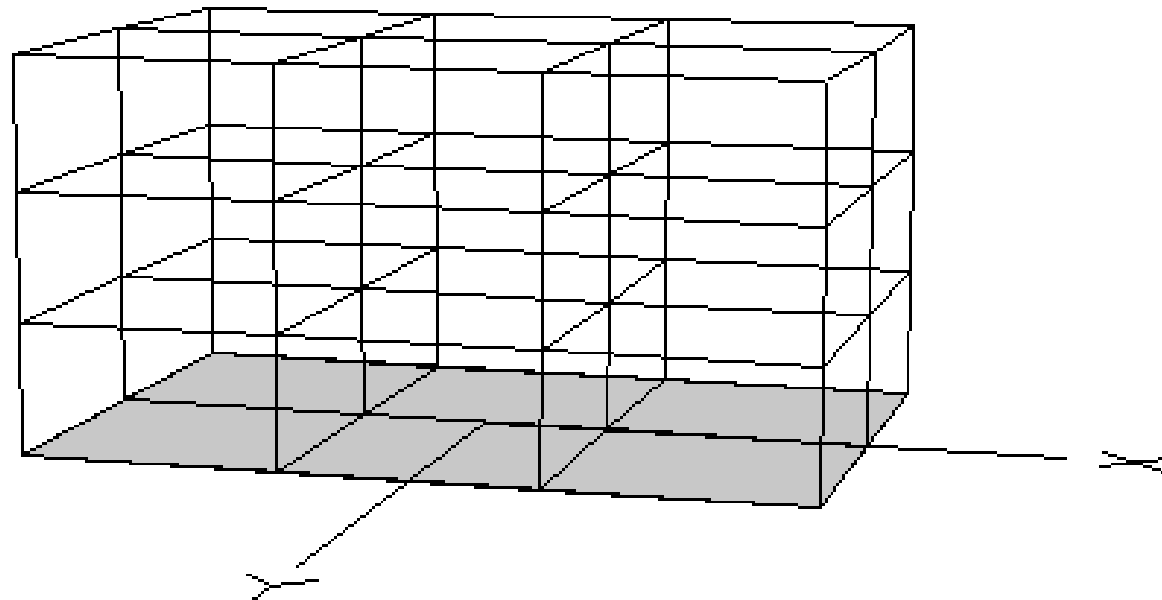


# 基本仮定

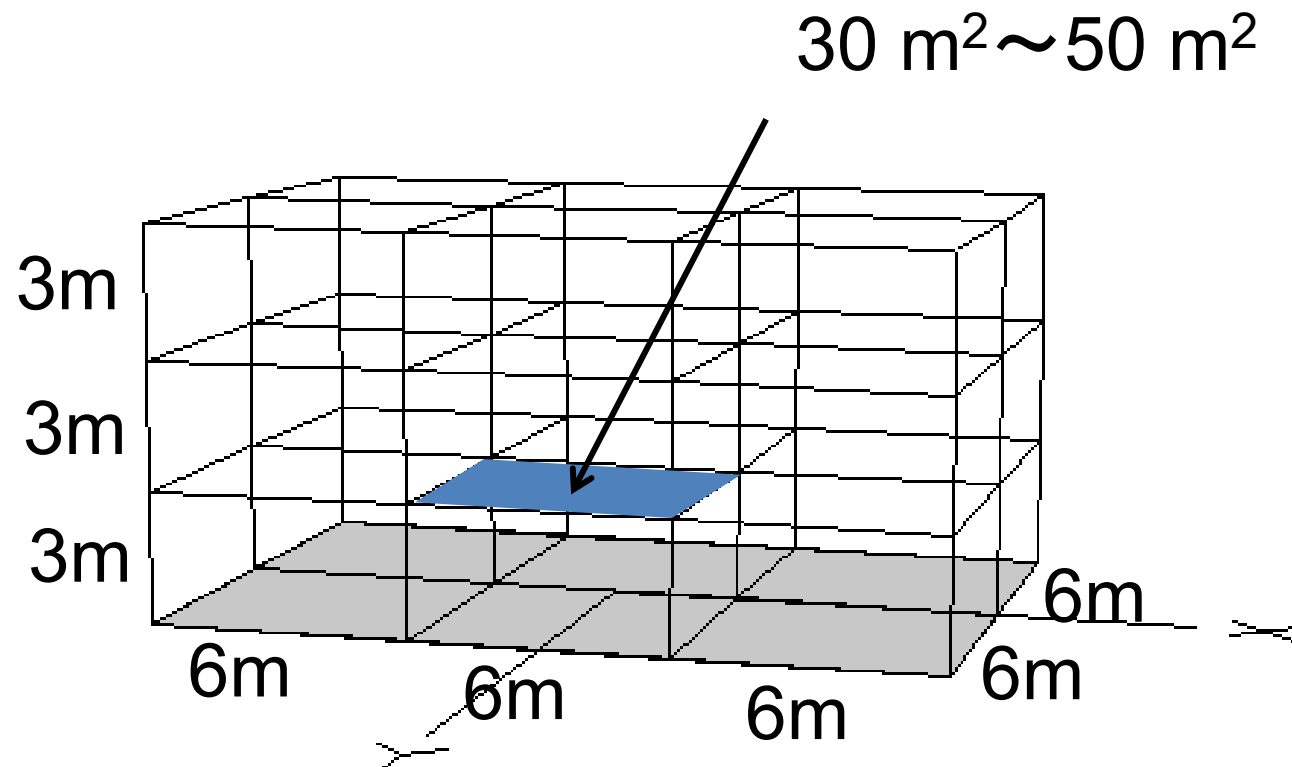
鉄筋コンクリート造骨組

3階建

2×3スパン

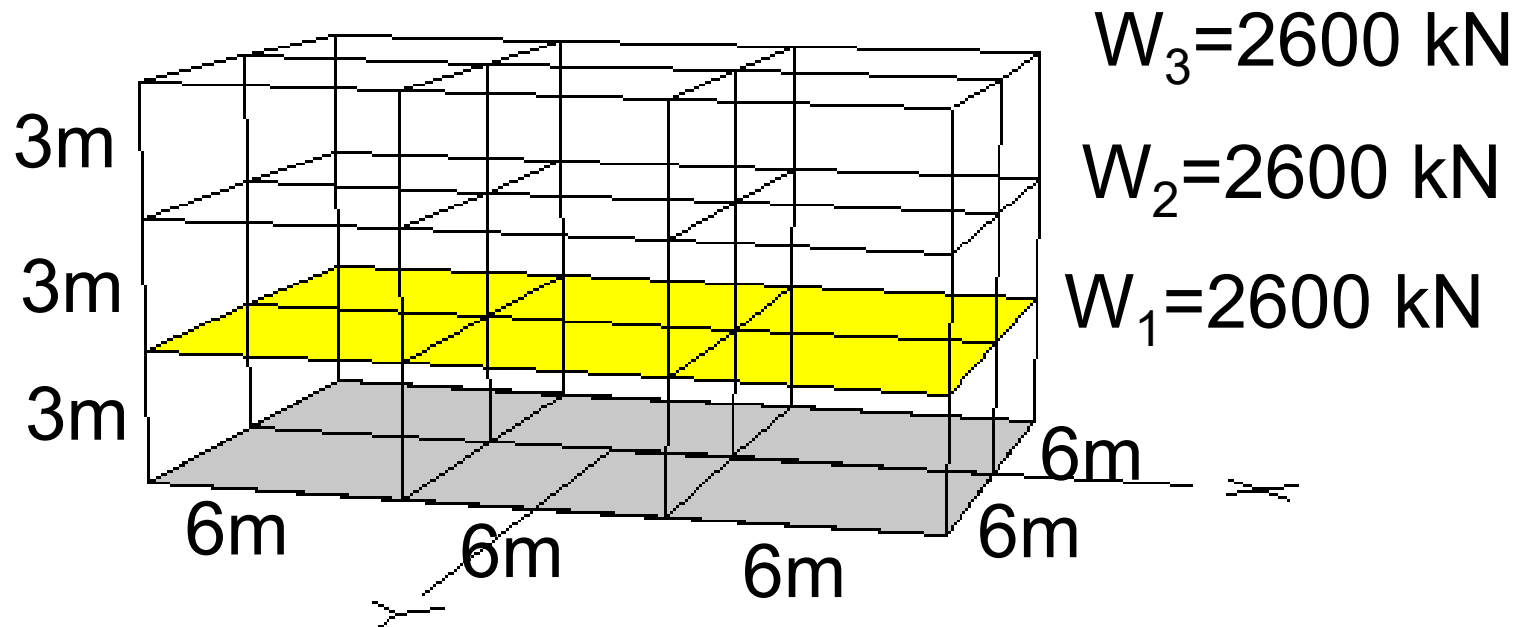


# スパン



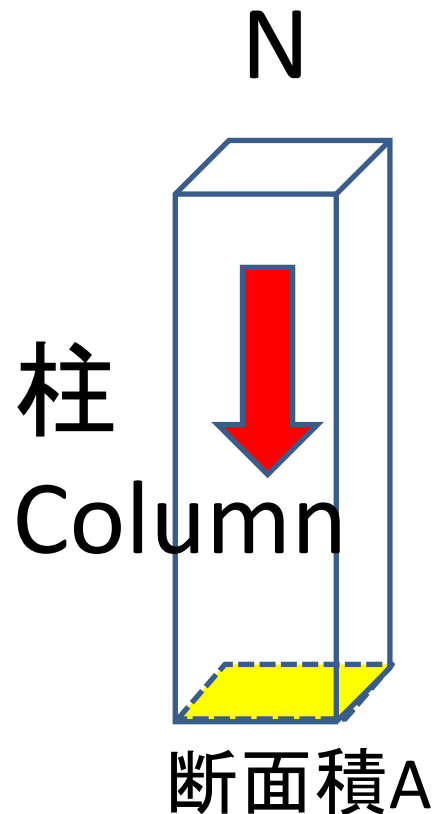
# 建物重量

12 kN / m<sup>2</sup>



# コンクリート強度

$$F_c = 240 \text{ (kg/cm}^2\text{)} \\ = 24 \text{ (MPa, N/mm}^2\text{)}$$



軸力(長期許容応力度)

