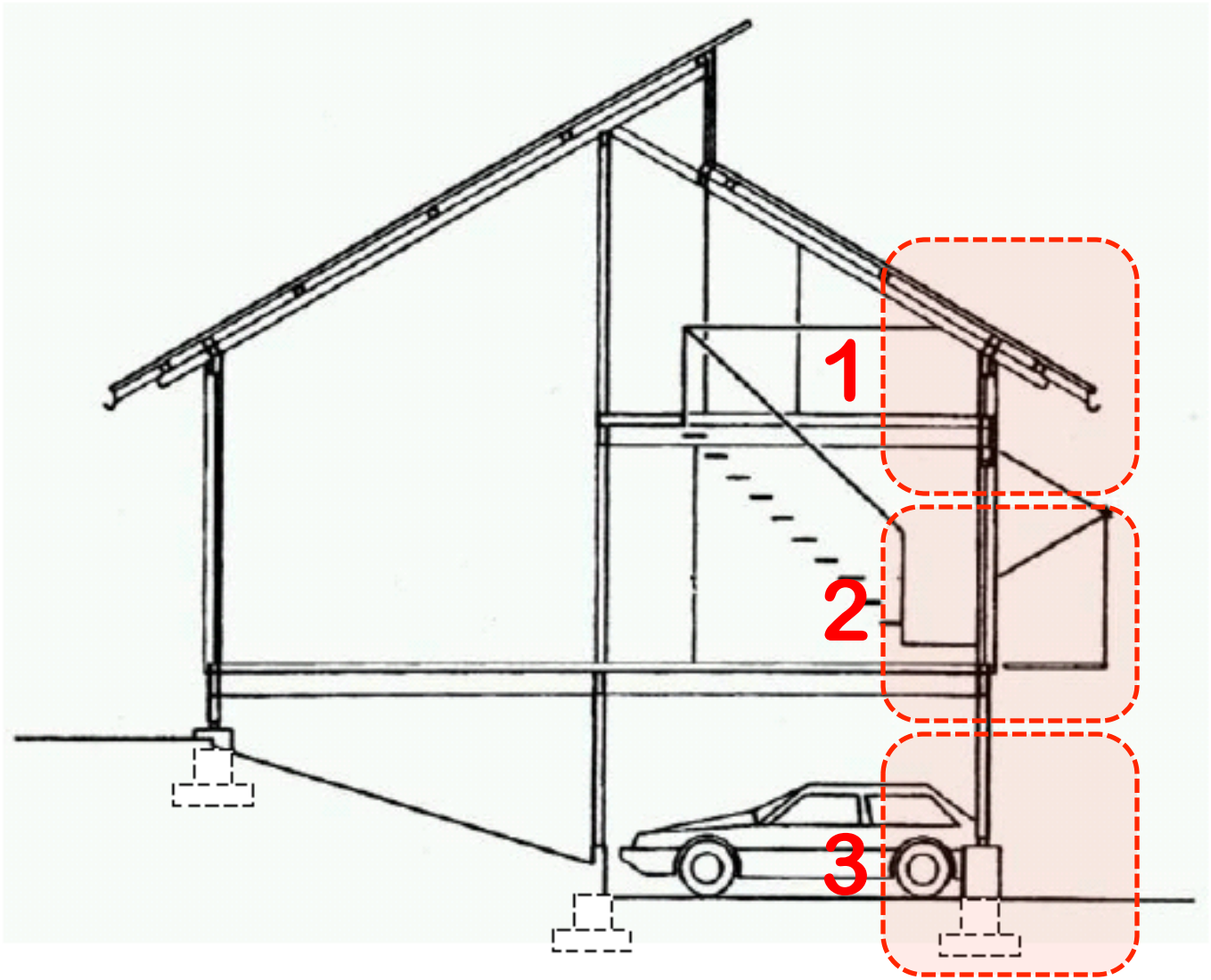
PERENCANAAN TEKNOLOGI & SISTEM BANGUNAN (PTSB) *03*


1
2
3

Walls	lb/ft^2
Clay brick	
High-absorption, per 4-in wythe	34
Medium-absorption, per 4-in wythe	39
Low-absorption, per 4-in wythe	46
Sand-lime brick, per 4-in wythe	38
Concrete brick	
4-in, with heavy aggregate	46
4-in, with light aggregate	33
Concrete block, hollow	
8-in, with heavy aggregate	55
8-in, with light aggregate	35
12-in, with heavy aggregate	85
12-in, with light aggregate	55
Clay tile, loadbearing	
4-in	24
8-in	42
12-in	58
Clay tile, nonloadbearing	
2-in	11
4-in	18
8-in	34
Furring tile	
1½-in	8
2-in	10
Glass block, 4-in	18
Gypsum block, hollow	
2-in	9.5
4-in	12.5
6-in	18.5

Masonry	lb/ft^3
Cast-stone masonry	144
Concrete, stone aggregate, reinforced	150
Ashlar:	
Granite	165
Limestone, crystalline	165
Limestone, oölitic	135
Marble	173
Sandstone	144

Roof and Wall Coverings	lb/ft^2
Clay tile shingles	9 to 14
Asphalt shingles	2
Composition:	
3-ply ready roofing	1
4-ply felt and gravel	5.5
5-ply felt and gravel	6
Copper or tin	1
Corrugated steel	2
Sheathing (gypsum), ½-in	2
Sheathing (wood), per in thickness	3
Slate, ¼-in	10
Wood shingles	2

Waterproofing	lb/ft^2
Five-ply membrane	5

Ceilings	lb/ft^2
Plaster (on tile or concrete)	5
Suspended metal lath and gypsum plaster	10
Suspended metal lath and cement plaster	15
Suspended steel channel supports	2
Gypsumboard per ¼-in thickness	1.1

Floor Finishes	lb/ft^2
Asphalt block, 2-in	24
Cement, 1-in	12
Ceramic or quarry tile, 1-in	12
Hardwood flooring, 7/8-in	4
Plywood subflooring, 1/2-in	1.5
Resilient flooring, such as asphalt tile and linoleum	2
Slate, 1-in	15
Softwood subflooring, per in of thickness	3
Terrazzo, 1-in	13
Wood block, 3-in	4

	lb/ft^2	
Wood joists, double wood floor, joist size	12-in spacing	16-in spacing
2 × 6	6	5
2 × 8	6	6
2 × 10	7	6
2 × 12	8	7
3 × 6	7	6
3 × 8	8	7
3 × 10	9	8
3 × 12	11	9
3 × 14	12	10

Concrete Slabs	lb/ft^2
Stone aggregate, reinforced, per in of thickness	12.5
Slag, reinforced, per in of thickness	11.5
Lightweight aggregate, reinforced, per in of thickness	6 to 10

