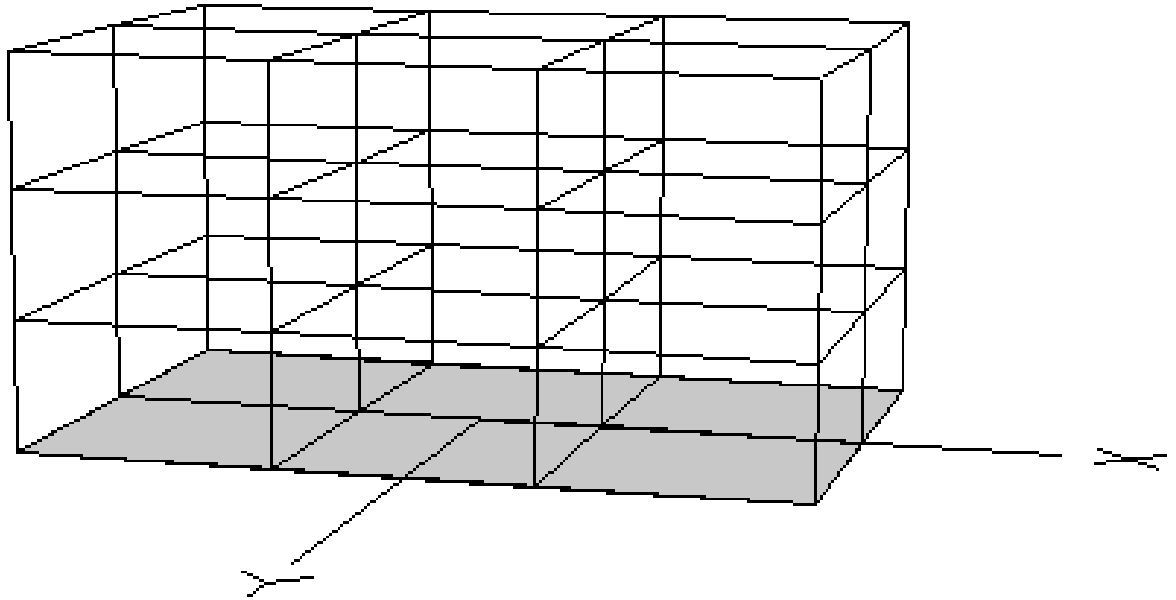
Basic Assumption

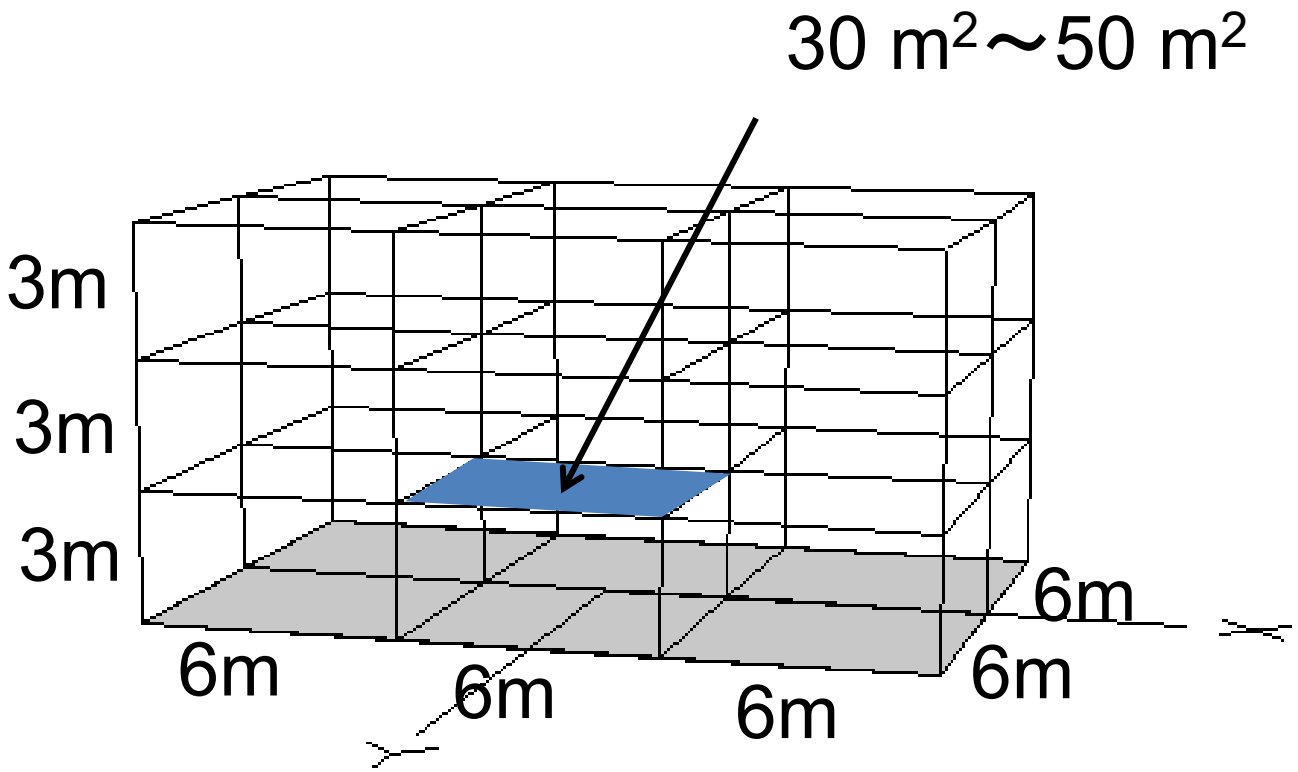
RC (Reinforced Concrete)

