

# 風圧によるビス引き抜き保持力及びボルトせん断保持力計算<参考>

— 設定条件 —  
 建築物の高さH=31m (10階相当)  
 基準風速Vo=46m/秒 (石垣島)  
 帳壁の負のピーク外圧係数Cpe=-2.2 (壁面左右0.1aより外側部分 ※a:平面の短編の長さ)  
 帳壁の負のピーク内圧係数Cpi=1.5 (開放型の建築物で風上開放の場合)  
 平均風速の鉛直分布係数Er=1.7x(H/250)<sup>0.1</sup> =1.7x(31/250)<sup>0.1</sup> =1.38 (地表面粗度区分1:海岸地域)

ピーク風力係数Cf=ピーク外圧係数Cpe - ピーク内圧係数Cpi=-2.2-1.5=-3.7

平均速度圧q(N/m<sup>2</sup>)=平均風速の鉛直分布係数Er<sup>2</sup> x 基準風速Vo<sup>2</sup> x 0.6 =1.38<sup>2</sup> x46<sup>2</sup> x0.6=2418

風圧力W(N/m<sup>2</sup>)=平均速度圧q x ピーク風力係数Cf=2418x(-3.7)=-8,946(N/m<sup>2</sup>)

| アイテム名 (900角)                            |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 開口率                                     | 39.4%  | 27.4%  | 27.4%  | 41.2%  | 41.2%  | 39.0%  | 40.4%  | 23.5%  | 42.7%  | 40.1%  | 39.3%  | 44.5%  | 44.3%  | 44.4%  | 24.6%  | 21.9%  | 32.3%  | 36.8%  | 33.0%  | 47.2%  | 28.0%  | 27.7%  | 23.9%  | 51.4%  | 37.6%  | 35.7%  | 18.5%  | 30.3%  | 46.4%  |
| 受風面積 (m <sup>2</sup> )                  | 0.49   | 0.59   | 0.59   | 0.48   | 0.48   | 0.49   | 0.48   | 0.62   | 0.46   | 0.49   | 0.49   | 0.45   | 0.45   | 0.45   | 0.61   | 0.63   | 0.55   | 0.51   | 0.54   | 0.43   | 0.58   | 0.59   | 0.62   | 0.39   | 0.51   | 0.52   | 0.66   | 0.56   | 0.43   |
| 風圧力W (N/m <sup>2</sup> )                | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 |
| 負担風圧力N                                  | -4,393 | -5,264 | -5,264 | -4,258 | -4,258 | -4,422 | -4,320 | -5,542 | -4,150 | -4,342 | -4,400 | -4,024 | -4,039 | -4,030 | -5,464 | -5,661 | -4,906 | -4,578 | -4,858 | -3,829 | -5,218 | -5,241 | -5,512 | -3,521 | -4,520 | -4,656 | -5,903 | -5,050 | -3,885 |
| ビス引き抜き保持力1(N)<br>(SUS410/呼び径4/アルミ板2.0)  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  |
| ビス本数                                    | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     |
| 総引き抜き保持力1 (N)                           | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 | 20,800 |
| 安全率                                     | 4.7    | 4.0    | 4.0    | 4.9    | 4.9    | 4.7    | 4.8    | 3.8    | 5.0    | 4.8    | 4.7    | 5.2    | 5.1    | 5.2    | 3.8    | 3.7    | 4.2    | 4.5    | 4.3    | 5.4    | 4.0    | 4.0    | 3.8    | 5.9    | 4.6    | 4.5    | 3.5    | 4.1    | 5.4    |
| ビス引き抜き保持力2(N)<br>(SUS410/呼び径4/スチール板1.6) | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  |
| ビス本数                                    | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     |
| 総引き抜き保持力1 (N)                           | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 |
| 安全率                                     | 9.5    | 7.9    | 7.9    | 9.8    | 9.8    | 9.4    | 9.6    | 7.5    | 10.0   | 9.6    | 9.5    | 10.3   | 10.3   | 10.3   | 7.6    | 7.3    | 8.5    | 9.1    | 8.6    | 10.9   | 8.0    | 7.9    | 7.5    | 11.8   | 9.2    | 8.9    | 7.0    | 8.2    | 10.7   |
| ボルトせん断力(N)<br>(強力M6/強度区分8.8)            | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  |
| ボルト本数                                   | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     | 16     |
| 総せん断保持力1 (N)                            | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 | 41,600 |
| 安全率                                     | 9.5    | 7.9    | 7.9    | 9.8    | 9.8    | 9.4    | 9.6    | 7.5    | 10.0   | 9.6    | 9.5    | 10.3   | 10.3   | 10.3   | 7.6    | 7.3    | 8.5    | 9.1    | 8.6    | 10.9   | 8.0    | 7.9    | 7.5    | 11.8   | 9.2    | 8.9    | 7.0    | 8.2    | 10.7   |

