ברוך ירמולינסקי מהנדסי מבנים בע"מ
Baruch Yarmolinsky Structural Engineers LTD

נספח אי

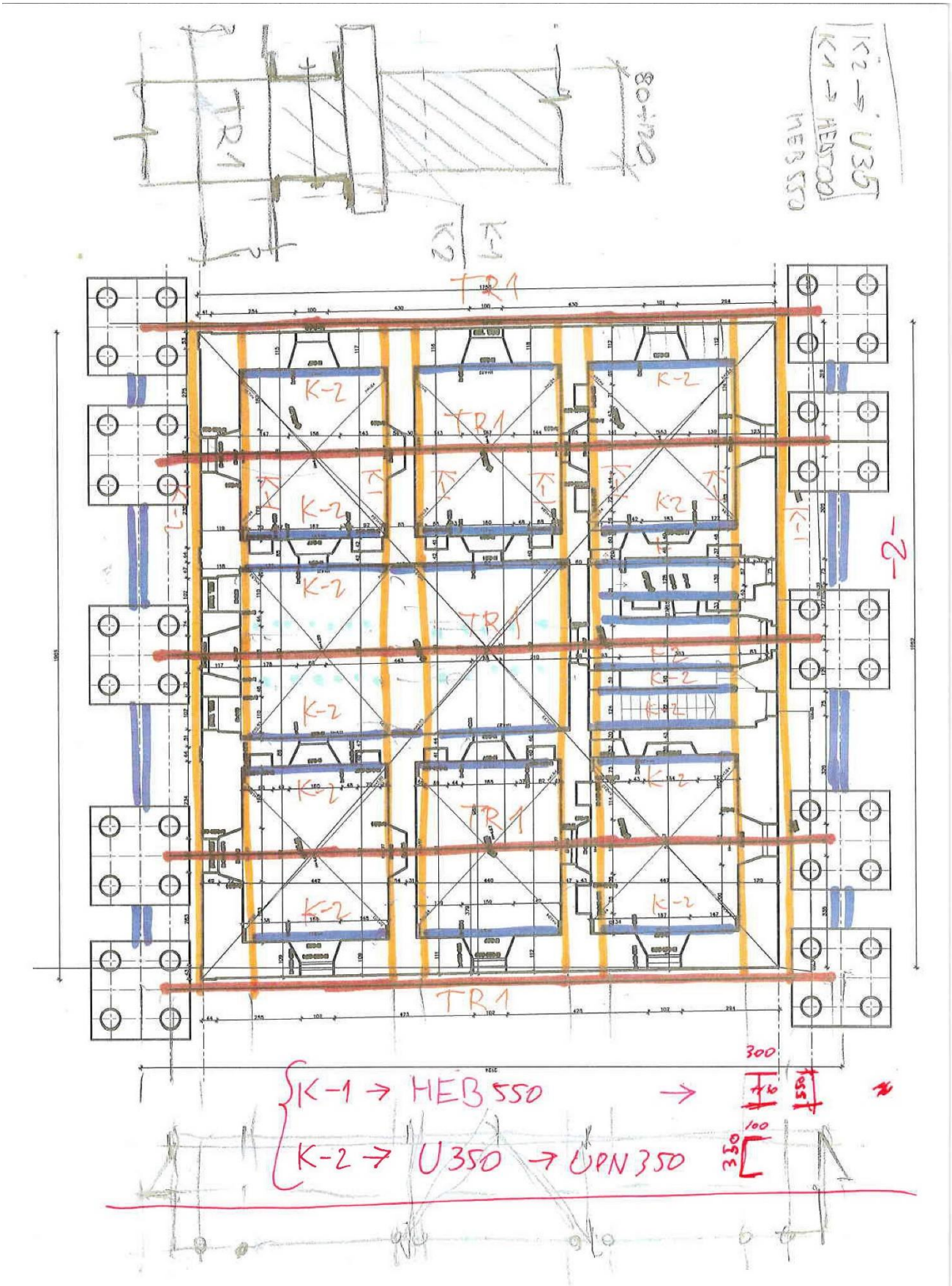
חישובים סטטיים

טל 02-6727404
פקס 02-6712919
נייד 054-4539760

יד חרוצים 10, משרד 302 ירושלים
ת.ד. 29141 ירושלים מיקוד 9129002

by@engs.com
www.byengs.com

Forces !
1 ,, 2 ,,
3 ,,
4 ,,
5 ,,
6 ,,
7 ,,
8 ,,
B= 5.2 t
6.0 m
3 Axes
in Between
Truss 116
Truss 117
Heavy
= Type 1 =
Concentrated loads :
(-) 2,3
(-) 5,7
(-) 9
(-) 11
(-) 13,14
To take approximately
$n_1 = 8$ nodes
$N = 5$ (t)
All loads finally should be applied to trusses
$Q = 3$ boat $\rightarrow n_1 N = 8 \cdot 4 = 32$
$Q = 1.0$ t / node
24.03.22



נייד 054-4559760

by@engs.com
www.byengs.com

יד חרוצים 10, משרד 302 ירושלים
ת.ד. 29141 ירושלים מיקוד 9129002

טל 02-6727404
פקס 02-6712919
נייד 054-4539760

by@engs.com
www.byengs.com
יד חרוצים 10, משרד 302 ירושלים
ת.ד. 29141 ירושלים מיקוד 9129002
טל 02-6727404
פקס 02-6712919
נייד 054-4539760

LOAD CARRYING CAPACITY of CROSS-SECTIONS

TYPE 1:

