

Chapter 30

Case Study I: EIFFEL TOWER

Adapted from (Billington and Mark 1983)

30.1 Materials, & Geometry

¹ The tower was built out of wrought iron, less expensive than steel, and Eiffel had more experience with this material, Fig. 30.1

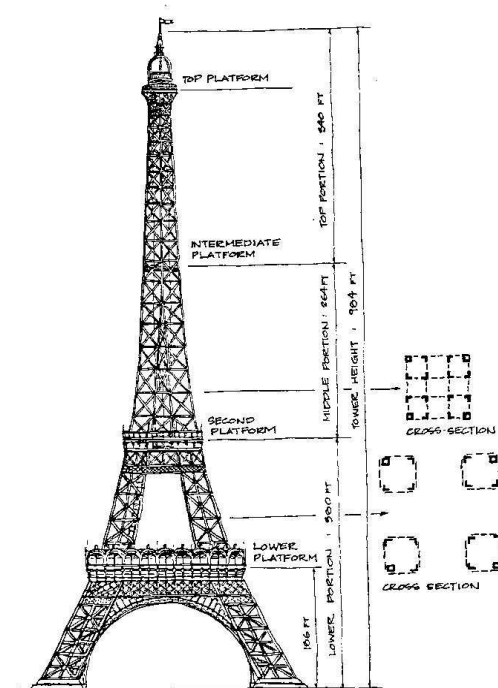


Figure 30.1: Eiffel Tower (Billington and Mark 1983)

Location	Height	Width/2	Width		$\frac{dy}{dx}$	β
			Estimated	Actual		
Support	0	164	328		.333	18.4°
First platform	186	108	216	240	.270	15.1°
second platform	380	62	123	110	.205	11.6°
Intermediate platform	644	20	40		.115	6.6°
Top platform	906	1	2		.0264	1.5°
Top	984	0	0		0.000	0°

4 The tower is supported by four inclined supports, each with a cross section of 800 in^2 . An idealization of the tower is shown in Fig. 30.2.

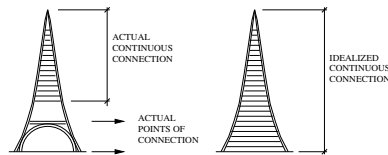


Figure 30.2: Eiffel Tower Idealization, (Billington and Mark 1983)

30.2 Loads

5 The total weight of the tower is 18,800 k.

6 The dead load is not uniformly distributed, and is approximated as follows, Fig. 30.3:

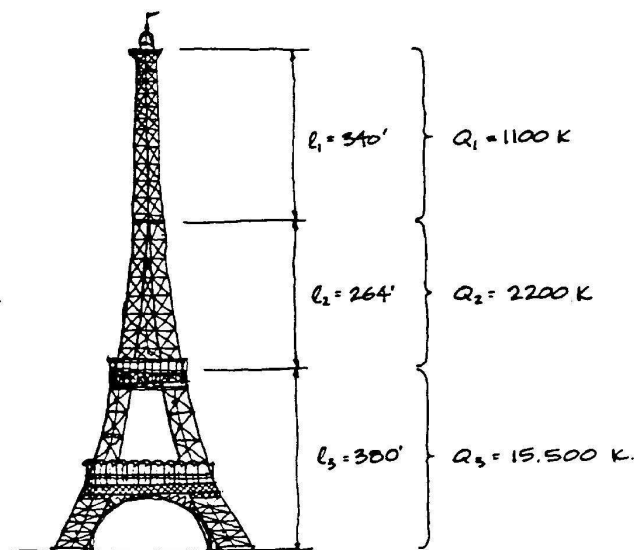


Figure 30.3: Eiffel Tower, Dead Load Idealization; (Billington and Mark 1983)