3 Story

2 × 3 Span

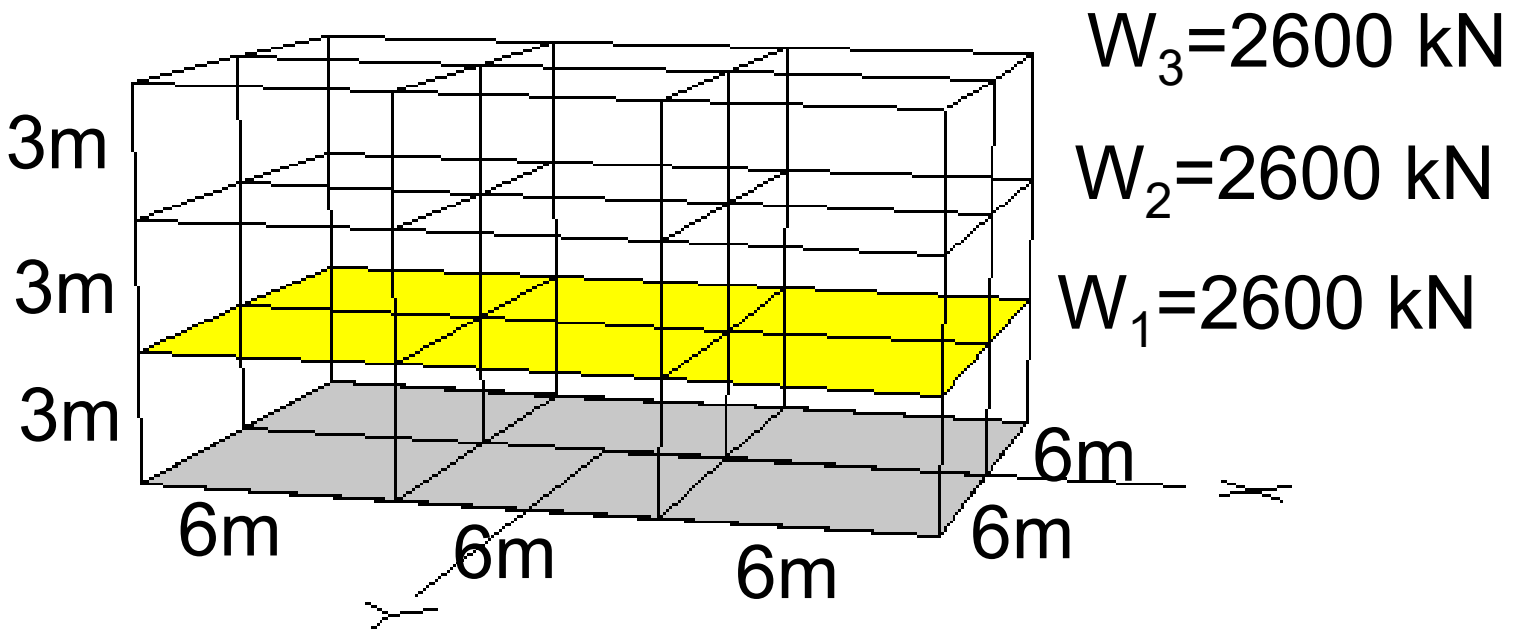


Span



Weight of Building

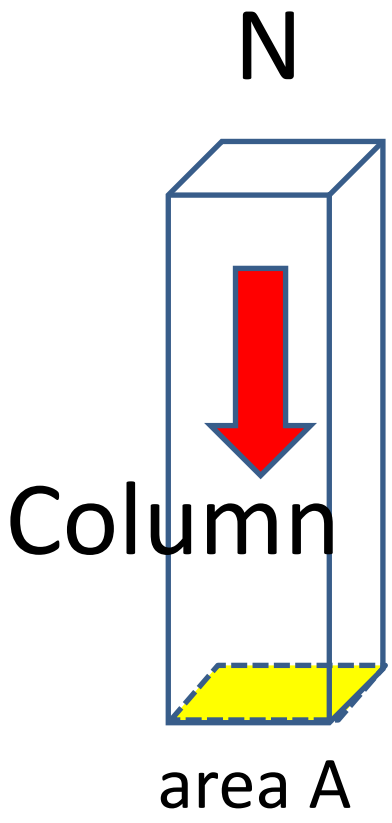
$1.2\ \text{ton} / \text{m}^2 \approx 12\ \text{kN} / \text{m}^2$