$\Sigma A = 270 \times 2 = 540\ cm^2$ $\quad (\Delta A' = 1.2 \times 70 \times 2 = 168\ cm^2)$

$K_A = \frac{540+168}{540} = 1.31$

$K_J = \frac{342.000 + 68600}{342.000} = \frac{410600}{342.000} = 1.20$

$W_x' = \frac{J}{0.5h'} = \frac{410\,600}{35} = 11730\ cm^3$ $\quad K_W \sim 1.0$

$[A] = f_Y \cdot \Sigma A_c' = 2{,}75 \cdot (540+168) = 1215 + 378 = 1593\ t$

$[M] = 114.00 \cdot 2{,}75 = 256{,}5\ tm$

To take preliminary T-P, 13-TIDAL joists / — TYPE 1

$N = \pm 950\ t$ $\quad M = \pm 80\ tm$

$\sigma_N = \frac{N\omega}{A} = \frac{950 \cdot 1.2}{(540+168)} = 1.61\ t/cm^2$

here $\omega = 1.2$, for $\lambda = \frac{200}{6 \cdot 0{,}29} = \frac{200}{17.7} \sim 11$

~: HEIGHT / BRACINGS ~ 2m

To have BRACINGS $1 \div 2$, AT LEAST $\lambda \leq 50 \div 60$

$\sigma_M = \frac{M}{W_x'} = \frac{8.000}{11.400} = 0{,}70\ t/cm^2$

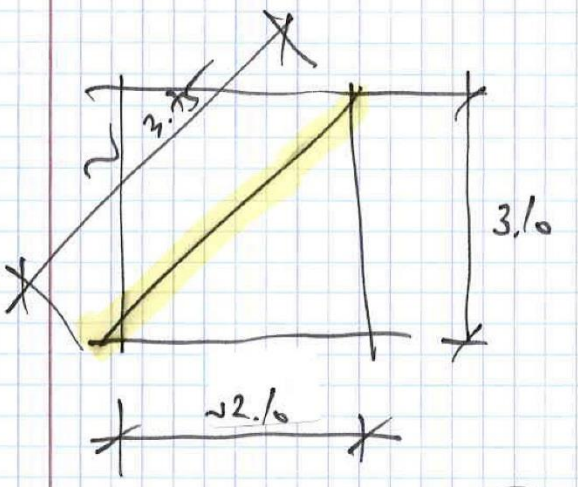
27.03.2020

by@engs.com
www.byengs.com
יד חרוצים 10, משרד 302 ירושלים
ת.ד. 29141 ירושלים מיקוד 9129002
טל 02-6727404
פקס 02-6712919
נייד 054-4539760