$$N = 0.2 F_c \times A$$

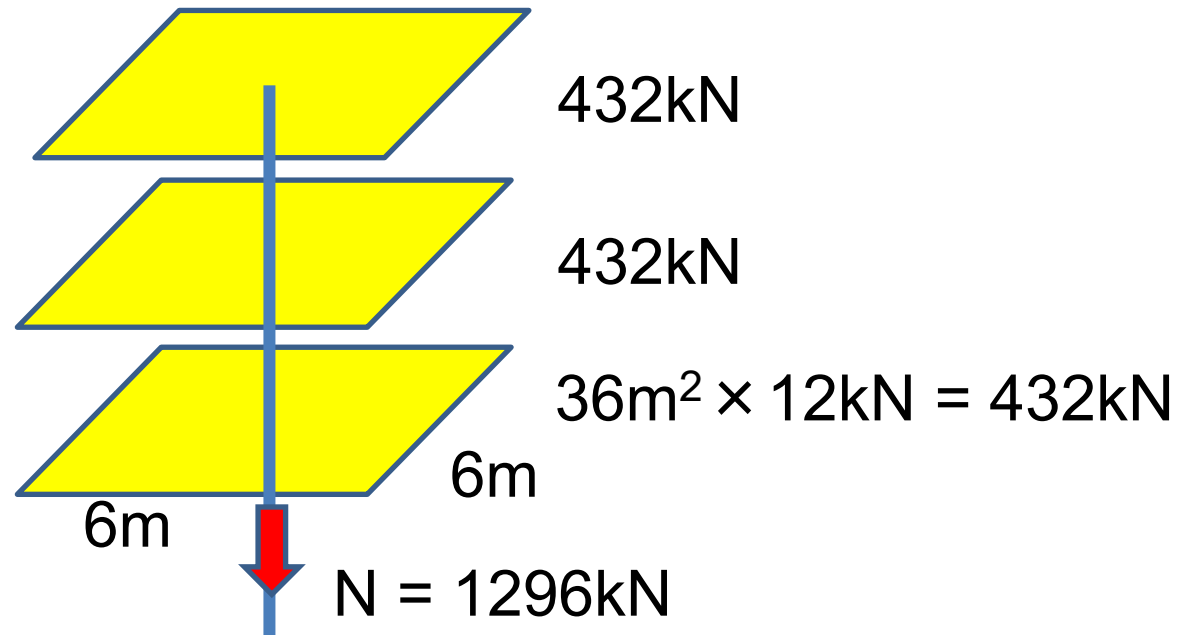
$$< (1/3) F_c \times A$$

# 柱サイズ

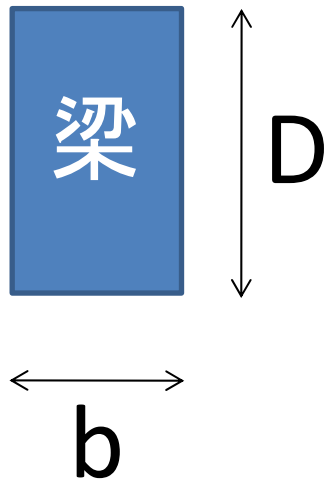
柱

$$A = N / (0.2F_c) = 1296(\text{kN}) / 4.8(\text{N/mm}^2) = 2700 (\text{cm}^2)$$

$$\rightarrow 60\text{cm} \times 60\text{cm}$$



# 梁サイズ



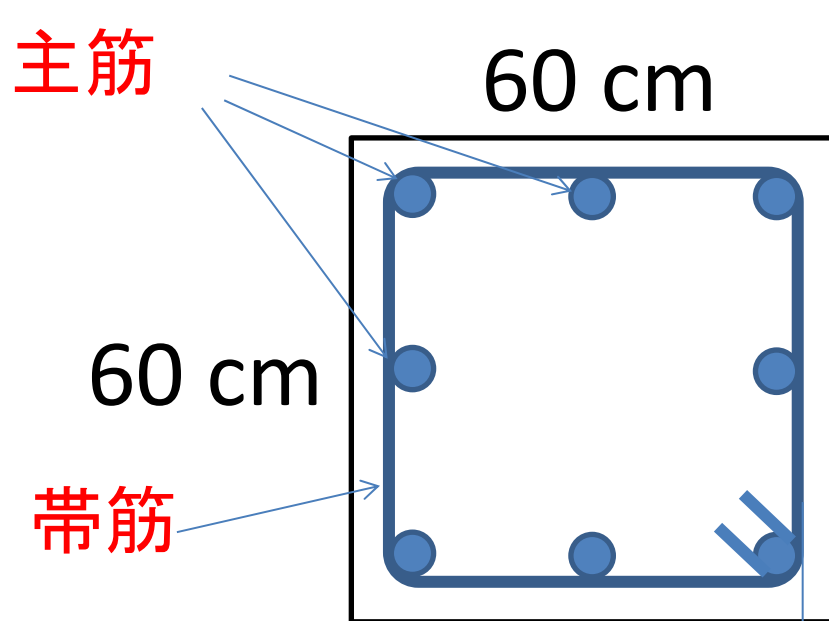
梁成  $D \approx (\text{スパン}) \times 1/10$

$$D = 60 \text{ cm}$$

梁幅  $b \approx D \times 1/2$