Concrete Strength

$Fc = 240\ (kg/cm^2)$

$= 24\ (MPa, N/mm^2)$



Axial Load

$N = 0.2\ Fc \times A$

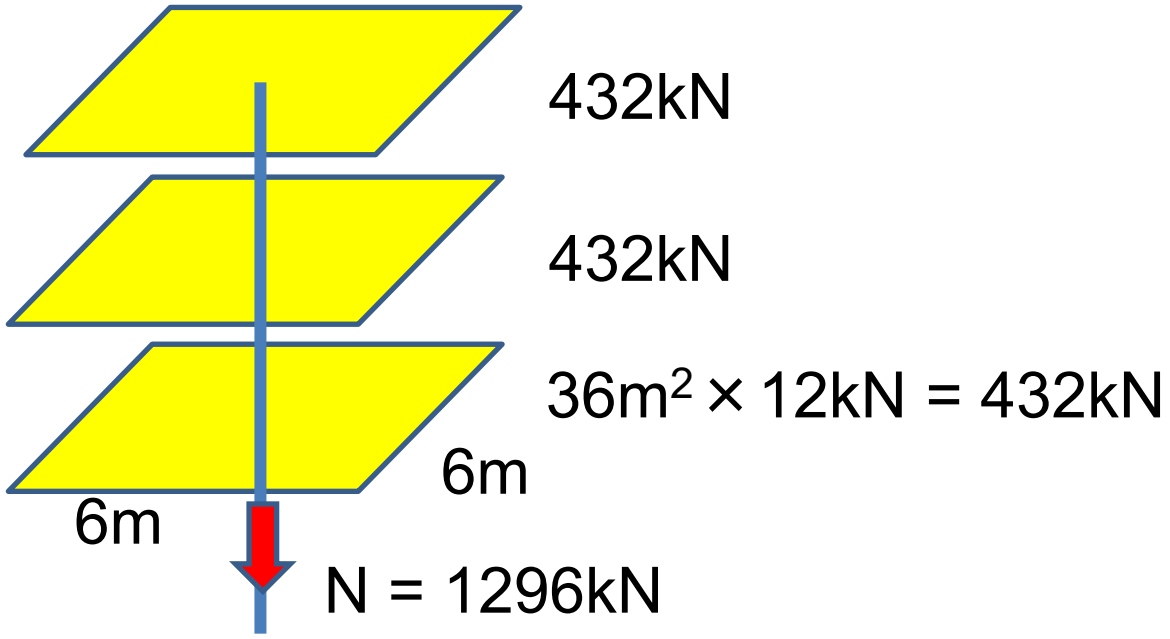
$< (1/3)\ Fc \times A$

Colum Size

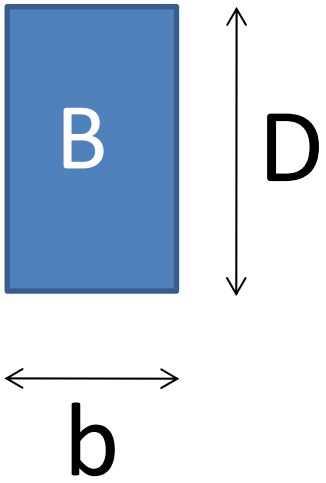
C

$A = N / (0.2Fc) = 1296(kN)/4.8(N/mm^2) = 2700\ (cm^2)$

→ 60cm × 60cm



Beam Size



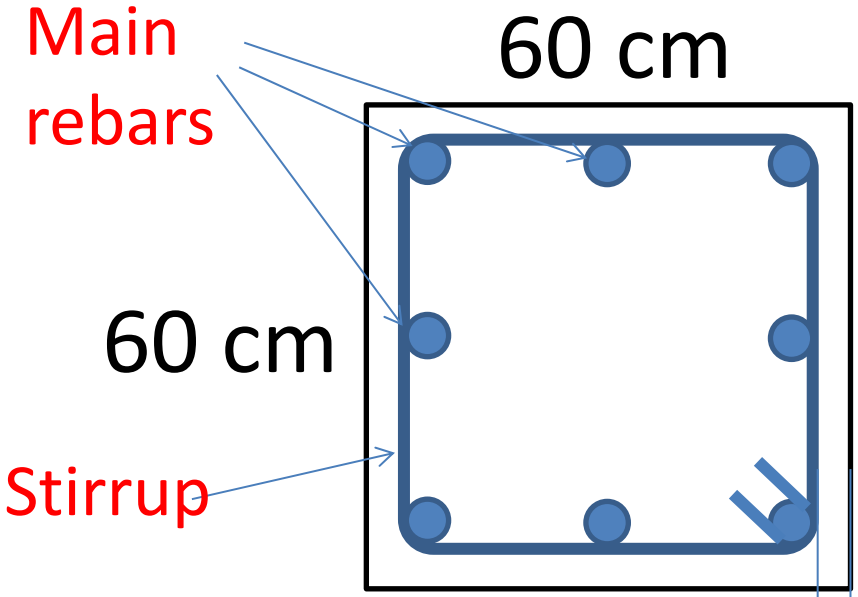
$D \approx (\text{Span}) \times 1/10$

$D = 60\ \text{cm}$

$b \approx D \times 1/2$

$b = 30\ \text{cm}$

Reinforcement in Column



Minimum rebar ratio = $\frac{\text{Total area of rebar}}{\text{Section area}}$

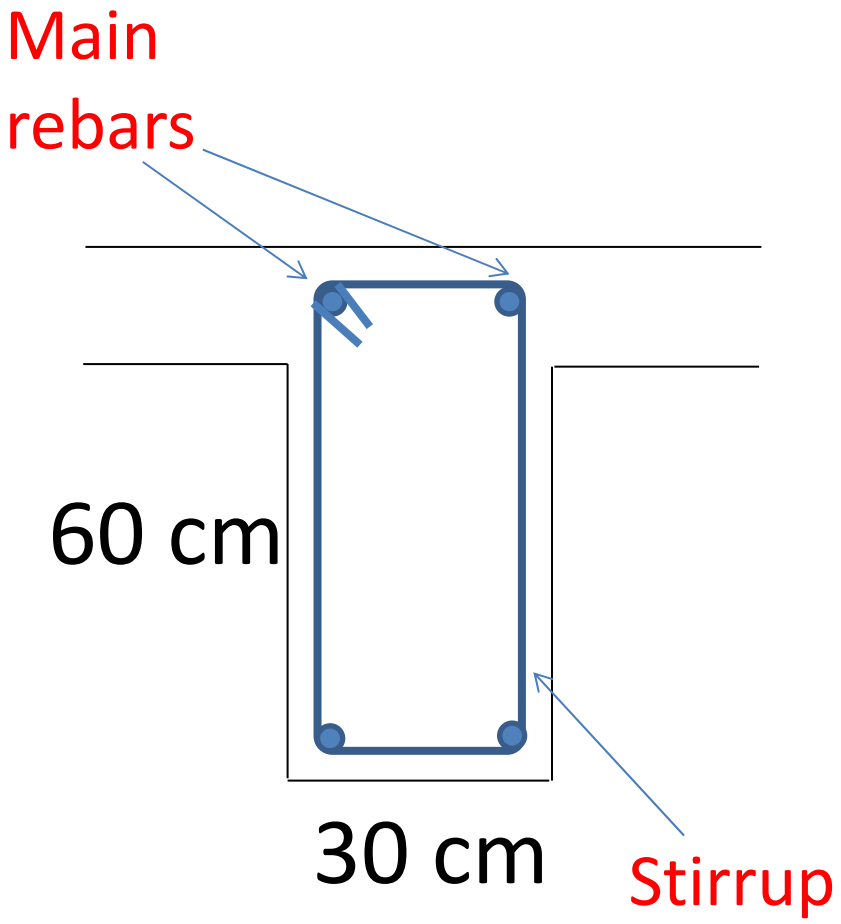
$> 0.8\ \%$

Total area of rebar
$= 3600\text{cm}^2 \times 0.008 = 28.8\ \text{cm}^2$
→ D22 (3.87cm^2) × 8

D10 or D13
space 10 cm（edge）
15cm (middle）
→ 2-D13@100

Covering Concrete
> 40mm

Reinforcement in Beam



Minimum rebar ratio = $\dfrac{\text{Tension side rebar area}}{\text{Section area}}$