Floor Fill	lb/ft²
Cinders, no cement, per in of thickness	5
Cinders, with cement, per in of thickness	9
Sand, per in of thickness	8
Partitions	lb/ft²
Plaster on masonry	
Gypsum, with sand, per in of thickness	8.5
Gypsum, with lightweight aggregate, per in	4
Cement, with sand, per in of thickness	10
Cement, with lightweight aggregate, per in	5
Plaster, 2-in solid	20
Metal studs	
Plastered two sides	18
Gypsumboard each side	6
Wood studs, 2 × 4-in	
Unplastered	3
Plastered one side	11
Plastered two sides	19
Gypsumboard each side	7
Glass	lb/ft²
Single-strength	1.2
Double-strength	1.6
Plate, ⅛-in	1.6
Insulation	lb/ft²
Cork, per in of thickness	1.0
Foamed glass, per in of thickness	0.8
Glass-fiber bats, per in of thickness	0.06
Polystyrene, per in of thickness	0.2
Urethane	0.17
Vermiculite, loose fill, per in of thickness	0.5

1 ft = 0,3048 m
1 in= 25,40 mm

1 lb/ft²= 16,019 kg/m³

lb = pounds

$$\sigma = \frac{F\ (k\ N)}{A\ (m^2)}$$

$$A = \frac{F\ (k\ N)}{\sigma\ (k\ N/m^2)}$$

The 2:1 method

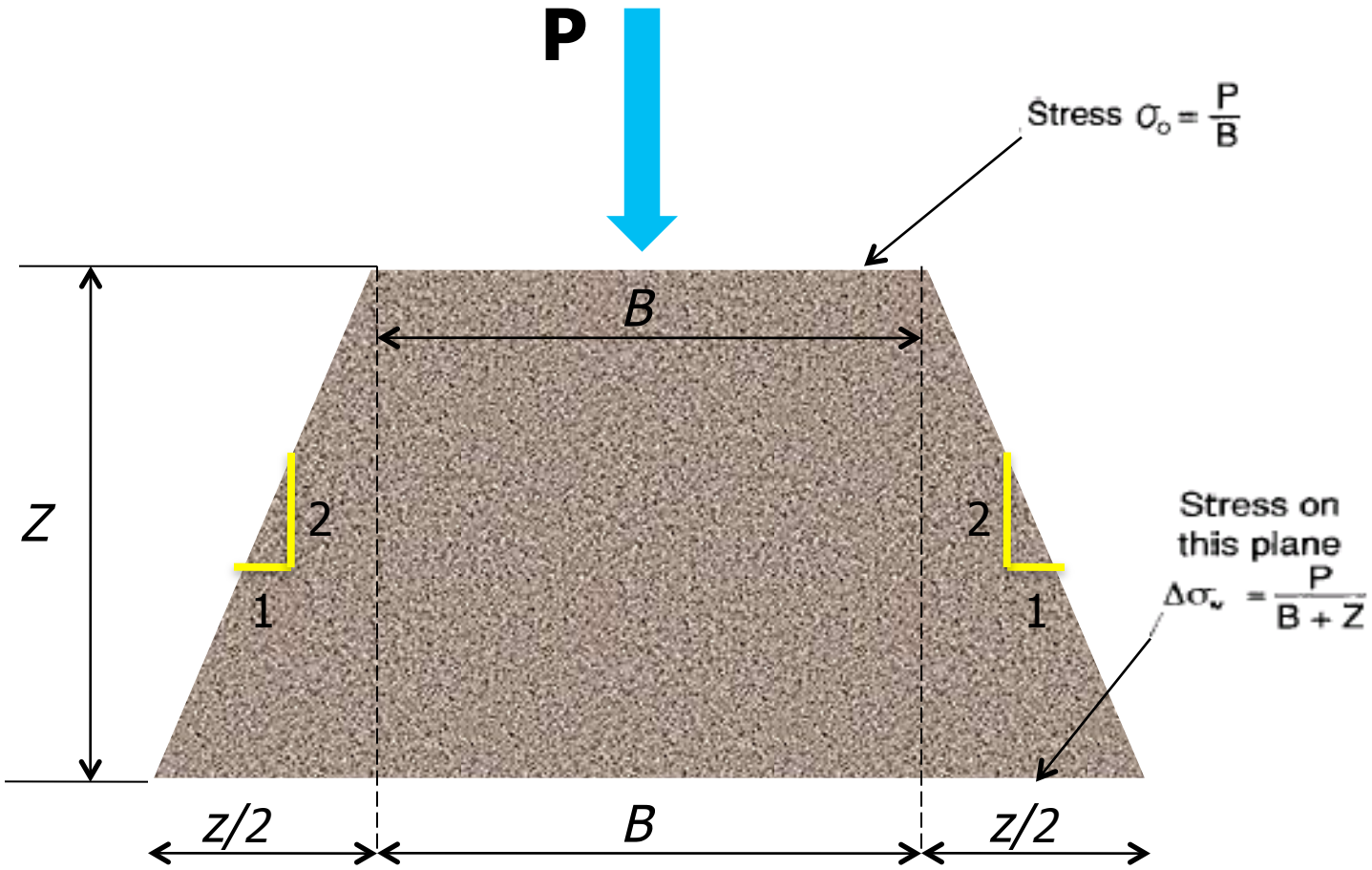
assumes that the stress dissipates with depth in the form of a trapezoid that has 2:1 (vertical: horizontal) inclined sides.

The purpose of this method is to approximate the actual ‘‘pressure bulb’’ stress increase beneath a footing.

