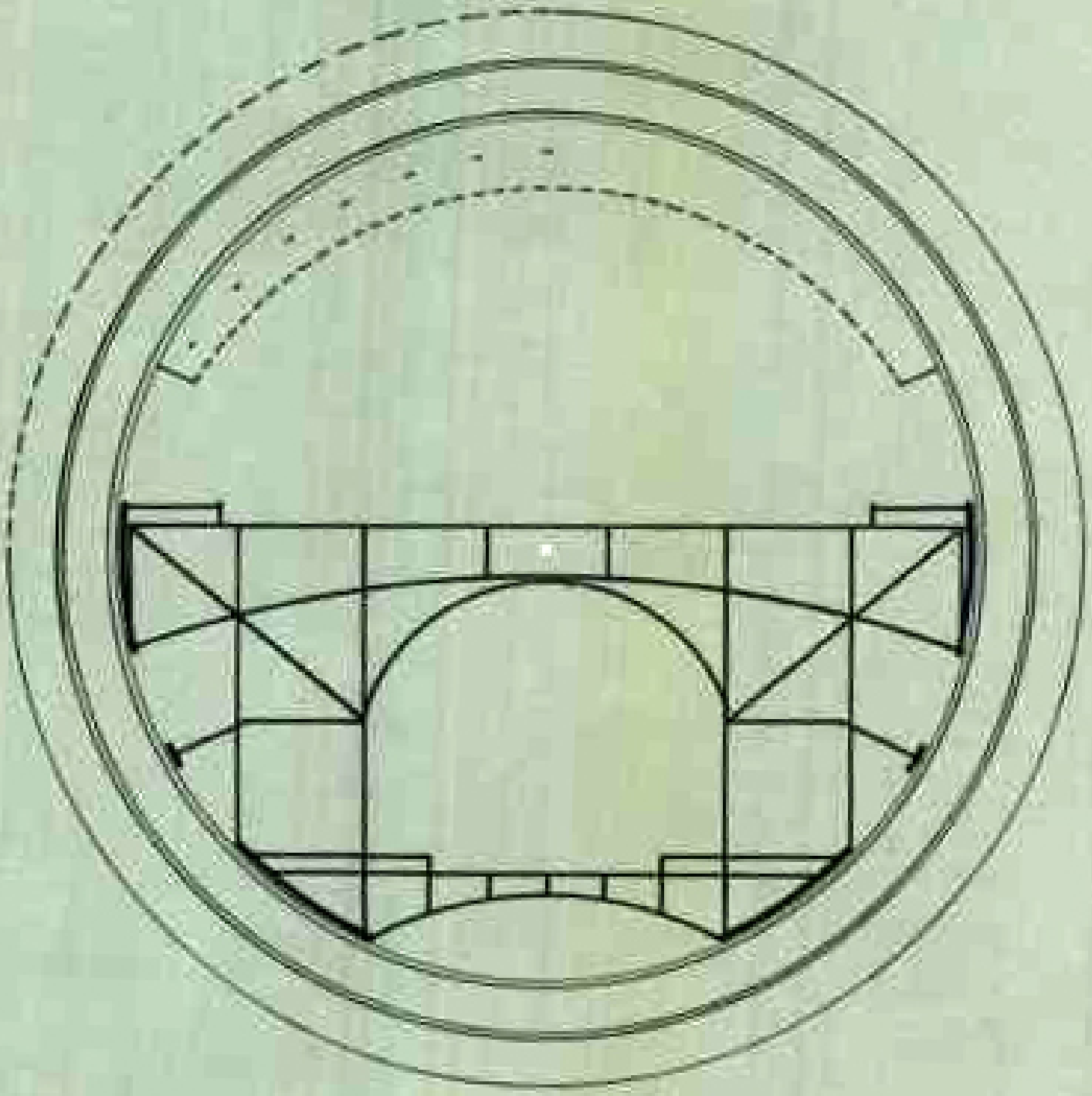
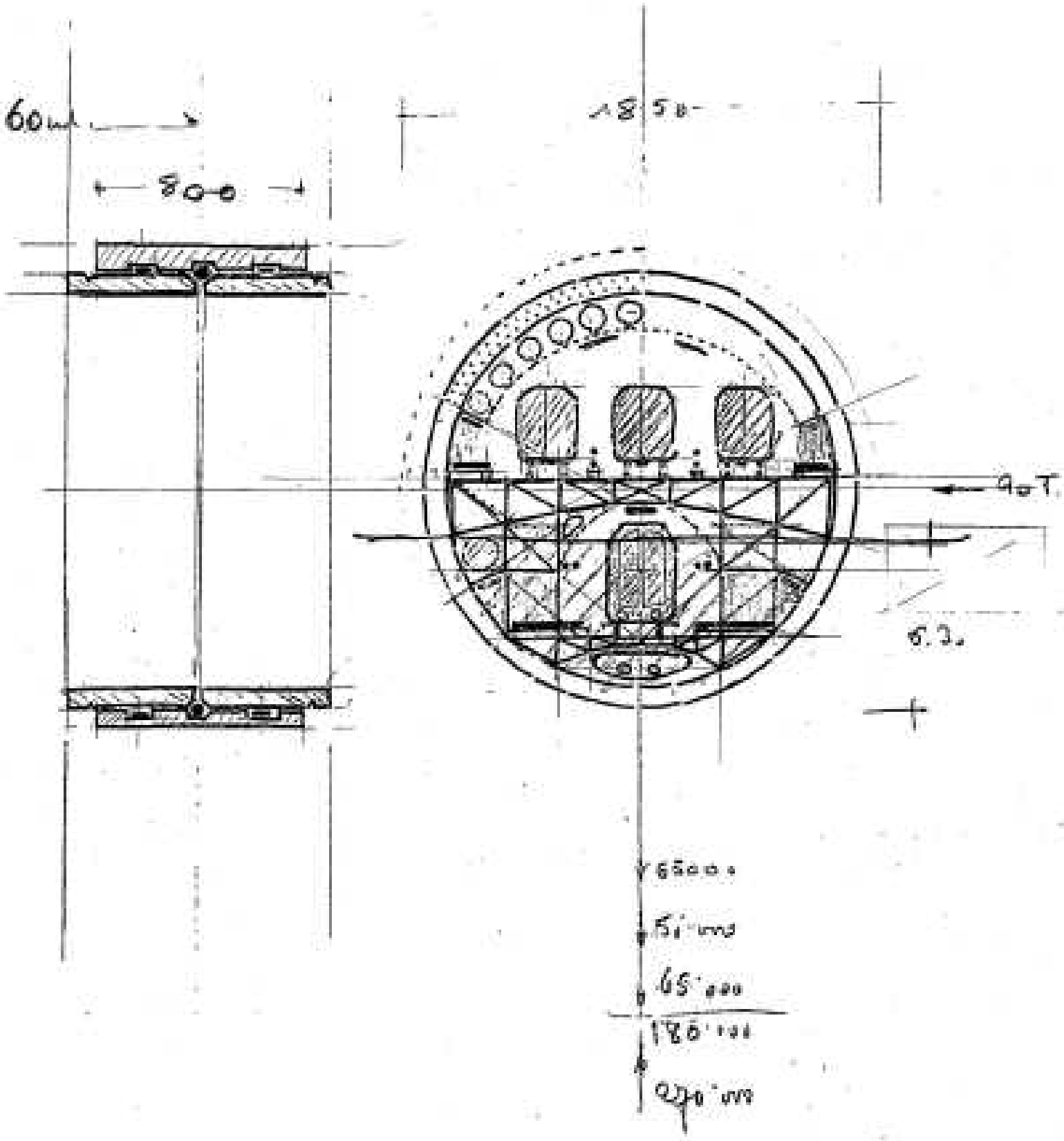
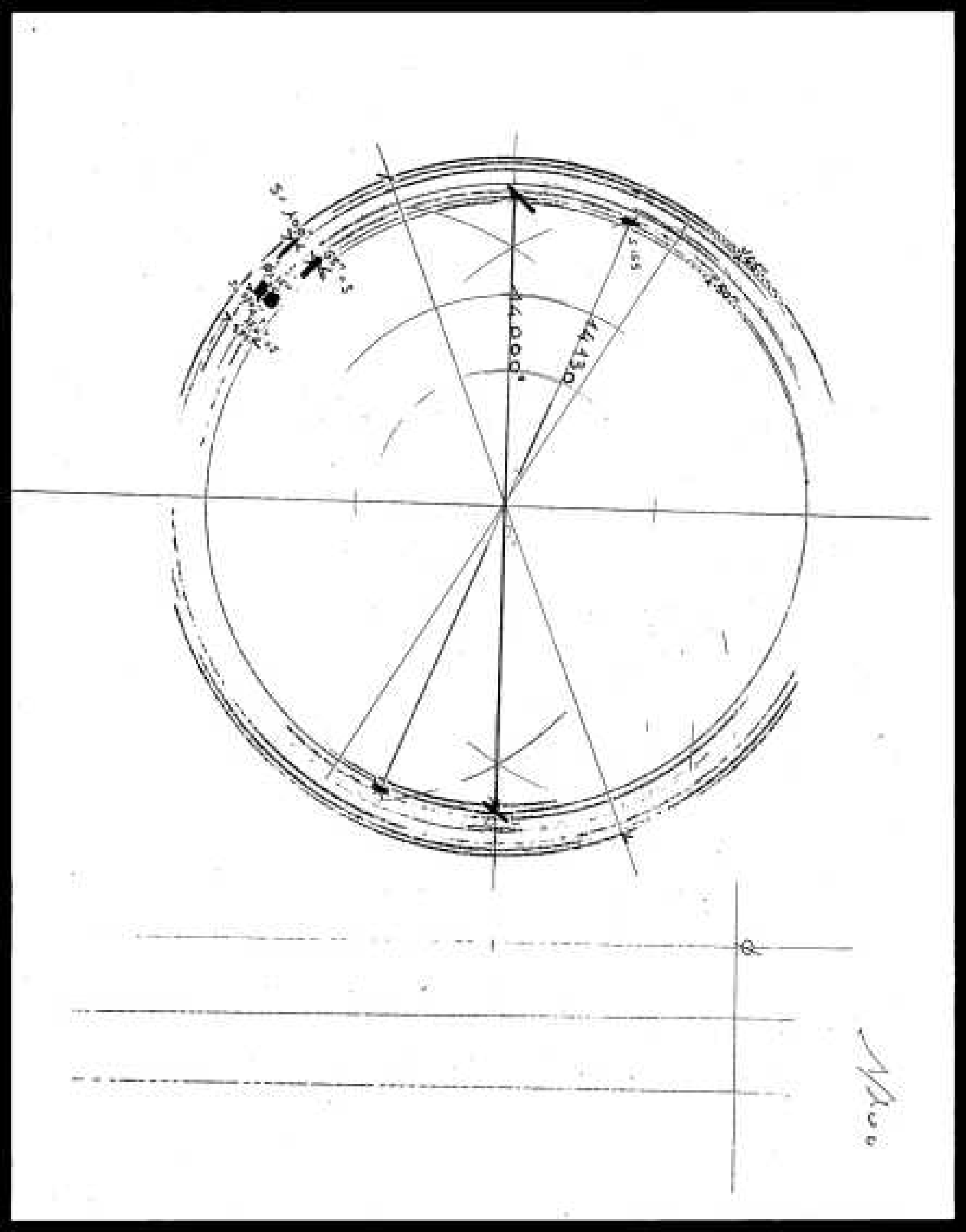



1/200
600
800
A8 5 B
9 T.
S.T.
6500
5100
65000
18600
2370




570 mm
157,5 mm


14,00
2,08

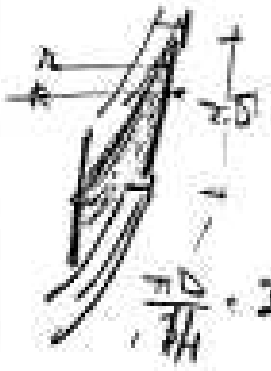
Q pag. 168

$$S = \frac{A_{sw} \cdot (5+25) \times D_{min} \times n \left[1+\sqrt{1+\frac{55 \times 15 \cdot \alpha \cdot (\gamma_{ca} - \gamma_{aria})}{5 \cdot \tau^2}}\right]}{\sigma_{amm} \times 55}$$

$$= \frac{3 \cdot \times 14\,mm \times 5,175 \left[1+\sqrt{(1+2750) \cdot 15 \cdot 5_{\alpha\alpha}}\right]}{28000} =$$

$$= \frac{42 \cdot \cdot \cdot \cdot \times 5,125}{0,2\ \cdot \cdot \cdot} \left(1 + 476 \cdot \cdot \cdot \cdot\right) =$$

$$= \frac{3|2\ 1\ 4\ \cdot \cdot \cdot \times 42601 \cdot \cdot \cdot}{72\ \cdot \cdot \cdot} = 194$$

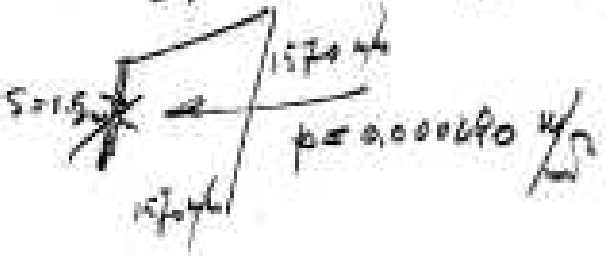


$$\frac{14.000}{13986} : 1$$

$$\sigma_{sw} = \frac{0.184 \left(2 \cdot \cdot \times 314 \cdot \times 3\right)}{13985 \times 15} = 206\ \text{kg/cm}^2$$

$$\sigma_{sw} \geq \frac{0.15 \times 0.25 \times 314 \cdot}{2\,\tau} = \text{kg/cm}^2\ 828,90$$