Diagonal loaded elements :

Tzir 3

$N \sim 400\ t \pm$ $\quad M_y = \pm 50\ tm$



$L' = \sqrt{3.10^2 + 2.10^2} = 3.75\ m$

(9.61) (7.41)

$\lambda = \frac{375}{(7.49)} = \frac{375}{7.49} \sim 50$

NOT CONNECTED 2 PROFILES

$\omega = 1.25$ (for $\lambda \sim 50 \div 55$)

$\sigma_N = \frac{N\omega}{A} = \frac{400\,(1.25)}{362} = 1.38\ \frac{t}{cm^2}$

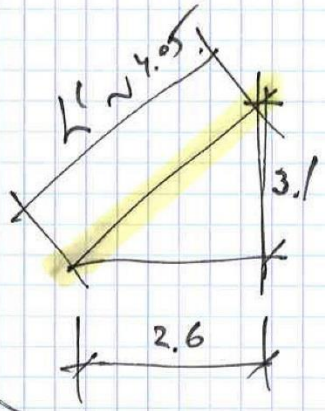
$\sigma_M = \frac{M}{W_y} = \frac{5000}{4800} = 1.04\ \frac{t}{cm^2}$

$\Sigma \sigma_i = 1.38 + 1.04 = 2.42\ \frac{t}{cm^2} \sim$

BUT BY DISPLACEMENTS :

2 I HEB 450 ÷ 500 B AT LEAST

FOR Tzir (9) : SLENDEST LOADED DIAGONAL ELEMENTS



$L' = \sqrt{3.1^2 + 2.6^2} = 4.05\ m$

(7.61) (6.36)

$\lambda = \frac{405}{(7.49)} = 54$ $\quad \omega = 1.27$

NOT CONNECTED

$N \sim \leq 410\ t$

$M \sim 12\ tm$

27.3.20

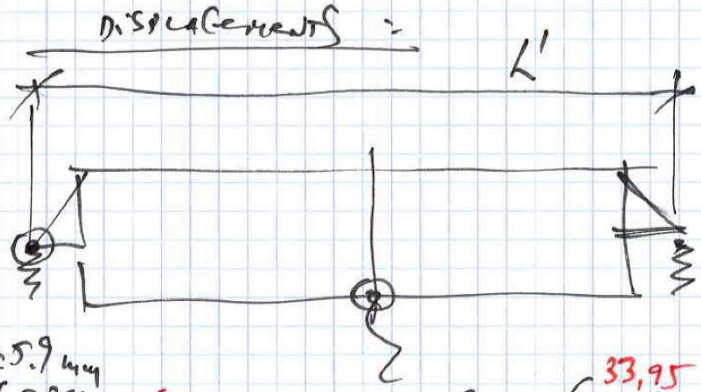
$\sigma_N = \frac{N_{(1)}}{A} = \frac{10 \cdot 1.9}{362} = 0.05\ t/cm^2$

$\sigma_M = \frac{M}{W_x} = \frac{1200}{4800} = 0.25\ t/cm^2$

$\sum \sigma_i = 0.05 + 0.25 = 0.29\ t/cm^2$

BUT BY DISPLACEMENTS !

DISPLACEMENTS =



$W = 5.9$ mm (5.88)

$\Delta = 33.95 - 5.88$ $W_{max} = 32$ mm (31.97) 33,95 28.07 mm

$\Delta = 31.97 - 5.88 = 26.09$ mm

$\frac{\Delta}{L'} = \frac{26.09}{20000} = \frac{1}{767}$! $\frac{28.07}{20000} = \frac{1}{713}$!