$$\sigma_z = \Delta\sigma_v = \frac{P}{B + z}$$

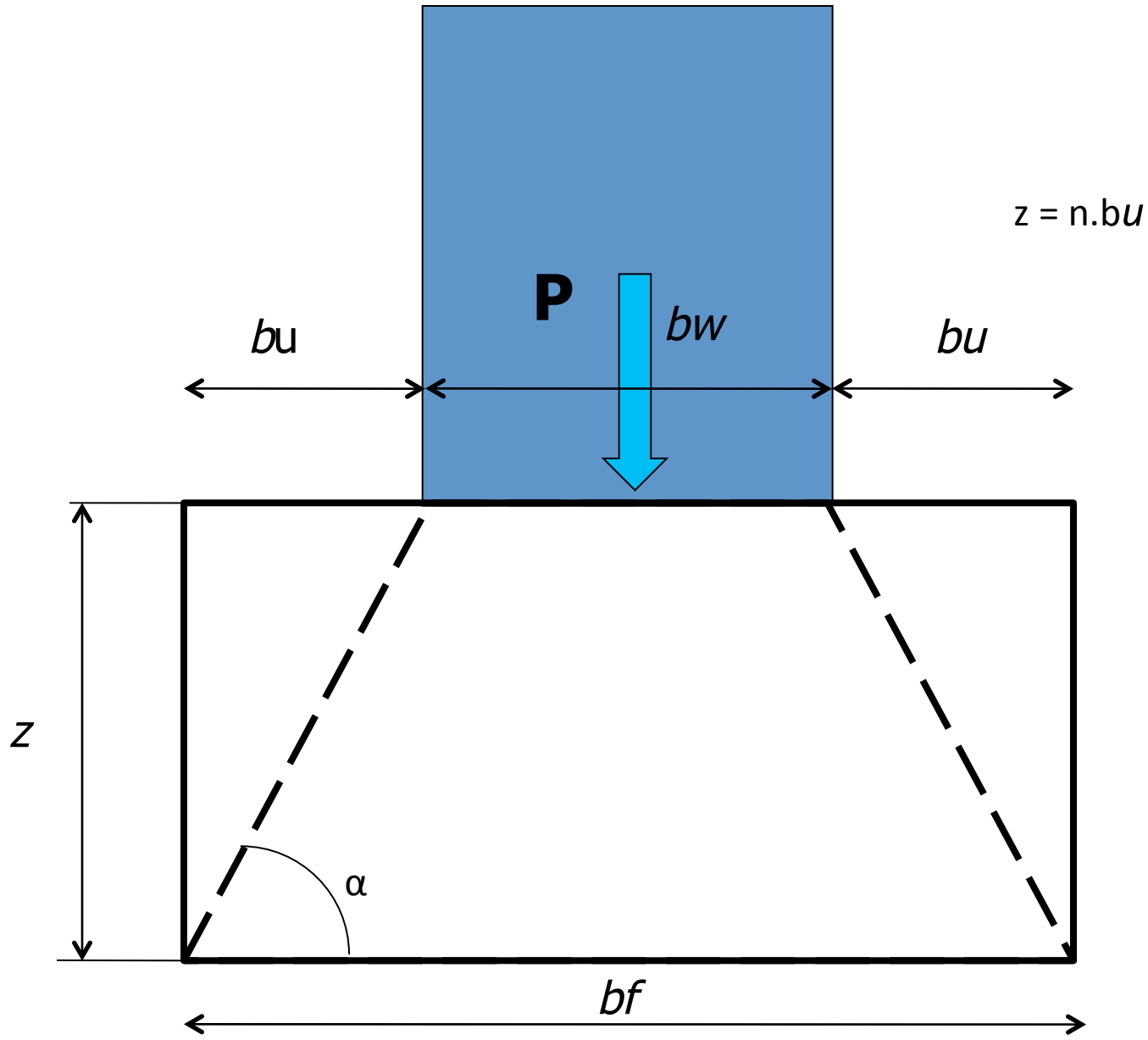
If the footing is a rectangular spread footing having a length L and a width B, then the stress applied by the rectangular footing (*σo*) would be *σo = P/ (BL)* where P entire load of the rectangular spread footing.

$$\sigma_z = \Delta\sigma_v = \frac{P}{(B+z)(L+z)}$$


P
Stress $\sigma_o = \frac{P}{B}$
B
Z
2
1
2
1
Stress on this plane
$\Delta\sigma_v = \frac{P}{B + Z}$
z/2
B
z/2

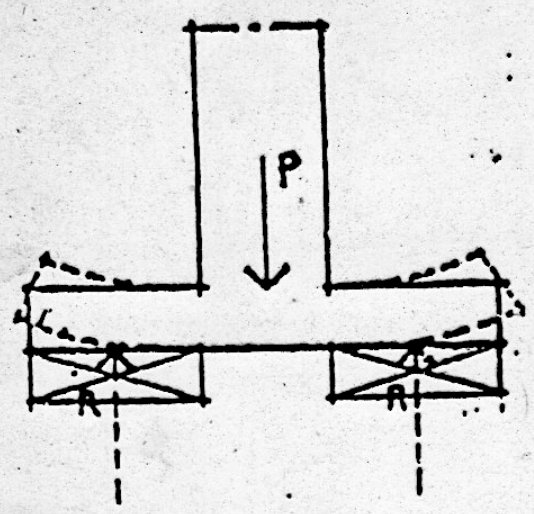
If there is known P= 200 kN/m, the wall thickness = 0.49 m,
σ = 240 kN/m², rectangular foundation length (l) = 1.00 m

using concrete B 15 determine:
1. the width of foundation (b)
2. the foundation depth (z)

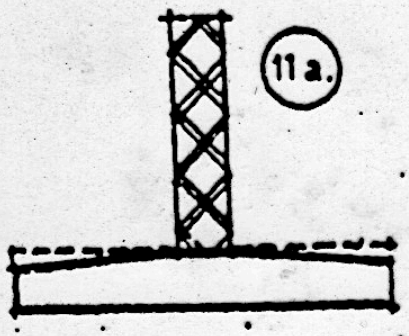

z = n.bu
P
bw
bu
bu
z
α
bf

n- value for vertical stress distribution					
Permitted vertical stress increase (σ) in kN/m²	100	200	300	400	500
B 5 (5,0 N/mm²)	1.6	2.0	2.0	not permitted	
B 10 (10,0 N/mm²)	1.1	1.6	2.0	2.0	2.0
B 15 (15,0 N/mm²)	1.0	1.3	1.6	1.8	2.0
B 25 (25,0 N/mm²)	1.0	1.0	1.2	1.4	1.6
B 35 (35,0 N/mm²)	1.0	1.0	1.0	1.2	1.3

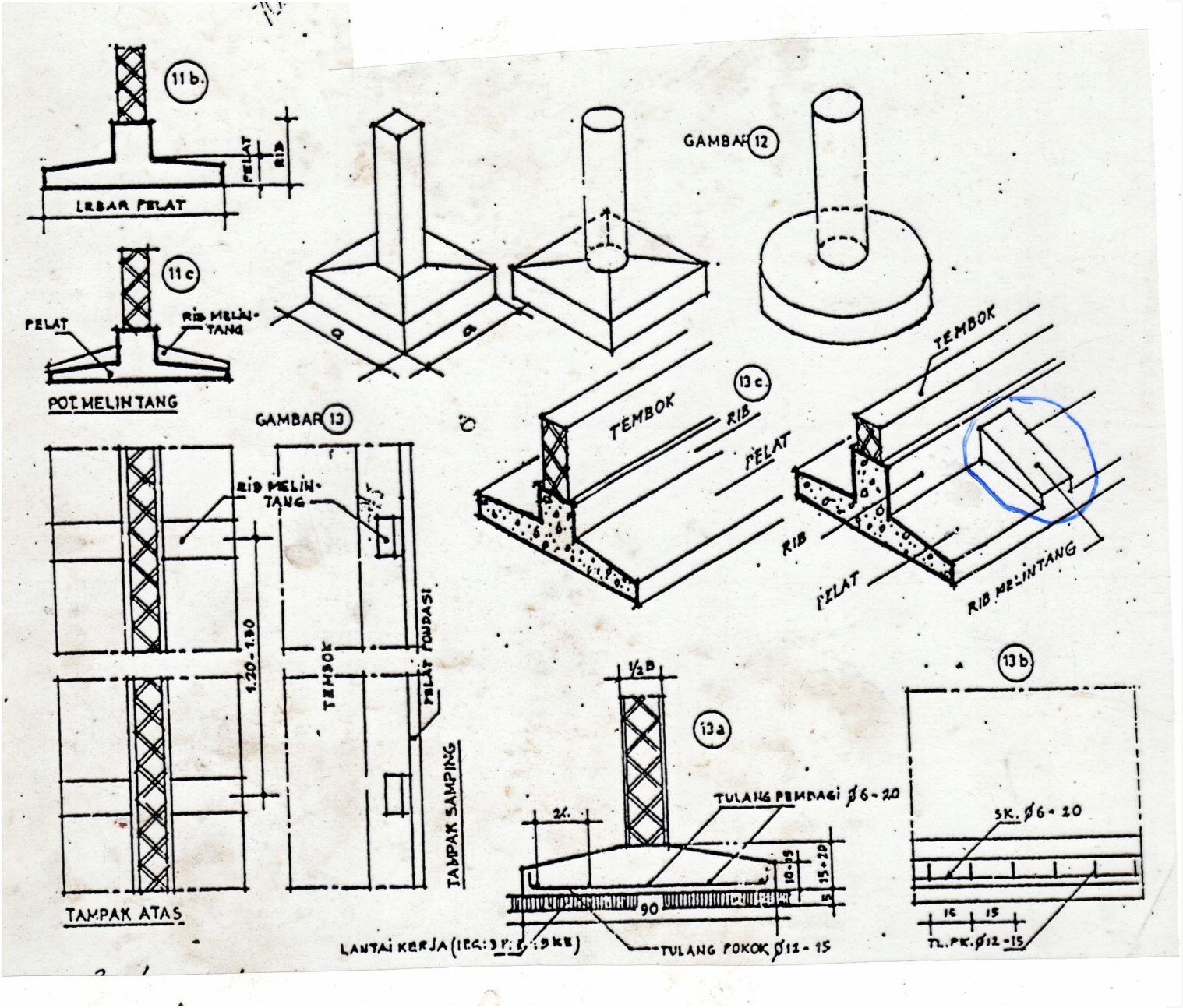
GAMBAR 11.

