One-Way Joist floor Construction :

"Ribbed-slab Construction" عقدة الأضلاع

ACI

* The slab is usually 5 to 10 cm thick,
* The ribs shall not be less than 10 cm wide,
* The ribs shall not have a depth of more than 3½ times the minimum width of rib.
* Clear spacing between ribs shall not be more than 75 cm
* Slab thickness shall be not less than 1/12 the clear distance between ribs, nor less than 5 cm. (4 cm CIP fillers are as strong as the concrete)
* Reinforcement normal to the ribs (in the top slab) shall be provided as required for flexure (to carry the load between ribs), but not less than required by ACI for shrinkage and temperature reinforcement.

See Fig. 10.10.1 for typical joist floors.

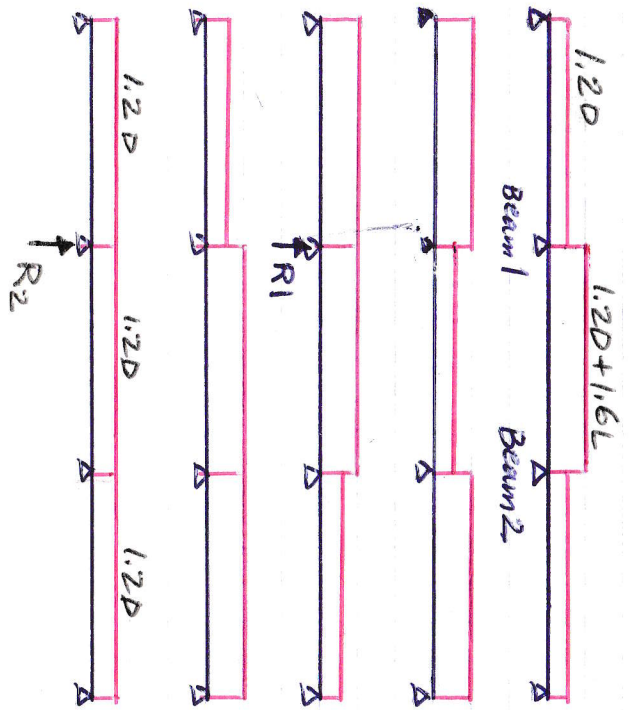
To limit deflection, ACI- _____ for ribbed one-way slabs must be applied.

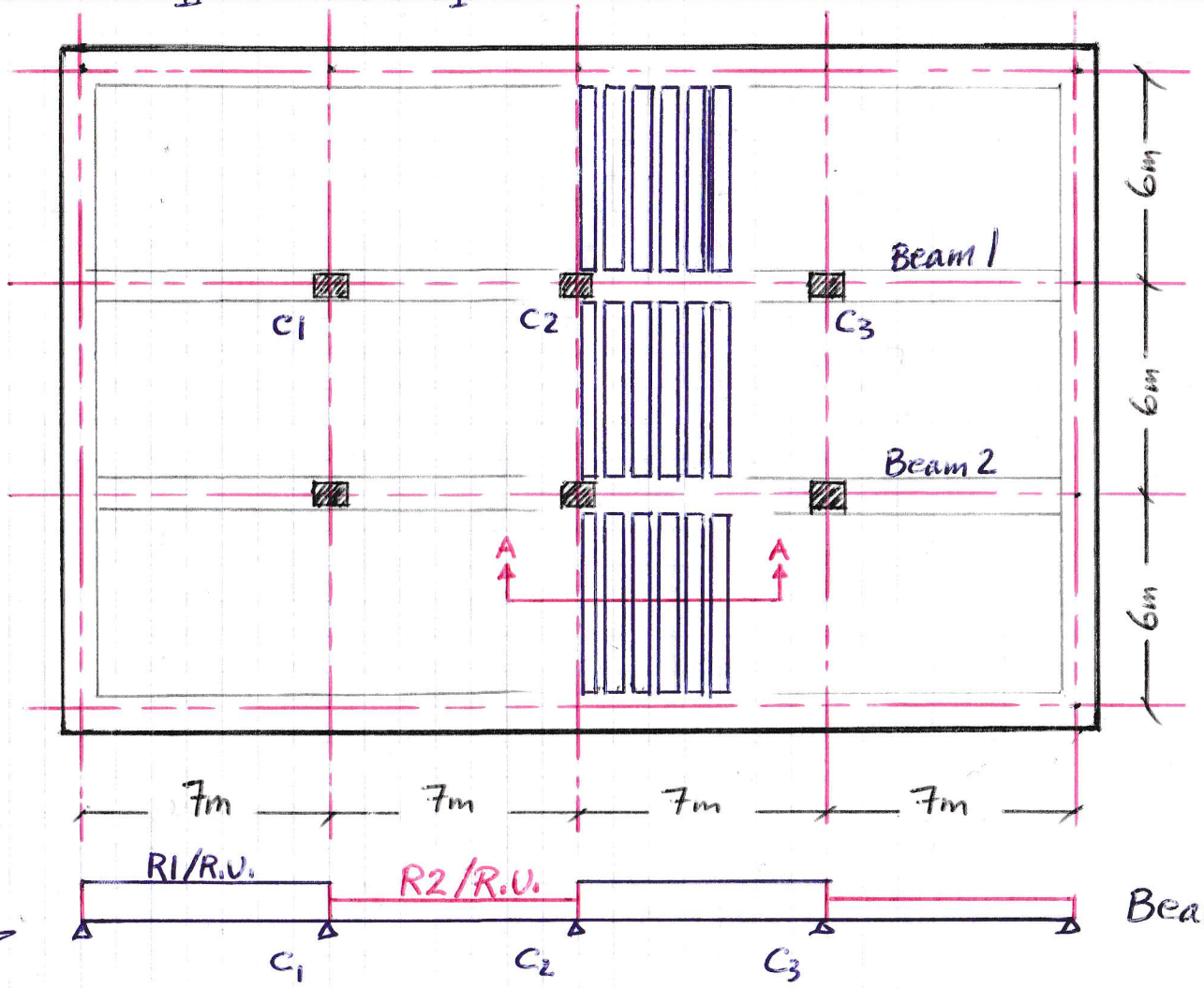
* Transverse distribution ribs are used with 12 cm min width, and ϕ14 bars top and bottom, when rib span exceeds about 4 m clear.