TRY =

360 B

Table 4 (7) 2HE450B

(8) 2HE450B 360 B

Table 5 (9) – 2HE270B

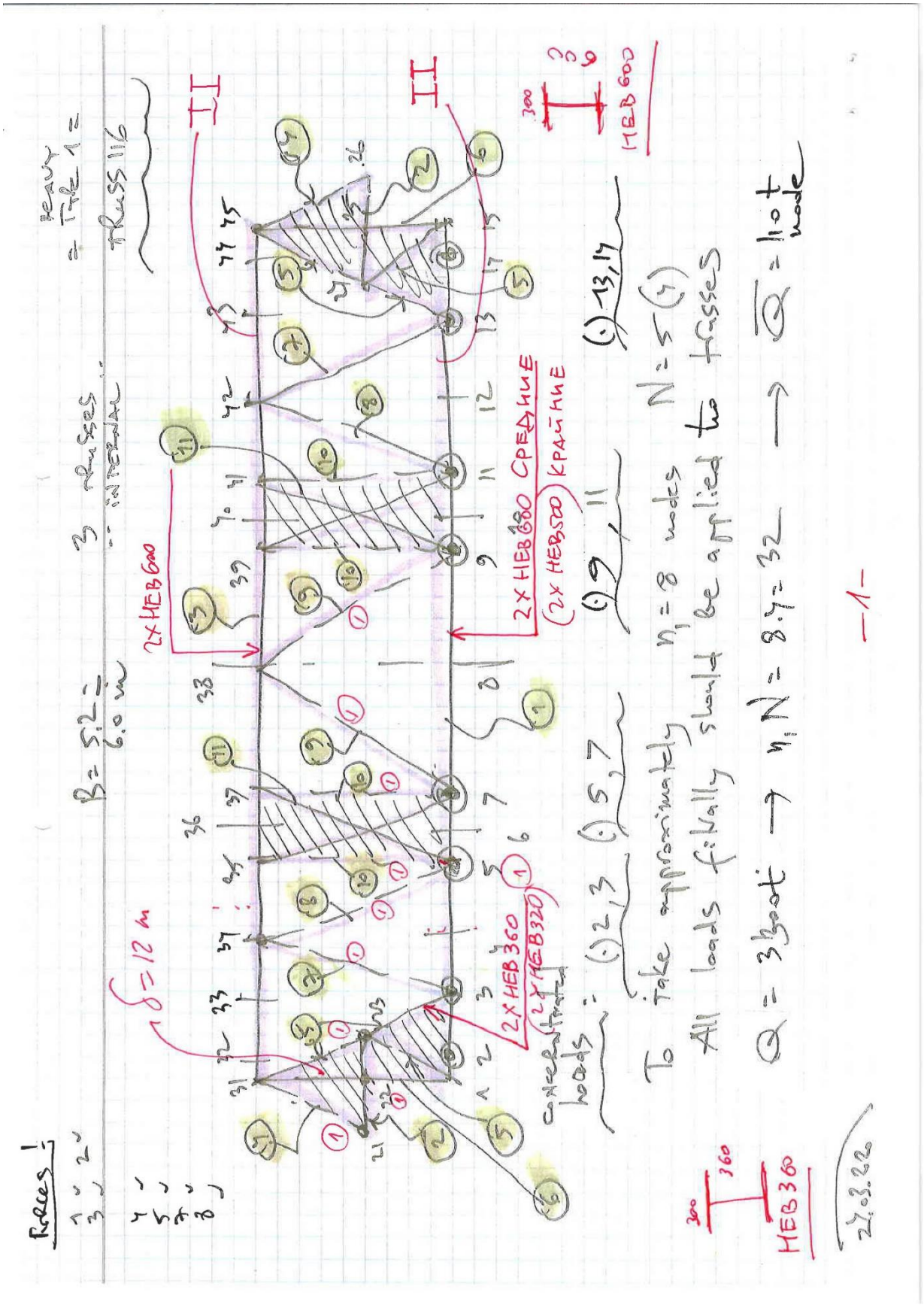
TRUSS 116a TXT

27.03.22

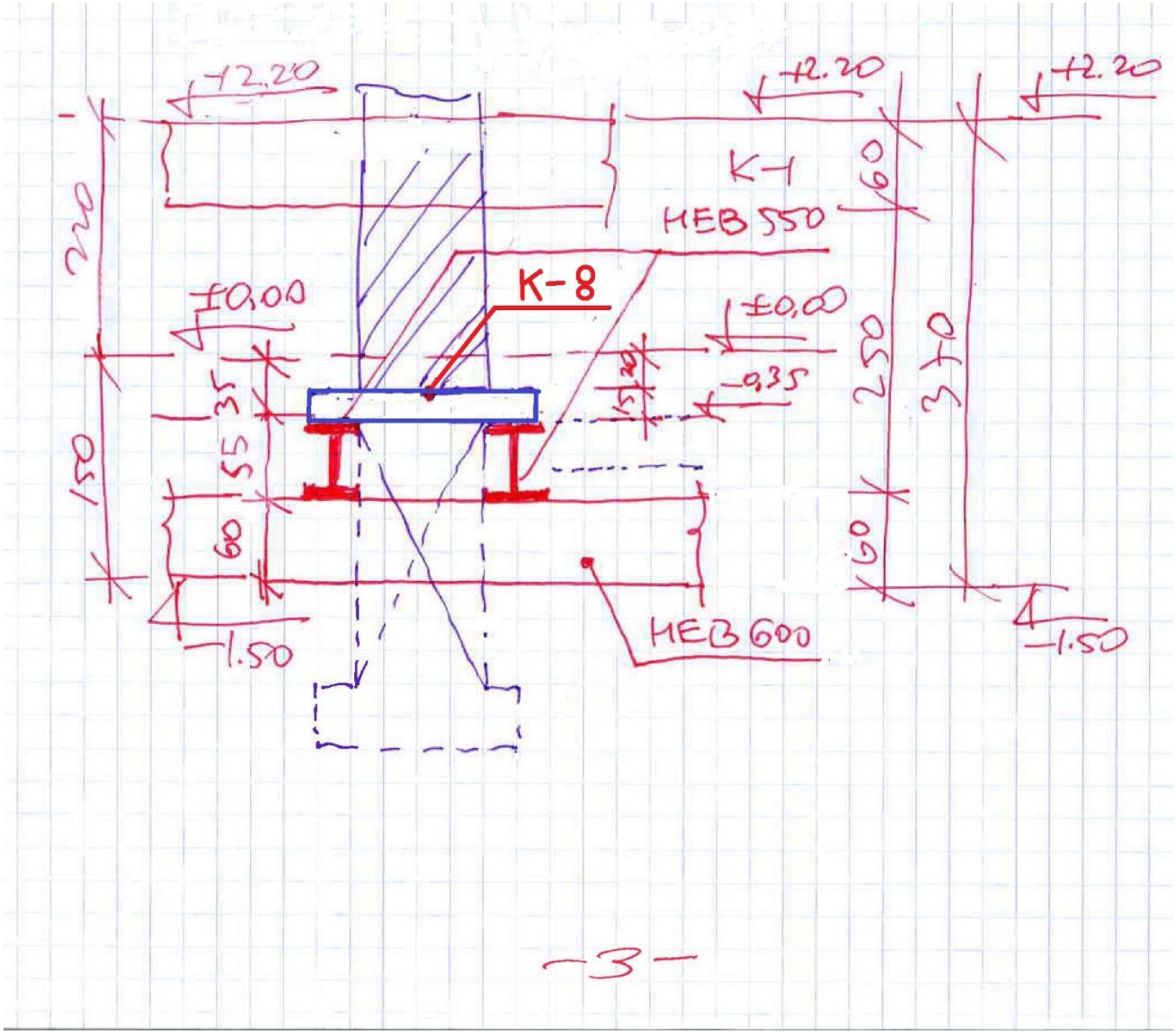
by@engs.com
www.byengs.com

יד חרוצים 10, משרד 302 ירושלים
ת.ד. 29141 ירושלים מיקוד 9129002