$$b = 30 \text{ cm}$$

# 柱配筋



D10 or D13  
 間隔 10 cm (端部)  
 15 cm (中央)  
 → 2-D13@100

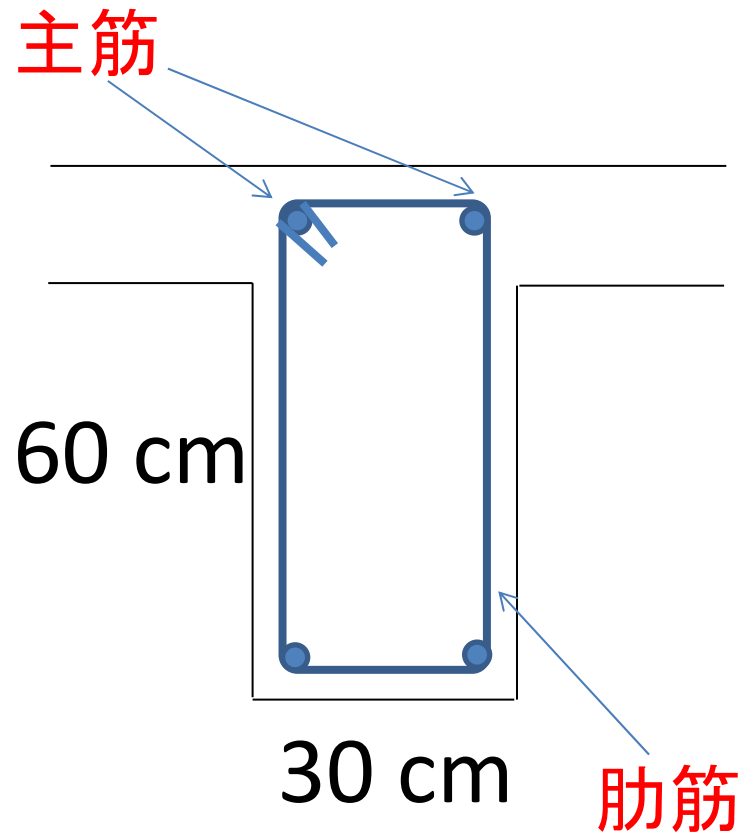
被り厚 > 40mm

$$\text{最小鉄筋量} = \frac{\text{全主筋断面積}}{\text{柱断面積}}$$

> 0.8 %

主筋全鉄筋断面積  
 $= 3600\text{cm}^2 \times 0.008 = 28.8\text{cm}^2$   
 → D22 (3.87cm<sup>2</sup>) × 8本

# 梁配筋



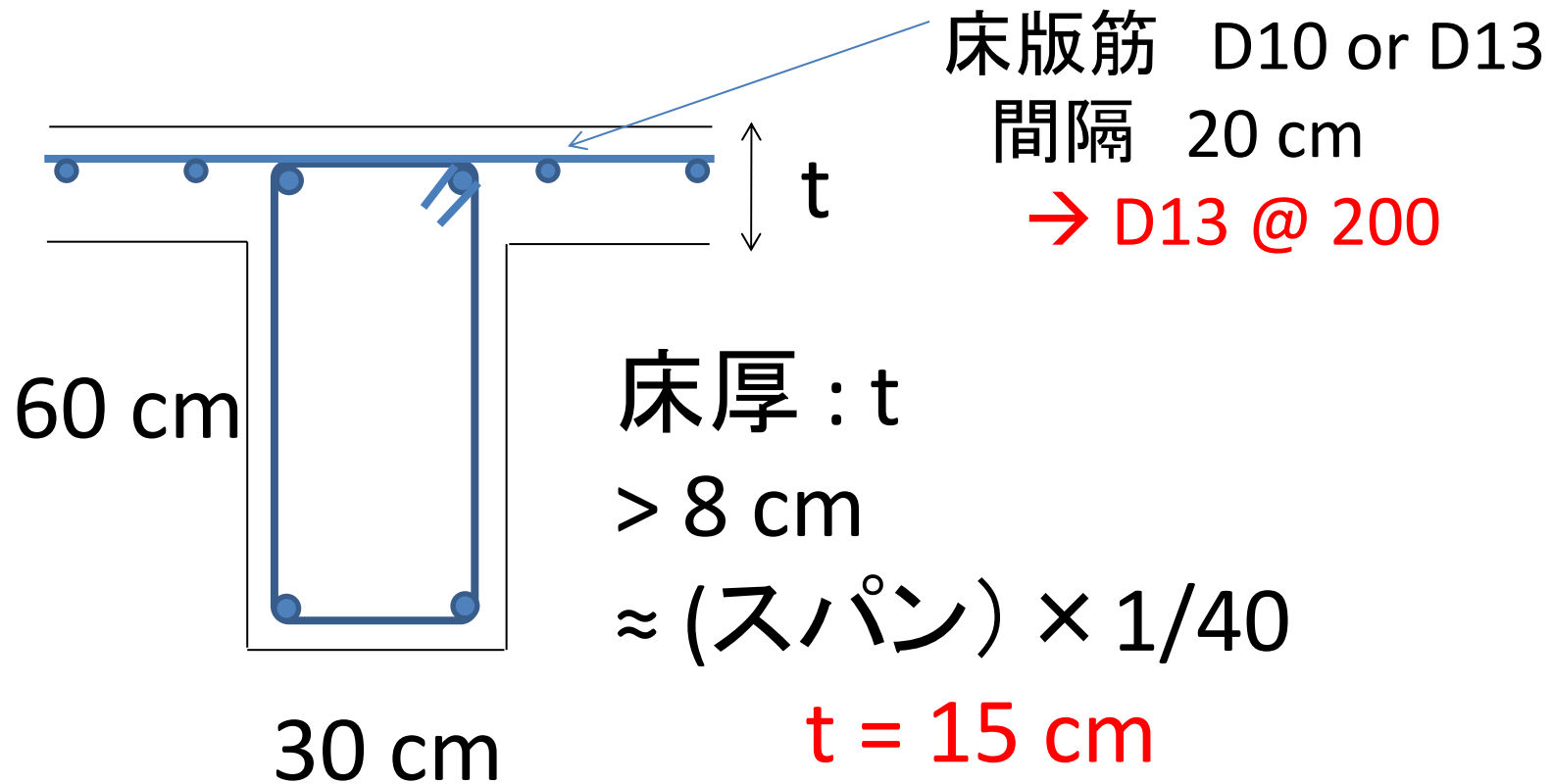
$$\text{最小引張鉄筋量} = \frac{\text{引張側主筋断面積}}{\text{梁断面積}} > 0.4 \%$$