| アイテム名 (1350角)                           |        |         |         |        |        |        |        |         |        |        |        |        |        |        |         |         |         |         |         |        |         |         |         |        |        |         |         |         |        |
|---|--------|---------|---------|--------|--------|--------|--------|---------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|--------|---------|---------|---------|--------|--------|---------|---------|---------|--------|
| 開口率                                     | 40.6%  | 28.2%   | 28.2%   | 42.5%  | 42.5%  | 40.2%  | 41.6%  | 24.3%   | 44.1%  | 41.3%  | 40.5%  | 45.9%  | 45.6%  | 45.8%  | 25.4%   | 22.6%   | 33.4%   | 38.0%   | 34.0%   | 48.6%  | 28.7%   | 28.5%   | 24.7%   | 53.0%  | 38.8%  | 36.9%   | 19.1%   | 31.3%   | 47.8%  |
| 受風面積 (m <sup>2</sup> )                  | 1.08   | 1.31    | 1.31    | 1.05   | 1.05   | 1.09   | 1.06   | 1.38    | 1.02   | 1.07   | 1.08   | 0.99   | 0.99   | 0.99   | 1.36    | 1.41    | 1.21    | 1.13    | 1.20    | 0.94   | 1.30    | 1.30    | 1.37    | 0.86   | 1.12   | 1.15    | 1.47    | 1.25    | 0.95   |
| 風圧力W (N/m <sup>2</sup> )                | -8,946 | -8,946  | -8,946  | -8,946 | -8,946 | -8,946 | -8,946 | -8,946  | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946 | -8,946  | -8,946  | -8,946  | -8,946  | -8,946  | -8,946 | -8,946  | -8,946  | -8,946  | -8,946 | -8,946 | -8,946  | -8,946  | -8,946  | -8,946 |
| 負担風圧力N                                  | -9,680 | -11,703 | -11,703 | -9,371 | -9,371 | -9,750 | -9,514 | -12,350 | -9,120 | -9,565 | -9,698 | -8,827 | -8,862 | -8,841 | -12,170 | -12,626 | -10,860 | -10,114 | -10,761 | -8,374 | -11,623 | -11,650 | -12,279 | -7,657 | -9,983 | -10,291 | -13,186 | -11,209 | -8,509 |
| ビス引き抜き保持力1(N)<br>(SUS410/呼び径4/アルミ板2.0)  | 1,300  | 1,300   | 1,300   | 1,300  | 1,300  | 1,300  | 1,300  | 1,300   | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300  | 1,300   | 1,300   | 1,300   | 1,300   | 1,300   | 1,300  | 1,300   | 1,300   | 1,300   | 1,300  | 1,300  | 1,300   | 1,300   | 1,300   | 1,300  |
| ビス本数                                    | 20     | 20      | 20      | 20     | 20     | 20     | 20     | 20      | 20     | 20     | 20     | 20     | 20     | 20     | 20      | 20      | 20      | 20      | 20      | 20     | 20      | 20      | 20      | 20     | 20     | 20      | 20      | 20      | 20     |
| 総引き抜き保持力1 (N)                           | 26,000 | 26,000  | 26,000  | 26,000 | 26,000 | 26,000 | 26,000 | 26,000  | 26,000 | 26,000 | 26,000 | 26,000 | 26,000 | 26,000 | 26,000  | 26,000  | 26,000  | 26,000  | 26,000  | 26,000 | 26,000  | 26,000  | 26,000  | 26,000 | 26,000 | 26,000  | 26,000  | 26,000  | 26,000 |