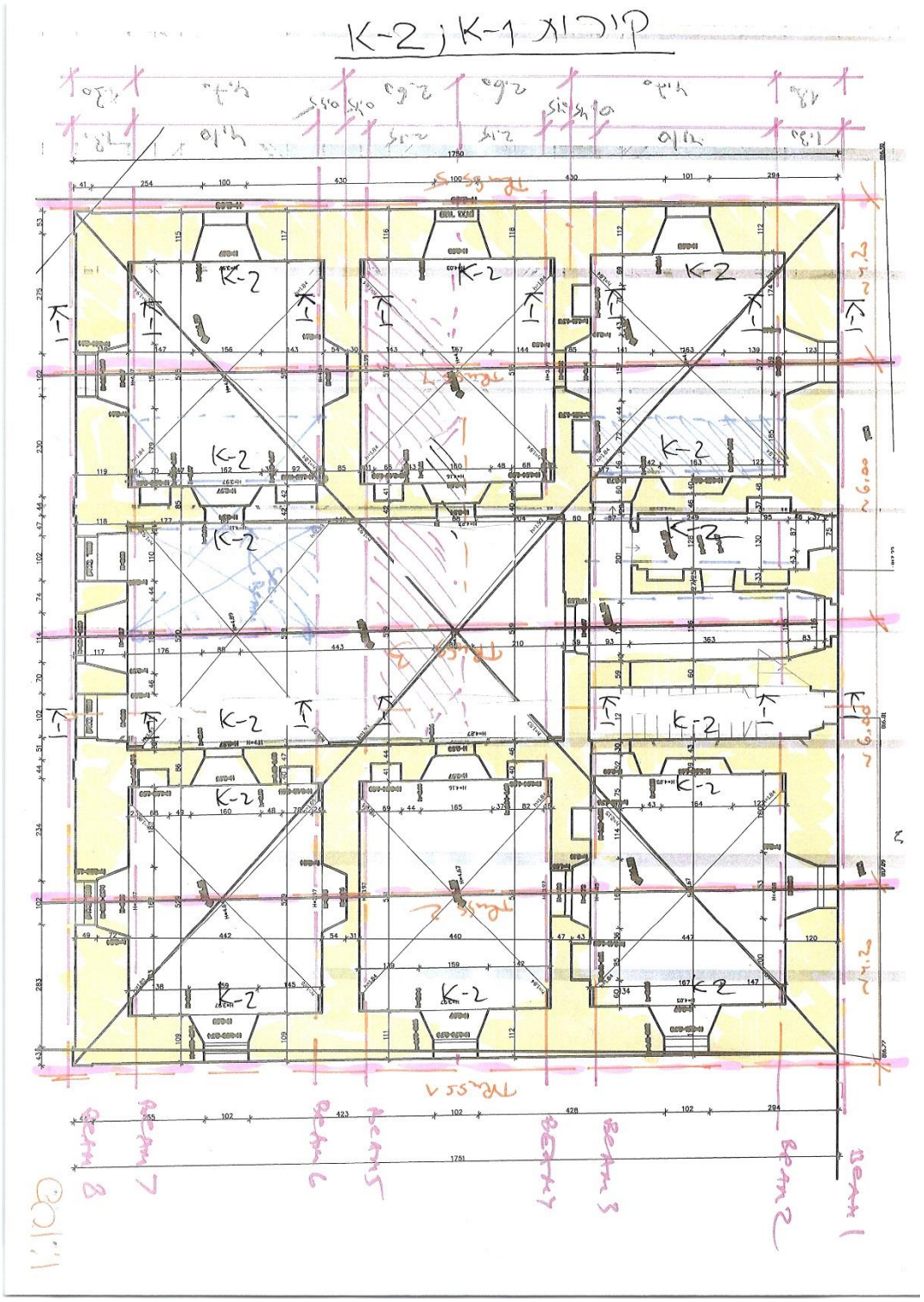
טל 02-6727404
פקס 02-6712919
נייד 054-4539760



by@engs.com
www.byengs.com
יד חרוצים 10, משרד 302 ירושלים
ת.ד. 29141 ירושלים מיקוד 9129002
טל 02-6727404
פקס 02-6712919
נייד 054-4539760



by@engs.com
www.byengs.com
יד חרוצים 10, משרד 302 ירושלים
ת.ד. 29141 ירושלים מיקוד 9129002
טל 02-6727404
פקס 02-6712919
נייד 054-4539760



by@engs.com
www.byengs.com

יד חרוצים 10, משרד 302 ירושלים
ת.ד. 29141 ירושלים מיקוד 9129002

טל 02-6727404
פקס 02-6712919
נייד 054-4539760

(1)