$$\begin{aligned} \text{引張側主筋断面積} \\ &= 1800\text{cm}^2 \times 0.004 = 7.2 \text{ cm}^2 \\ &\rightarrow \text{D22 (3.87cm}^2) \times 2\text{本} \end{aligned}$$

D10 or D13  
 間隔 15 cm (端部)  
 20 cm (中央)  
 $\rightarrow 2\text{-D13@150}$



# スラブ配筋



# 鉄筋強度

規格

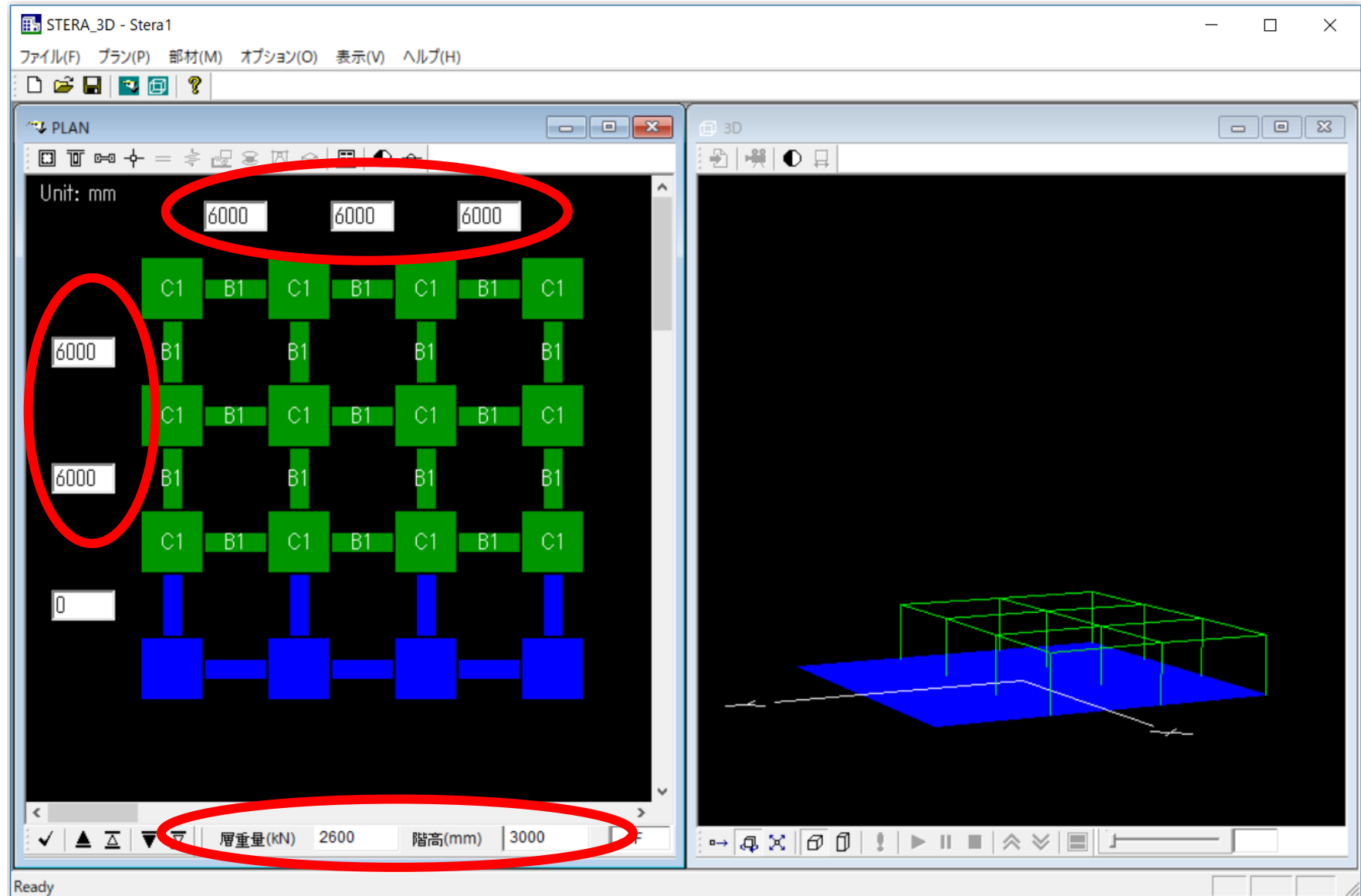
引張強度

SD295      3.0 (t/cm<sup>2</sup>) = 295 (MPa, N/mm<sup>2</sup>)

