Possible Answers Feb/Mar 2005

702-2/0 W

Moontlike Antwoorde

GAUTENG DEPARTMENT OF EDUCATION/*GAUTENGSE DEPARTEMENT VAN ONDERWYS*

SENIOR CERTIFICATE EXAMINATION/*SENIORSERTIFIKAAT-EKSAMEN*

BUILDING CONSTRUCTION SG/ BOUKONSTRUKSIE SG

QUESTION/*VRAAG* 1

1.1 Safety precautions/*Veiligheidsmaatreëls*
Scaffolding/*Steiers*

- Scaffolds must be erected by an expert.
- *Steiers moet deur 'n kenner opgerig word.* (2)

- Wood for scaffolding must be clean sawn and not painted to cover defects.
- *Hout vir steierwerk moet skoon gesaag wees en nie geverf word om swak plekke te bedek nie.* (2)

- Scaffold boards must be secured properly to prevent them from sliding.
- *Steierplanke moet stewig vas wees om verskuiwing te voorkom / te voorkom dat dit gly.* (2)

- Scaffold boards must overlap on the putlogs to prevent falls.
- *Steierplanke moet by kortelinge oorvleuel om valle te voorkom.* (2)

- The surface of the boards must be kept dry. Dampness can cause slippery conditions.
- *Steiers moet droog gehou word. Nattigheid kan blibberige toestande veroorsaak.* (2)

- Scaffolding must not be overloaded.
- *Steiers mag nie oorlaai word nie.* (2)

- There must be no loose bricks or tools lying around the working area.
- *Geen los stene of gereedskap mag in die werksgebied rondlê nie.* (2)

- Scaffolding must be bold and strong, not to sway.
- *Steiers moet stewig en sterk wees sodat dit nie wieg nie.* (2)

- Scaffolding must be erected as near to a wall as possible.
- *Steiers moet so na as moontlik aan die muur opgerig word.* (2)

- Scaffolding must have base plates.
- *Steierpale moet van voetplate voorsien wees.* (2)

(**Any / *Enige***) 5x2=(10)

1.2
- All work on the sewerage system complies with the regulations.
- *Dat alle rioleringswerk aan die regulasies voldoen.*

- Cleaning eyes should be installed at each branching off.
- *Steekoë moet by elke vertakking aangebring word.*

- A ventilation pipe must be installed at the highest or furthest point of the system.
- *'n Ontlugpyp moet op die hoogste of verste punt geïnstalleer word.*

- Drains must have the correct gradient.
- *Riole moet die regte val hê.*

- Must be laid straight from one point to the other.
- Moet van punt tot punt reguit gelê wees.

- Stench traps must be installed where waste water enters the drain.
- *Stankafsluiters moet geïnstalleer word waar vuilwater die riool binnegaan.*

- The whole system must be water- and airtight.
- *Die hele stelsel moet water- en lugdig wees.*

- All drain pipes must be put on a solid concrete base, to prevent them from sagging or breaking.
- *Alle rioolpype moet op 'n soliede basis gelê word om te verhoed dat die pype breek of sak.*

- The system must be of such a nature that all sewerage will flow away easily.
- Die stelsel moet van so 'n aard wees dat rioolvuil maklik wegvloei.

- Rather avoid placing drain pipes underneath a building. Where it is not possible, drain pipes must be placed in concrete.
- *Vermy waar moontlik om rioolpype onder 'n gebou te plaas. Indien onvermydelik, moet die rioolpype in beton geplaas word.* 5x2=(10)

1.3 Site plan/*Terreinplan*

- The north point
- *Die noordekant*

- Any servitudes
- *Enige servitute*

- Building lines
- *Boulyne*

- Sewerage plans
- *Rioolplanne*

- Placing of building
- *Plasing van gebou*

(14)

1.4 Dumpy level/*Bukswaterpas*

- To measure horizontal heights
- *Om horisontale hoogtes te meet*

- To measure vertical heights
- *Om vertikale hoogte te meet*

- To measure horizontal angles
- *Om horisontale hoeke te meet*

(6)

1.5
- No change of direction underneath the building
- Mag nie onder die gebou van rigting verander nie

- An access opening should be installed on both sides where the sewer enters under the building, and at the point of exit.
- *'n Toegangsopening moet aan beide kante, waar die riool onder die gebou in- en uitgaan, aangebring word.*

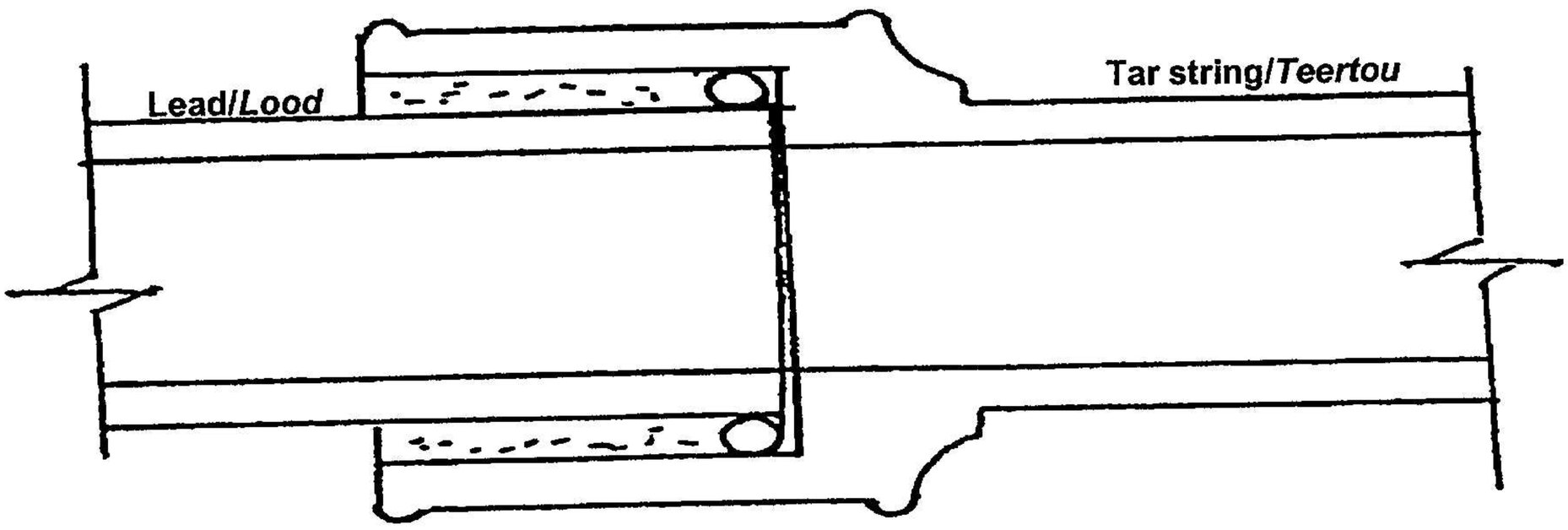
- No connections must be made under the building.
- *Geen aansluitings mag onder die gebou gemaak word nie.*