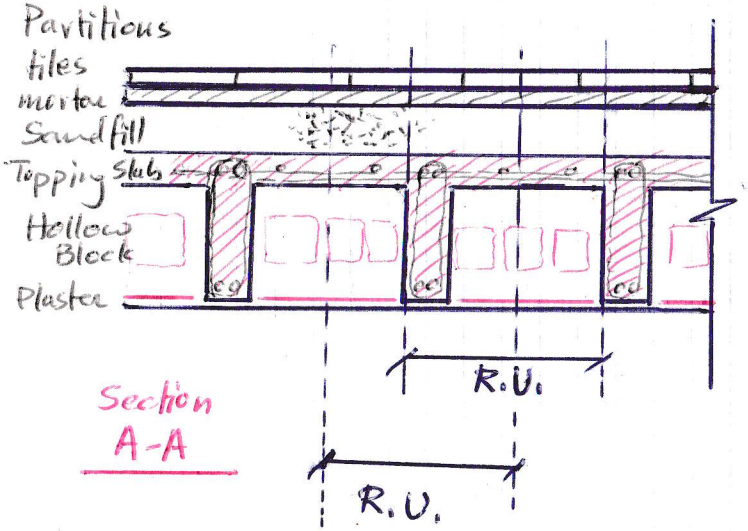
Dr. Ghada (د. غادة) II , Dr. Jamal (د. جمال) I