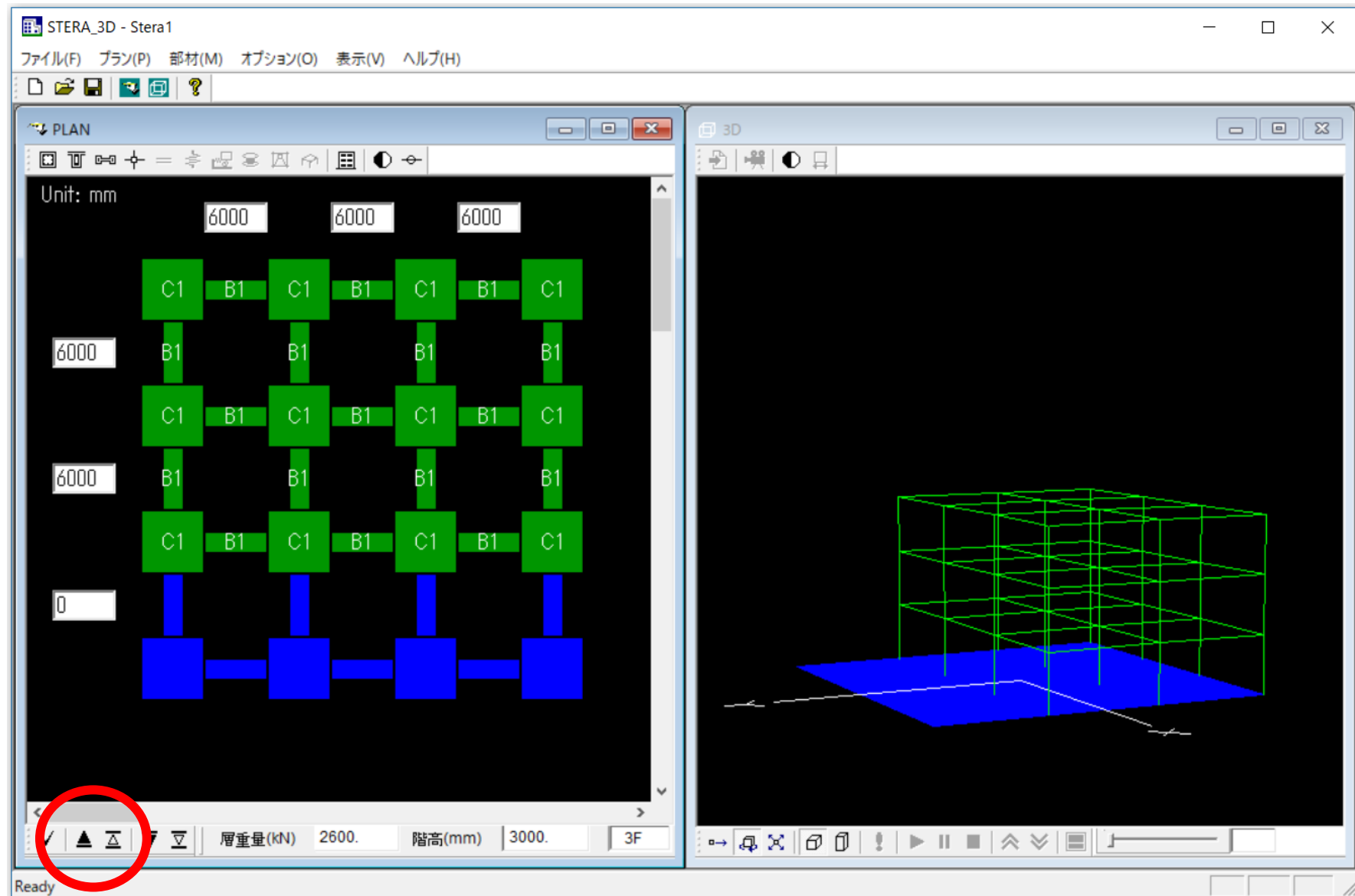
SD345      3.5 (t/cm<sup>2</sup>) = 345 (MPa, N/mm<sup>2</sup>)

SD390      4.0 (t/cm<sup>2</sup>) = 390 (MPa, N/mm<sup>2</sup>)

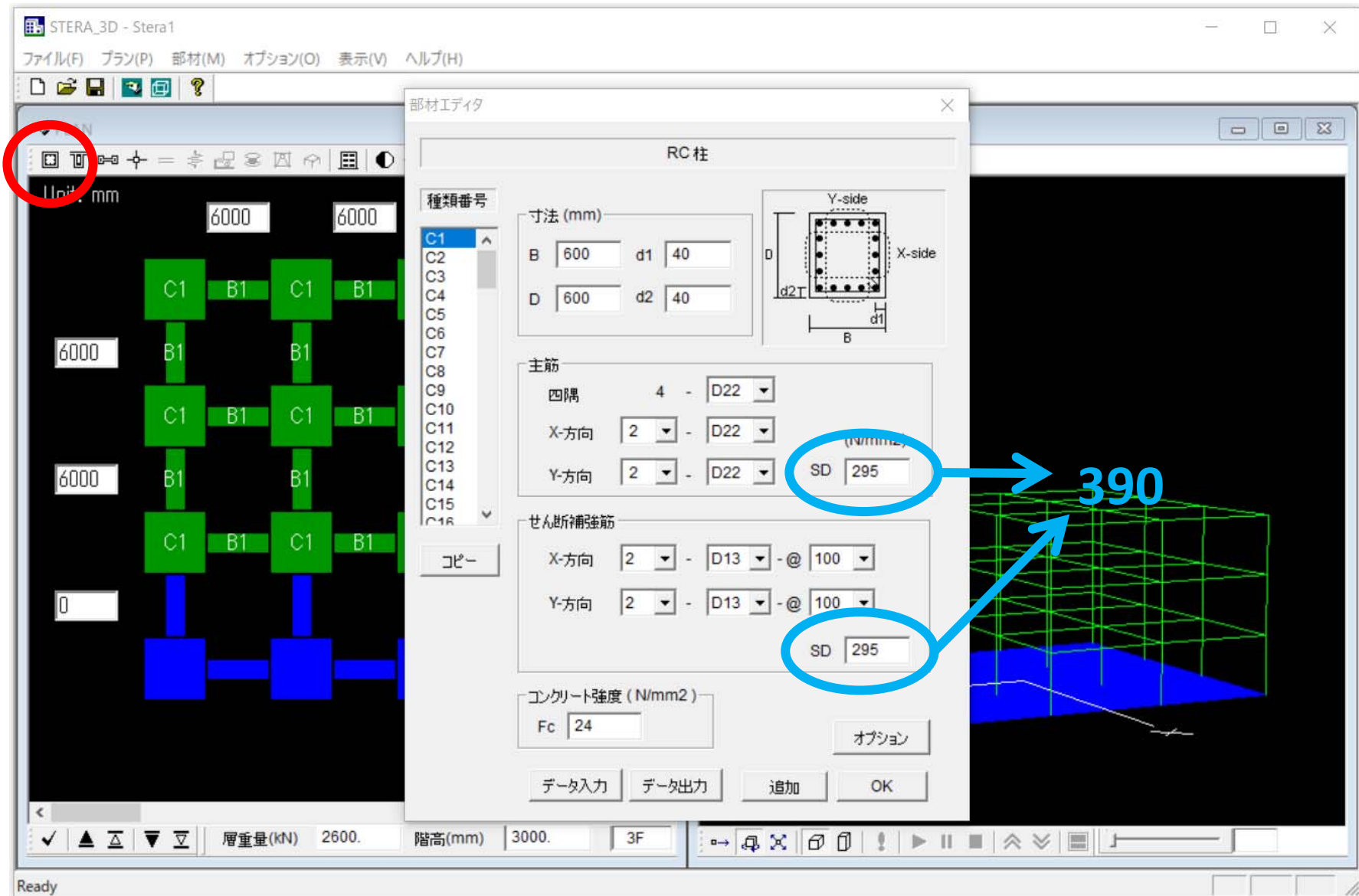
# STERA 3D (建物寸法入力)