$> 0.4\ \%$

Total area of rebar

$= 1800\text{cm}^2 \times 0.004 = 7.2\ \text{cm}^2$

→ D22 (3.87cm^2) × 2

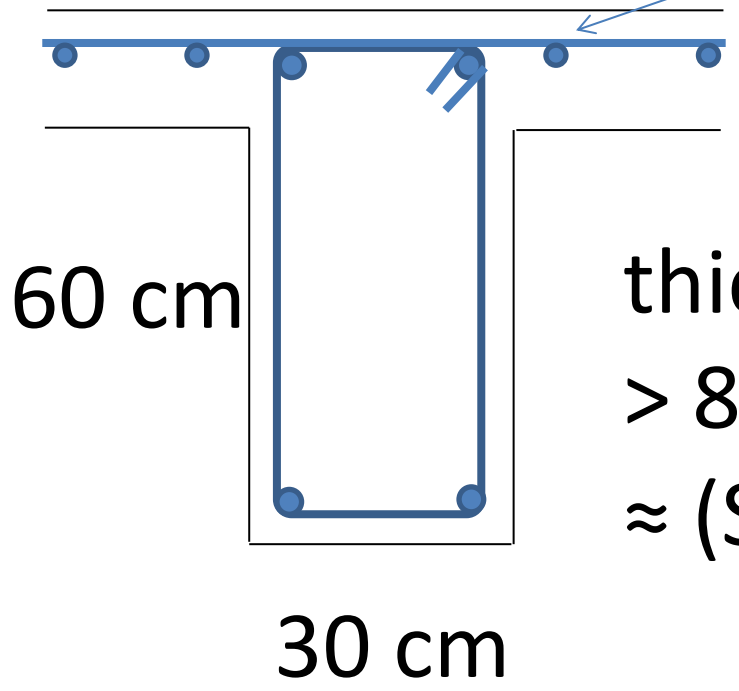
D10 or D13

space 15 cm（edge）

20cm (middle）

→ 2-D13@150

Reinforcement in Slab



D10 or D13

space 20 cm

→ D13 @ 200

thickness: t

> 8 cm

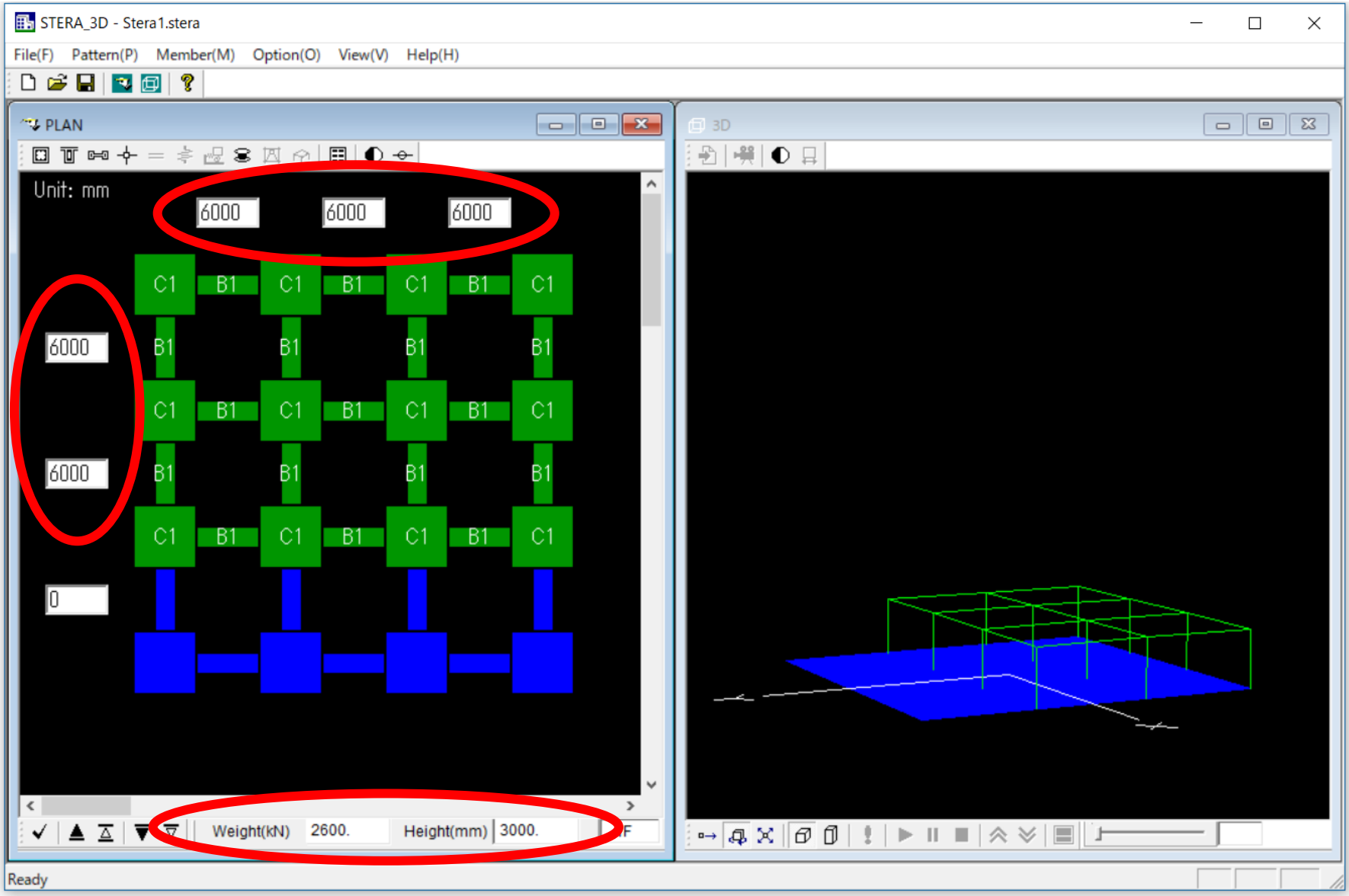