$S_{sw} = 17\ mm$ kg/cm² = 1 kg/cm²



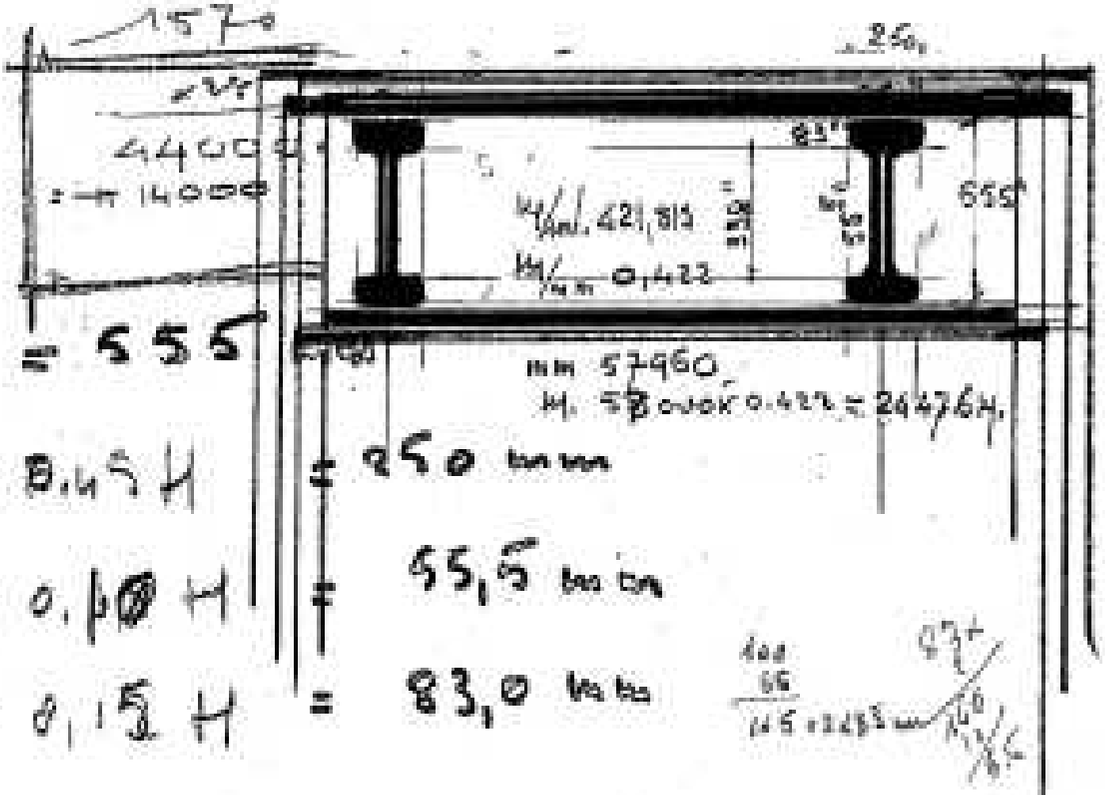
$$\sigma_{sw} \geq \frac{0.15 \times 0.35 \times 1570}{35^2} = \text{kg/cm}^2\ 105,42$$

$$\sigma_{sw} \leq \frac{0.15 \times 0.000690 \times 1570}{15^2} = \text{kg/cm}^2\ 0.80$$

$$\frac{181.17}{12}$$

= 15 mm

W



$H = 555$

$B = 0{,}45\,H = 250$ mm mm

$d = 0{,}10\,H = 55{,}5$ mm mm

$t = 0{,}15\,H = 83{,}0$ mm mm

$b = B - d = 0{,}45\,H - 0{,}10H = 0{,}35H : 194$ mm mm

$h = H - 2t = H - 0{,}30\,H = 0{,}70H : 388$ mm mm

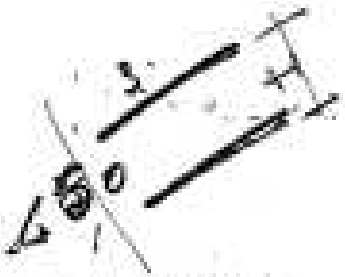
$$W = \frac{0{,}45\,H^4 - 0{,}35\,H \times (0{,}70H)^3}{6H} =$$

$$= 0{,}075\,H^3 - 0{,}058 \times 0{,}1176\,H^3 =$$

$$= 0.0681\,H^3$$

$$H = \sqrt[3]{\frac{1165\,000\,00}{0.0681}} = \sqrt[3]{17\,105\,000} = 555$$

$$W = \frac{140\ldots\ldots}{12} = \text{mm}^3\sqrt{1165\ldots} =$$



$$W = 817'500\ mm \times H^3 \left[\frac{0.25 - 0.322 \times 0.80}{0.842}\right]^3$$

$$H = \sqrt[3]{\frac{817'500\ mm}{0.06}} = \sqrt[3]{13'625'000\ mm^3} = 239.14\ mm$$

$$J = \frac{0.358\,H^4 - 0.322\,H \times (0.842\,H)^3}{12}$$

$$B = 0.358\,H$$

$$d = 0.036\,H$$

$$t = 0.054\,H$$

$$W = \frac{0.358H^4 - 0.322H(0.842\,H)^3}{6H} =$$

$$= 0.05H^3 - 0.05 \times 0.71\,H^2 = 0.05H^2 - 0.035H^3$$

$$= 0.05\,H -$$

$$b = B - d = 0.358H - 0.036H = 0.322H$$

$$h = H - 2t = H - 2 \times 0.054H = 0.842H$$

$$W = 0.0145H^3 - 0.05H^2 + 0.035H^3$$

$$H = \sqrt{\frac{817'500\ mm}{0.0355}} = \sqrt[3]{23'028'169\ mm^3} = 284.43\ mm$$

$$H = \sqrt[3]{\frac{817'500\ mm}{0.025}} = \sqrt[3]{32'700'000\ mm^3} = 319.00\ mm$$

$$= 6900\ mm$$

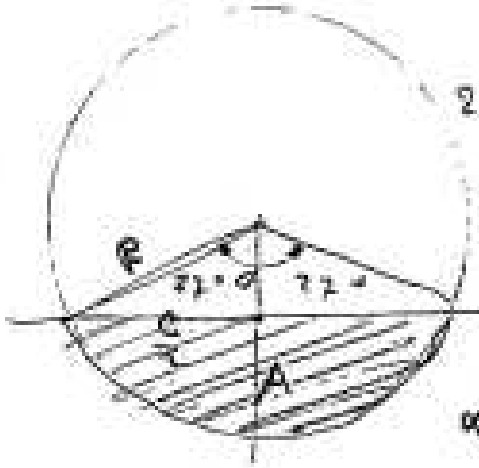
$$0.03H^2 - 0.05H + 817'500\ mm = 0$$

$$H = \frac{0.05 \pm \sqrt{0.0025 - 163'500\ mm}}{0.10} = 0.005 - 12786$$

$\frac{1+\cos\alpha}{2} = \cos^2\frac{\alpha}{2}$

$\tan\frac{\alpha}{2} = \frac{c}{2}/R$

$2R\tan\frac{\alpha}{2} = c$



$\frac{\pi R^2}{360}\alpha - R\cos\frac{\alpha}{2}\times\frac{c}{4} = A$

$\alpha\frac{\pi R^2}{360} - R\left(\cos\frac{\alpha}{2} + \frac{1}{2}\tan\frac{\alpha}{2}\right) = A$

$R = 1^{cm}$ $\quad R' = 37\,\mu$

$\pi = 3.14$

$\tan\frac{\alpha}{2} = \frac{\sin\alpha}{1+\cos\alpha}$

$\frac{\alpha}{360}\pi R^2 - R\left(\cos\frac{\alpha}{2} + \frac{1}{2}\frac{\sin\alpha}{1+\cos\alpha}\right) = A$

$\frac{\alpha}{360}\pi R^2 - R\left(\frac{\cos\frac{\alpha}{2}(1+\cos\alpha) + \frac{1}{2}\sin\alpha}{1+\cos\alpha}\right) = A$

$0{,}00925 - 18\left(\cos\frac{\alpha}{2}\times 2\cos^2\frac{1}{2} + \frac{1}{2}\sin\alpha\right) = 270\cdot 10^{-6}$

$= \left(\cos\frac{\alpha}{2} + 1\cos^2\frac{1}{2} + \frac{1}{2}\sin\alpha\right)$

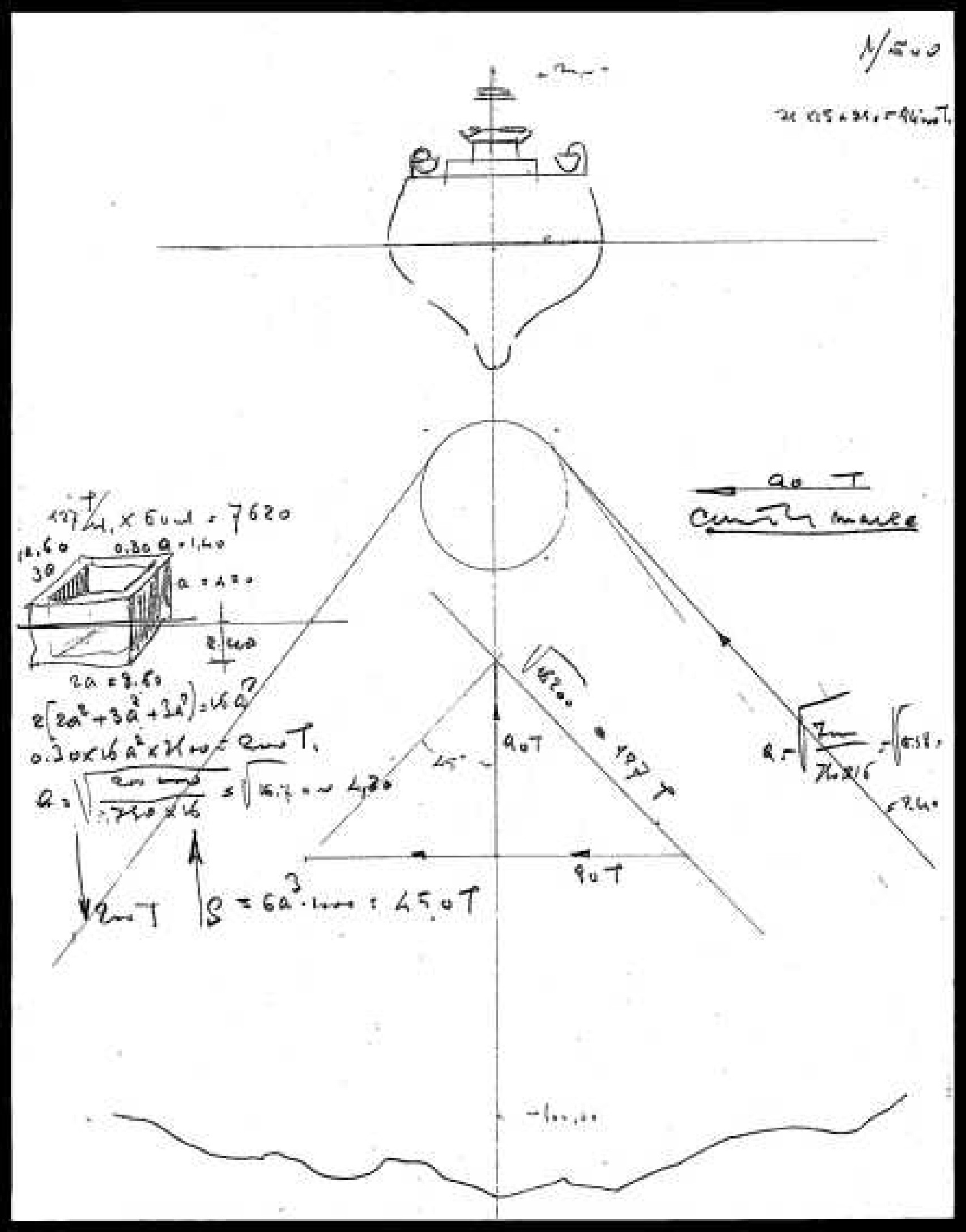
$\frac{270\cdot 10^{-6}}{18\cdot 10^{-3}} = 15$