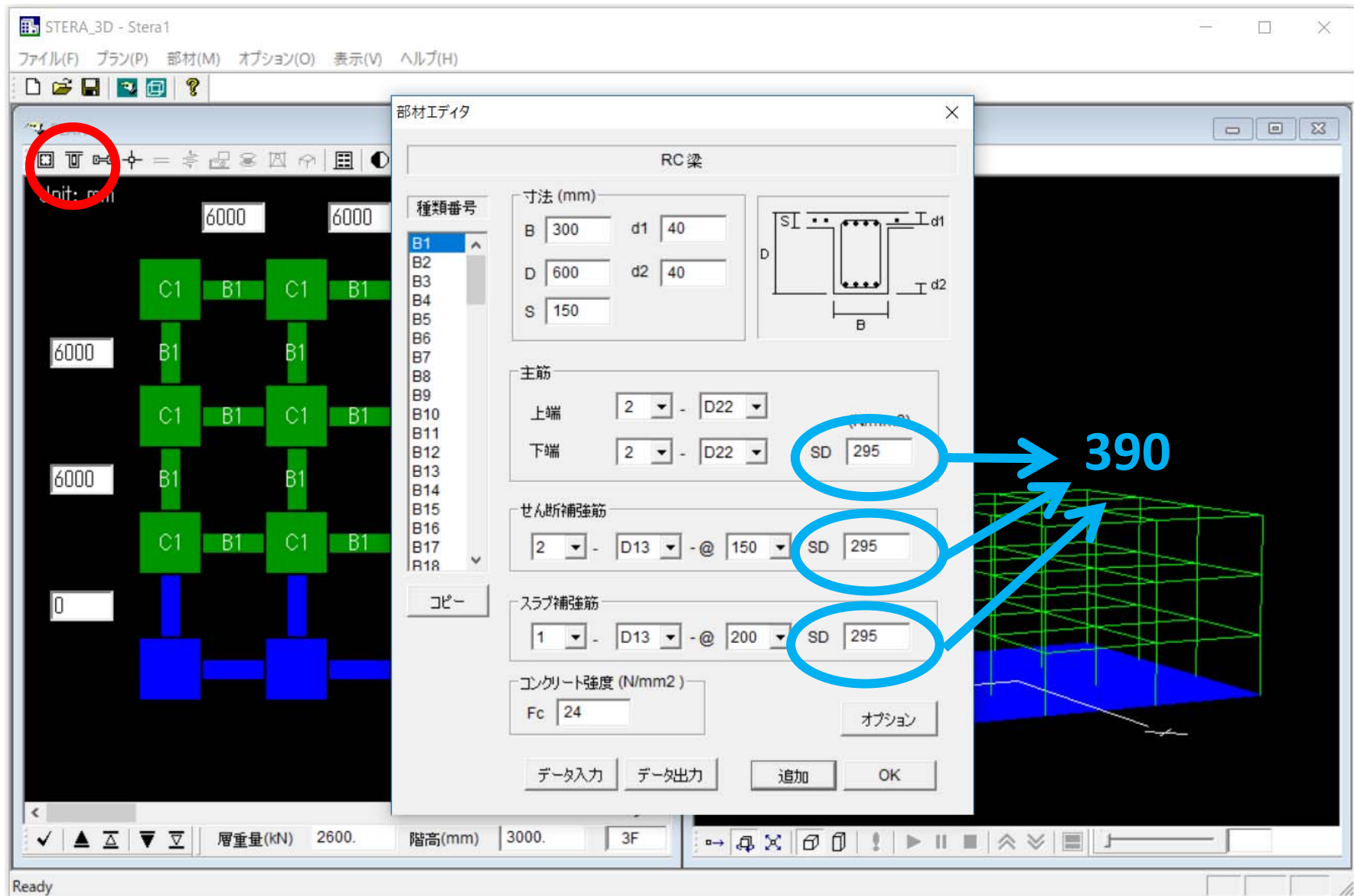
# STERA 3D (上の階に移動・コピー)