- The sewer should be laid at least 50 mm from the foundation.
- Die riool moet minstens 50 mm weg van die fondasie gelê wees.

- It is preferable to use heavy cast iron pipes.
- *By voorkeur moet van swaar gietysterrioolpype gebruik gemaak word.*

- Where permission is granted to use earthen pipes, the whole sewer must be boxed.
- *Waar toestemming verleen is vir die gebruik van erderioolpype, moet die hele pyp in bekisting gelê wees.*

1.6



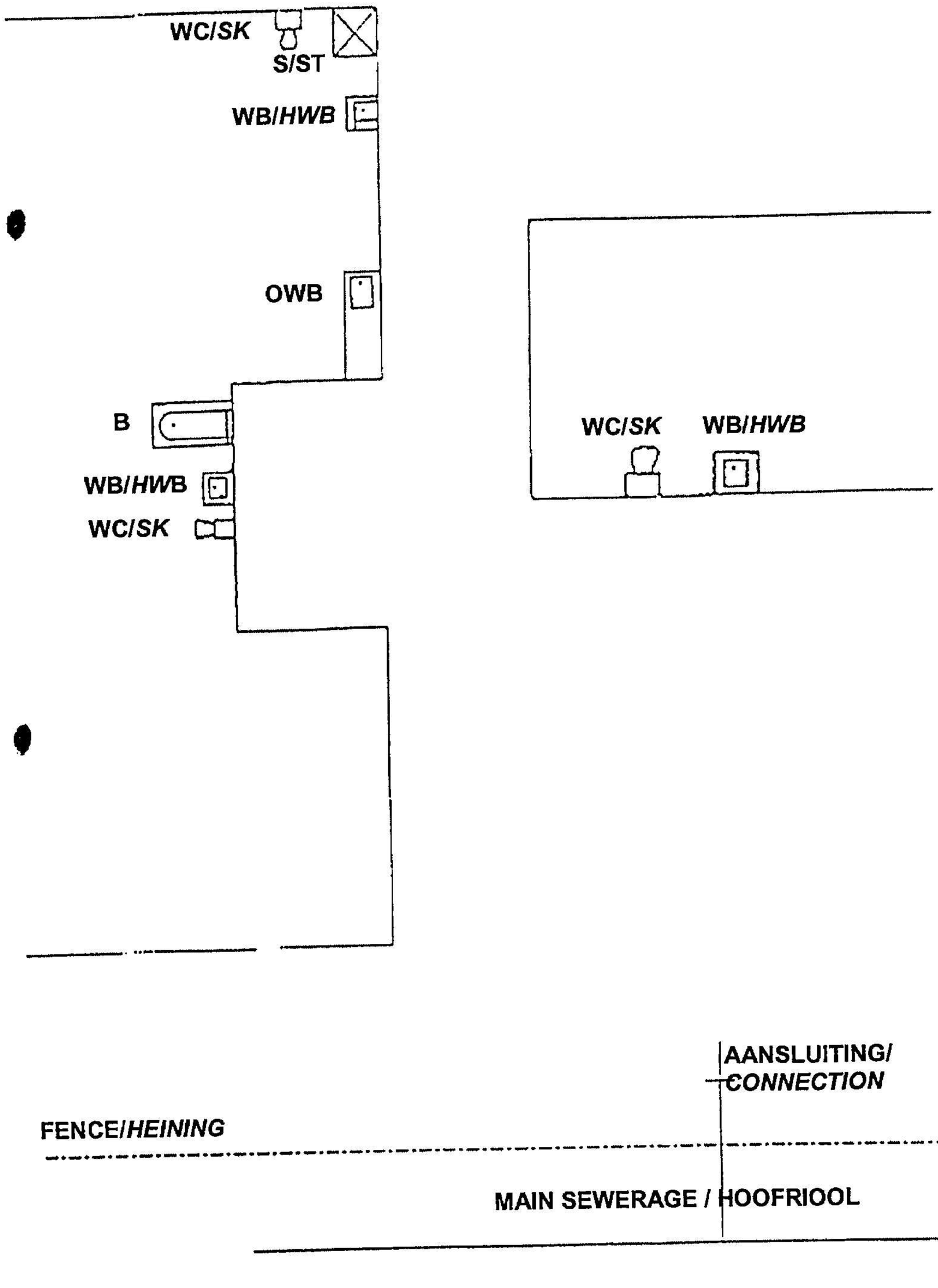
Joint between two cast-iron sewerage pipes/*Las tussen twee gietysterrioolpype*

(10)
[60]