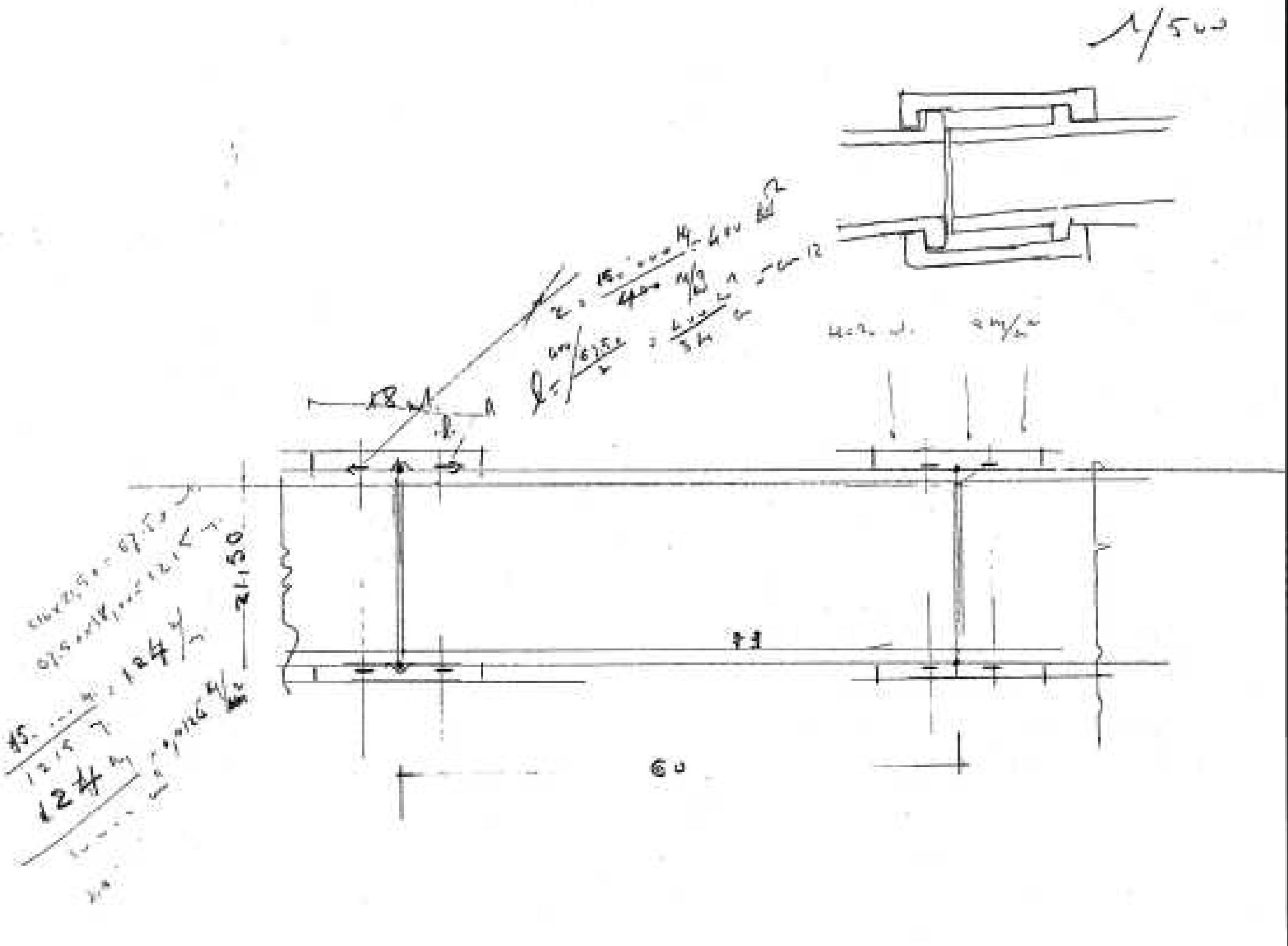
$18{,}00 \times A = 270\cdot 10^{-6}$ $\quad 0{,}0$ $\quad 6\,6\,5$

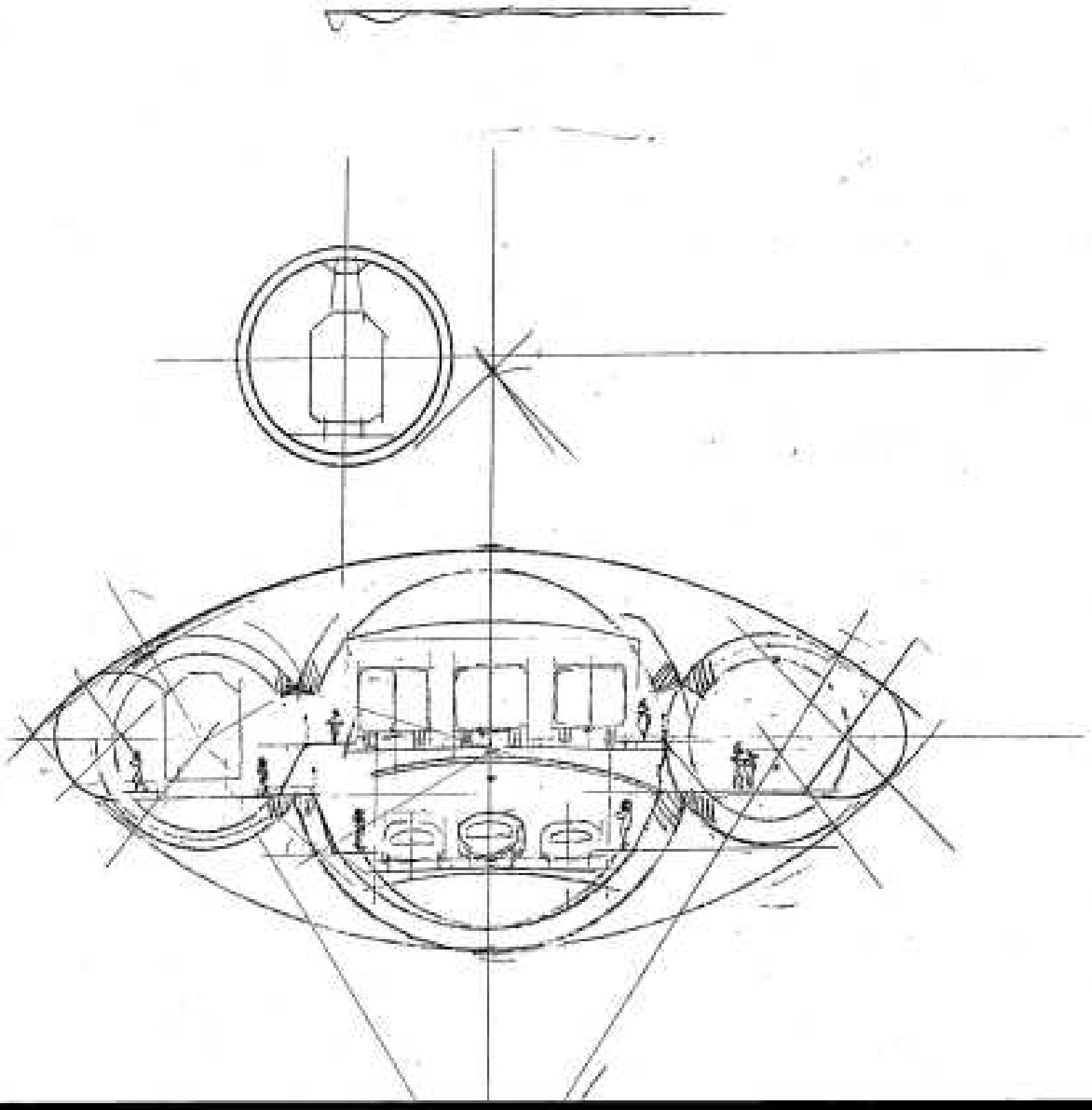
$A = 15$ mm

$\alpha = 54^\circ$

$0.9.8n\times 18$ $\quad e = 15{,}20$


90 T
Cuerda inferior
0.30 a = 1.40
a = 4.70
2a = 9.40
45°
90 T
90 T
S = 6a² · 1.000 = 45.0 T





Tubi Estr.

Ser. trazione kg/cm² 840/250
                       275/210
                       500/550

" modulo elast. kg/cm³ 2 x 10⁶

Coeff. dil. Term. α 88 x 10⁻⁷
                      150 000 kg/cm²
                      171 000 "

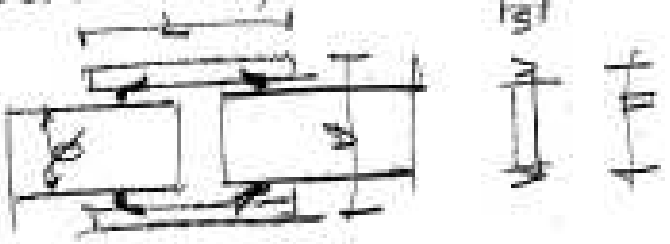
modul. elast.

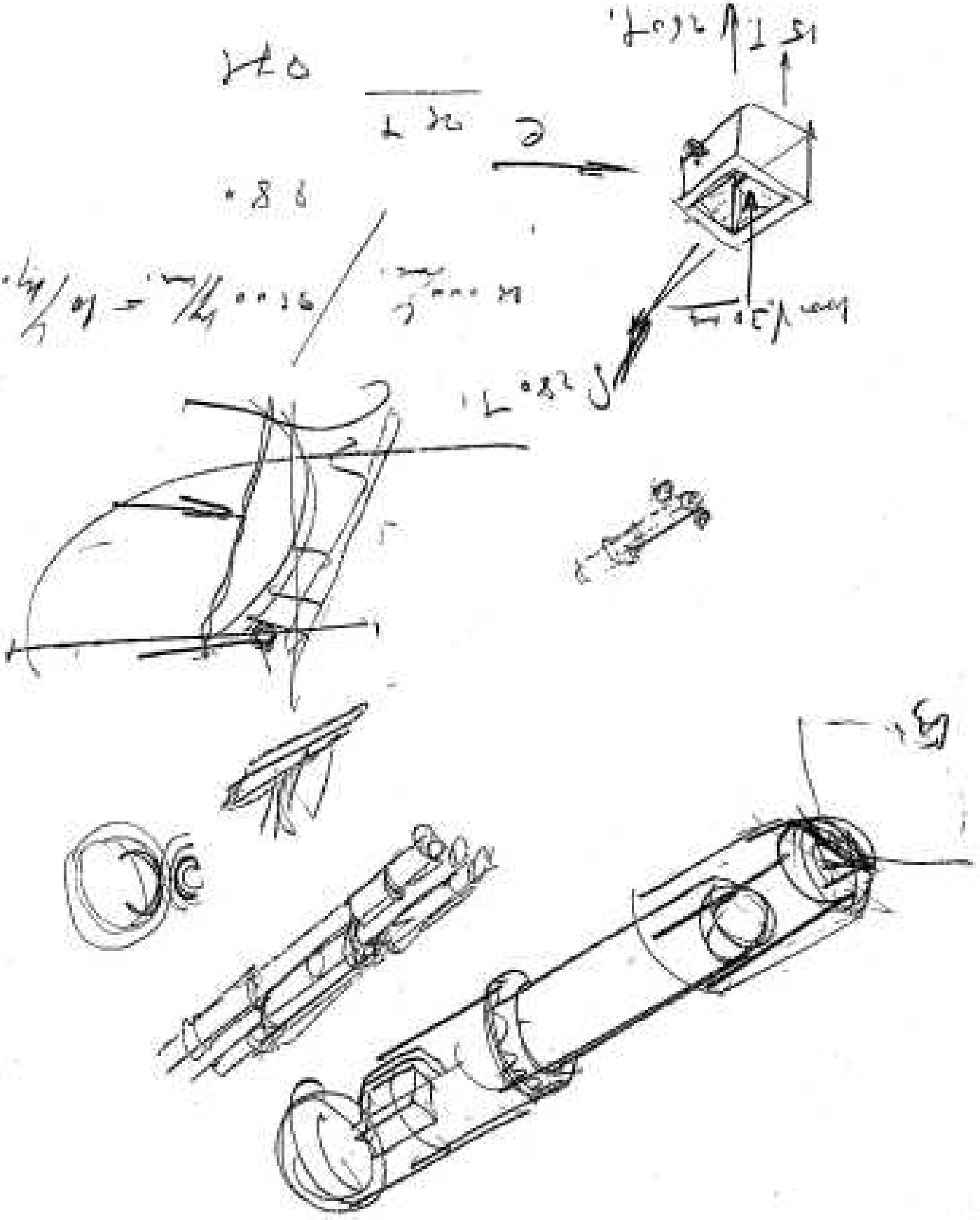
D = 1... m/m 10 A. c = 65 kg/m 487 kg/ml.

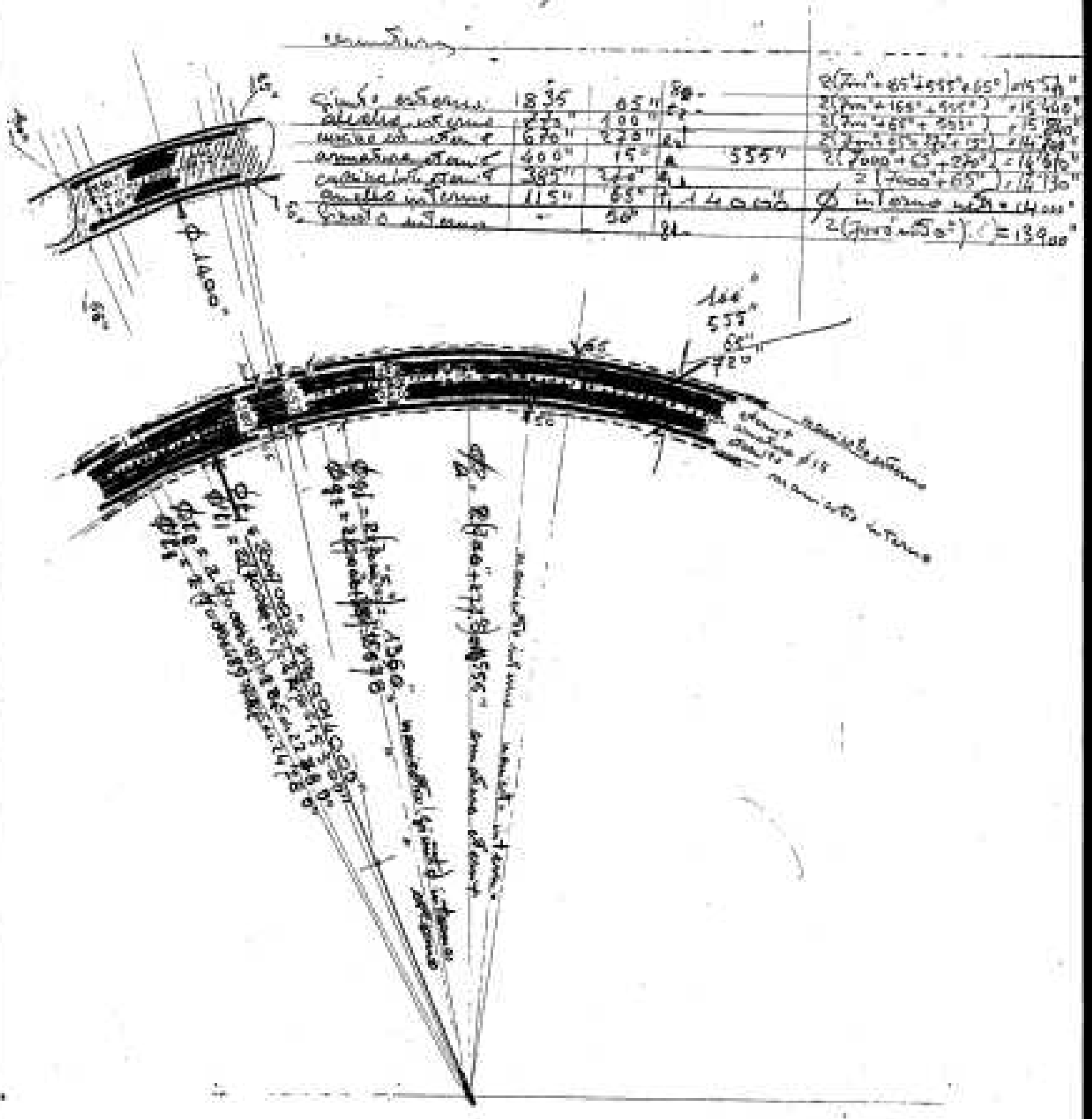
- Massima corsa asse
- 2 pressioni
- corsa minima asse

Diagramma di taglio e momento flettente

L = 0,75 Φ
D = 1,33 Φ
F = 1,07 Φ
S = 0,075 Φ
Q = (ΦZ) kg.