≈ (Span）× 1/40

t = 15 cm

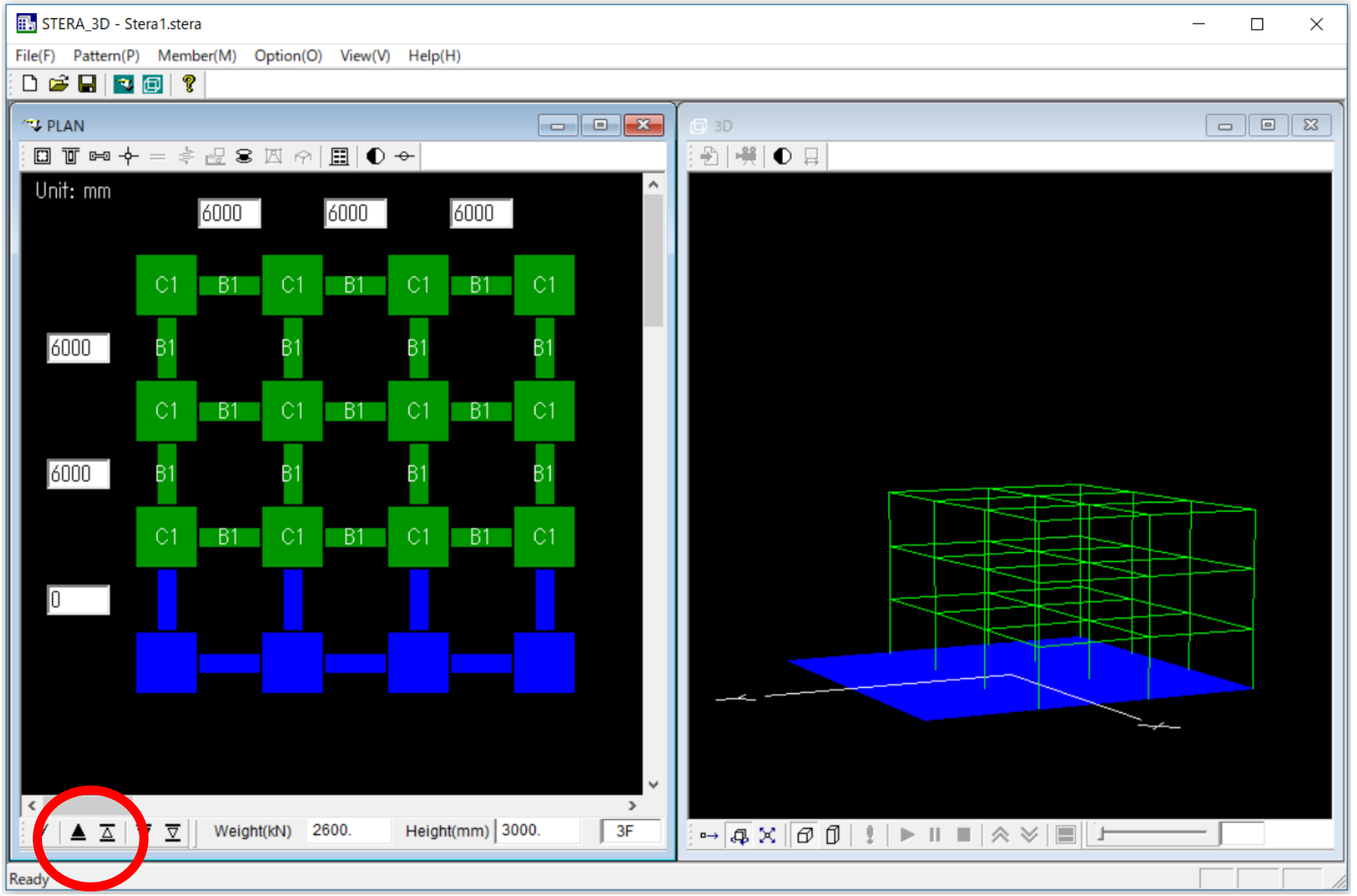
Strength of steel

Name	Tensile strength
SD295	3.0 (t/cm^2) = 295 (MPa, N/mm^2)
SD345	3.5 (t/cm^2) = 345 (MPa, N/mm^2)
SD390	4.0 (t/cm^2) = 390 (MPa, N/mm^2)

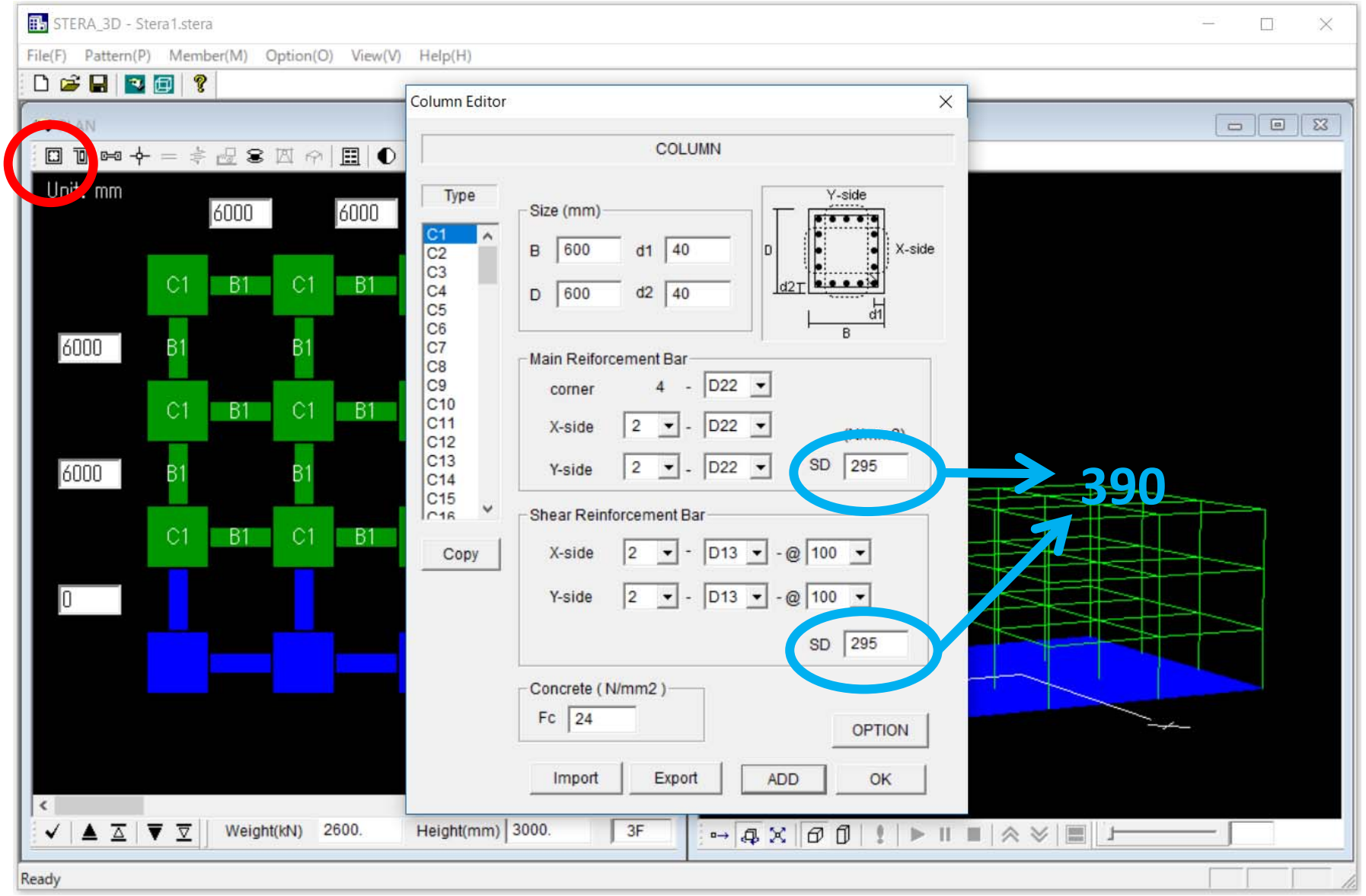
STERA 3D (Input of Size)