Structural Analysis II
Reinforced Concrete Design I

Typical Rib

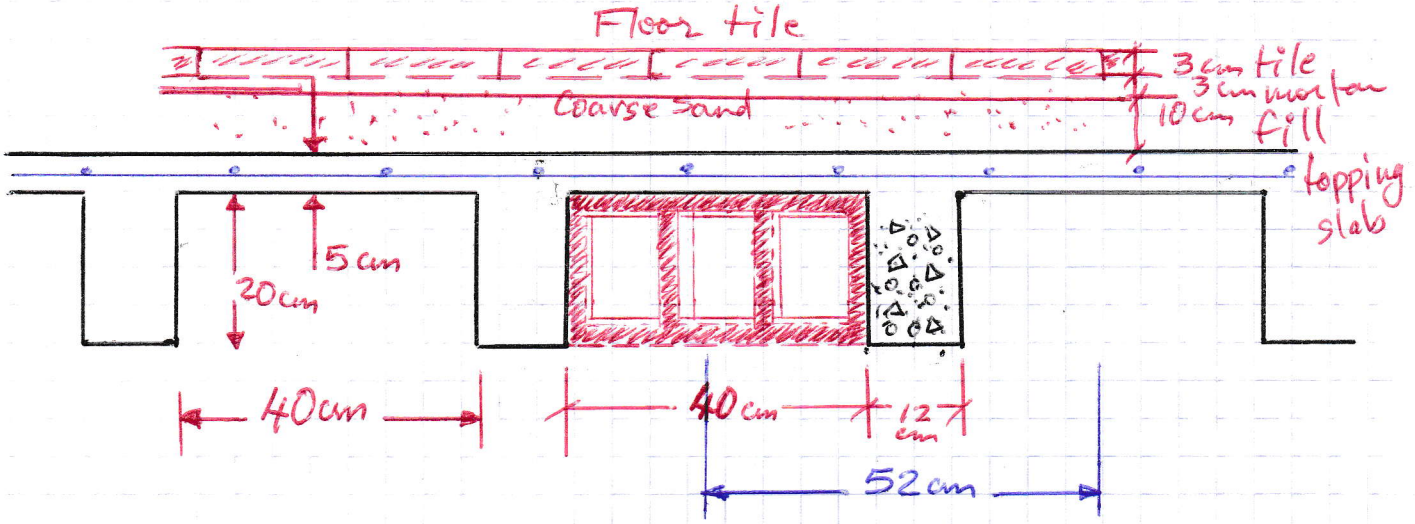






Section A-A

Applied Load Analysis:



Live Load = $150\ kg/m^2\ (0.52) = 78\ kg$ / linear m of rib

Dead load = Repetitive Unit = $1m \times 0.52m = 0.52\ m^2$

Topping Slab = $\left(\frac{5}{100}\right)\left(\frac{52}{100}\right)(2400) = 62.4$ kg / linear m

Rib = $\left(\frac{12}{100}\right)\left(\frac{20}{100}\right)(2400) = 57.6$ kg / linear m

Block = $\left(\frac{20}{100}\right)\left(\frac{40}{100}\right)(900) = 72$ kg / linear m

Plaster = $(3/100)(52/100)(2200) = 34$ kg / linear m

Coarse Sand fill and Floor tile $\approx \left(\frac{10}{100}\right)\left(\frac{52}{100}\right)(1800) = 93.6$ kg / linear m

$= \left(\frac{3}{100}\right)\left(\frac{52}{100}\right)(2400) = 37.4$ kg / linear m

$= \left(\frac{3}{100}\right)\left(\frac{52}{100}\right)(2200) = 34$ kg / linear m

Partitions $\approx (125\ kg/m^2)\left(\frac{52}{100}\right) = 65$ kg / linear m

---

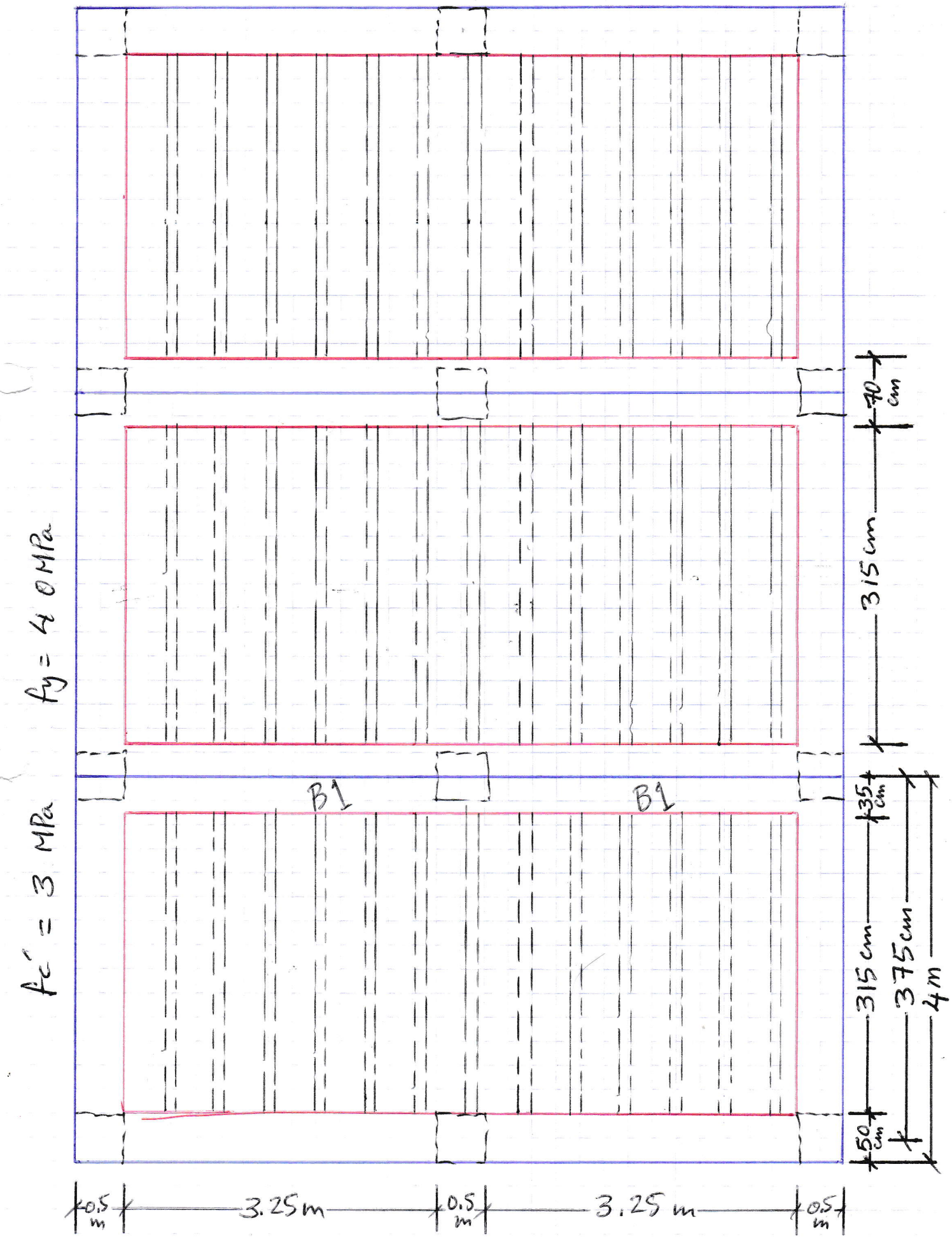
Total Dead Load = 456 kg / linear m of rib