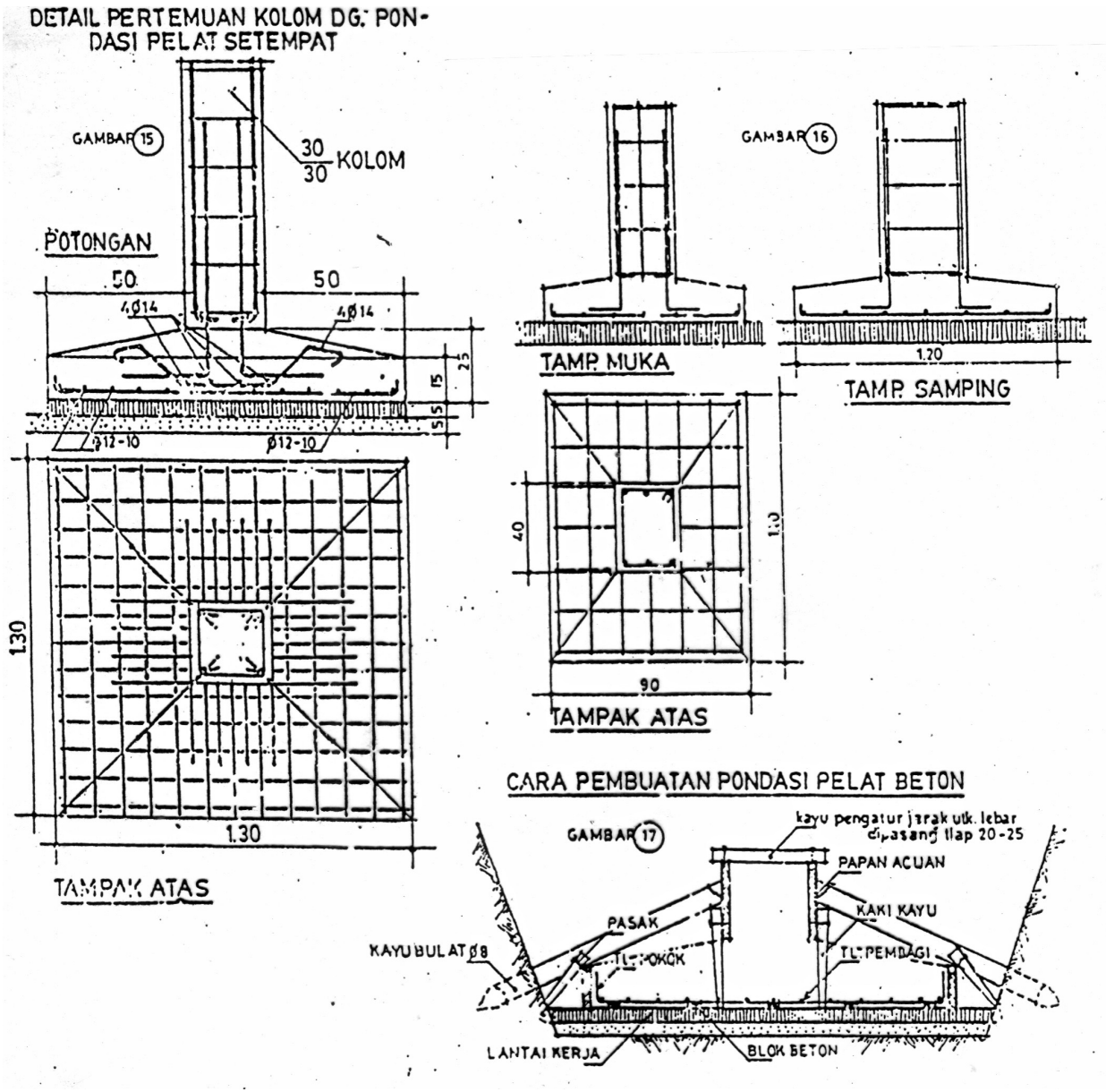


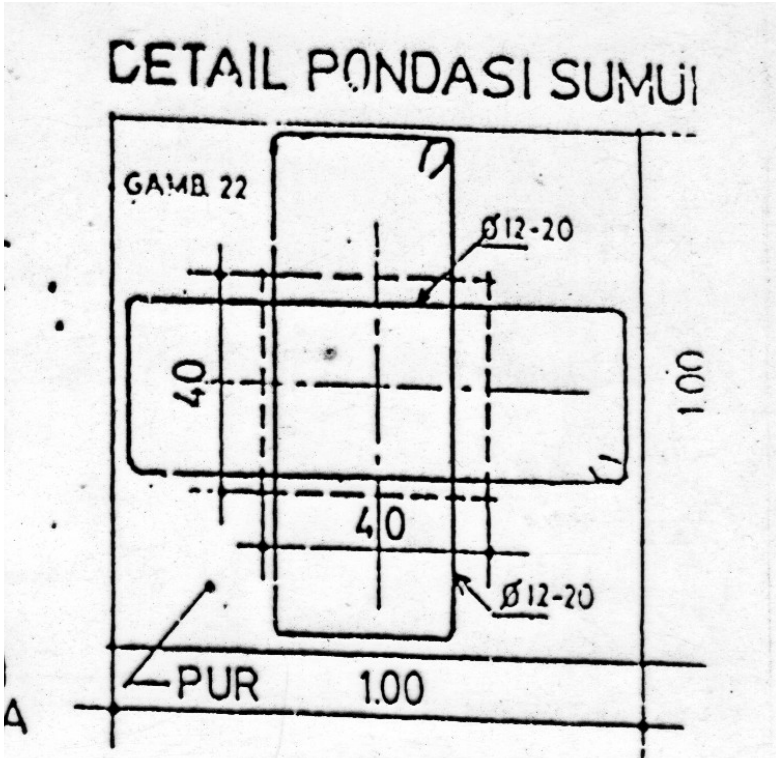
skema pembebanan pada pondasi pelat beton