| 安全率                                     | 2.7    | 2.2     | 2.2     | 2.8    | 2.8    | 2.7    | 2.7    | 2.1     | 2.9    | 2.7    | 2.7    | 2.9    | 2.9    | 2.9    | 2.1     | 2.1     | 2.4     | 2.6     | 2.4     | 3.1    | 2.2     | 2.2     | 2.1     | 3.4    | 2.6    | 2.5     | 2.0     | 2.3     | 3.1    |
| ビス引き抜き保持力2(N)<br>(SUS410/呼び径4/スチール板1.6) | 2,600  | 2,600   | 2,600   | 2,600  | 2,600  | 2,600  | 2,600  | 2,600   | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600   | 2,600   | 2,600   | 2,600   | 2,600   | 2,600  | 2,600   | 2,600   | 2,600   | 2,600  | 2,600  | 2,600   | 2,600   | 2,600   | 2,600  |
| ビス本数                                    | 20     | 20      | 20      | 20     | 20     | 20     | 20     | 20      | 20     | 20     | 20     | 20     | 20     | 20     | 20      | 20      | 20      | 20      | 20      | 20     | 20      | 20      | 20      | 20     | 20     | 20      | 20      | 20      | 20     |
| 総引き抜き保持力1 (N)                           | 52,000 | 52,000  | 52,000  | 52,000 | 52,000 | 52,000 | 52,000 | 52,000  | 52,000 | 52,000 | 52,000 | 52,000 | 52,000 | 52,000 | 52,000  | 52,000  | 52,000  | 52,000  | 52,000  | 52,000 | 52,000  | 52,000  | 52,000  | 52,000 | 52,000 | 52,000  | 52,000  | 52,000  | 52,000 |
| 安全率                                     | 5.4    | 4.4     | 4.4     | 5.5    | 5.5    | 5.3    | 5.5    | 4.2     | 5.7    | 5.4    | 5.4    | 5.9    | 5.9    | 5.9    | 4.3     | 4.1     | 4.8     | 5.1     | 4.8     | 6.2    | 4.5     | 4.5     | 4.2     | 6.8    | 5.2    | 5.1     | 3.9     | 4.6     | 6.1    |
| ボルトせん断力(N)<br>(強力M6/強度区分8.8)            | 2,600  | 2,600   | 2,600   | 2,600  | 2,600  | 2,600  | 2,600  | 2,600   | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600  | 2,600   | 2,600   | 2,600   | 2,600   | 2,600   | 2,600  | 2,600   | 2,600   | 2,600   | 2,600  | 2,600  | 2,600   | 2,600   | 2,600   | 2,600  |
| ボルト本数                                   | 20     | 20      | 20      | 20     | 20     | 20     | 20     | 20      | 20     | 20     | 20     | 20     | 20     | 20     | 20      | 20      | 20      | 20      | 20      | 20     | 20      | 20      | 20      | 20     | 20     | 20      | 20      | 20      | 20     |
| 総せん断保持力1 (N)                            | 52,000 | 52,000  | 52,000  | 52,000 | 52,000 | 52,000 | 52,000 | 52,000  | 52,000 | 52,000 | 52,000 | 52,000 | 52,000 | 52,000 | 52,000  | 52,000  | 52,000  | 52,000  | 52,000  | 52,000 | 52,000  | 52,000  | 52,000  | 52,000 | 52,000 | 52,000  | 52,000  | 52,000  | 52,000 |
| 安全率                                     | 5.4    | 4.4     | 4.4     | 5.5    | 5.5    | 5.3    | 5.5    | 4.2     | 5.7    | 5.4    | 5.4    | 5.9    | 5.9    | 5.9    | 4.3     | 4.1     | 4.8     | 5.1     | 4.8     | 6.2    | 4.5     | 4.5     | 4.2     | 6.8    | 5.2    | 5.1     | 3.9     | 4.6     | 6.1    |