P.d.2.

fo 1570

	Ø	C	S		Kg	L
C_A x x x 17		68	15	acciaio	11'210	3 200
φ_1 x 13900		43'646	50	"	25'983'977	"
φ_2 x 15570		48'889	65	"	34'123'852	"
t_1	14000	43'960	65	"	41'402'826	"
t_2	15440	48'481	100	"	53'248'619	"
a_1	14130	44'369'970		filo Ø	49'496'177	"
a_2	14700	46'158'970		filo Ø	41'089'390	"
a	1509	4738	ϕ 15	acciaio	9'196'172	"
				totale	265'995'669	"

14000 = 2 R_1

14130 = 2 R_2

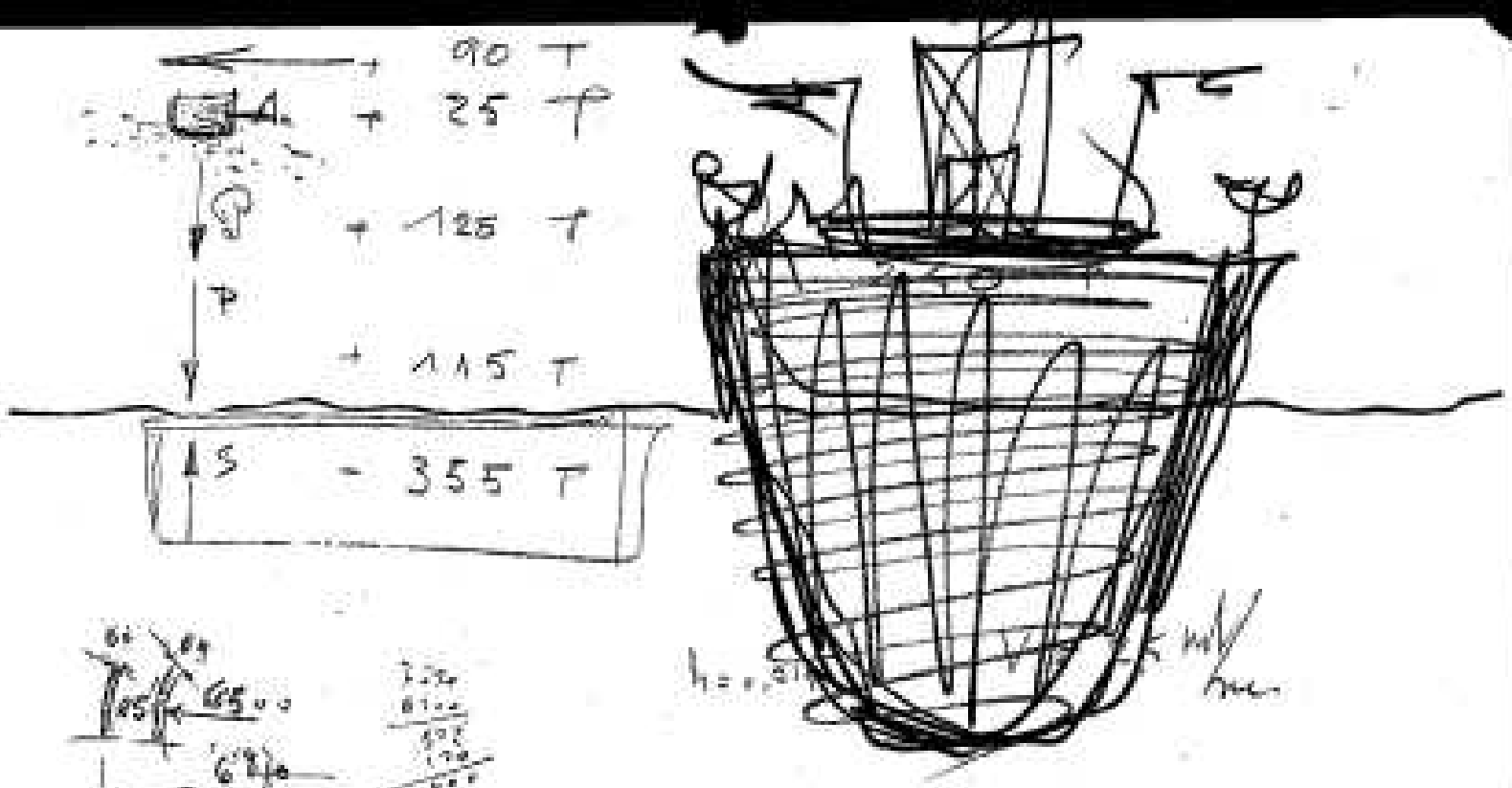
$\frac{\pi D^2}{4}$ = 187'135 kg

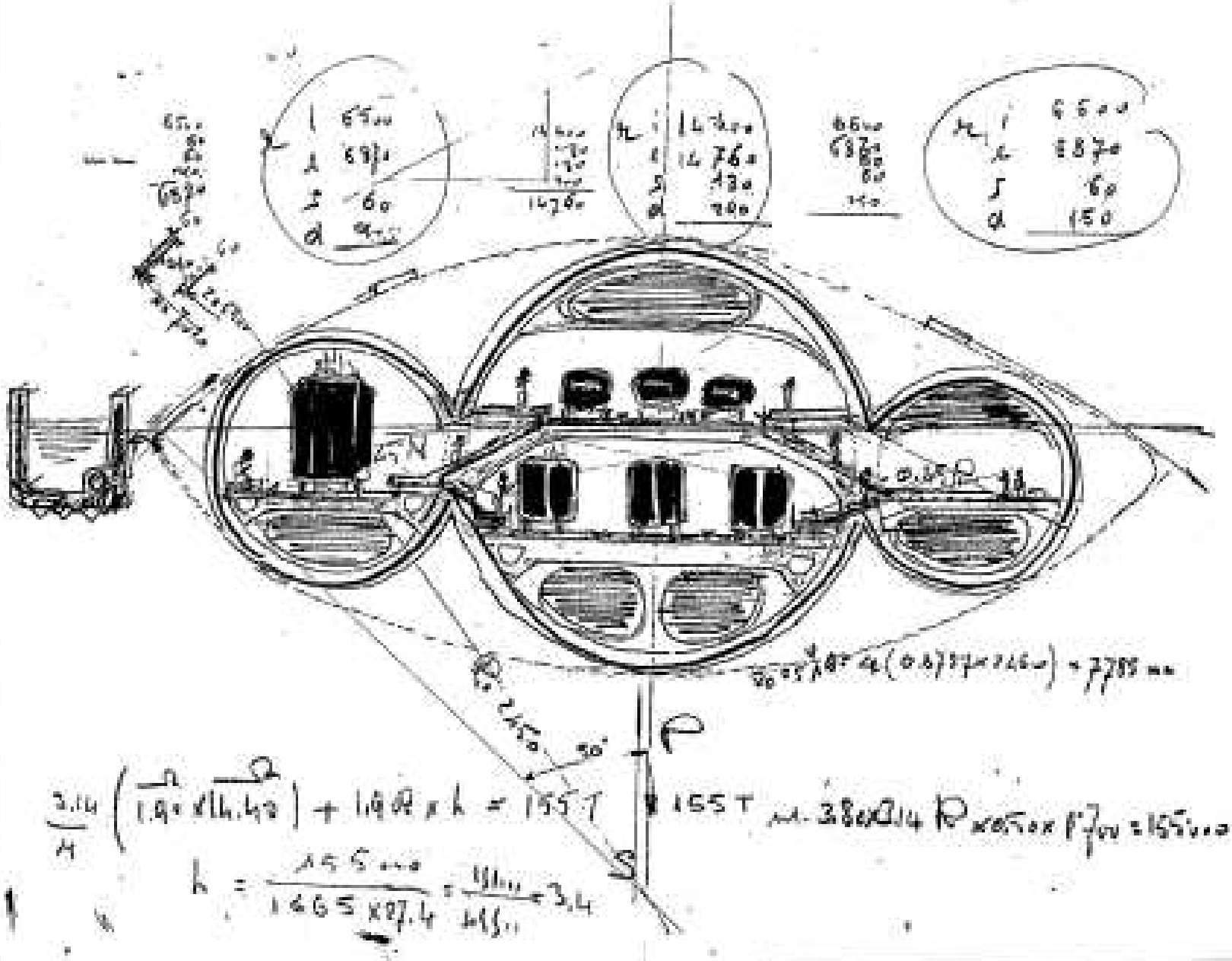
Spinta

S = 190'303 kg

V	Vp	Vista posteriore + ruote
M	Mg	Mot. Gomma + pedana + ruote
M	Mf	Mot. Ferro + pedana + ruote

d = 14000



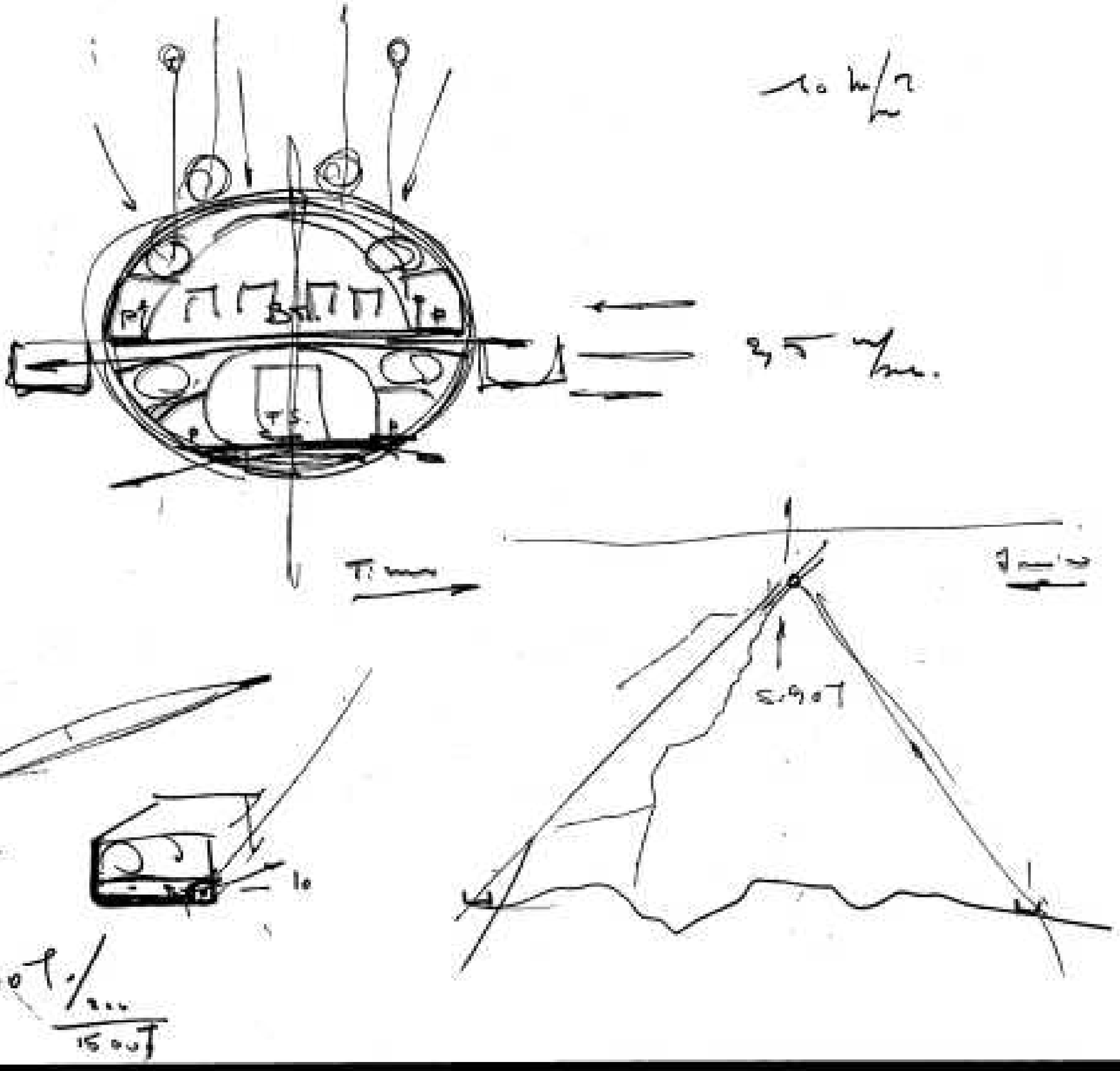


$$\frac{3.14}{4}\left(\frac{\overline{1.8}^{2}\times\overline{14.4}^{2}}{}\right)+1.8\,R\times h=155\,T \qquad 155\,T \text{ m. } 38\times 4 \text{ R } \text{ kg/cm}^2 = 155\,\text{t/m}$$

$$h=\frac{455\,\text{mm}}{1665\times 27.4}=\frac{155\,\text{t/m}}{45\,\text{t/m}}=3.4$$