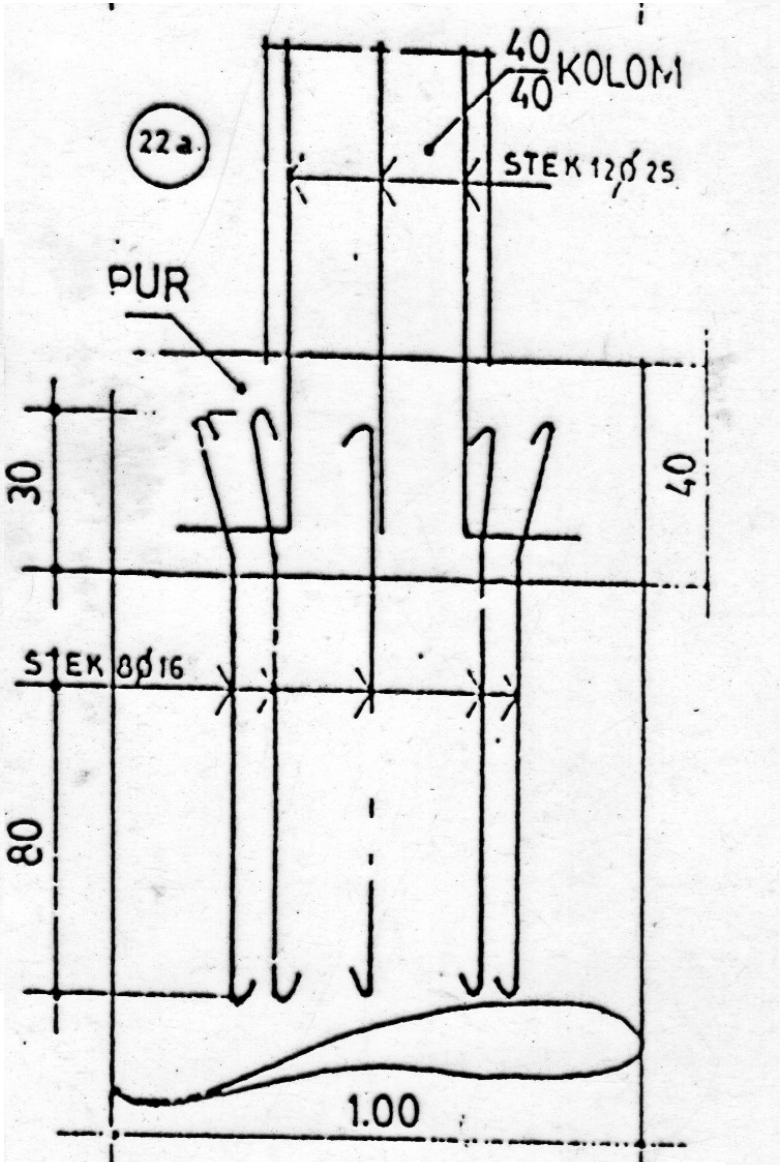


11 a.

