

# Load factor to be applied to buckling design of cylindrical lattice shells under asymmetric snow loads

Yutaka NIHO\*, Shiro KATO<sup>a</sup>, Shoji NAKAZAWA<sup>b</sup>

\* National Institute of Technology, Kure College of Engineering, Architecture and civil engineering,  
 niho@kure-net.ac.jp

<sup>a</sup> Toyohashi University of Technology, Architecture and Civil Engineering  
 kato-shiro@tg.commufa.jp

<sup>b</sup> Toyohashi University of Technology, Architecture and Civil Engineering  
 nakazawa@ace.tut.ac.jp

## Abstract

Relationships between reliability index and load factor to be applied in structural design has been recently focused for reticulated shells under uniform snow load [1, 2]. However few papers has been found in the case of non-uniform snow load in the author’s knowledge.

This paper investigates the relationship between reliability index  $\beta$  and non-uniform snow load factor  $\gamma_s$ . The load consists of uniform dead load  $p_d$  and non-uniform load  $\rho_s h_s$  as shown in Figure 1. The structure is a kind of cylindrical roofs with equilateral triangle grids composed of steel tubular hollow members. Each member is rigidly connected to nodes at its both ends. The several cases are studied for different member slenderness ratios of 40, 50 and 60 together for different subtended half angles of 2, 3, 4 and 5 degrees. One example is shown in Figure 2 to illustrate the relationships in the case of 4 degrees for the subtended half angle and 40 for the member slenderness ratio. The loads are in this case of  $0.8\text{kN/m}^2$  for dead load and  $h_{s(n)}=0.5\text{m}$  snow fall of 100 years return period.

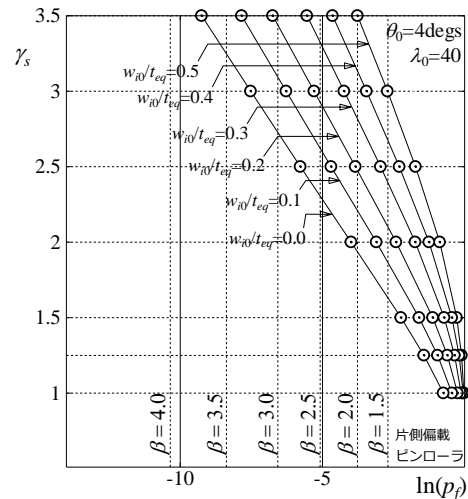
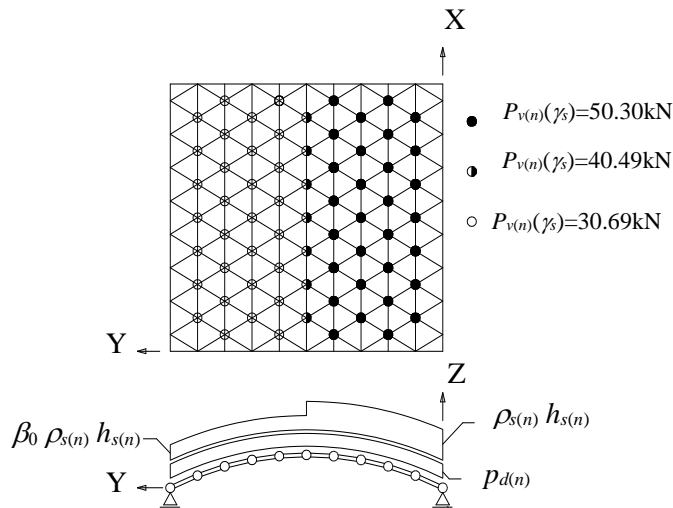


Figure 1 Dead load and asymmetrical snow load

Figure 2 Snow load factor  $\gamma_s$  to reliability index  $\beta$

## References

- [1] S., Kato et al.: Journal of the IASS, Vol.58, No.3, pp.207-225, September 2017
- [2] Y., Niho et al. : Proceedings of IASS2018, Boston, 2018