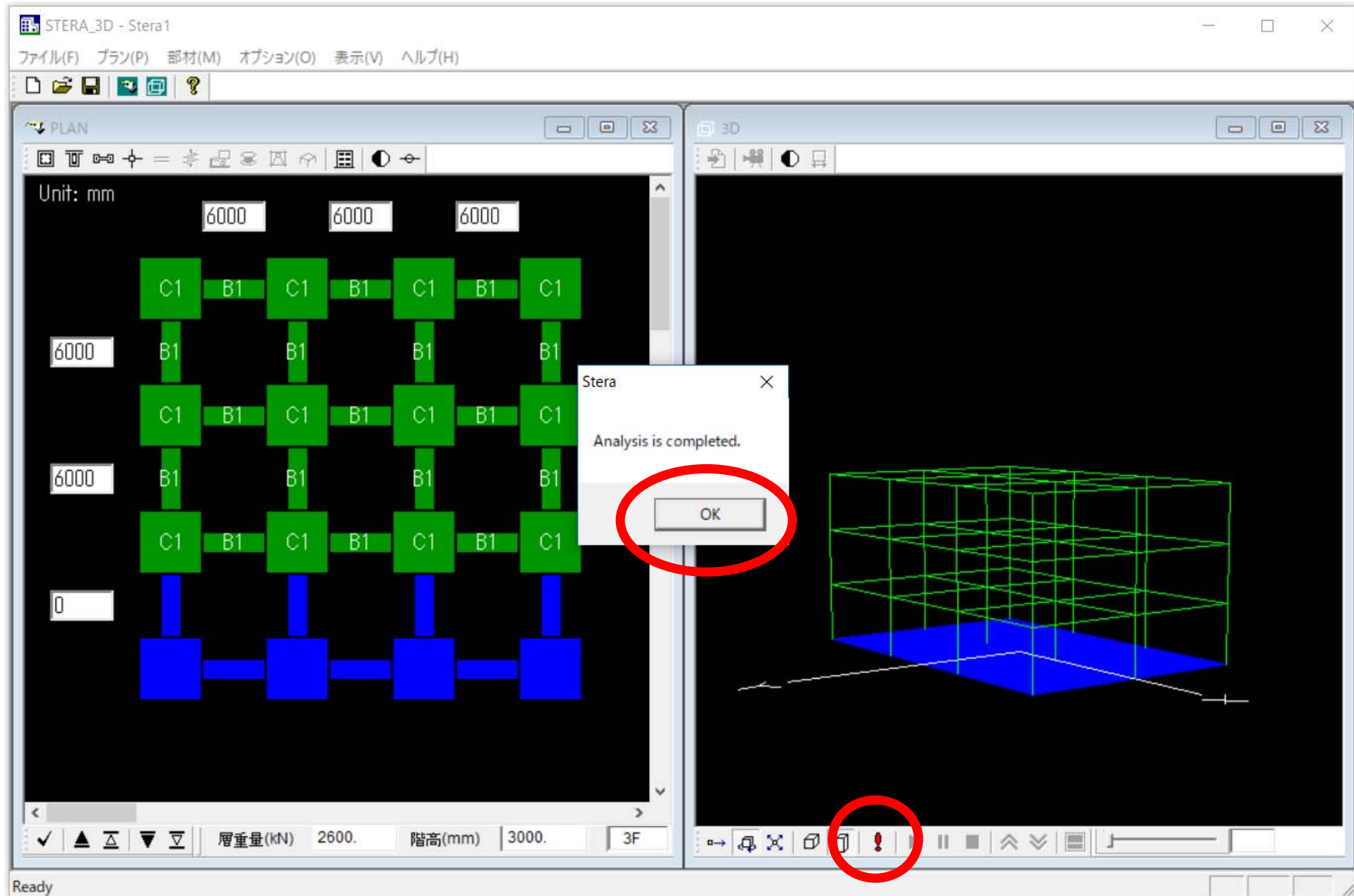
# STERA 3D (柱断面入力)



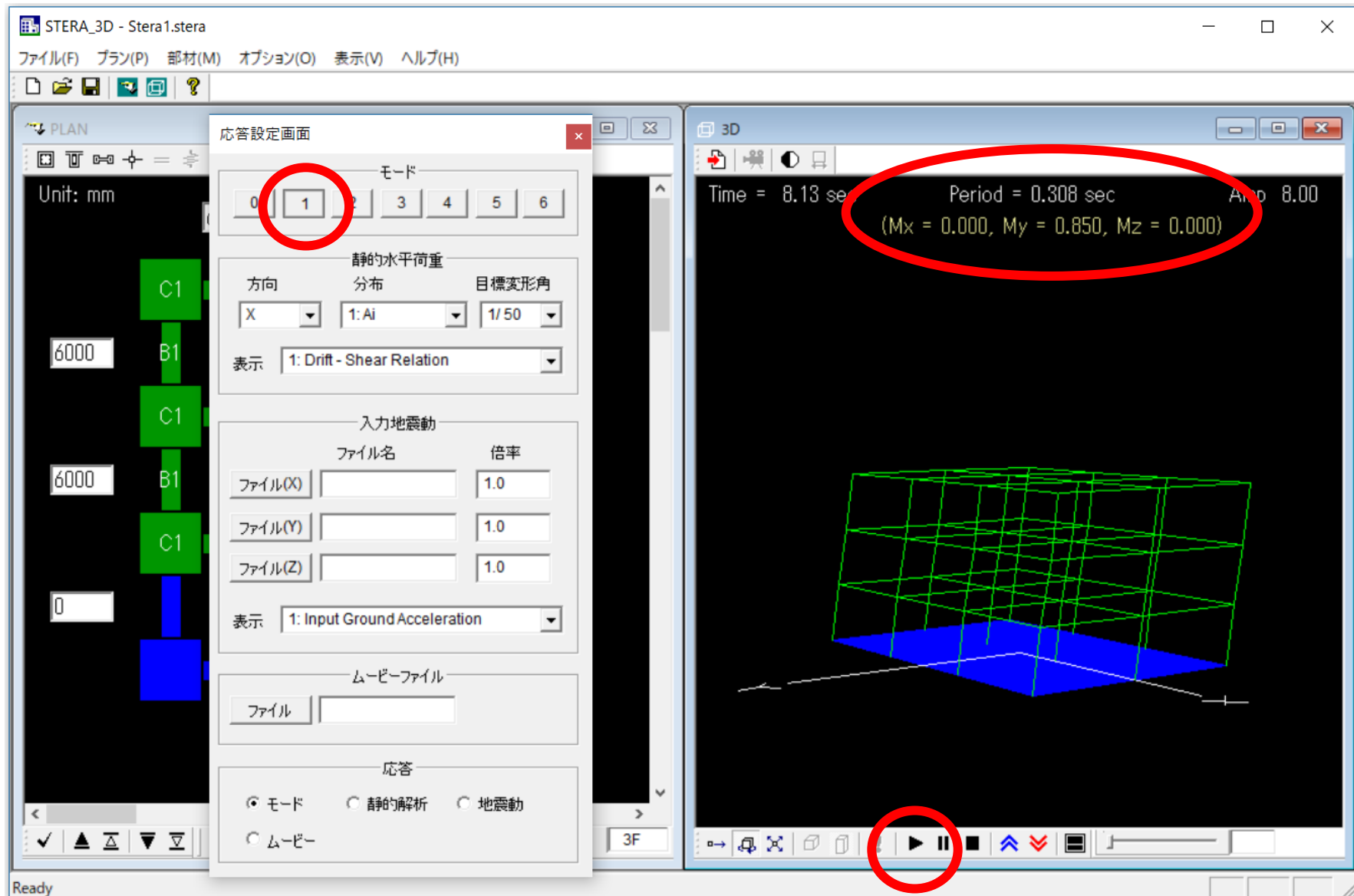
# STERA 3D (梁断面入力)



# STERA 3D (解析)



# STERA 3D (弾性モード解析)





# STERA 3D (静的非線形解析)

The screenshot displays the STERA 3D software interface for static nonlinear analysis. The main window is titled "STERA\_3D - Stera1.stera".

**PLAN View (Left):** Shows a vertical structural model with columns labeled C1 and B1, and a base. Dimensions of 6000 mm are indicated. The unit is set to mm.

