

NOTE

- TYPE OF GRATING : RFB50x6 BBP=35.3 , TB6x6 TBP=100
END PLATE : FB44x6
- TYPE OF FRAME : PL-61x60x6t (Bending Type)
- SURFACE FINISHING GRATING : HOT DIP GALVANIZED ASTM (A123)
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- DESIGN CONDITION LOAD : HEAVY DUTY T-20 (Parallel to main structure)
Impact coefficient = 0.4

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REV.	REV.DATE	DESCRIPTION

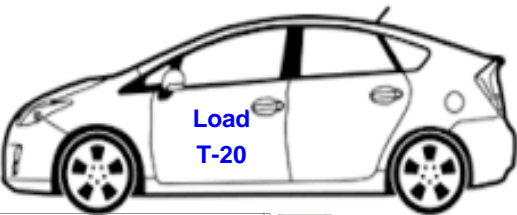
PROJECT TITLE		Typical_Drawing					
CHECKED BY	CHATCHAI	DETAIL GRATING FOR GUTTER				1	
DRAWN BY	THITIKORN.P	Span = 300				2	1
DATE DRAWN	24/04/2020	DDR NO.	DDR20177	JOB NO.	-	DWG.NO.	DW20177F02
		REV.					0
SCALE	NTS	DAIKURE (THAILAND) CO. , LTD.					

Grating,Strength calculation

1. Design Condition

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 = 30 cm. (L' = 30 cm.)**
 Allowable stress $\sigma_a = 18 \text{ kN/cm}^2$ **18**
 Allowable bending $\delta/L = 1 / 300$

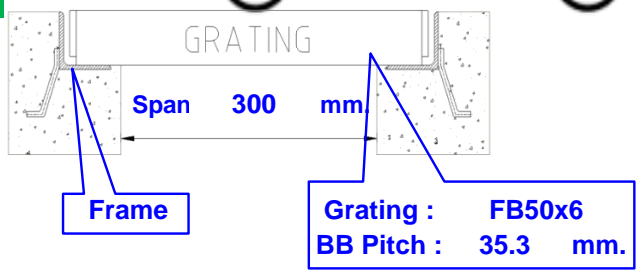
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Parallel to main structure

2. Grating, Cressection performance

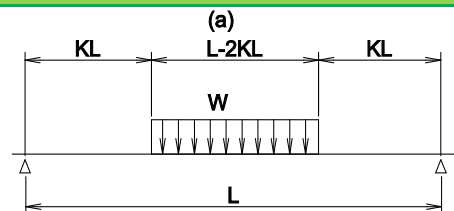
Main structure **FB50x6**
Pitch (p) = **3.53 cm.**
 Cross-sectional performance, others
 • Geometrical moment of iner $I = 6.25 \text{ cm}^4/\text{piece}$
 • Section modulus $Z = 2.5 \text{ cm}^3/\text{piece}$
 • Young's modulus $E = 20000 \text{ kN/cm}^2$



3. Load, Bending moment

3.1 Loading form

$$K = \frac{L - a}{2L} = \frac{30 - 20}{2 \times 30} = 0.167$$



3.2 Load (per unit area : kN/cm2)

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

3.3 Load (main structure per one : kN)

$$W = w p (L - 2 K L) = 0.112 \times 3.53 \times (30 - 2 \times 0.167 \times 30) = 7.9$$

3.4 Bending moment (: kN · cm)

$$M = \frac{W(L + 2 K L)}{8} = \frac{7.9 \times (30 + 2 \times 0.167 \times 30)}{8} = 40$$

4. Stress

$$\sigma = \frac{M}{Z} = \frac{40}{2.5} = 15.81 \text{ kN/cm}^2 \leq \sigma_a \text{ kN/cm}^2 \text{ O.K.}$$

5. Bending (Deflection)

$$\delta = \frac{W L^3 (1 + 2 K) (5 - 4 K^2)}{384 E I} = \frac{7.9 \times 30^3 \times (1 + 2 \times 0.167) \times (5 - 4 \times 0.167^2)}{384 \times 20000 \times 6.25} = 0.0290 \text{ cm.}$$

$$\delta/L = 1 / 1034 \leq 1 / 300 \text{ O.K.}$$



Parallel to main structure