Le mythe du Cosmos

- Introduction p. 70
- L'Antiquité
- Europe
- Rien à faire

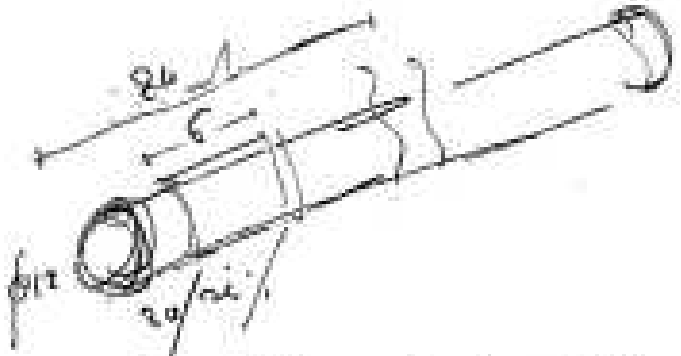


Anwendung Formeln

σ = 55 kN/mm²
E = 21000 kN/mm²
ρ = 7800 kg/m³

120 kg/m 84 kg/1m

(= (1,00 x 1,00 x 0,015) x 7850 kg/m³ = 390 kg)



C = 12π = 37,68 cm
A = 1,13 cm²
37,68 x 9540 = 3600 kg/m

(1,00 x 1,00 x 0,01225 x 7800 kg/m³ = 95,40 kg

1,17 x 1,5 = 1,7 m²/m

kg/m 1,76 x 1,00 m = 18,3 kg

1) 18,9 m x 1,5 = 40 m²

pp: Stahl angenommen (wie Tabelle) Ø 12
γ = 3,2 x 11 = 0,0113 m² + 1,0 kg/m = 212,76

pp: Beton (Tabelle entnommen) t = 6
1,76 (900 + 3600)

kg/m 1'851,50 x 6,00 m = 6,606,00 kg

1'939,04
1'851,50

2) 47,00 m x 45,00 kg/m = 2'115,00 kg

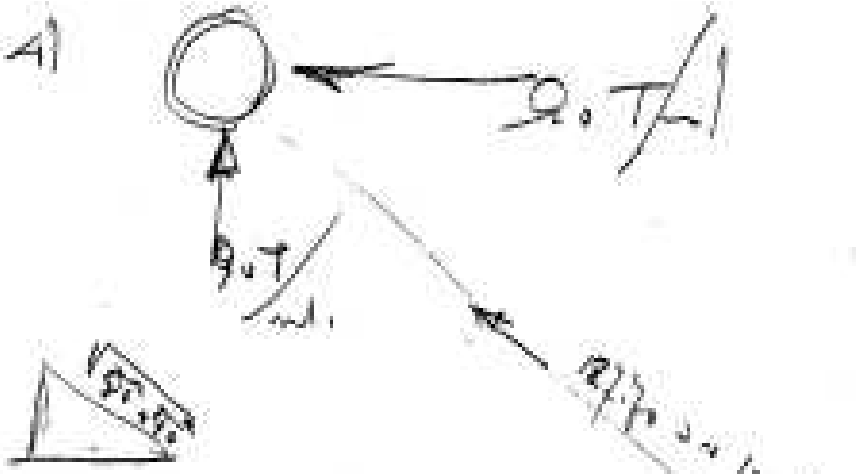
Gewicht angenommen

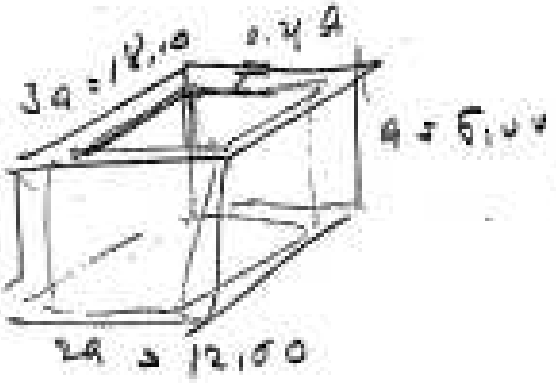
90 mm kg/m x 24 m = 0,09 m³ (90 mm kg/m³)
2,4 x 1000

3) 32 m x 1,5 x 1,13 x 7800 kg/m³ = 452 kg/m.

8,0 m x 2 m x kg/m² = 960 kg

A)





$$\frac{13,0\ m}{0,4\ m} \cdot 24 = 85,0\ m \times 0,175 \times \left(2 \times 3a^2 + 2a^2 + 6a^2\right)$$

$$\frac{12 \times 13,0\ m^4}{0,4\ m} = 21,0 \times 0,175 \times 72\ a^2$$

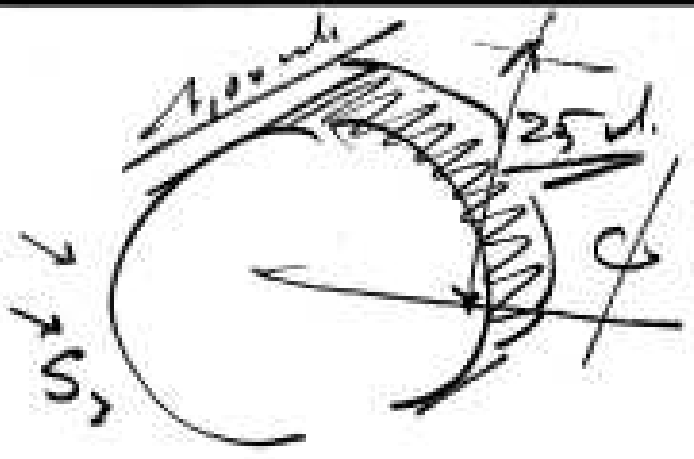
$$a = \sqrt{\frac{1560,0\ m^2}{441,0\ m}} = 1,88$$

$$\frac{2,2\ m}{0,4\ m} \times 6,74\ m = 37,7\ m \cdot m^2/m = 37,7\ m^3$$

$$\frac{\quad}{\quad}$$

$$\frac{\quad}{\quad}$$

$$\frac{\quad}{\quad}



$S_1 = 660$ kg

$S_2 = 186\,000$ kg.

$$S_1 = \frac{2.5\ \text{kg/cm}^2 \times 1.000\ \text{m}^2 \times 1.35\ \text{kg/m}^3}{9.81\ \text{kg/cm}^2} \times 9.81\ \text{kg/cm}^2 = 660\ \text{kg/m}^2$$

$$S_2 = \frac{3.14 \times 15^2}{4} \times 1.35\ \text{kg/m}^2 = 176.500\ \text{kg/m}^2$$

$$S_3 = 15 \times 3.14 \times 1.57 \times 25\ \text{m} \times 1.35 = 73.127.750\ \text{kg}$$

$$15 \times 3.14 \times 1.57 \times 100\ \text{m} \times 1.35 = 299.911.000\ \text{kg}$$

١٩٧٨/٢

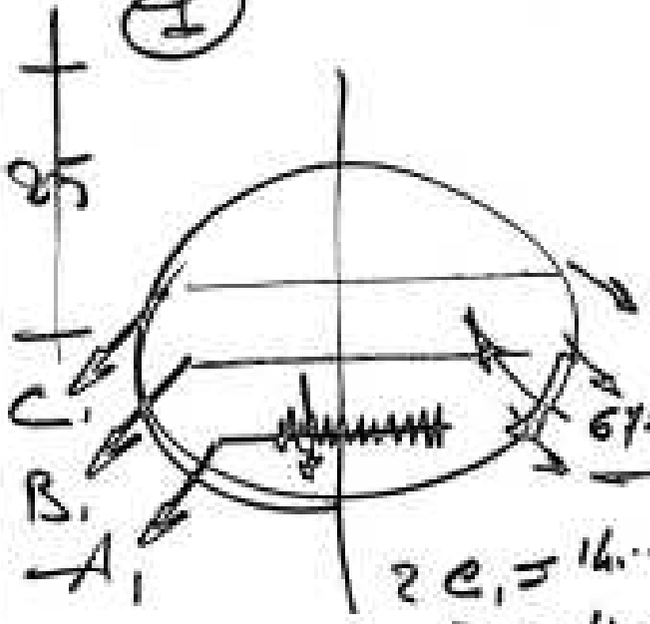
مثال $1.3 \frac{50.000}{1.57 \times 170} = L = \underline{\underline{35}}$

$1.3 \frac{5000}{157 \times 170} = L = \underline{\underline{35}}$

$1.3 \frac{8000}{157 \times 170} = L = \underline{\underline{140}}$

Cuba Cuba 1971/2

(I) ϕ15 1.57 $\frac{\pi D^2}{4}$ 1.57 = 280 kg.



R3 1890 ... kg. (5.750 kg/m.)

~ 2'...'000 kg.

6750 kg. × 1.57 × 4.80 = 51 ... kg.

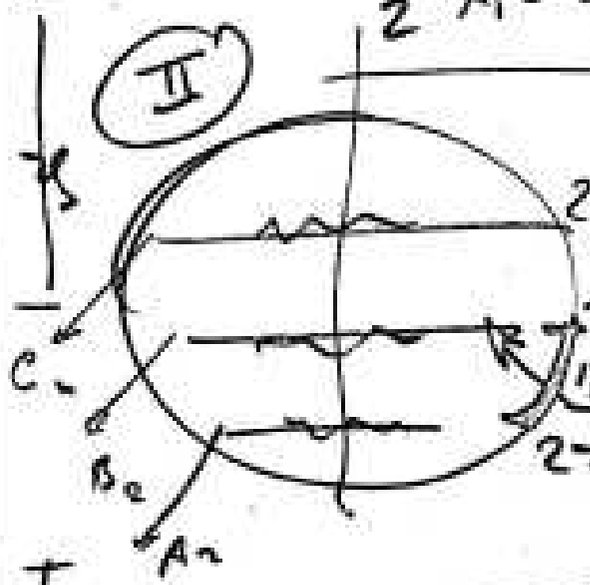
2 C1 = 14.. × 1.57 × (175 kg/m. + 400 kg/m.) = 11.540 kg

2 B1 = 11.. × 1.57 × 227 kg/m. + 15 ... kg = 18.990 "

2 A1 = 41.. × 1.57 = 267 kg/m. + 80 ... kg = 33.000 "

113.460

(II)



~ 9'...'... kg.

199'... kg.

9.750 kg.

2 C2 = 14 × 1.57 × 175 kg/m. (B 107 kg/m.)

= 4'000 kg.

2 B2 = 11 × 1.57 × 177 "

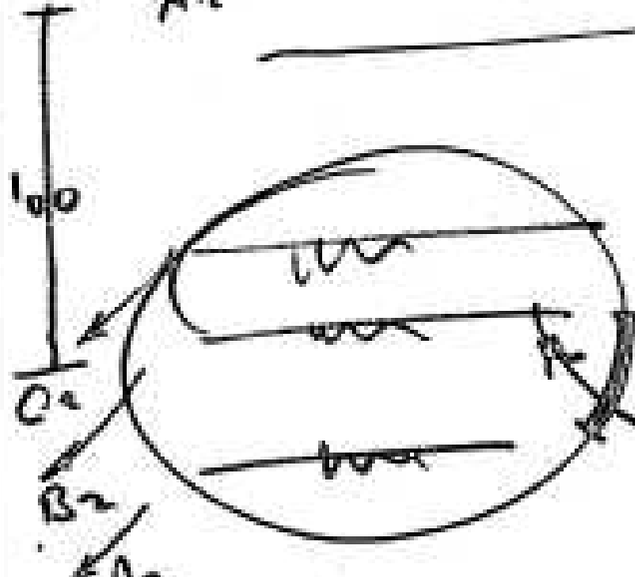
= 3'000 "

17107 kg. × 1.57 × 4.80 = 130 ... kg.

2 A2 = 4 × 1.57 × 65 f "

9.750 "

~ 75...'... kg

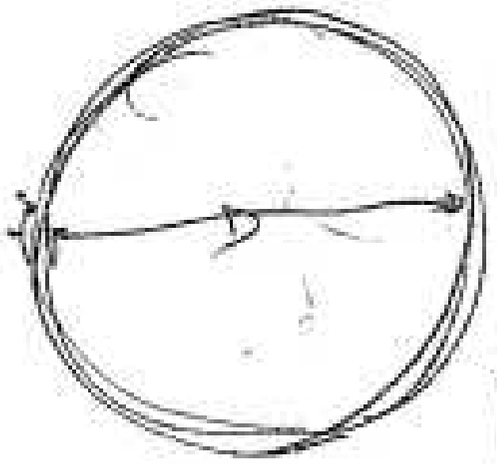


7.5..'... kg

(26.8.. kg/m.)