**Response Setting Screen (Middle):** A dialog box titled "応答設定画面" (Response Setting Screen) is open. The "モード" (Mode) section has buttons 0 through 6. The "静的水平荷重" (Static Horizontal Load) section is circled in red and includes:

- Direction: X
- Distribution: 1: Ai
- Target Drift Angle: 1/50
- Display: 1: Drift - Shear Relation

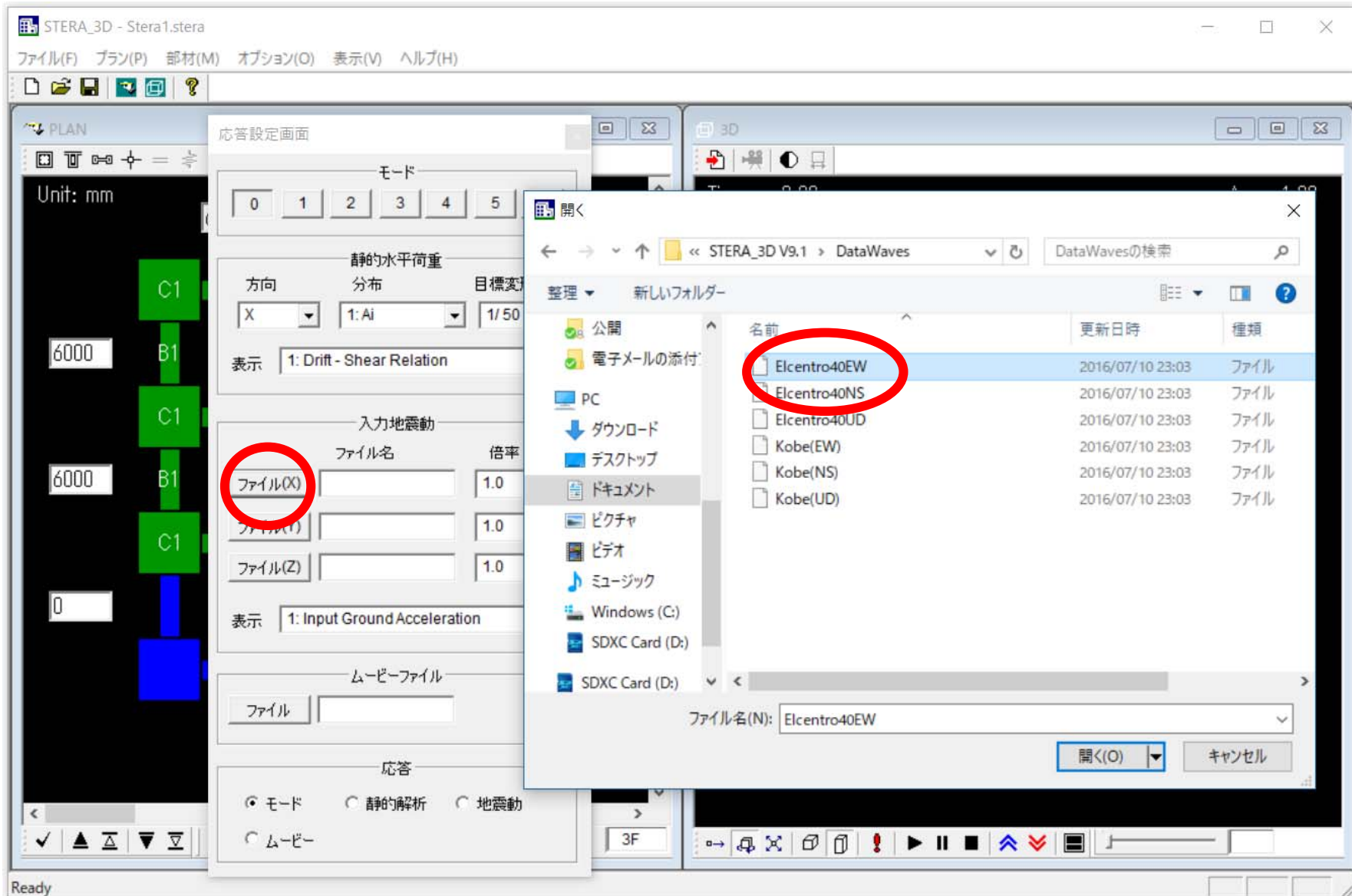
The "入力地震動" (Input Earthquake) section has fields for File Name and Magnification (all set to 1.0) for X, Y, and Z directions. The "ムービーファイル" (Movie File) section has a "ファイル" (File) field. The "応答" (Response) section has radio buttons for "モード", "静的解析" (Static Analysis), and "地震動" (Earthquake), with "静的解析" selected.

**3D View (Right):** Shows a 3D wireframe model of the structure. The legend indicates displacement ranges: yellow for  $1 < U < 5$  and red for  $5 < U$ . The amplitude is set to 8.00. The view shows 426 / 500 elements.

**Graph (Bottom Right):** A graph titled "Base shear factor > 0.3" plots  $Q_i / W$  (Base Shear Factor) on the y-axis (0.0 to 0.4) against  $R_i$  (Drift Ratio) on the x-axis (1/100 to 1/50). Three curves are shown, labeled 1, 2, and 3. A dashed horizontal line is drawn at  $Q_i / W = 0.3$ . A red dashed line indicates the path of the analysis.

The bottom right corner of the 3D view has a playback control bar with a play button circled in red.

# STERA 3D (地震応答解析)



# STERA 3D (地震応答解析)

The screenshot displays the STERA 3D software interface for seismic response analysis. The main window is titled "STERA\_3D - Stera1.stera" and features a menu bar (File, Plan, Part, Option, Display, Help) and a toolbar. The interface is divided into several panels:

- PLAN Panel:** Shows a 2D view of the building structure with columns labeled C1 and beams labeled B1. Dimensions of 6000 mm are indicated. A blue square represents the base of the structure.
- Response Setting Panel (応答設定画面):**
  - モード (Mode):** Buttons for modes 0 through 6.
  - 静的水平荷重 (Static Horizontal Load):** Direction: X, Distribution: 1: Ai, Target Drift Angle: 1/50. Display: 1: Drift - Shear Relation.
  - 入力地震動 (Input Earthquake Motion):**

ファイル名 (File Name)	倍率 (Scale)
ファイル(X) Elcentro40EW	1.0
ファイル(Y) Elcentro40NS	1.0
ファイル(Z) Elcentro40UD	1.0

Display: 1: Input Ground Acceleration.
  - ムービーファイル (Movie File):** File input field.
  - 応答 (Response):** Radio buttons for Mode, Static Analysis, and Earthquake Motion (selected). A Movie button is also present.
- 3D Panel:** Shows a 3D wireframe model of the building. Time = 5.68 sec, Amplitude = 32.00. Below the model are three time-series plots for X, Y, and Z directions:
  - X: 210.1 gal
  - Y: 341.7 gal
  - Z: 206.3 galA duration of 15.0 sec is also shown. Playback controls (play, pause, up/down arrows) are visible at the bottom of the 3D panel, with the play and pause buttons circled in red.