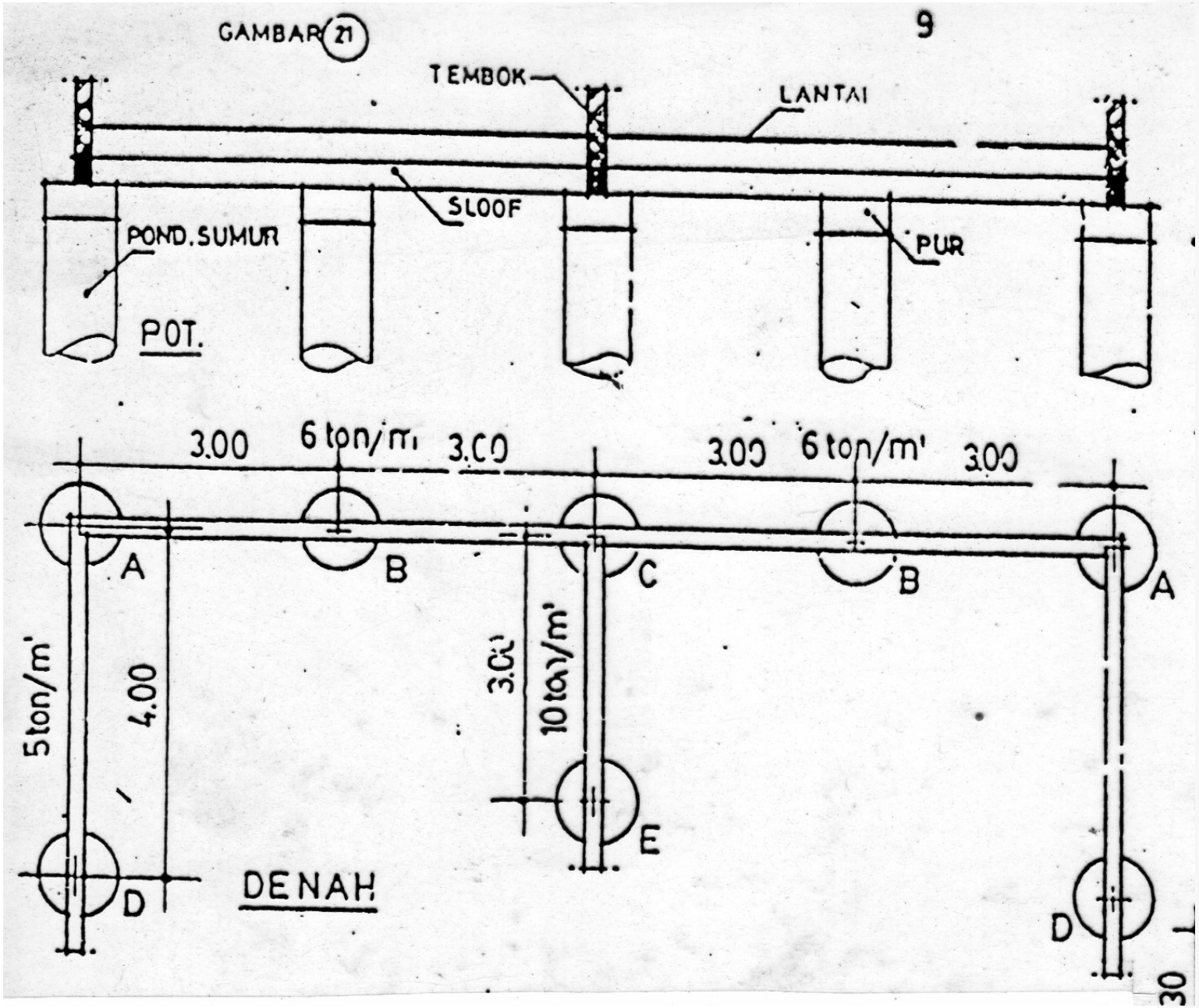

11 b.
PELAT
RIB
LEBAR PELAT
11 c
PELAT
RIB MELINTANG
POT. MELINTANG
GAMBAR 12
GAMBAR 13
RIB MELINTANG
1.20 - 1.80
TEMBOK
PELAT PONDASI
TAMPAK ATAS
TAMPAK SAMPING
13 c.
TEMBOK
RIB
PELAT
TEMBOK
RIB
PELAT
RIB MELINTANG
13 a
½B
2K.
TULANG PEMBAGI Ø6 - 20
10-15
15-20
5
90
LANTAI KERJA (1PC : 3 P : 5 : 9 KR)
TULANG POKOK Ø12 - 15
13 b
SK. Ø6 - 20
15
15
TL. PK. Ø12 - 15

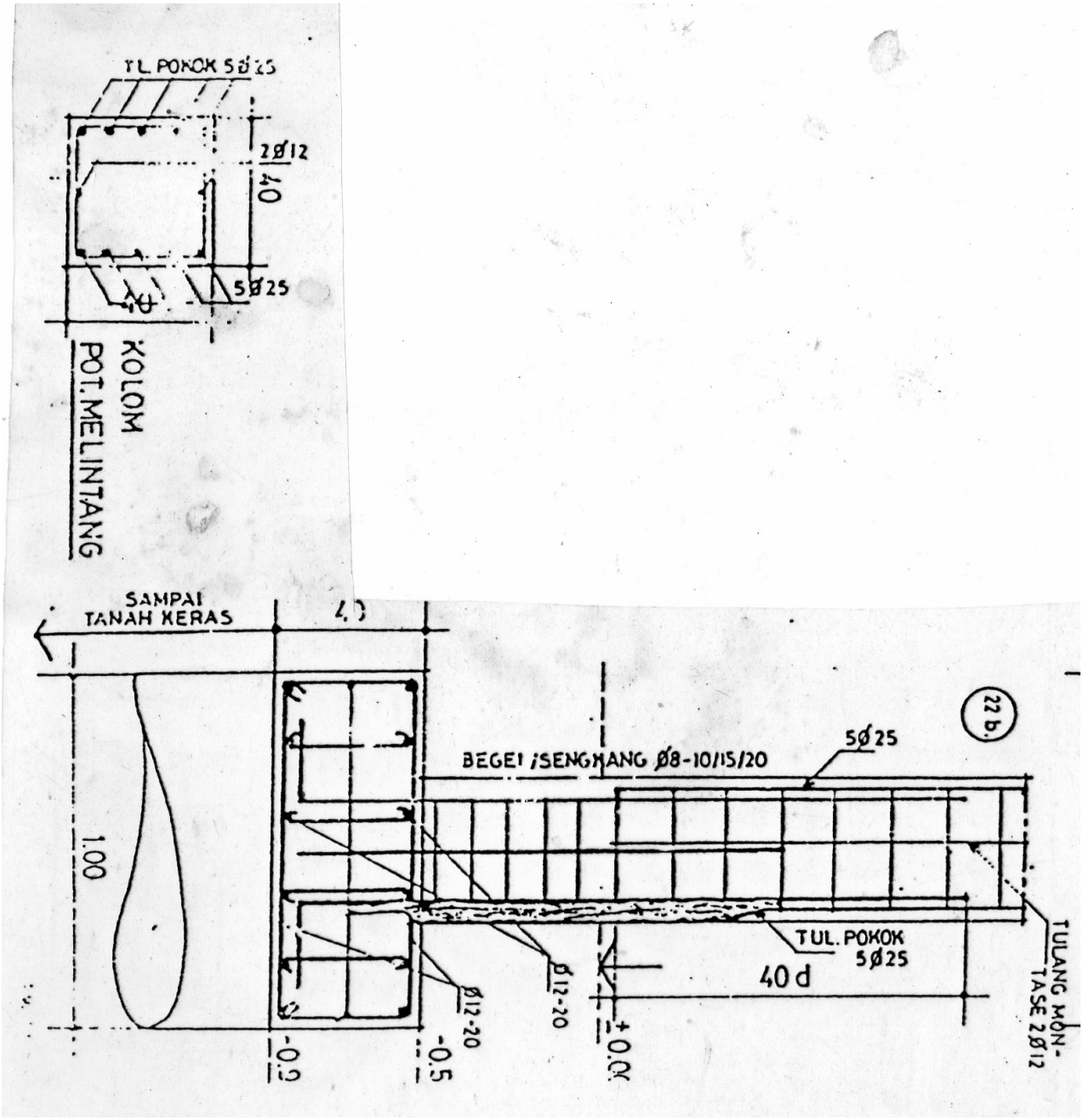

DETAIL PERTEMUAN KOLOM DG. PONDASI PELAT SETEMPAT
GAMBAR 15
30
30
KOLOM
POTONGAN
50
50
4Ø14
4Ø14
15
25
5
Ø12-10
Ø12-10
130
130
TAMPAK ATAS
GAMBAR 16
TAMP. MUKA
1.20
TAMP. SAMPING
40
130
90
TAMPAK ATAS
CARA PEMBUATAN PONDASI PELAT BETON
GAMBAR 17
kayu pengatur jarak utk. lebar dipasang llap 20-25
PAPAN ACUAN
KAKI KAYU
PASAK
KAYU BULAT Ø8
TIANG POKOK
TIANG PEMBAGI
LANTAI KERJA
BLOK BETON


