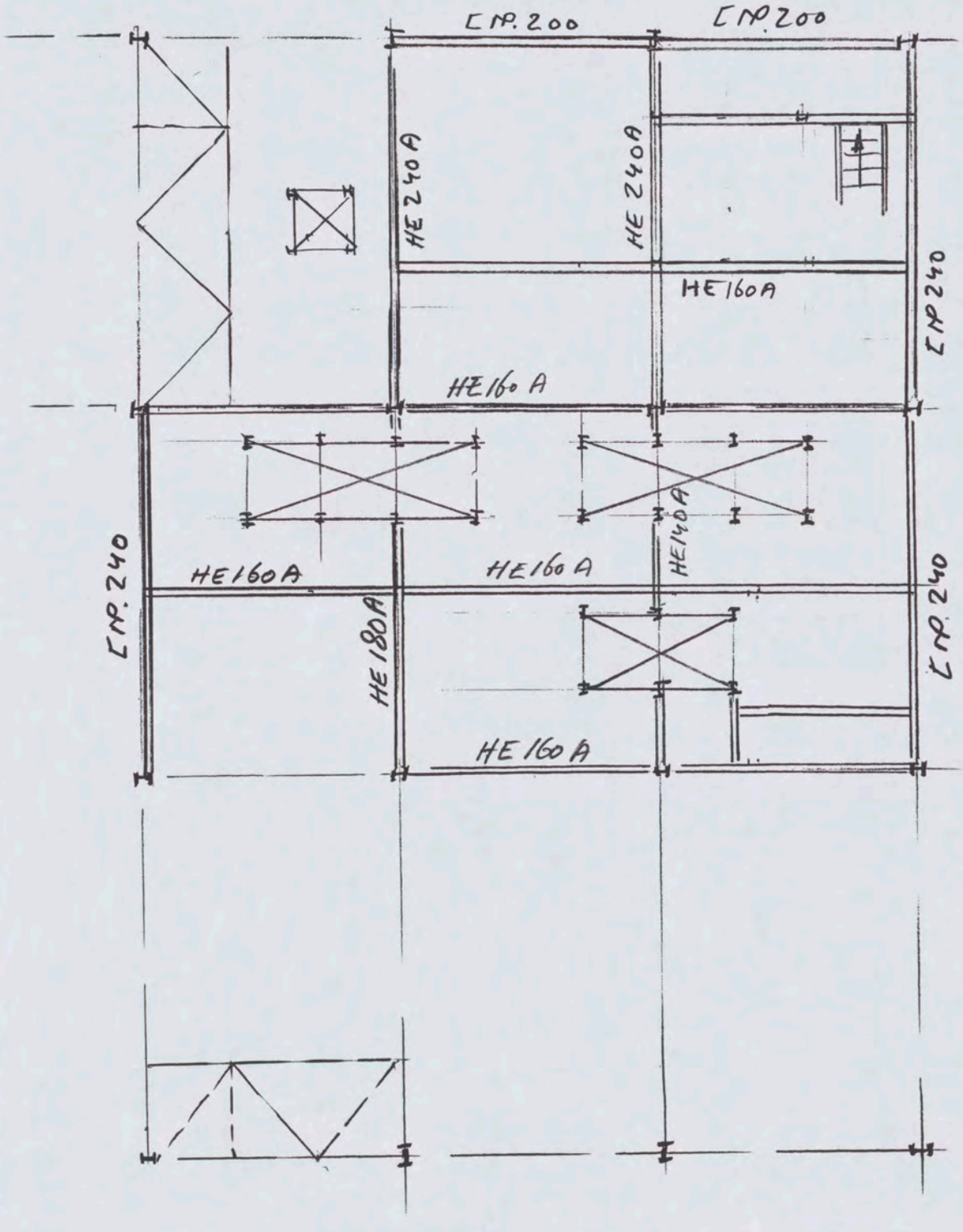


91.156

Vervolgblad: 3.2

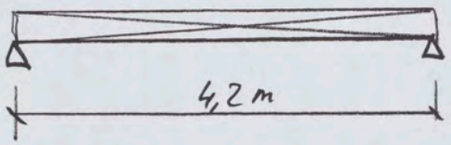
Hall 11C vloer + 4800

hoofdbalken



91.156

vloerbalk



hoh. = 3 m

q e.g. = 3 × 1 = 3 kN/m'

q nlb = 3 × 2,5 = 7,5 kN/m

doorbuiging u max : 1/350 = 12 mm

$I_{ben} = \frac{4,2^3}{12}\left[6,2 \times (3+7,5) \times 4,2\right] = 1688\ cm^4$

neem HE 160 A $I_x = 1673\ cm^4$

$M_d = 1/8 \times 1,2 \times 3 \times 4,2^2 + 1/8 \times 1,5 \times 7,5 \times 4,2^2 =$

$M_d = 7,938 + 24,81 = 32,7443$ kN.m.