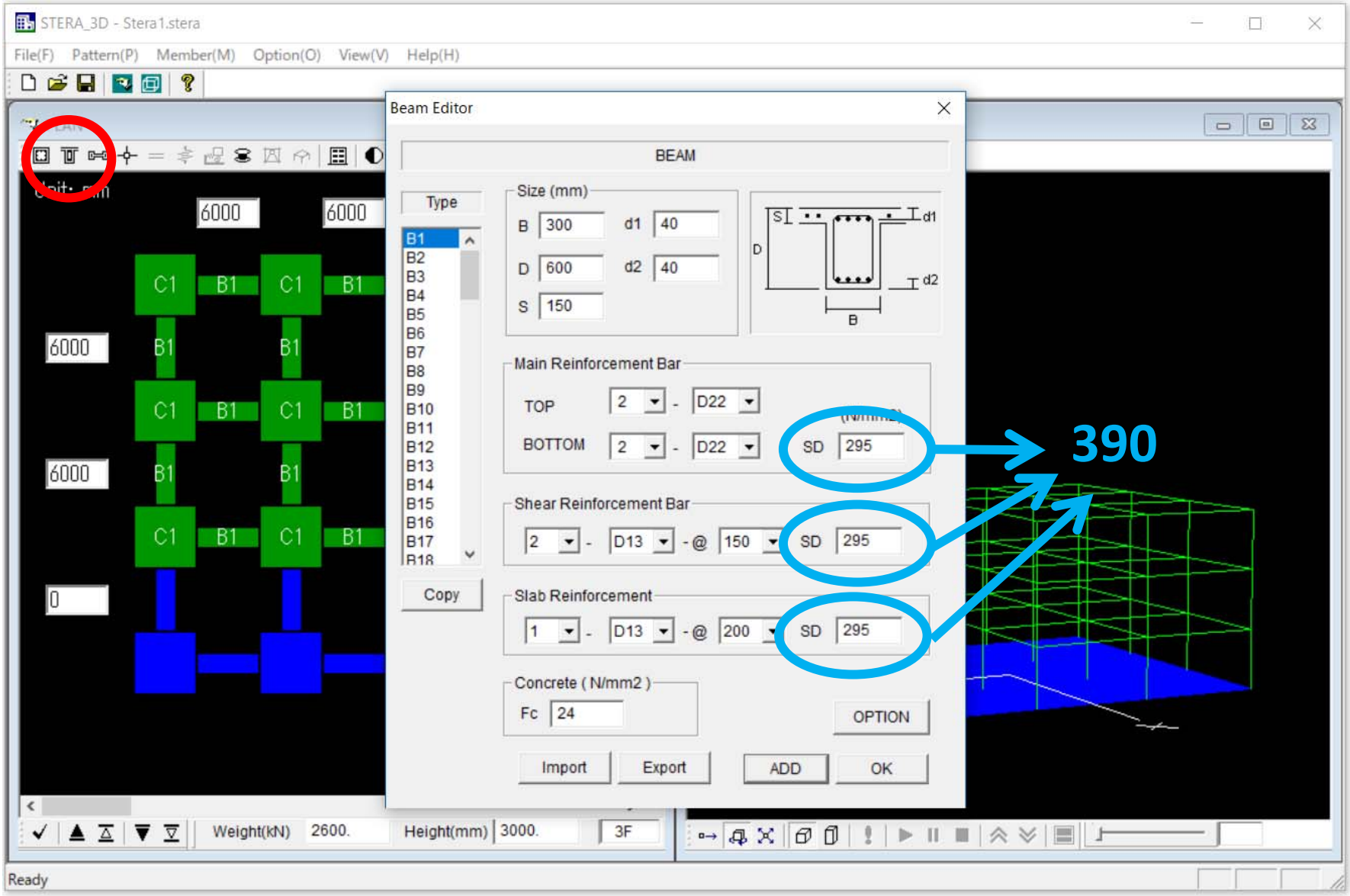
STERA 3D (Upper floor, copy)



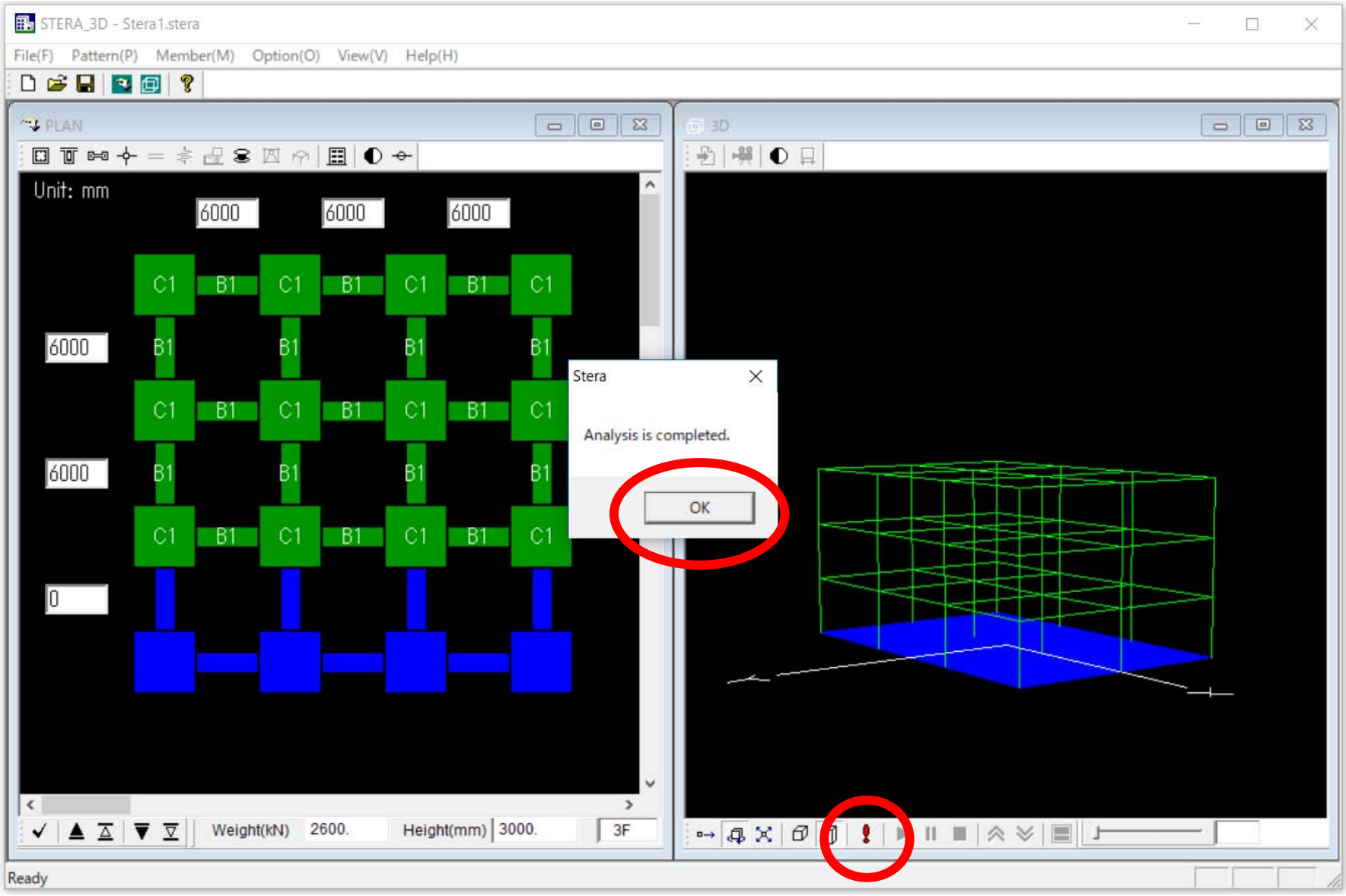
STERA 3D (Column Input)