26.80. kg. × 1.57 × 480 = 202 ... kg. 9.750

M/4.10 AE 1964 7-E / F1B



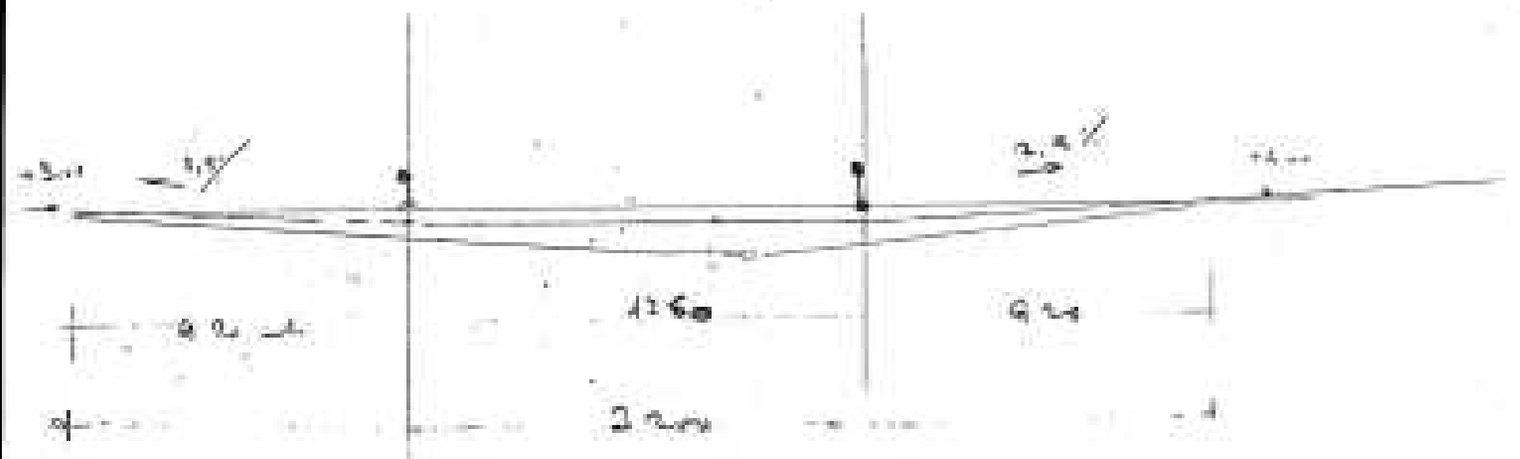
			Sinistra			
D	S	V	L	D	H	
1...	66	485	920	1780	132	a ...
18...	1190	878	3'980	13 ...	83	...
98...	950	745	3'48	19900	1185	... -85%
M...	730	56...	2'430	19760	900	... -95%

I ...

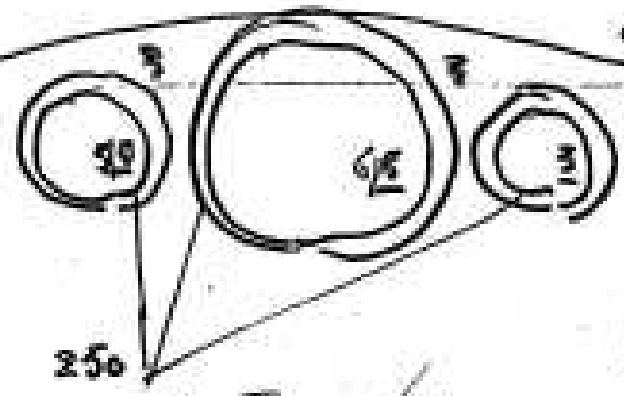
II ...

III ...

$\frac{0.95}{1,10} = \frac{6.75}{9.70}$



ACCIAIO



$\frac{c}{2} =$

(M_t) kgm 140000

(M_t) 7000 kgm

21 750 kgm

$0.4 \times 2 = 18\,000$ kg T

$= 5'635'416$

90000 kg T

$W = \frac{1\ldots}{12}\left(\overline{0.05}^2 + \overline{0.03}^2 + \overline{0.25}^2\right)$

$W = \frac{1\ldots}{12}\left(\overline{0.15}^2 + \overline{0.25}^2 + \overline{0.05}^2\right)$

$= 3\ldots\ldots\ mm^3$

14,40

$M_i = 911\ldots\ldots$ kgmm

$0.35 \times M_{20} + 0.65\sqrt{M_{20}^2 + M_t^2}$

$0.35\,M_{20} + 0.65\,M\sqrt{2^2+1}$

$h = \frac{911\ldots\ldots}{7+13} = 4$

$J = \frac{bh^3}{12} = 185\ldots$

$1\ldots\ldots$

$15a = h\ldots\ldots$

$b \quad mm^3 \quad W = \frac{bh^2}{12} = 161\ldots$

M_i kgmm ; W mm^3

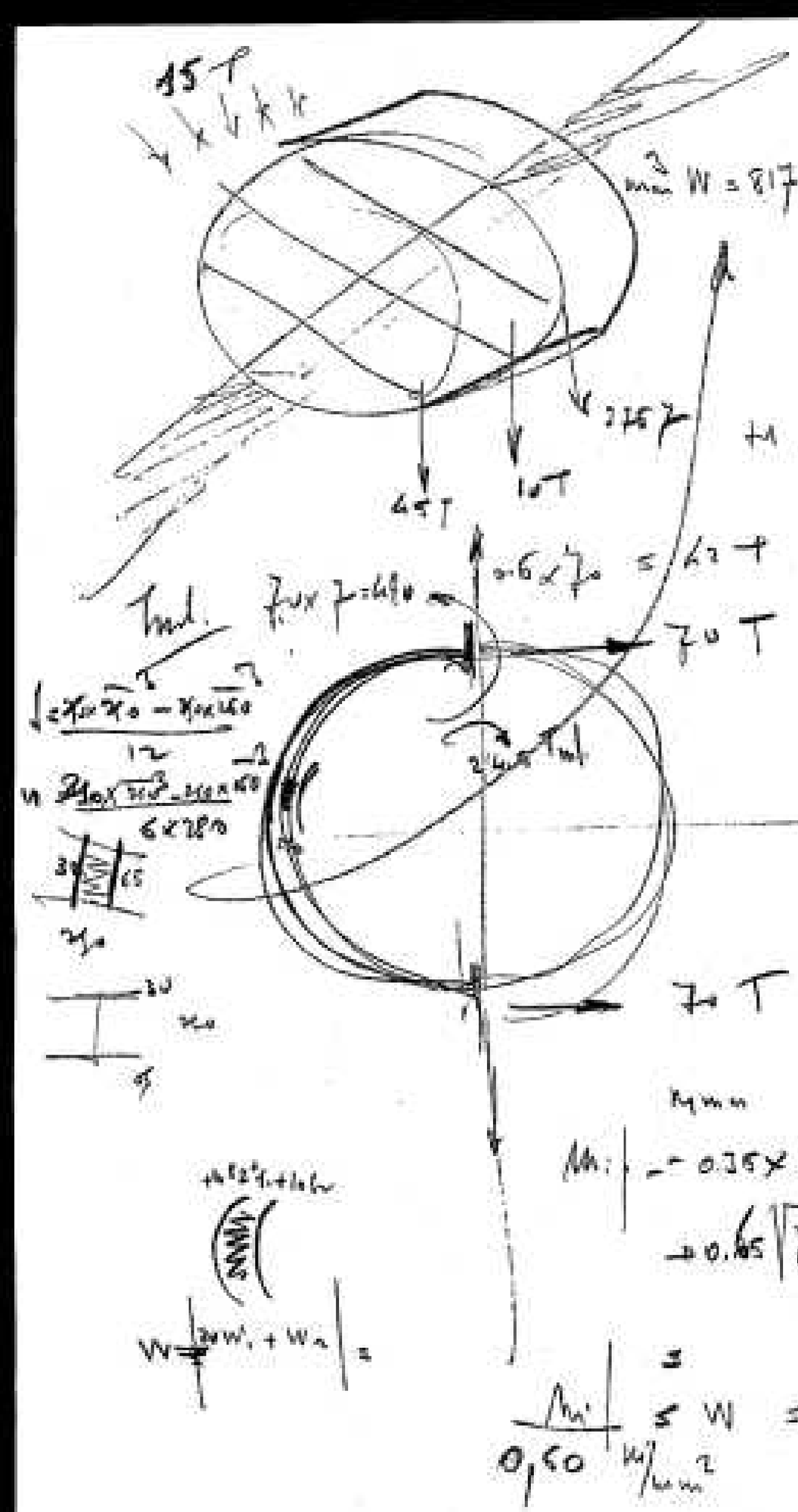
$M_i = 0.35 \times 140\,000\,000 + 0.65\sqrt{140\text{ in mm}^2 + 7\ldots\ldots\ldots} = 140113679$

$(25'56\ldots)$

$\frac{M_i}{W} = 70\ kg/mm^2 = \frac{14\,011\,36\,79}{141.\ldots} = 99.37$ $\frac{M_i}{W} = \frac{5h'-\ldots}{5'635'416}$

$\frac{M_i}{70} = 2\ldots\ldots$ mm mm $h = \sqrt{\frac{2\ldots\ldots \times 12}{1\ldots}} = 155$

$\frac{M_i}{70} = \frac{25550\ldots}{70} = 365\ldots$ $h = \sqrt{\frac{365\ldots \times 12}{1\ldots}} = 1,066$



$$W = 817\,000\,000\ \text{mm}^3 \qquad \frac{H^4 - 0.6\,H^4}{6 \times H} = 0.112\,H^3$$

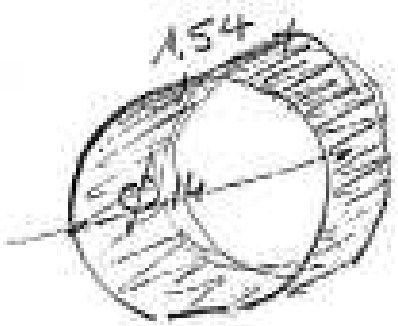
$$H = \sqrt[3]{98,04,00,00} = 468\ \text{mm}$$

$$0.6 \times 70 = 42\ \text{T}$$

$$W = 817\,330\,000\ \text{mm}^3$$

$$0,60\ \text{kg/mm}^2$$

1 Atm = 1000



53 000 kg/h.

(5)

$\frac{9233\ T}{mq.} = \frac{233000}{9 \times 16 \times 1,54} \frac{kg}{T}$

= 936,60 kg/m²

p/ Atm. 0,244 kg/mm²

S/ mm mm

16 mm mm

h = 4,5

a = 80

l = 1540 mm

R = 55 kg/mm²

$e = \frac{0,244 \times 16\ mm \times 4,5}{4\ mm \times 55} \left[1 + \sqrt{1 + \frac{80 \times 1540}{0,244\ (1540 + 16\ mm)}} \right] = 5,71\ mm$

$R_T = 4.30$ $R_A = 7.80$ $R_P = 4.30$ $R_C = 25.75$

$n_T = 3.75$ $n_A = 6.70$ $n_P = 3.80$ $n_C = 8.75$

$\delta_T = 0.55$ $\delta_A = 0.50$ $\delta_P = 0.50$

$C_T = 27.00$ $C_A = 45.26$ $C_P = 27.00$ $PQ_C = 2.00 \times 51.5 = 103.00$

$C_T = 23.75$ $C_A = 42.15$ $C_P = 23.85$ $2Q_C = 1.67 \times 55 = 91.80$

$S = \pi\left(\frac{4.30^2}{23.75} + \frac{7.80^2}{42.15} + \frac{4.30^2}{23.85}\right) \text{km} = 873.00$ $\Sigma(Q_1 + Q_2) = 413.25$

Quota (km 10)

$L = 0.75 \times 7.50 = 5.60$ $L = 0.75 \times 13.80 = 10.40$ $L = 6.60$

$D_T = 1.38 \times 7.60 = 10.25$ $1.38 \times 13.40 = 18.50$ $1.26 \times 1.00 = 10.50$

$D_A = 1.38 \times 13.40 = 18.50$

$J_T = 0.05\left(\frac{8.60^4}{2} - \frac{7.50^4}{2}\right) = 25.61$ $J_A = 0.05\left(\frac{14.40^4}{2} - \frac{13.60^4}{2}\right) = 161.27$ $J_P = 0.05\left(\frac{8.60^4}{2} - \frac{7.60^4}{2}\right) = 21.13$

$W_T = 0.2 \times \frac{25.61}{8.60} = 51.84$ $W_A = 0.2 \times \frac{97.80}{14.40} = 154.56$ $W_P = 0.2 \times \frac{44.12}{8.60} = 51.44$

$F_T = 0.785\left(8.60^2 - 7.50^2\right) = 18.98$ $F_A = 0.785\left(14.40^2 - 13.60^2\right) = 17.12$ $F_P = 0.785\left(8.60^2 - 7.60^2\right) = 13.90$

$SP = 0.1 \times 2.5 \left(F_T + F_A + F_P\right) 2 = 94.32 \text{ kg/cm}$ $P_{tot} = 1.50\ P = 141.50 \text{ kg/cm}$

(T) (A) (P)

$\eta_T = \frac{23.50}{84.00} = 0.27$ $\eta_A = \frac{13.00}{164.00} = 0.093$ $\eta_P = \frac{26.00}{84.00} = 0.308$

$\lambda \frac{2}{R_T} = 0.25$ $1 - \eta_A^2 = 0.99137$ $1 - \eta_P^2 = 0.12$

$p_C = 0.10 \text{ kg/cm}^2$

$p = 0.66$ $p = 0.14$ $p = 0.21$ $p = 0.24$

$\sigma_T' = \frac{0.9 \times 0.10}{1 - \eta_T^2} = \text{kg/mm}$ $\sigma_A' = \frac{0.9 \times 0.10}{1 - \eta_A^2} = \text{kg/mm}$

$\sigma_T'' = \frac{1.7 \times 0.10}{1 - \eta_T^2} = \text{kg/mm}^2$ $\sigma_A'' = \frac{1.7 \times 0.10}{1 - \eta_A^2} = \text{kg/mm}^2$

$\tan\varphi = \frac{2.40\left(1 - \eta^2\right)}{0.80} = 0.68$ $\varphi = 34°$ $\sigma_{max} = 7.14 = \text{kg/mm}^2$

$\tan\varphi' = \frac{2.40\left(1 - \eta^2\right)}{1.70} = 0.25$ $\varphi' = 14°$ $\sigma_{max} = \text{kg/mm}^2$