$\sigma_{id} = \frac{32,7443 \times 10^6}{220 \times 10^3} = 149\ N/mm^2 < 235$

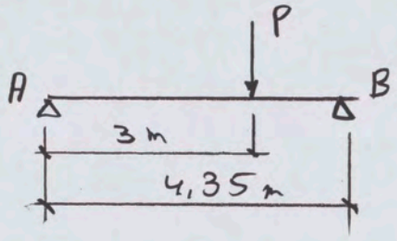
$\mu_c = 0,64$

Indien IPE 200 $I_x = 1943\ cm^4$

R = 22,1 kN

R;d = 31,2 kN

Vloerbalk



$P_{e.g.} = 3 \times 4,2 \times 1 = 12,6$ kN

$P_{Nb} = 3 \times 4,2 \times 2,5 = 31,5$ kN

Indien HE 160 A

$u = \frac{4,35^3}{1673}\left[8,2 \times (12,6 + 31,5)\right] = 17,8$ mm $= 1/244\ l$

neem HE 180 A $I_x = 2510$ cm^4

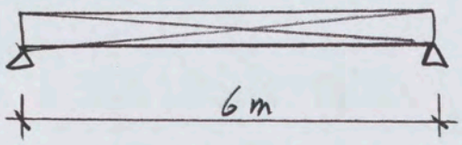
doorbuiging $u = 11,87$ mm $= 1/367\ l.$

$R_A = 13,7$ kN $\quad R_{A;d} = 19,4$ kN

$R_B = 30,5$ kN $\quad R_{B;d} = 43$ kN

Vervolgblad: 3.5

Vloerbalk



hoh. 2,1 m.

$q_{e.g.} = 2{,}1 \times 1 = 2{,}1$ kN/m'

$q_{Nb.} = 2{,}1 \times 2{,}5 = 5{,}25$ kN/m'

Indien HE 200 A

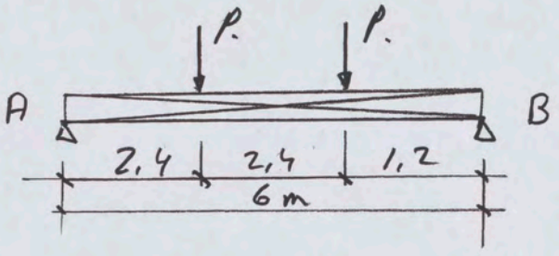
$$u = \frac{6^3}{36 g_2}\left[6{,}2 \times (2{,}1 + 5{,}25) \times 6\right] = 16 \text{ mm}$$

$= 1/375$ l.

$R_{.} = 22{,}05$ kN.

$R;d = 31{,}2$ kN.

Vloerbalk



$P_{e.g.} = 2,4 \times 4,2 \times 1 = 10,08\ kN$

$P_{Nb.} = 2,4 \times 4,2 \times 2,5 = 25,2\ kN.$

neem HE 240 A

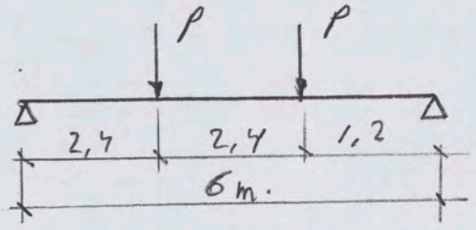
$$u. = \frac{6^3}{7763}\left[9,5 \times (10,08+25,2) + 5,6 \times (10,08+25,2)\right] = 14,8\ mm.$$

$$= 1/405\ \ell.$$

$R.A = 28,8\ kN$ $\quad R.A;d = 39,9\ kN.$

$R.B = 42,3\ kN$ $\quad R.B;d = 59,9\ kN.$

vloerrandbalk $l. = 6\ m$



$P_{e.g.} = 10{,}08/2 = 5\ kN$

$P_{Nb} = 25{,}2/2 = 12{,}6\ kN$

max. doorbuiging $1/400\ l = 15\ mm.$

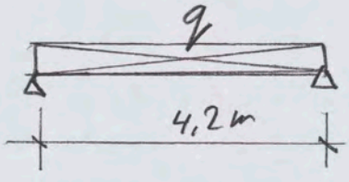
$$I_{ben} = \frac{6^3}{15}\left[9{,}5\,(5+12{,}6) + 5{,}6\,(5+12{,}6)\right] = 3827\ cm^4$$

neem INP. 240 $I_x = 3600\ cm^4$

$R. = 17{,}6\ kN$ $R;d = 24{,}9\ kN.$

vloerrandbalk $L = 4{,}2\ m$

draagende breedte 1,5 m



$q_{e.g.} = 1{,}5 \times 1 = 1{,}5\ kN/m'$

$q_{Nb} = 1{,}5 \times 2{,}5 = 3{,}75\ kN/m'$

stel doorbuiging $u = 10\ mm$

$$I_{ben} = \frac{4{,}2^3}{10}\left[6{,}2 \times 5{,}25 \times 4{,}2\right] = 1013\ cm^4$$

neem praktisch INP. 200

$R. = 11\ kN$ $R;d = 16{,}55\ kN.$