QUESTION/*VRAAG 2*

2.1

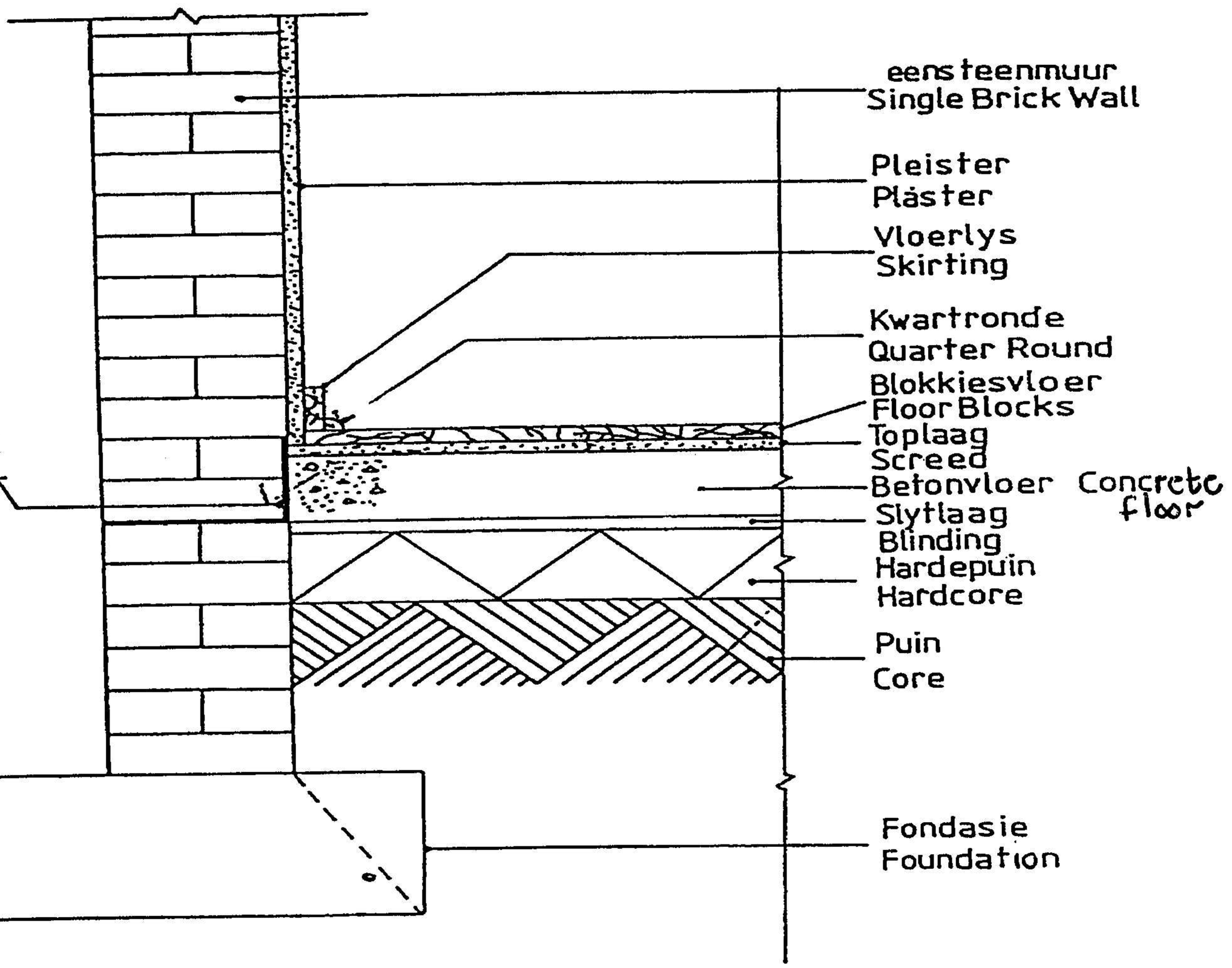
GEDEELTE VAN 'n PLAN VAN 'n WOONHUIS MET 'n BUITEGEBOU



(20)

2.2	One brick wall foundation		*Eensteenfondasiemuur konstruksie*
	Concrete foundation strip	1	*Betonfondasiestrook*
	Foundation wall	1	*Fondasiemuur*
	Core filling	1	*Puinvulling*
	Hard core	1	*Hardepuin*
	Ground level	1	*Grondvlak*
	Blinding	1	*Slytlaag*
	Screed	1	*Toplaag*
	Damp proof	2	*Vogweerlaag*
	Floor blocks	1	*Blokkiesvloer*
	Quarter round	1	*Kwartrond*
	Skirting	1	Vloerlys
	Outer wall	1	*Buitemuur*
	Plaster	1	*Pleister*
	Linework	2	*Lynwerk*
	Labelling	2	*Byskrifte*
	Neatness	2	*Netheid*
		20	