DETAIL PONDASI SUMUR
GAMB 22
Ø12-20
40
40
Ø12-20
1.00
PUR
1.00

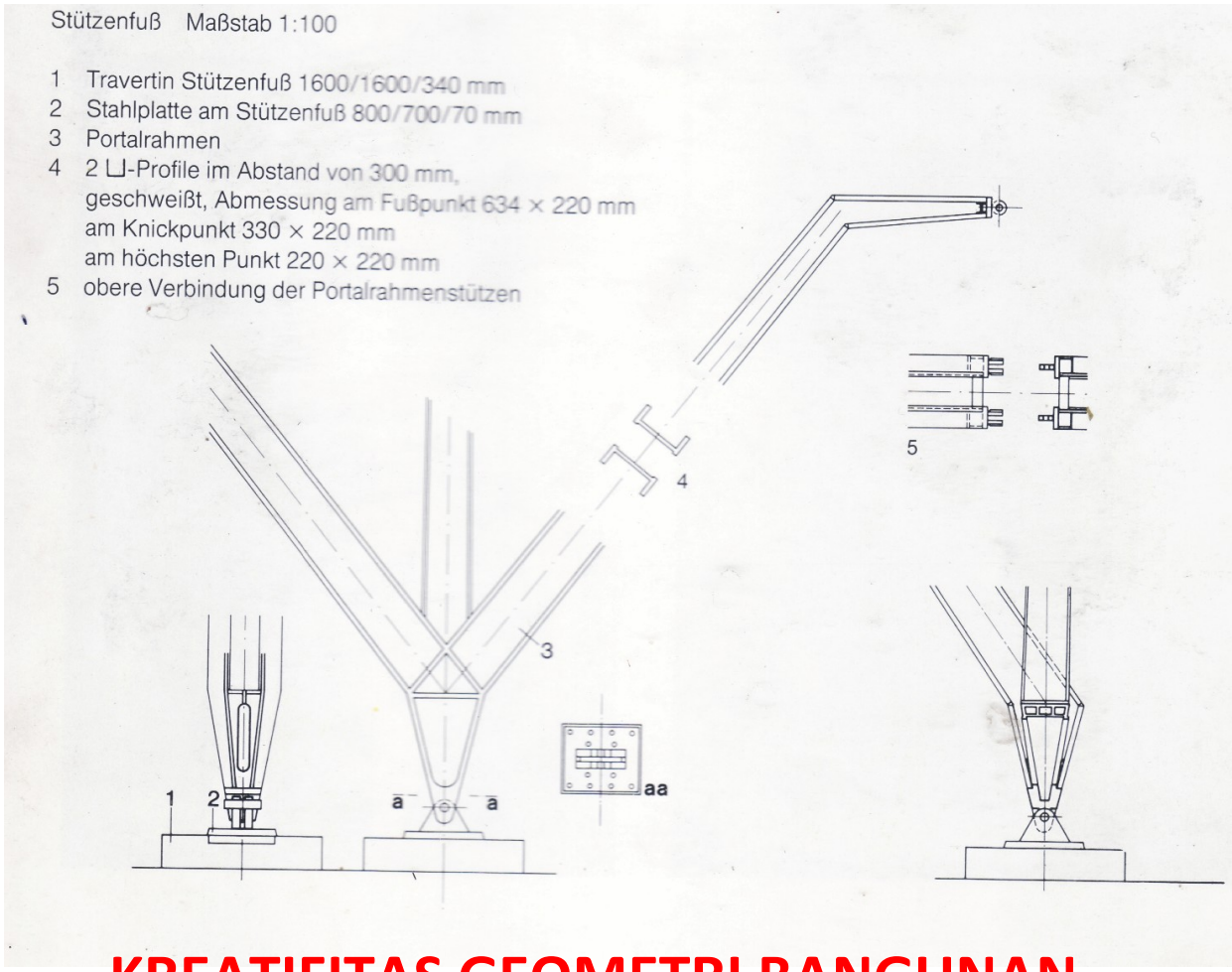

22a
40
40
KOLOM
STEK 12Ø25
PUR
30
40
STEK 8Ø16
80
1.00

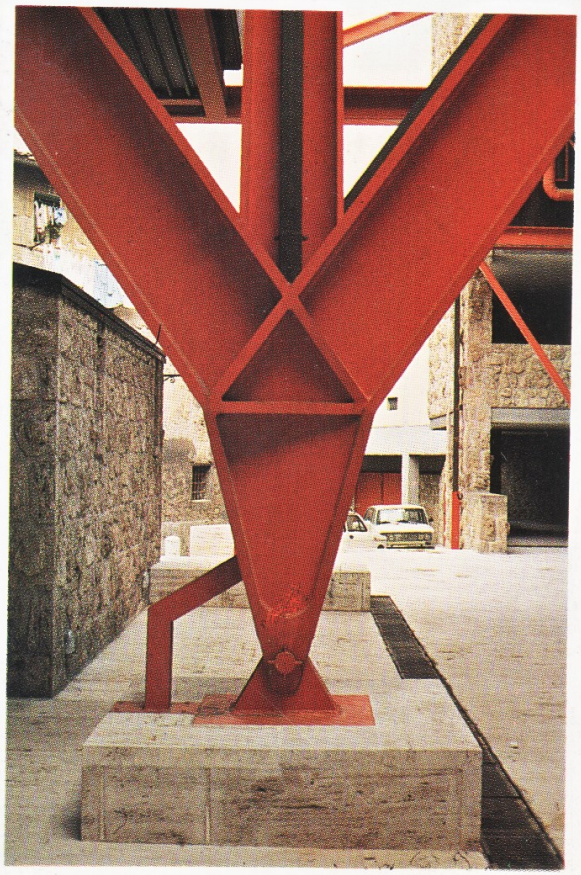
GAMBAR 21


TEMBOK
LANTAI
SLOOF
POND. SUMUR
PUR
POT.
3.00
6 ton/m'
3.00
3.00
6 ton/m'
3.00
A
B
C
B
A
5 ton/m'
4.00
3.00
10 ton/m'
D
E
D
DENAH

