

NOTE

1. TYPE OF GRATING : RFB60x6 BBP=35.3 , TB6x6 TBP=100
END PLATE : FB55x6
2. TYPE OF FRAME : PL-71x60x6t (Bending Type)
3. SURFACE FINISHING GRATING : HOT DIP GALVANIZED ASTM (A123)
4. SURFACE FINISHING FRAME : HOT DIP GALVANIZED ASTM (A123)
5. DESIGN CONDITION LOAD : HEAVY DUTY T-20 (Parallel to main structure)
Impact coefficient = 0.4

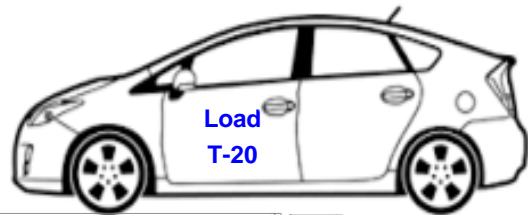
PROJECT TITLE		Typical_Drawing							
CHECKED BY	CHATCHAI	DETAIL GRATING FOR GUTTER Span = 400				1	1		
DRAWN BY	THITIKORN.P					2			
DATE DRAWN	24/04/2020	DDR NO.	DDR20177	JOB NO.	-	DWG. NO.	DW20177F03	REV.	0
1	06/05/2020	Add Page 1/2		SCALE	NTS				
REV.	REV. DATE	DESCRIPTION							

Grating,Strength calculation

1. Design Condition

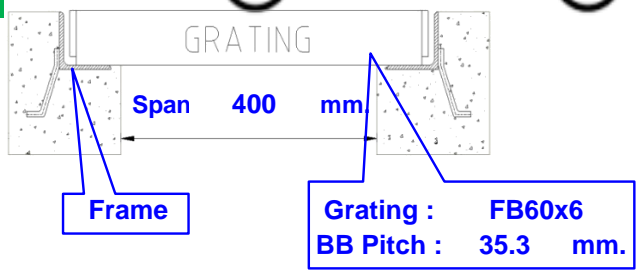
← Input

Load **T-20**
 Load on one rear whee P = 80 kN.
 Contact area a x b = 20 cm. x 50 cm.
Vehicle direction **Parallel to main structure**
 Impact coefficient i = 0.4
Span **L = 40 cm. (L' = 40 cm.)**
 Allowable stress $\sigma_a = 18 \text{ kN/cm}^2$ **18**
 Allowable bending $\delta/L = 1 / 300$



2. Grating, Cressection performance

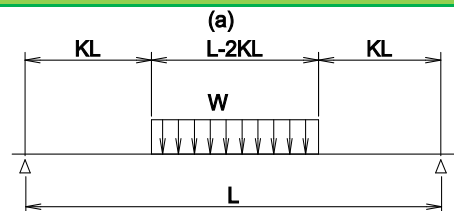
Main structure **FB60x6**
Pitch (p) = **3.53 cm.**
 Cross-sectional performance, others
 • Geometrical moment of iner $I = 10.8 \text{ cm}^4/\text{piece}$
 • Section modulus $Z = 3.6 \text{ cm}^3/\text{piece}$
 • Young's modulus $E = 20000 \text{ kN/cm}^2$



3. Load, Bending moment

3.1 Loading form

$$K = \frac{L - a}{2L} = \frac{40 - 20}{2 \times 40} = 0.250$$



3.2 Load (per unit area : kN/cm2)

$$w = \frac{P(1+i)}{ab} = \frac{80 \times (1+0.4)}{20 \times 50} = 0.112$$

3.3 Load (main structure per one : kN)

$$W = w p (L - 2KL) = 0.112 \times 3.53 \times (40 - 2 \times 0.25 \times 40) = 7.9$$

3.4 Bending moment (: kN · cm)

$$M = \frac{W(L + 2KL)}{8} = \frac{7.9 \times (40 + 2 \times 0.25 \times 40)}{8} = 59$$

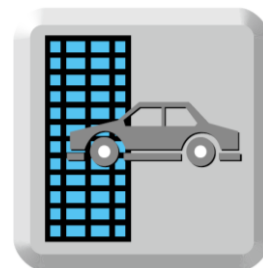
4. Stress

$$\sigma = \frac{M}{Z} = \frac{59}{3.6} = 16.48 \text{ kN/cm}^2 \leq \sigma_a \text{ kN/cm}^2 \quad \text{O.K.}$$

5. Bending (Deflection)

$$\delta = \frac{W L^3 (1 + 2K) (5 - 4K^2)}{384 E I} = \frac{7.9 \times 40^3 \times (1 + 2 \times 0.25) \times (5 - 4 \times 0.25^2)}{384 \times 20000 \times 10.8} = 0.0435 \text{ cm.}$$

$$\delta/L = 1 / 920 \leq 1 / 300 \quad \text{O.K.}$$



Parallel to main structure