One brick wall foundation/*Eensteenfondasiemuur konstruksie*

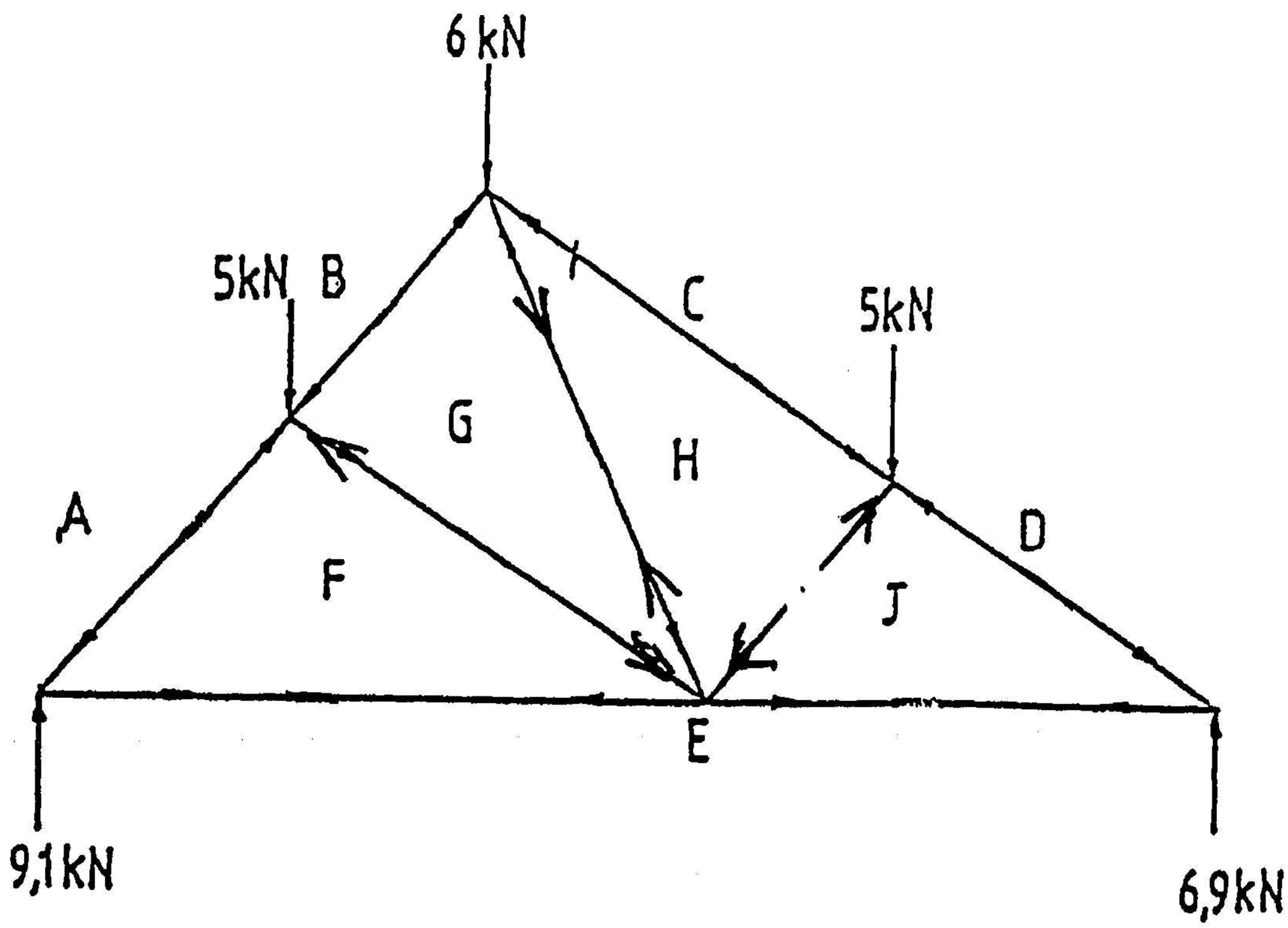


(20)

2.3	2.3.1	Red/*Rooi*	
	2.3.2	Brown/*Bruin*	
	2.3.3	Blue/*Blou*	
	2.3.4	Black/*Swart*	
	2.3.5	Green/*Groen*	5x2=(10)
2.4	2.4.1	Waste vent pipe/*Vuilwaterpyp*	
	2.4.2	Shower/*Stort*	
	2.4.3	Urinal/*Urinaal*	
	2.4.4	Inspection eye/*Inspeksie-oog*	
	2.4.5	Inspection chamber/*Inspeksiekamer*	5x2=(10)
			[60]

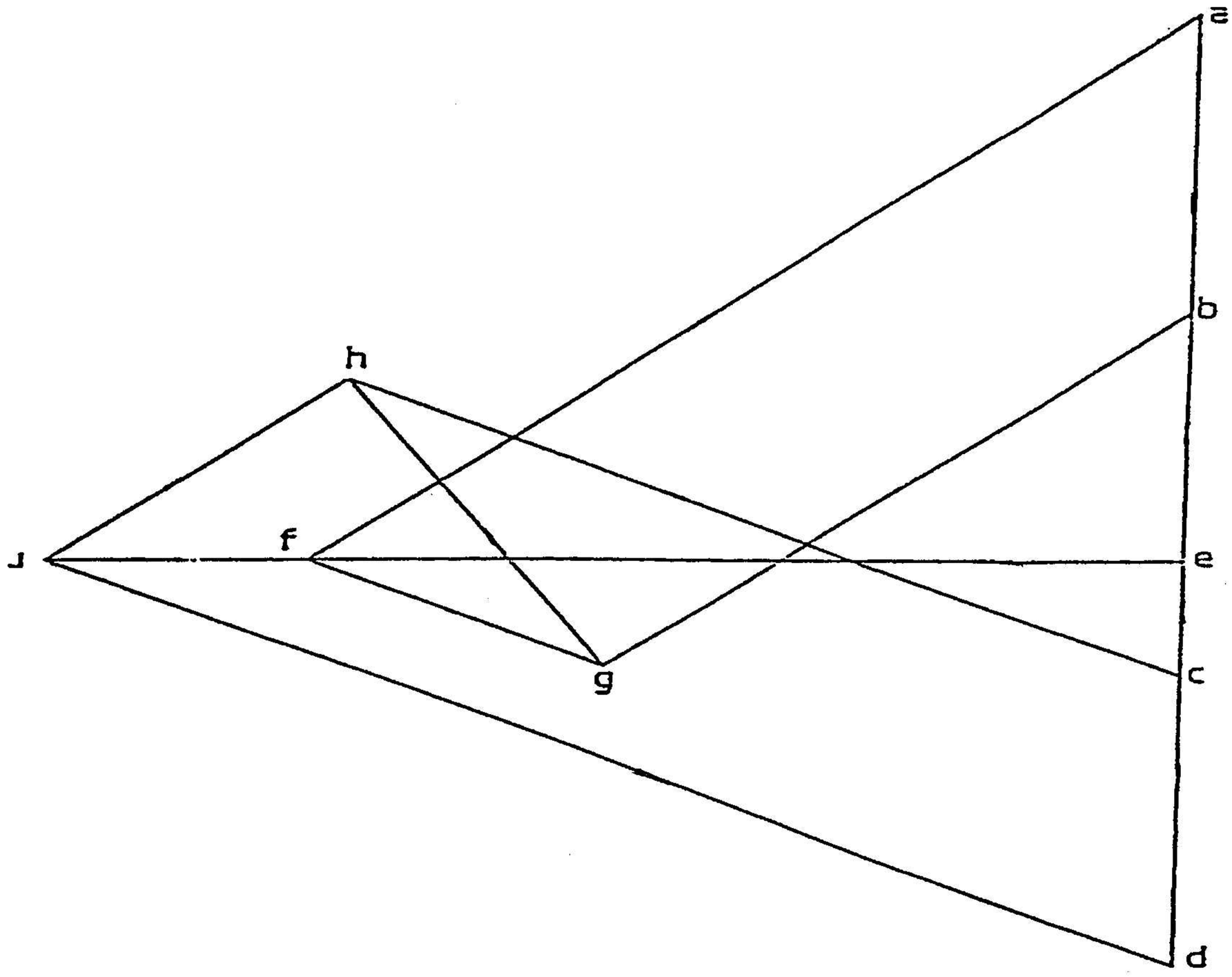
QUESTION/*VRAAG 3*

3.1



Scale:
Skaal:

3.2



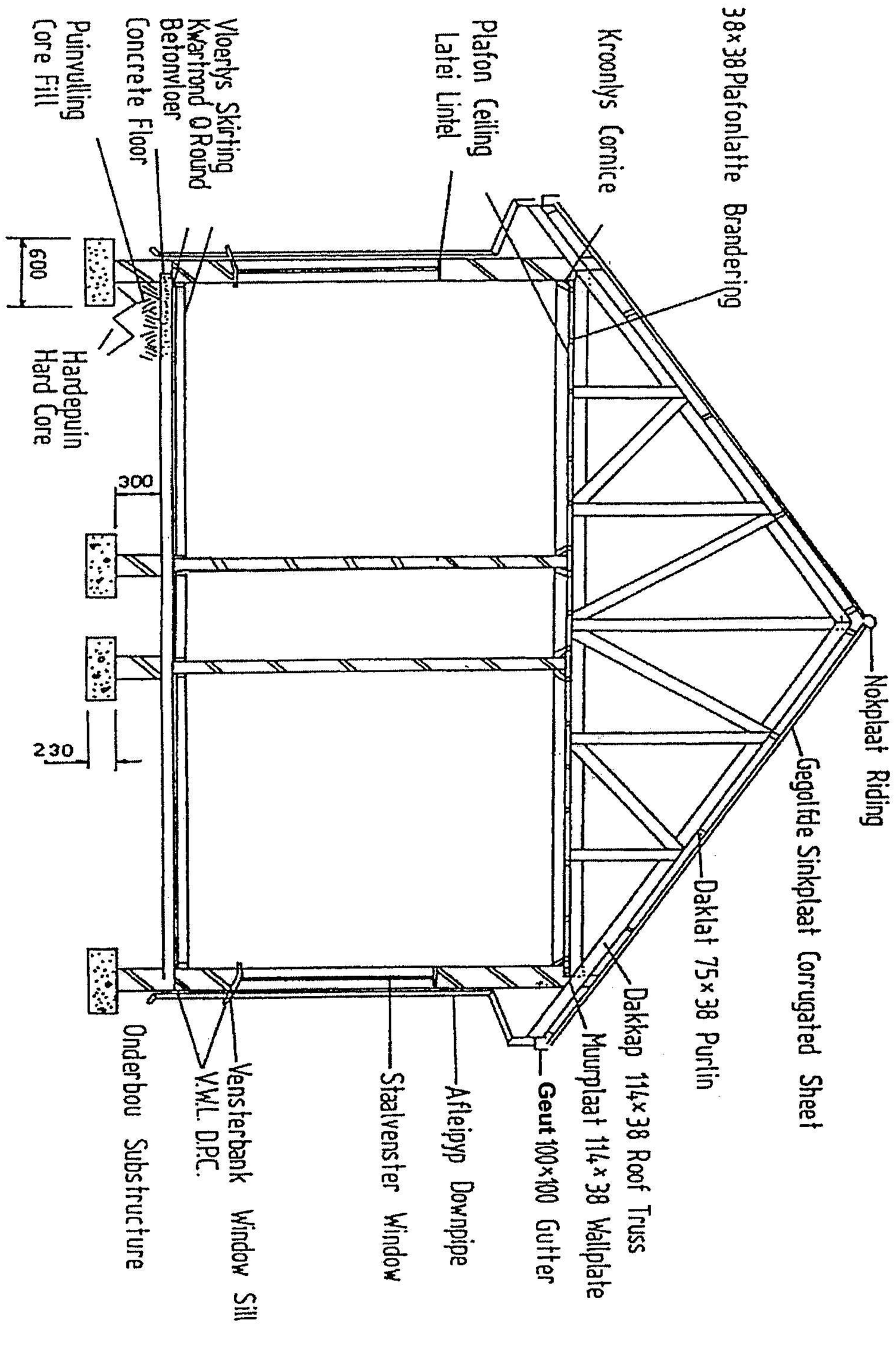
3.3

Member/*Onderdeel*	Magnitude/*Grootte*	Nature/*Aard*
JE	11,7kN	Tie/*Stang*
AF	72,8kN	Strut/*Stut*
HJ	4,2 kN	Strut/*Stut*
BG	8,2 kN	Strut/*Stut*
GH	5,5 kN	Tie/*Stang*
CH	10,0kN	Strut/*Stut*
DJ	13,5kN	Strut/*Stut*
FE	9,1 kN	Tie/*Stang*
GF	3,5 kN	Strut/*Stut*

[60]

QUESTION/*VRAAG 4*

Foundations	2	*Fondasie*
Substructure	2	*Onderbou*
Superstructure	2	*Bobou*
Hard core	2	*Hardepuin*
Core filling	2	*Puinvulling*
Floor	2	*Vloer*
DPC	2	*VWL*
Skirting	2	*Vloerlys*
Quarter round	2	*Kwartrond*
Window sill	2	*Vensterbank*
Window	2	*Venster*
Lintel	2	*Latei*
Outer walls	3	*Buitemure*
Inner walls	3	*Binnemuur*
Ceiling	2	*Plafon*
Cornice	2	*Kroonlys*
Brandering	2	*Plafonlatte*
Wall plate	2	*Muurplaat*
Roof construction	6	*Dakkonstruksie*
Overhang	4	*Oorhang*
Roof covering	2	*Dakbedekking*
Line work	2	*Lynwerk*
Labelling	2	*Byskrifte*
Gutters	2	*Geute*
Down pipes	2	*Afleipype*
Scale	2	*Skaal*
	60	