SECONDARY ELEMENTS

TYPE "A" — "BLUE" BEAMS (K-2)

$A' = 2.60 \times 4.40 = 11.44 m^2$ (maximum)

$\overline{Q} = \frac{11.44}{343.0} \times (3300 - 1300) \times 0.80 = 52 t$

(1300 — weight of external walls; 0.80 — influence of beams type "B")

$\overline{q} = \frac{\overline{Q}}{L'} = \frac{52.0}{4.40} = 11.8 \, t/m$

$R = \overline{q} \frac{L'}{2} = 11.8 \cdot 2.2 = 26 t$

$M = 11.8 \cdot \frac{4.4^2}{8} = 28.5 \, tm$

$[W_x] = \frac{2850}{2.5} = 1290 \, cm^3$!

To take additional 1-2 secondary beam — type "A" (blue beams)

For type "A" to take

$\frac{2}{3} \cdot \overline{M} = \frac{2}{3} \cdot 28.5 = \frac{57.0}{3} = 19.0 \, tm$

$[W_x] = \frac{1900}{2.5} = 845 \, cm^3$

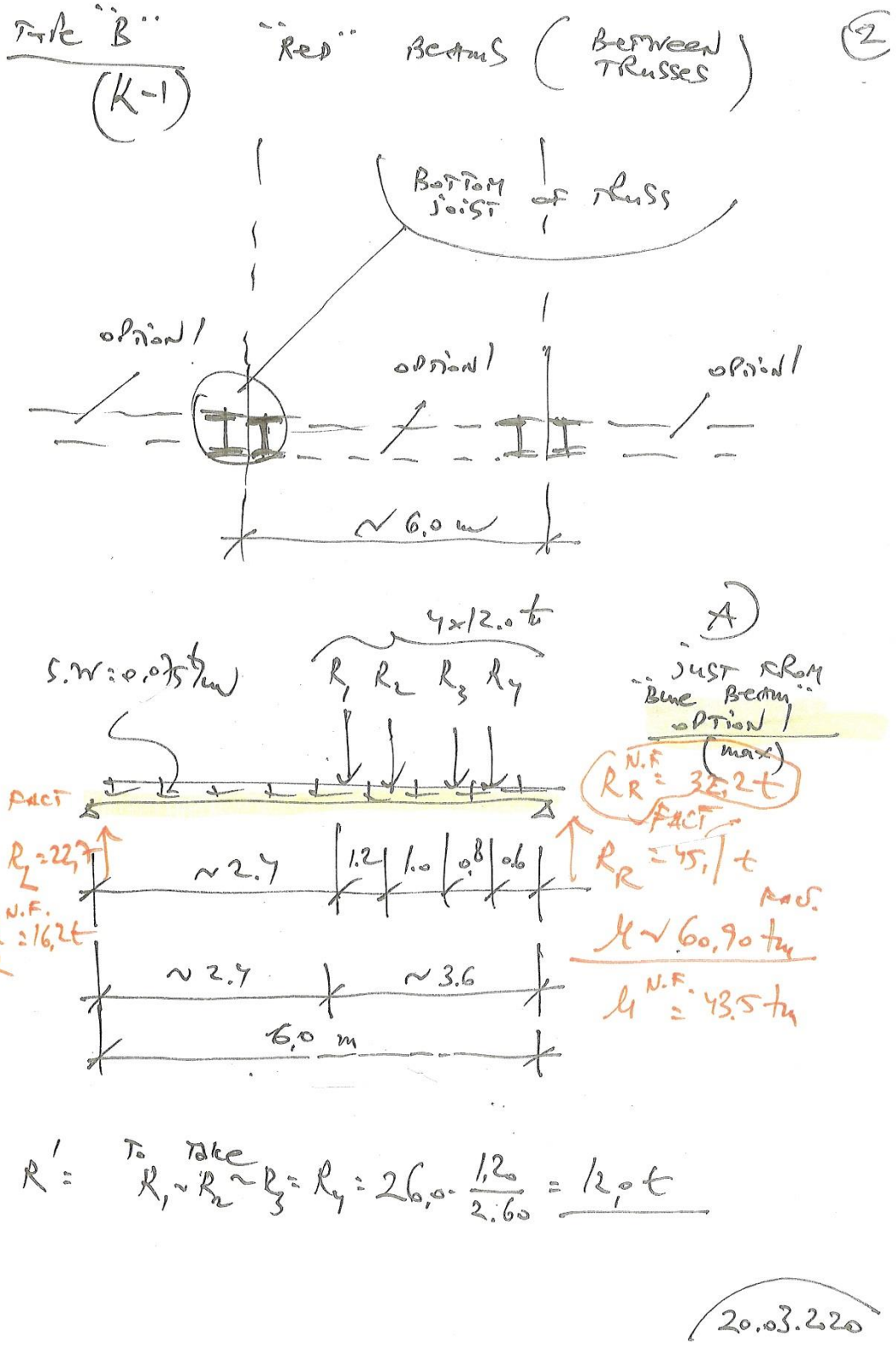
Σ NP 350 (38.0)

