Street light pole foundation wind strength calculation

Pole Height (m)   10
Top Diameter D (m) 0.1
Bottom Diameter d 0.208
Bolts   4*M20
Flange of pole(mm) 400*400*20

II, The light pole force analysis

Wind Speed V (m/s)	Wind Pressure P(N/m²)	Wind area of Pole S1 (m2)	Wind area of Lamp S2 (m2)	Distance from the base flange of pole to the position of equal force L1 (m)	Distance of Lamps affected by wind force L2 (m)	Pull force of each bolts beared F1 (N)	Pull force on the lamp F2 (N)
36.9	851.00625	1.54	0.3	2.93	10	1310.549625	255.301875

Distance from the bolt a to the position of force （side of flange）La (m)	Distance from the bolt b to the position of force （side of flange) Lb(m)	The Moment generated by the wind force on the Pole is M wind (N·m)	The Moment generated by the wind force on the lamp is M lamp (N·m)	The pulling moment of the bolts on the flange of the lamp post is M bolts (N·m)	Pull force bolts to the flange Fa=Fb=F (KN)	Force on a single bolt F (KN)	
0.2942	0.1016	3839.910401	2553.01875	6392.929151	8.075959009	8.075959009	

Note: M bolts = 2Fa*La+2Fb*Lb=2Fa*0.2825+2Fb*0.0747 = M wind + M light

III, the actual force limit calculation of the foundation bolts

The design tensile strength of bolt material Q235 steel MPa	The minimum diameter of M20 Bolt (mm)	M20 bolts effective cross-sectional area = πr2 (mm2)	Permissible pulling force Fxu(KN)		
215	17.29	234.78	50.48		

图 3   图 4
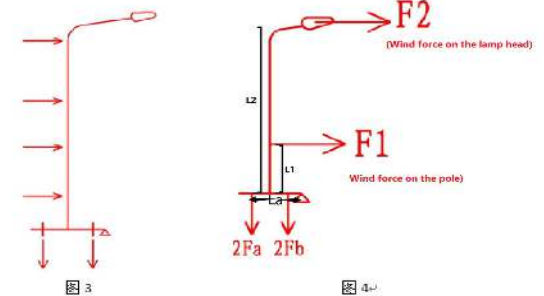
IV, The foundation bolts safety identification

Fxu > F, Safe

According to the above calculation, the street light in the case of suffering 12 typhoons, the actual instantaneous pulling force of the
 single bolts is much smaller than the permissible pulling force of the foundation bolts :