Skaal 1:50
Scale

[60]

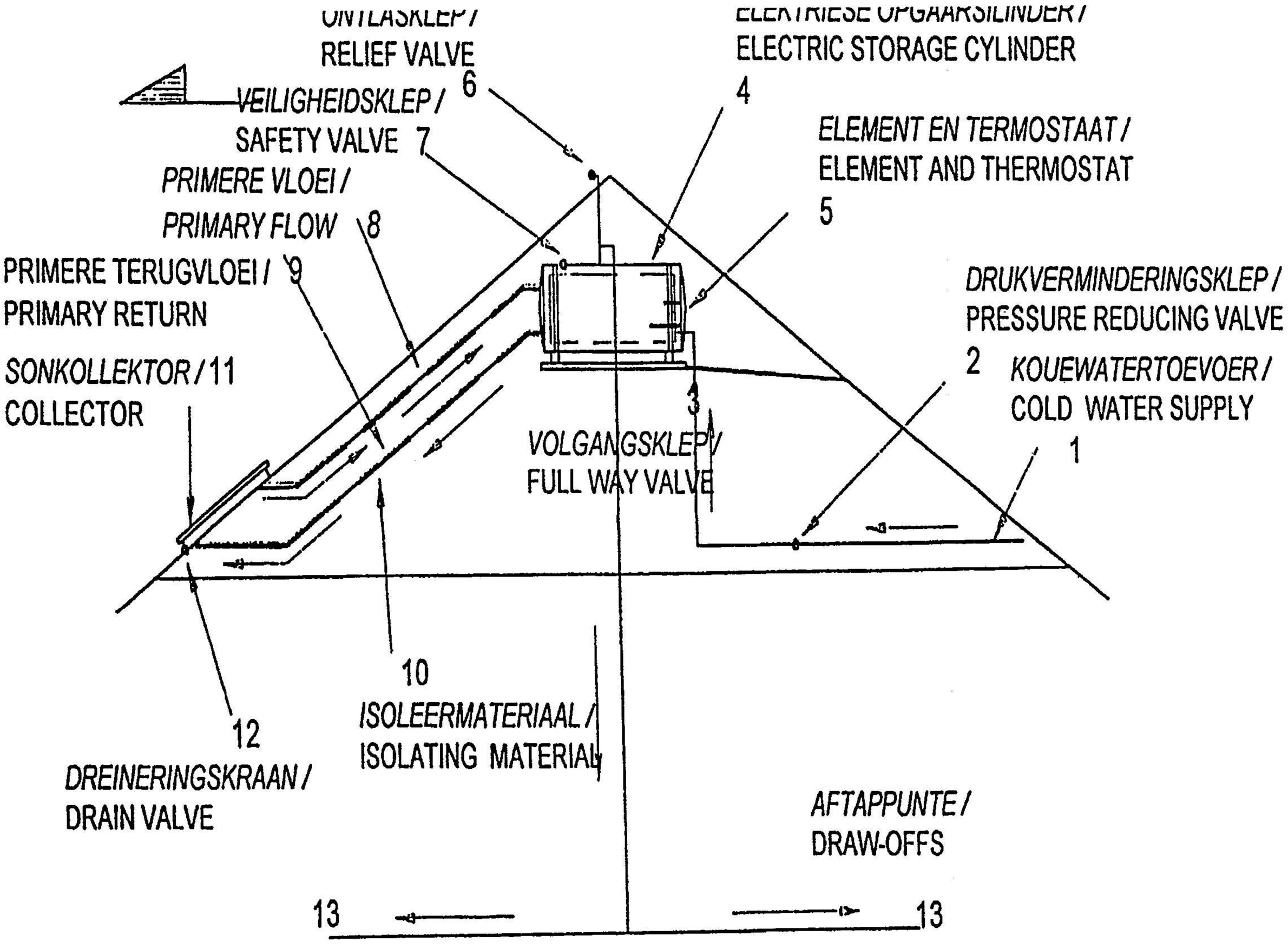
QUESTION/*VRAAG* 5

5.1 Solar water heating/*Sonwatervehitting*

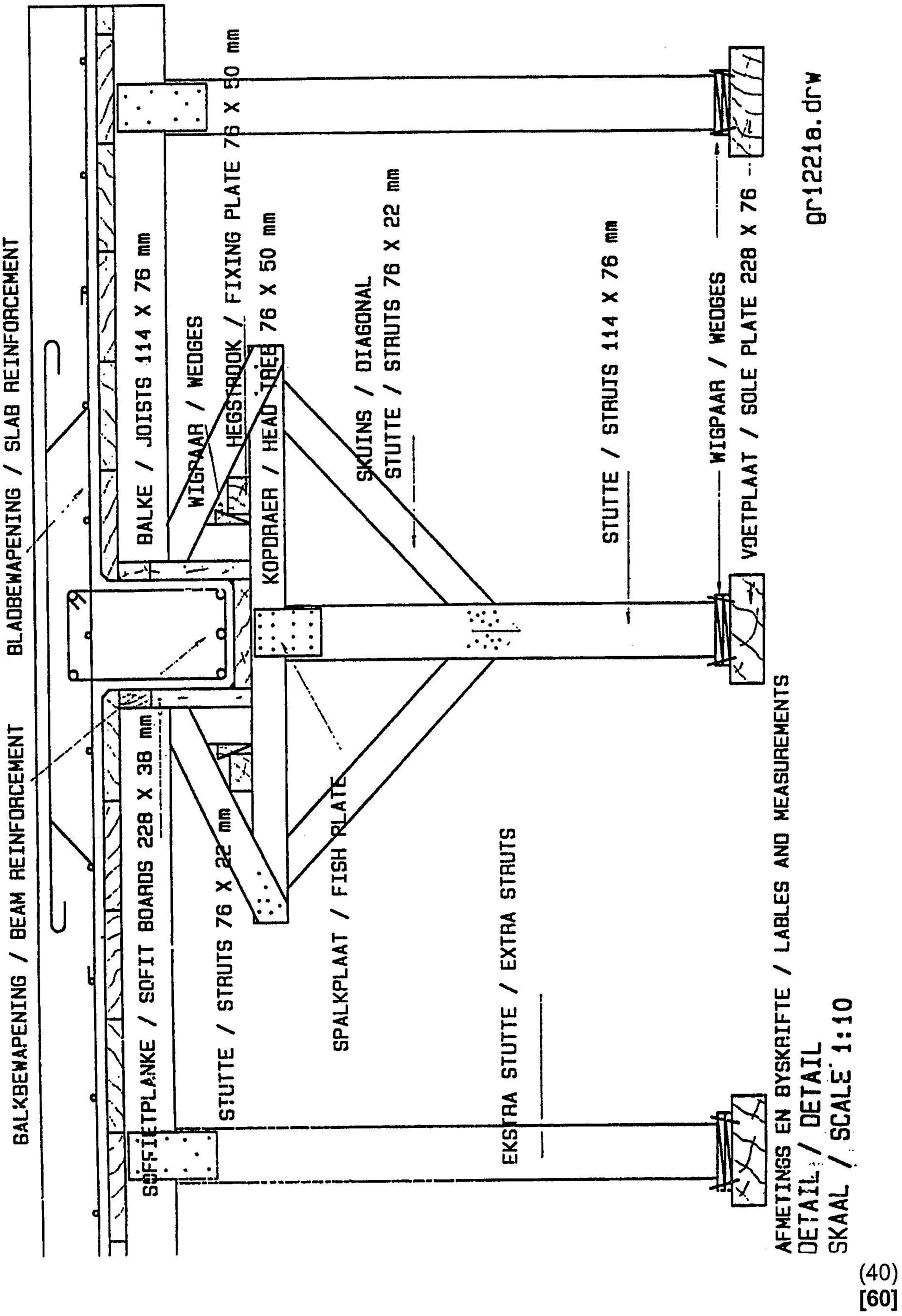
Cold water supply/*Kouewatertoevoer*	(1)
Pressure reducing valve/*Drukverminderingsklep*	(1)
Full way valve/*Volgangklep*	(1)
Electric storage cylinder/*Elektriese opgaarsilinder*	(2)
Element and thermostat/*Element en termostaat*	(2)
Relief valve/*Ontlasklep*	(1)
Safety valve/*Veiligheidsklep*	(1)
Primary flow/*Primêre vloei*	(1)
Primary return/*Primêre terugvloei*	(2)
Isolating material/*Isoleermateriaal*	(2)
Solar collector/*Sonkollektor*	(1)
Drain valve/*Dreineringskraan*	(1)
Draw-offs/*Aftappunte*	(1)
North/*Noord*	(1)
Arrows for flow/*Pylpunte vir vloei*	(2)

5.2 Formwork beam and floor/*Balk en vloer bekisting*

Beam	2	*Balk*
Floor	2	*Vloer*
Decking	4	*Bladbekisting*
Bearers	2	*Drabalke*
Battens	2	*Jukke*
Cleats	2	*Klampe*
Fishplate	2	*Spalkplaat*
Diagonal struts	2	*Skuinsstutte*
Strut (gumpole)	4	*Stut (Gompaal)*
Wedges	2	*Wigpaar*
Sole plate	2	*Voetplaat*
Dimensions	4	*Afmetings*
Labelling	4	*Byskrifte*
Linework	2	*Lynwerk*
Neatness	2	*Netheid*
Scale	2	*Skaal*
	40	


ONTLASKLEP /
RELIEF VALVE
6
ELEKTRIESE OPGAARSILINDER /
ELECTRIC STORAGE CYLINDER
4
VEILIGHEIDSKLEP /