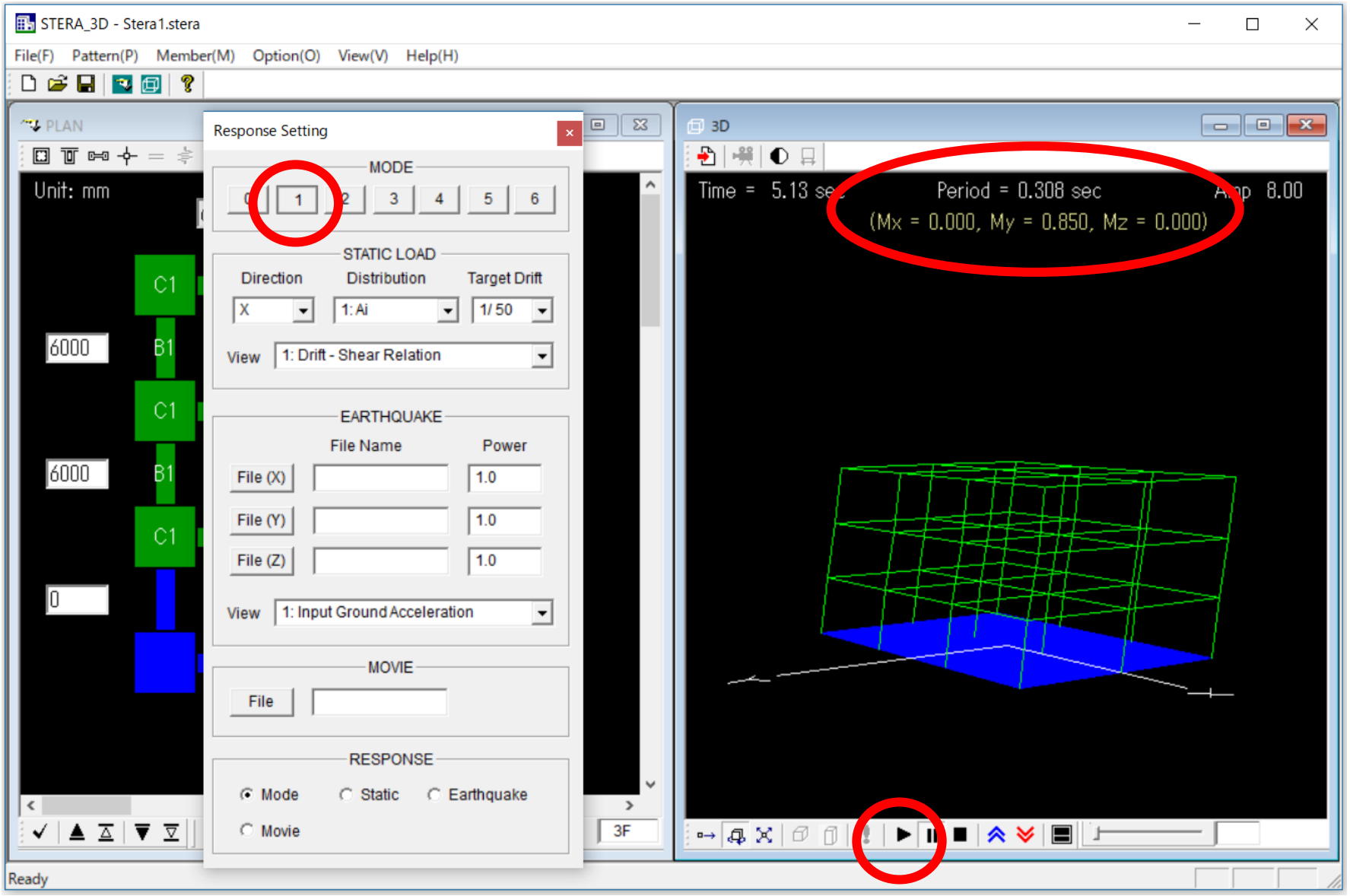
STERA 3D (Beam Input)



