Preliminary

planned mechanical load

- ○ transportation (loan)
- ○ exhibition
- ○ transportation and exhibition
- ○ restoration treatment

AND

format of canvas

- ○ quadrangle
- ○ oval
- ○ circular*

· **If the format of the canvas is circular, the dimensions "width" and "height" are replaced by "diameter".*

AND

know first natural frequency?

NO

pretension
- ○ low: TensionFactor = 0.7
- ○ low-medium: TensionFactor = 0.85
- ○ medium: TensionFactor = 1
- ○ medium-high: TensionFactor = 1.1
- ○ high: TensionFactor = 1.2

∧

lining
- ○ 0: LiningFactor = 1
- ○ 1: LiningFactor = 1.1
- ○ 2: LiningFactor = 1.2
- ○ 3: LiningFactor = 1.3

*affects base thickness***

∧

deformation
- ○ not at all: DeformFactor = 1
- ○ medium: DeformFactor = 1.1
- ○ heavy: DeformfFactor = 1.2

∧

impasto-painted
- ○ 0%: ImpastoFactor = 1
- ○ 10%: ImpastoFactor = 1.1
- ○ 20%: ImpastoFactor = 1.4
- ○ 50%: ImpastoFactor = 2

YES

∨

known frequency
- ☐ freqeuncy from user

· *Parameters are not dependent on each other.*
· *Pretension, lining, and deformation act as adjustment parameters in the calculation of the Young's modulus, and impasto is used to adjust the density.*
· ***If the thickness of painting is not provided, the base thickness is estimated based on the presence and number of lining layers. Without lining (0 layers), it is set to 2–2.5 mm. With lining, the base thickness is set to 2–3 times the value with lining. However, for improved accuracy, entering the measured thickness is recommended.*

AND

measurements of artwork

canvas size
- ☐ weight [kg]
- ☐ width/height or diameter [mm]
- ☐ average thickness** of painted canvas [mm]

stretcher construction
- ☐ weight [kg]
- ☐ width/height or diameter [mm]
- ☐ thickness [mm]
- ☐ number of partitions
- ☐ width/height or diameter of one partition [mm]
- ☐ average thickness of length and cross bars [mm]
- ○ type of wood: soft/hard

decorative frame
- ☐ weight [kg]
- ○ weight with/without glazing
- ☐ width/height or diameter [mm]
- ☐ thickness [mm]
- ○ type of glazing: plain/museum/acrylic
- ☐ width/height or diameter of glazing [mm]
- ☐ thickness of glazing [mm]

individually **partially** **as a whole**

Calculation of first natural frequency

base Young's modulus: 400 [N/mm^2] → calculation of Young's modulus

Poisson ratio: 0.3 → calculation of bending stiffness

base density: 400 [kg/m^3] → calculation of density

calculation of Young's modulus → calculation of bending stiffness → calculation of density → first natural frequency [Hz]