SAFETY VALVE 7
ELEMENT EN TERMOSTAAT /
ELEMENT AND THERMOSTAT
5
PRIMERE VLOEI /
PRIMARY FLOW 8
PRIMERE TERUGVLOEI / 9
PRIMARY RETURN
DRUKVERMINDERINGSKLEP /
PRESSURE REDUCING VALVE
2
KOUEWATERTOEVOER /
COLD WATER SUPPLY
1
SONKOLLEKTOR / 11
COLLECTOR
3
VOLGANGSKLEP /
FULL WAY VALVE
10
ISOLEERMATERIAAL /
ISOLATING MATERIAL
12
DREINERINGSKRAAN /
DRAIN VALVE
AFTAPPUNTE /
DRAW-OFFS
13
13

5.2


BLADBEWAPENING / SLAB REINFORCEMENT
BALKBEWAPENING / BEAM REINFORCEMENT
BALKE / JOISTS 114 X 76 mm
SOFFIETPLANKE / SOFIT BOARDS 228 X 38 mm
WIGPAAR / WEDGES
HEGSTROOK / FIXING PLATE 76 X 50 mm
KOPDRAER / HEAD JRÉE 76 X 50 mm
SKUINS / DIAGONAL STUTTE / STRUTS 76 X 22 mm
STUTTE / STRUTS 114 X 76 mm
SPALKPLAAT / FISH PLATE
EKSTRA STUTTE / EXTRA STRUTS
WIGPAAR / WEDGES
VOETPLAAT / SOLE PLATE 228 X 76 mm
AFMETINGS EN BYSKRIFTE / LABLES AND MEASUREMENTS
DETAIL / DETAIL
SKAAL / SCALE 1:10
gr1221a.drw

(40)
[60]

QUESTION/*VRAAG* 6

6.1 Drawing/*Tekening*

6.2 Calculate RR/*Bereken RR* (1)

LOM = ROM Moments to left = Moments to right
LOM = ROM Momente na links = Momente na regs (1)

Take moments about LR/*Neem momente om LR*

RR x 10 = (3 m x 10kN) + (6 m x 20kN)_ + (7m x 20kN) (1)

RR x 10 = 30 + 120 + 140

$RR = \frac{290}{10}$

RR = 29kN (5)

Calculate LR/*Bereken LR* (1)