$W_u = 1.2(456) + 1.6(78) = 672$ kg / m of rib

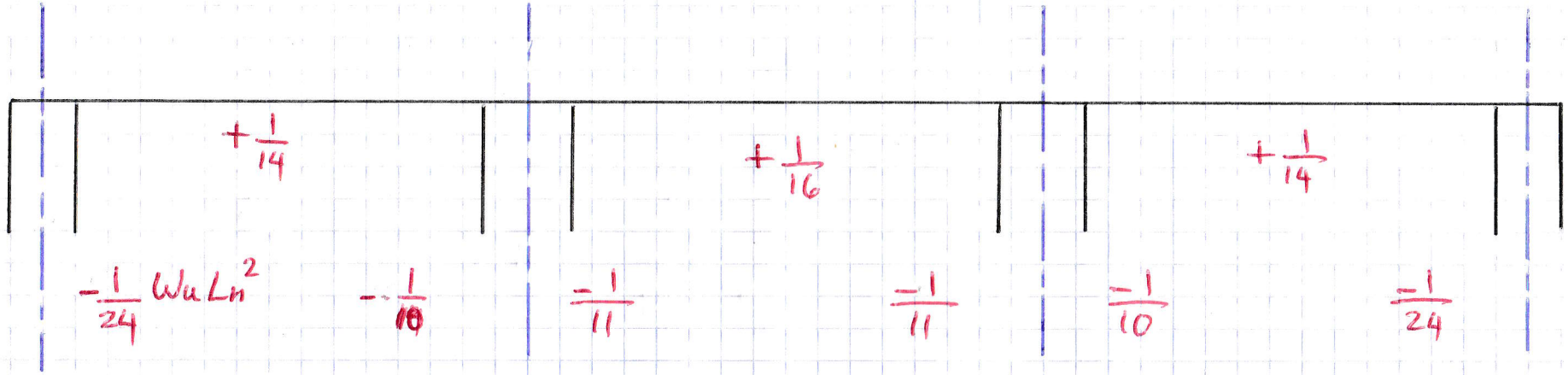
Note: rib supports a portion of the slab 52 cm wide.

Also: Rib loading = 0.672 t/m

Slab loading = $0.672/0.52 = 1.293\ t/m^2$


f'c = 3 MPa
fy = 4 0 MPa
B1
B1
70 cm
315 cm
35 cm
315 cm
375 cm
4 m
50 cm
0.5 m
3.25 m
0.5 m
3.25 m
0.5 m

Take a representative rib:



Max Shear = $1.15 \frac{W_u L_n}{2}$

W_u = 0.672 ton/m

L_n = 4m − 0.50 − $\frac{0.70}{2}$ = 3.15m

Outside to center — edge beam — Interior beam