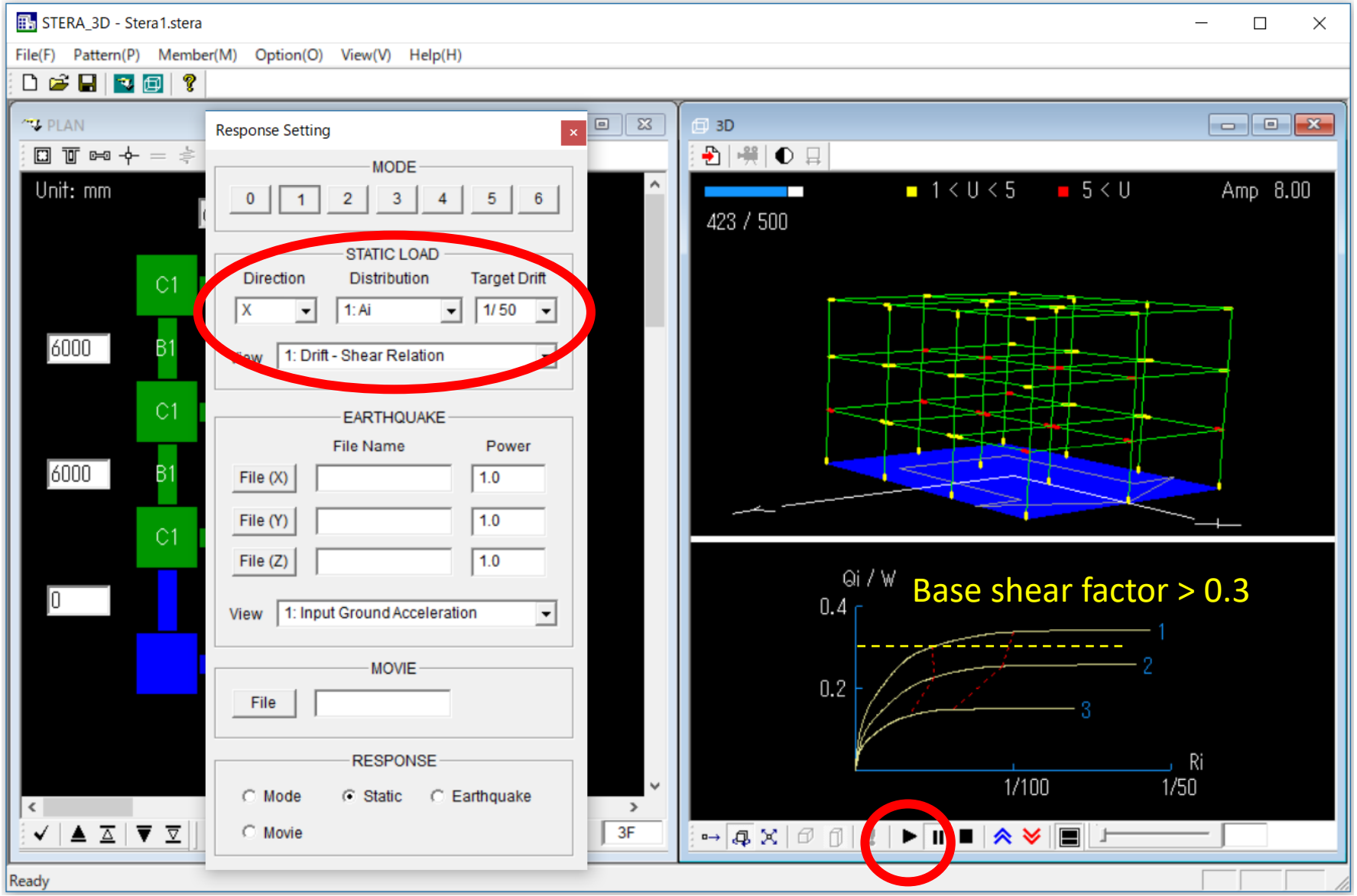
STERA 3D (Analyze)



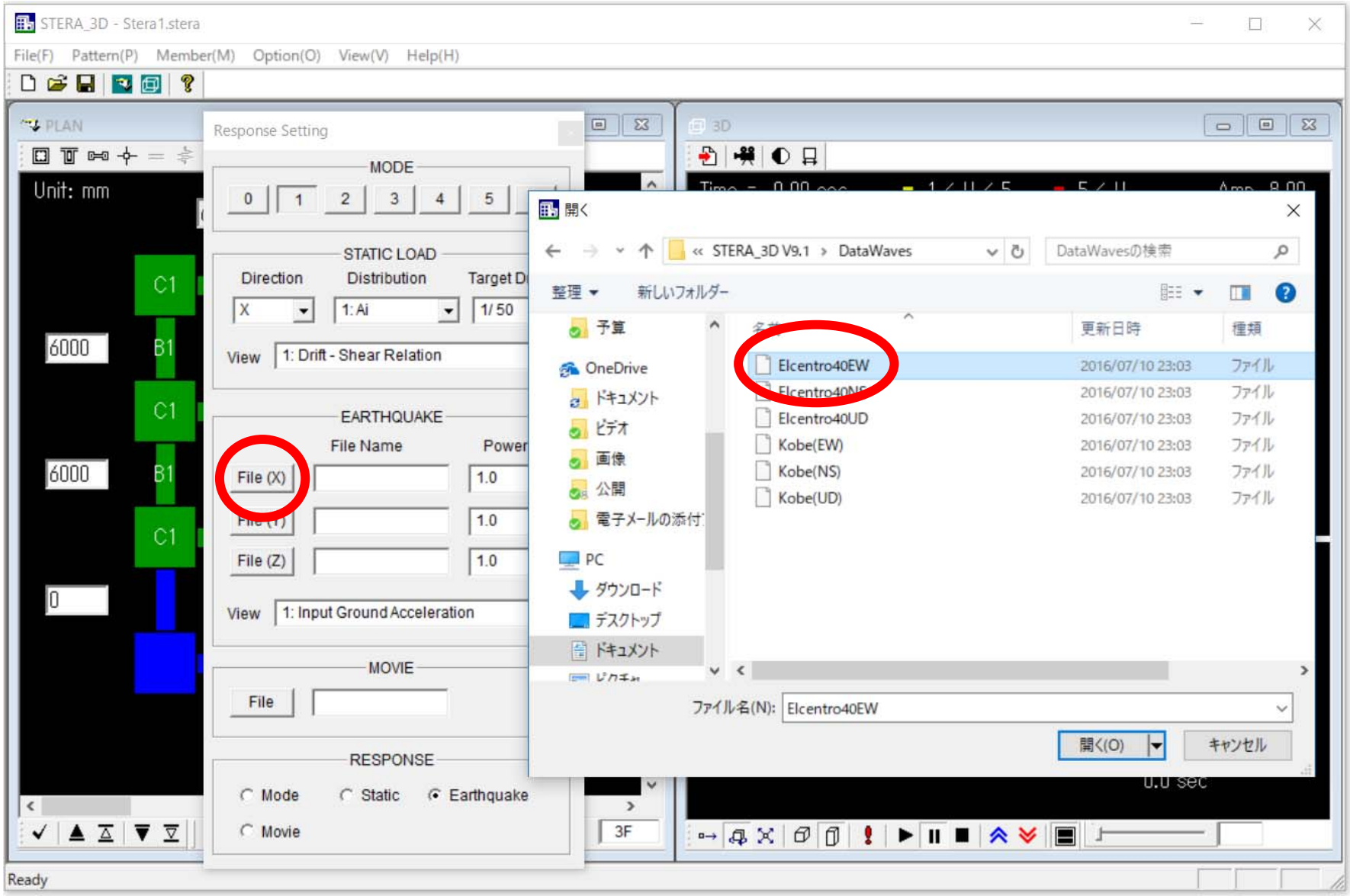
STERA 3D (Elastic Mode)



STERA 3D (Nonlinear Push-over)



STERA 3D (Earthquake Response)



STERA 3D (Earthquake Response)