Take moments about RR/*Neem momente om RR*

LR x 10 = (3 m x 20kN) + (4 m x 20 m) + (7 m x 10kN)) (1)
LR x 10 = 60 + 80 + 70 (1)
$LR \times 10 = \frac{210}{10}$ (1)

LR = 21kN (5)

Test/*Toets*

29 + 21 = 10 + 20 + 20 = 50 (2)

SF
SKa = 21kN (1)

SKb = 21kN (1)

SKb+ = 21 – 10 = 11kN (1)

SF
SKc = 21 – 10 = 11kN (2)

SF
SKd- = 21 – 10 – 10 = 1kN (2)

SF
SKd+ = 21 – 10 – 20 = -9kN (2)

SF
SKe = 21 – 10 – 20 – 20 = 29kN (3)

SF
SKf = 21 – 10 – 20 – 20 + -29 = 0 (3)
(15)

BM
BMa = 0 (1)

BMb = 21 x 3 = 63kN/M (1)

BMc = (21x5) – (2x10)
105 – 20 = 85kN/M (3)

BMd = (21x6) – (,5x10) – (3x10)
126 – 5 – 30 = 91kN/M (3)

BMc = (21 x 7) – (1x20) – (4x10)
147 – 20 – 40 = 87kN/M (3)

BMf = (21 x 10) – (3x20) – (4x20) – (7x10)
210-60-80-70 = 0kN/M (3)

QUESTION/*VRAAG 7*

A	B	C	D
			Substructure centre line / *Onderbou hartlyn*
			[2 x 17 000] = [34 000] mm
			[2 x 11 000] = [22 000] mm
			[56 000] mm
			Minus [4 x 330] = [1 320] mm = [54 680] mm
			The centre line is / *Die hartlyn is* [54,68] mm
			Height of substructure is 450 mm / *Hoogte van onderbou is 450 mm*
			50 bricks per square metre for a half-brick wall / *50 stene per vierkante meter vir 'n halfsteenmuur*
			There are [3] half-brick walls *Daar is [3] halfsteenmure*
1/	[54,68] [0,45] [24,606]	[24,606]	
[3 /]	[24,606] [50] [1230,3]		[3690,9] bricks are required *[3690,9] stene word benodig*
			Superstructure centre line / Bobou hartlyn
			2 x 17 000 = 34 000 mm
			2 x 11 000 = 22 000 mm
			56 000 mm
			Minus [4 x 220] = [880] mm = [55120] mm
			The centre line is / *Die hartlyn is* [55,12] mm
			Height of superstructure is [2900] mm *Hoogte van bobou is [2900] mm*
			50 bricks per square metre for a half-brick wall / *50 stene per vierkante meter vir 'n halfsteenmuur*
			There are [2] half-brick walls *Daar is [2] halfsteenmure*
1/	[55,12] [2,9] [159,848]	[159,848]	
[2 /]	[159,848] [5] [7992,4]		[15984,8] bricks are required *[15984,8] stene word benodig*

			Beam filling centre / *Balkvulling hartlyn*
			2 x 17 000 = 34 000 mm
			2 x 11 000 = 22 000 mm
			56 000 mm
			Minus [4 x 110] = [440] mm = [55560] mm
			The centre line is / *Die hartlyn is* [55,56] mm
			Height of beam filling is 225 mm *Hoogte van balkvulling is 225 mm*
			50 bricks per square metre for a half-brick wall *50 stene per vierkante meter vir 'n halfsteenmuur*
			There are [/] half-brick walls *Daar is [/] halfsteenmure*
1/	[55,56] [0,225] [12,501]	[ ]	
1/	[12,501] [50] [625,05]		[625,05] bricks are required *[625,05] stene word benodig*
			Total for structure without deductions / *Totaal vir struktuur sonder aftrekkings*
			Substructure / *Onderbou* [3690,9]
			Superstructure / *Bobou* [15984,8]
			Beam filling / *Balkvulling* [625,05]
			[20300,75] Bricks / *Stene*
			Deductions / *Aftrekkings*
			Doors / *Deure*
			[2] x 2 x 1
			50 bricks per square metre for a half-brick wall / *50 stene per vierkante meter vir 'n halfsteenmuur*
			There are [2] half-brick walls *Daar is [2] halfsteenmure*
2/	[2] [1] [4]	[ ]	
[2 /]	[4] [50] [200		There are [400] bricks *Daar is [400] stene*

			Windows / *Vensters*
			[5] x 2 x 1,5
			50 bricks per square metre for a half-brick wall / *50 stene per vierkante meter vir 'n halfsteenmuur*
			There are 2 half-brick walls / *Daar is 2 halfsteenmure*
[5 /]	[2] [1,5] [15]		
2/	[15] [50] [750]		There are [1500] bricks *Daar is [1 500] stene*
			Total deductions / *totale aftrekkings*
			Doors / *Deure* [400] Windows / *Vensters* [1500] [1900] Bricks / *Stene*
			Total bricks for structure / *Totale hoeveelheid stene vir die struktuur*
			Structure / *Struktuur* [20300,75] Deductions / *Aftrekkings* [1900] [18400,75]
			Plus 6% wastage / *vermorsing*
			[18 400,75] [0,06] x [1104,05] **[18400,75] [1104,05] + [19504,8]**
			[19 505] bricks will be required for the structure [19 505] *stene sal benodig word vir die struktuur*
			Foundation centre line A / *Fondasie hartlyn A*
			17 000 – 2/ 110 = 16 780 7 000 - 2/ 110 = 6 780 Floor thickness/Vloerdikte 75 mm
	[16,78] [6,78] [0,075] [8,53]		

			Foundation centre line B/*Fondasie hartlyn B*
			5 000 - 2/ 110 = 4 780 4 000 - 2/ 110 = 3 780 Floor thickness/*Vloerdikte 75 mm*
	[4,78] [3,78] [0,075] [1,36]		
			Total amount of concrete/ ***Totale hoeveelheid beton***
	[8,53] [1,36]+ [9,89]		[9,89] cubic metres of concrete will be required. [9,89] kubieke meter beton sal benodig word.

[60]

TOTAL / *TOTAAL* **300**