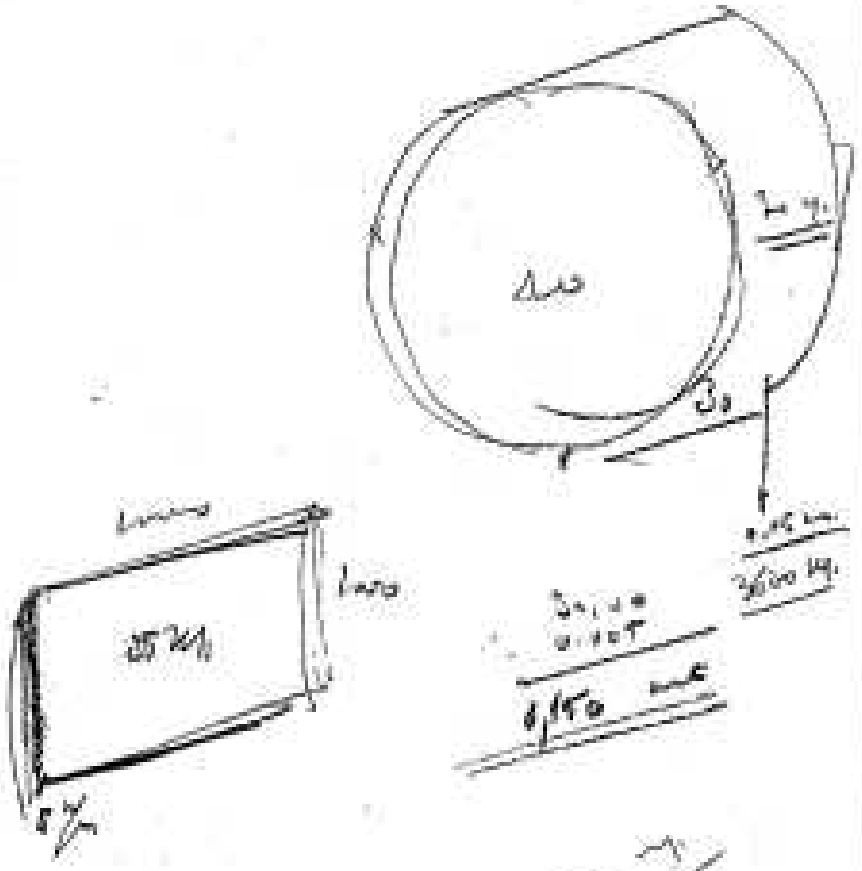
$G = 55$ kg/mm²

$E =$ [illegible] kg/mm²

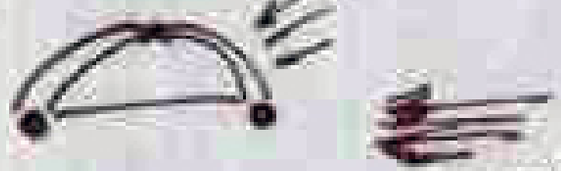
σ [illegible] kg/mm²

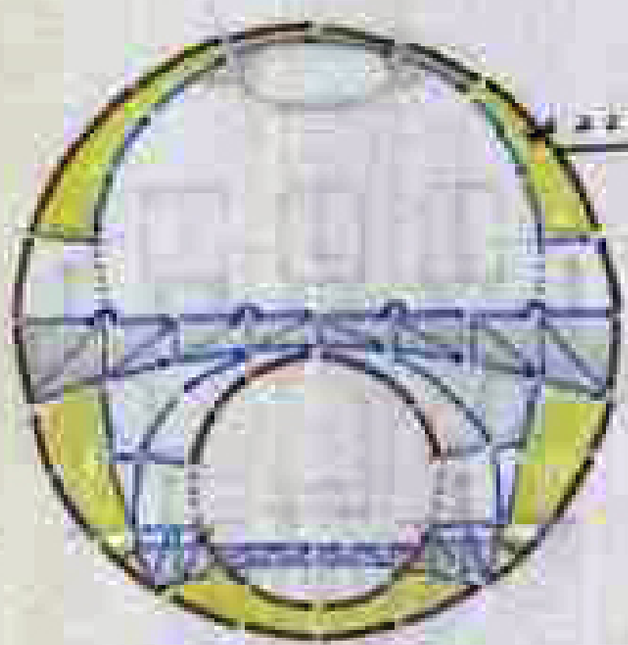
$$J = \frac{\pi}{4}\left(R^4 - r^4\right)$$

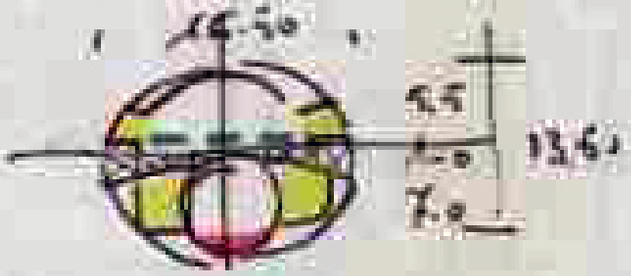
$$V = \frac{M}{R}$$

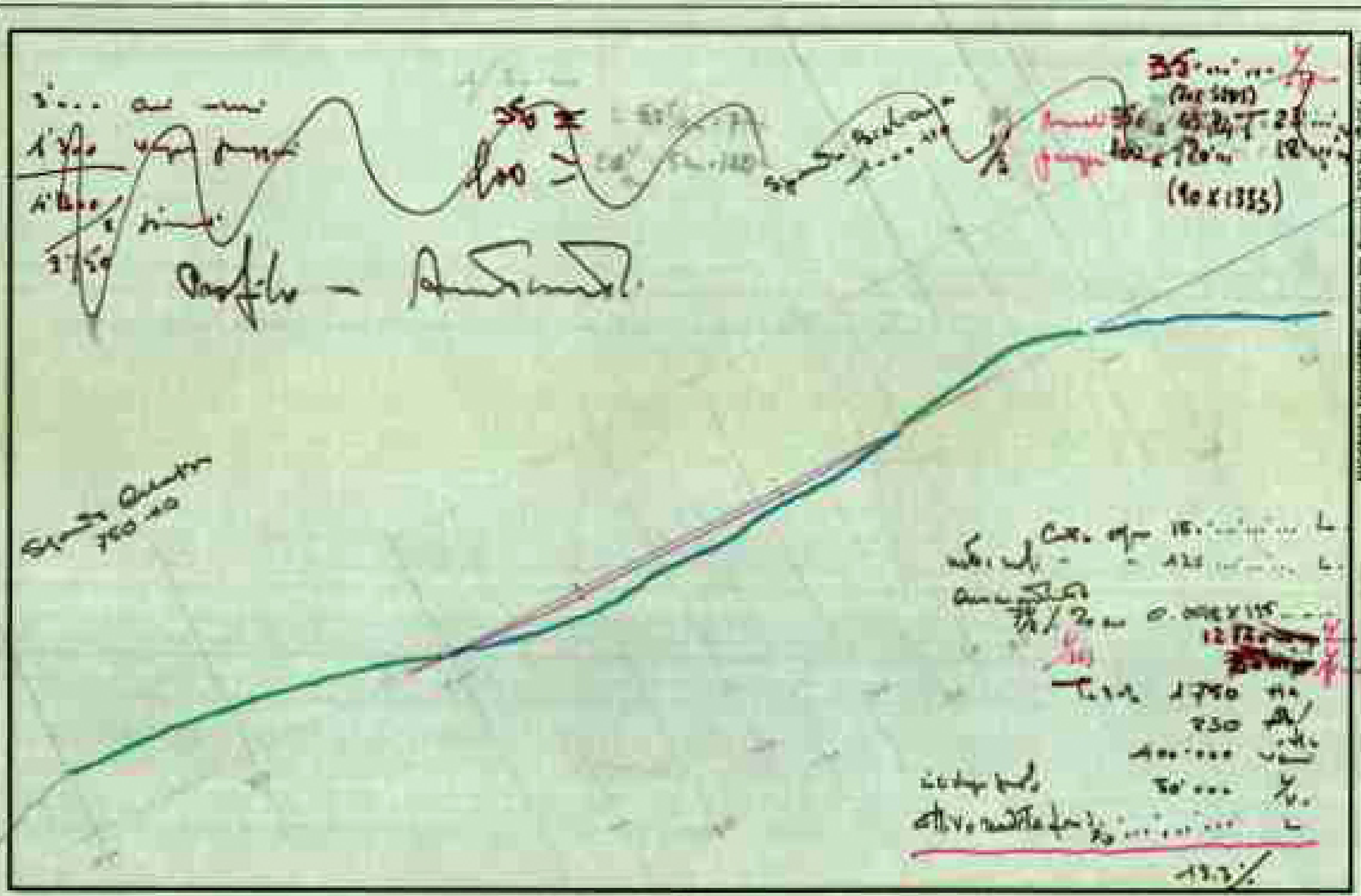


kg/mm²


90T/m²







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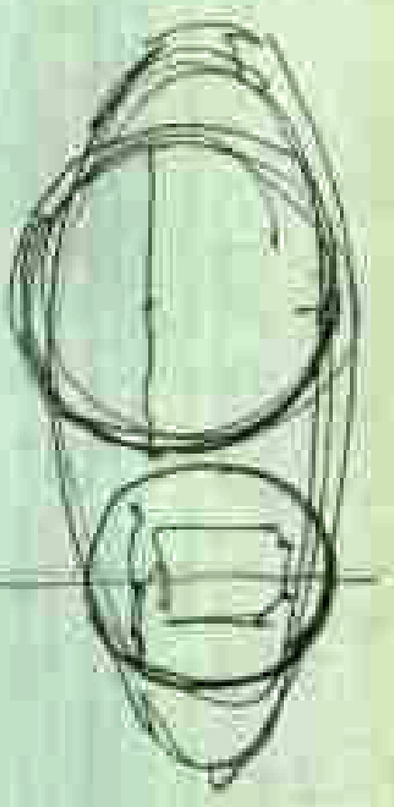