20.2.22

by@engs.com
www.byengs.com

יד חרוצים 10, משרד 302 ירושלים
ת.ד. 29141 ירושלים מיקוד 9129002

טל 02-6727404
פקס 02-6712919
נייד 054-4539760

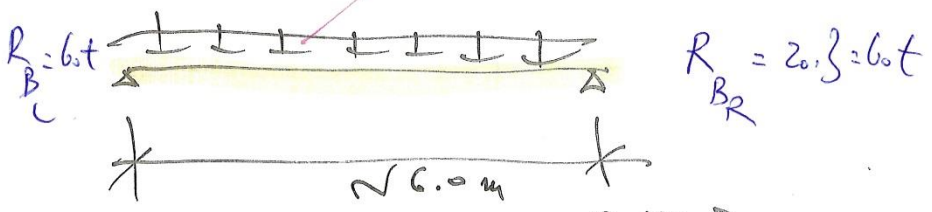


by@engs.com
www.byengs.com
יד חרוצים 10, משרד 302 ירושלים
ת.ד. 29141 ירושלים מיקוד 9129002
טל 02-6727404
פקס 02-6712919
נייד 054-4539760

(3)

B) FROM INTERNAL WALLS

מינ
$q = 16.2\ t/m$ [20.0 t/m]



משטח: 0.8

$A' = 0.5(4.20)\cdot(6.00)\cdot 0.80 = 10.1\ m^2$ [12.6]

↑ INFLUENCE OF BEAMS מה-"A"

TOTAL =

$Q = \frac{12.6}{34.3} \times 33.0 = \underline{121\ t}$

מינ $Q = \frac{10.1}{34.3} \times 33.0 = \underline{97.2\ t}$

$\left[\ q = \frac{121}{6.0} = 20\ t/m \rightarrow\right]$ $q_{min} = 16.2\ t/m$

$M_2 = \frac{qL^2}{8} = 16.2 \cdot \frac{6.0^2}{8} = \underline{72.9\ tm}$

TOTAL: $\Sigma M_i + M_2 = 43.5 + 72.9 = \underline{116.4\ tm}$

$[W] = \frac{\Sigma M}{f_T} = \frac{116.4\ t\cdot m}{2.25\ t/cm^2} = \underline{517.0\ cm^3}$

TO TAKE I NE 550 B

$\Sigma R = 45.1 + 60.2 = 90 + 120 = \underline{210\ t}$

20.03.2

by@engs.com
www.byengs.com
יד חרוצים 10, משרד 302 ירושלים
ת.ד. 29141 ירושלים מיקוד 9129002
טל 02-6727404
פקס 02-6712919
נייד 054-4539760