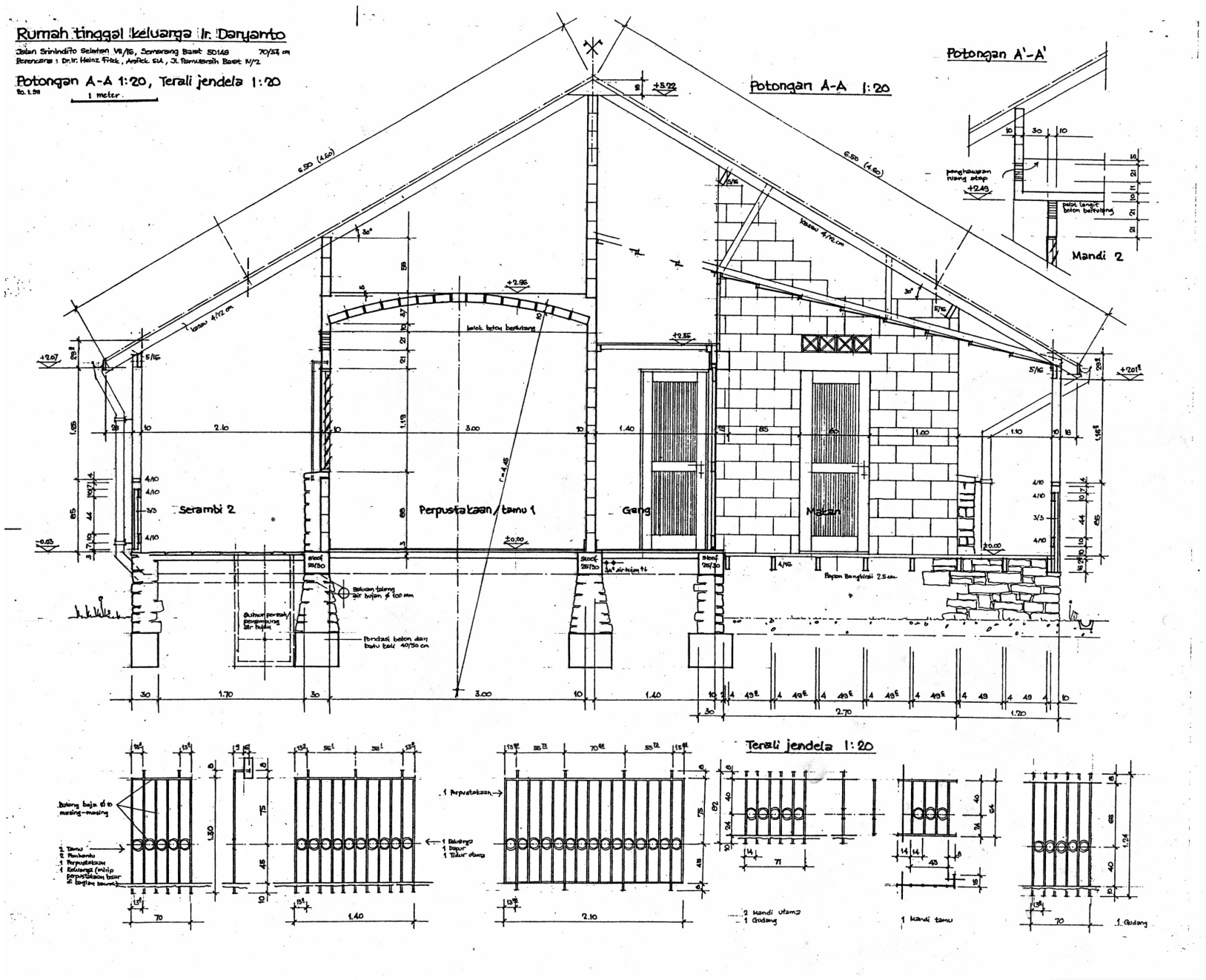


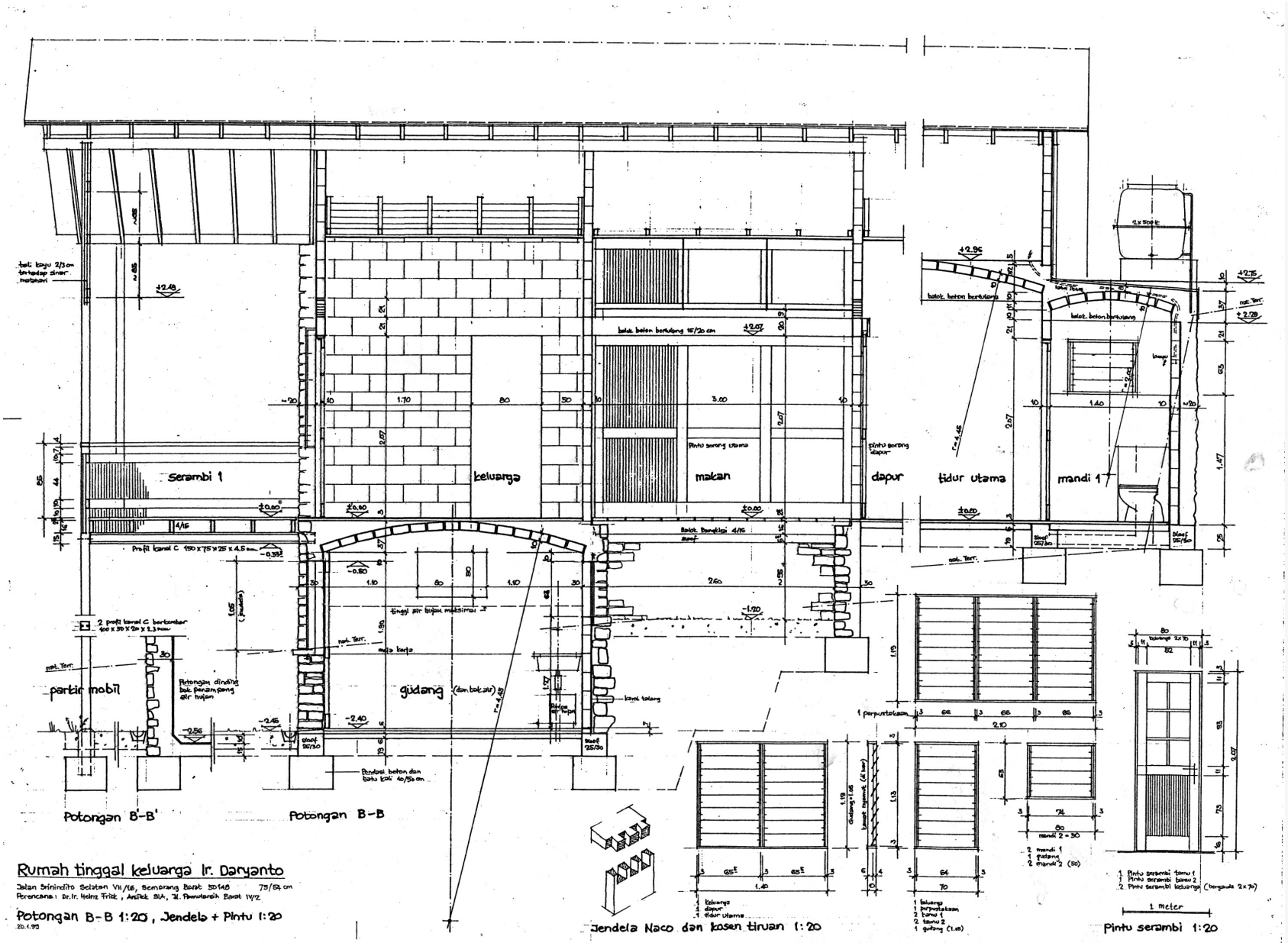
KREATIFITAS GEOMETRI BANGUNAN –
HUBUNGAN RANGKA DAN PONDASI





KREATIFITAS GEOMETRI BANGUNAN –
HUBUNGAN RANGKA DAN PONDASI


Rumah tinggal keluarga Ir. Daryanto
Jalan Srinindito Selatan VII/16, Semarang Barat 50148
Perencana : Dr.Ir. Heinz Frick, Arsitek SIA, Jl. Pamularsih Barat V/2
Potongan A-A 1:20, Terali jendela 1:20
1 meter
Potongan A-A 1:20
Potongan A'-A'
Mandi 2
Serambi 2
Perpustakaan / tamu 1
Gang
Makan
Terali jendela 1:20
1 Mandi utama
1 Gudang
1 Mandi tamu
1 Gudang


Serambi 1
keluarga
makan
dapur
tidur utama
mandi 1
parkir mobil
gudang
Potongan B'-B'
Potongan B-B
Rumah tinggal keluarga Ir. Daryanto
Potongan B-B 1:20, Jendela + Pintu 1:20
Jendela Naco dan kosen tiruan 1:20
Pintu serambi 1:20
1 meter