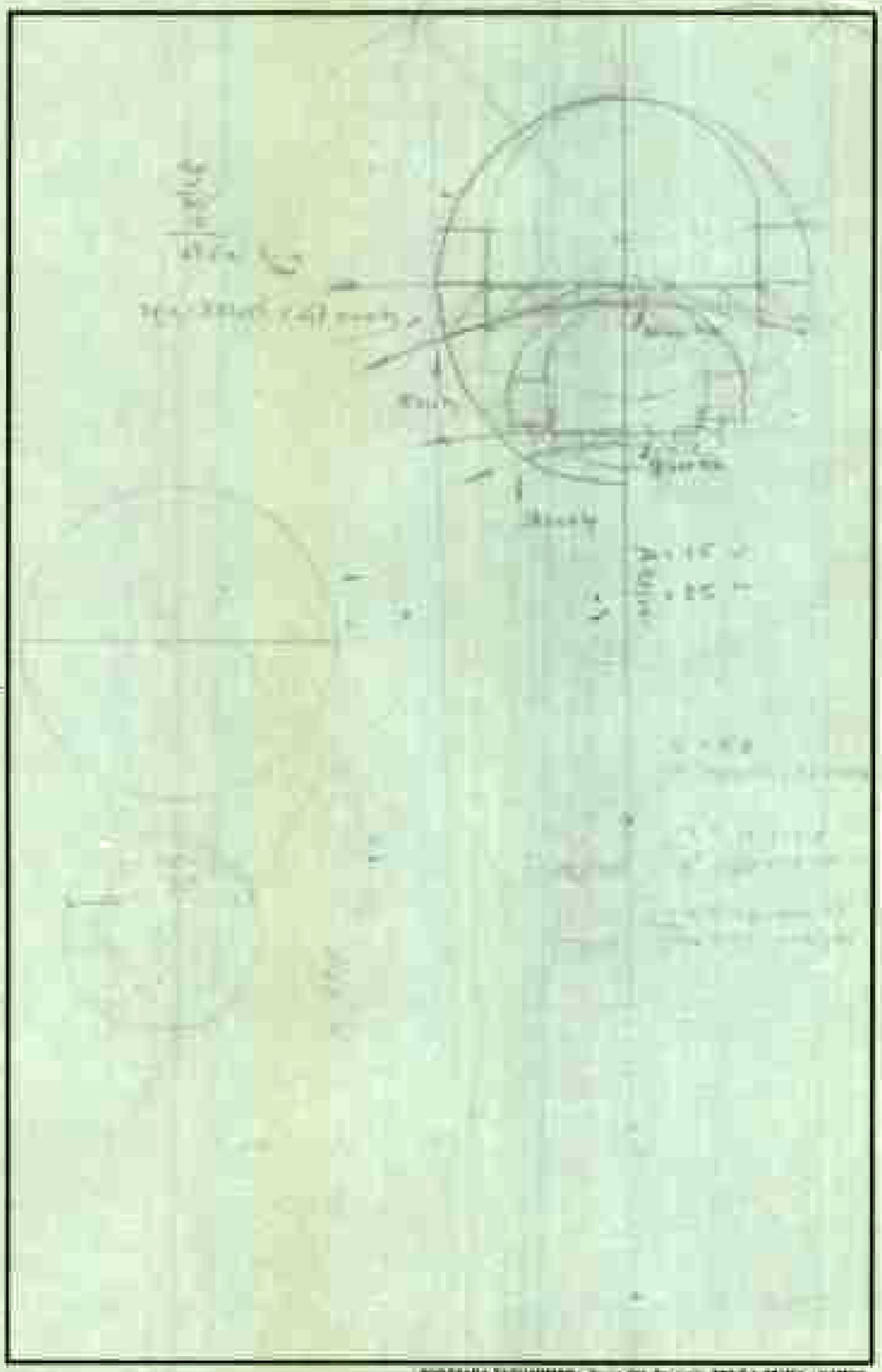

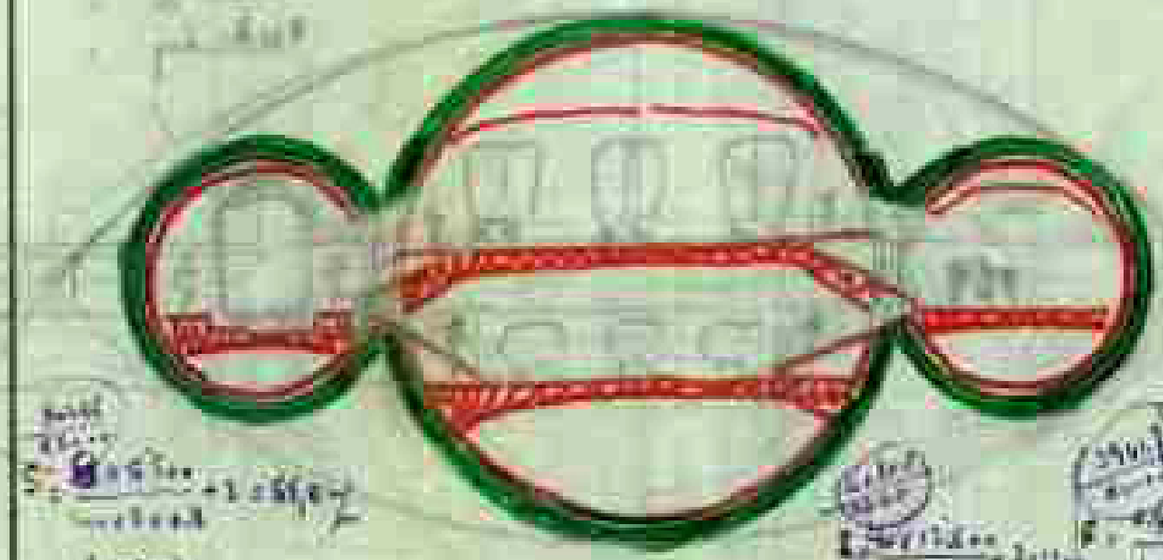

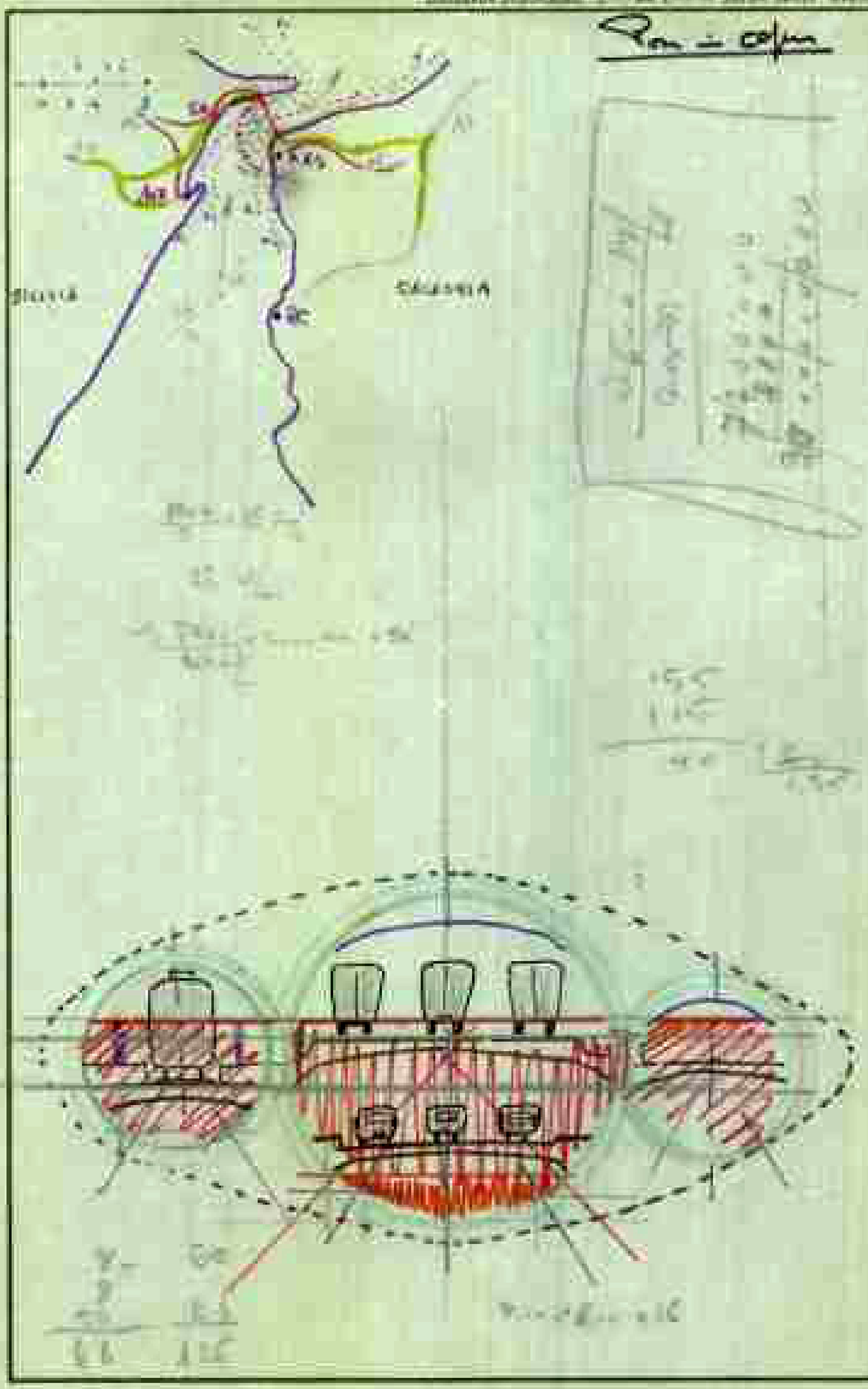

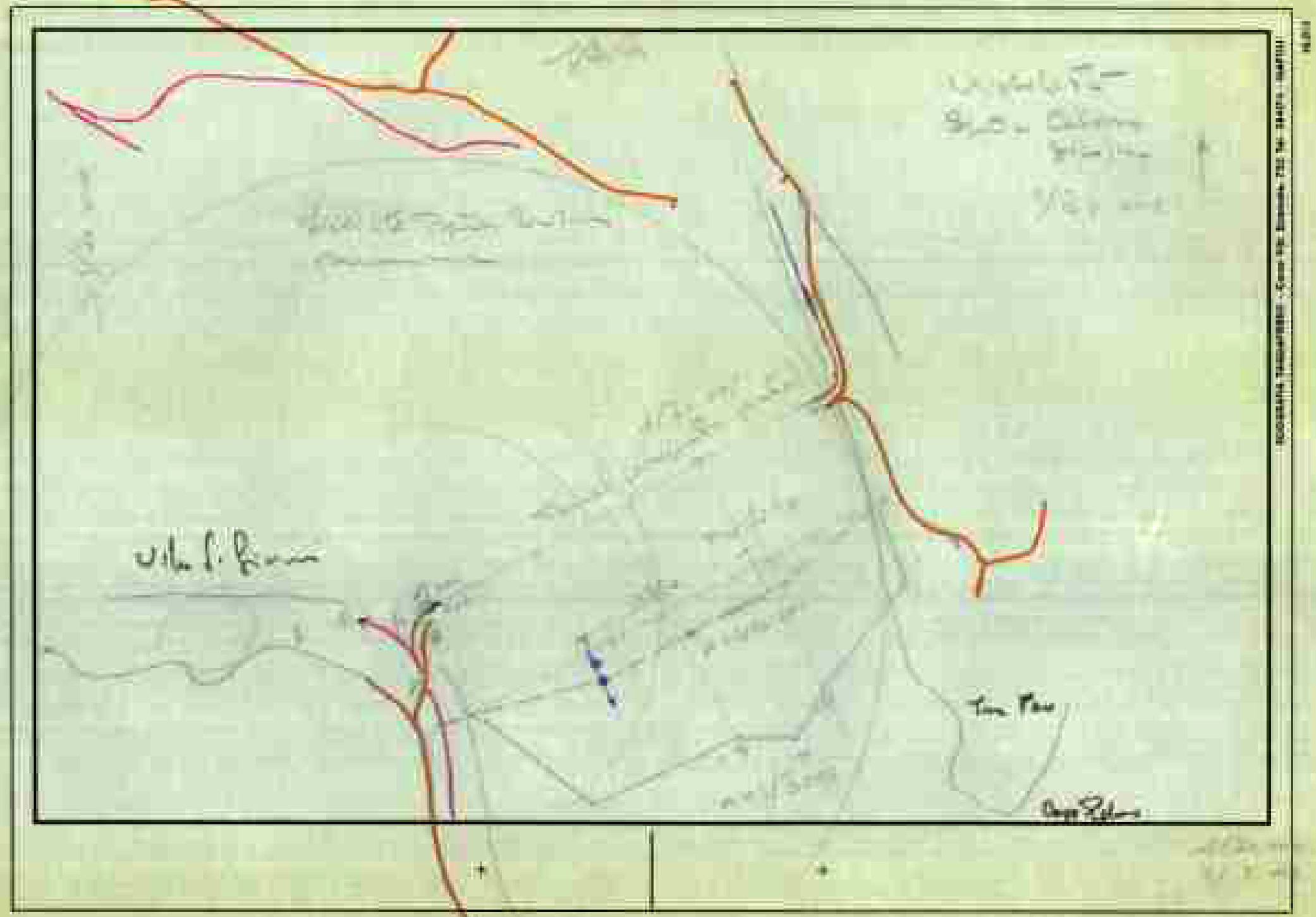

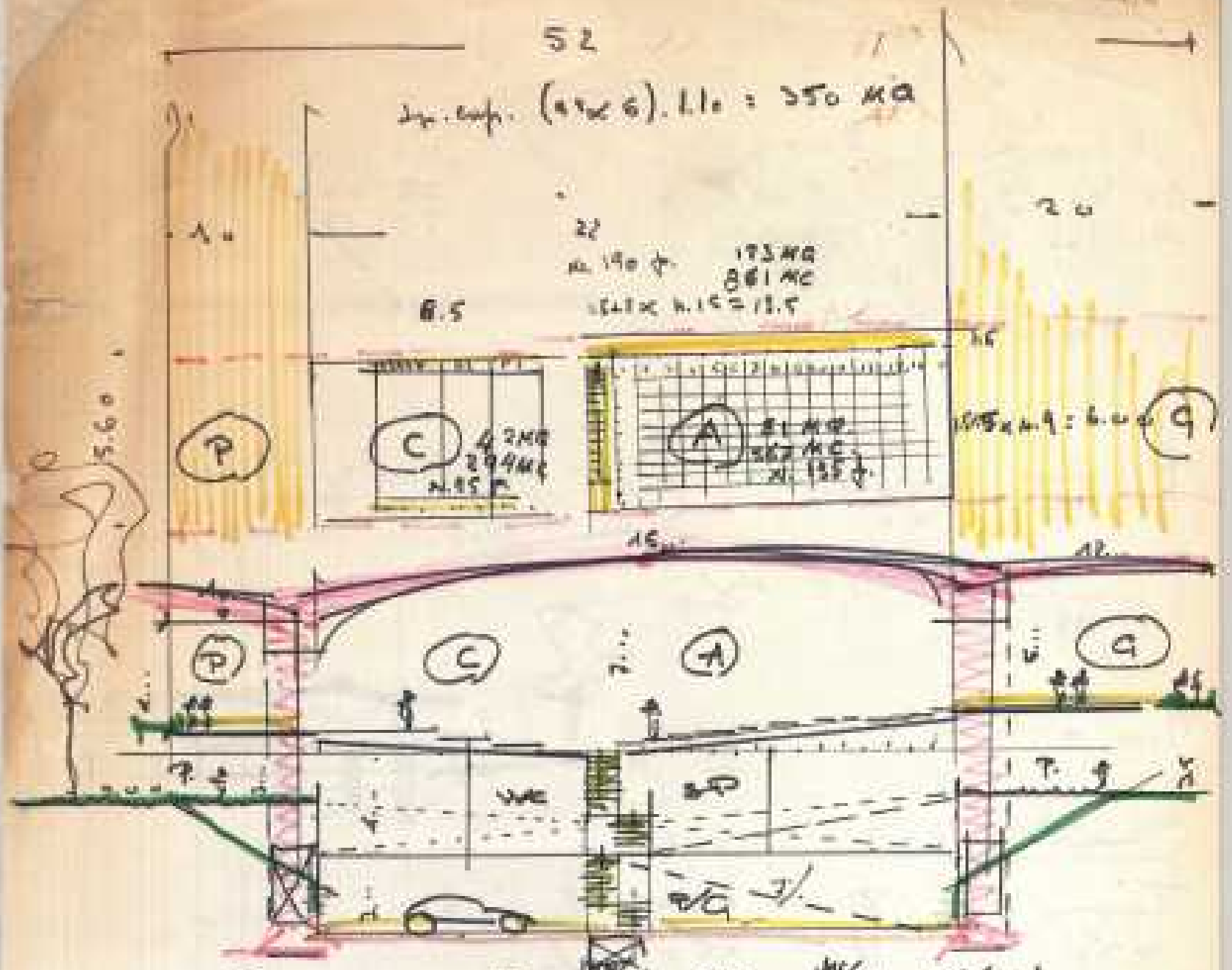

	MQ	P	MC	MC/P	MC/MQ
P. 135 55	81	0.60	527	7....	7....
	42	0.70	294	7....	7....
	60		240		
	120		600		
10 kw/m²	123	80	492		
	123		369		
	(600) 180		600	23 = 1/23	5.50
200 t	729	360	3162	15.80	4.40