

Load and Constructional Experiments on Beam-shape String Crescent Structure with Pretension Cables fitted to the neutral surface

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Abstract

String Crescent Structure (SCS) [1] is Reuse System, and this is kinetic structure that can change the structural shape without replacement members. The author has already worked the load experiments of the column SCS and had confirmed the stability and the prestress effect.

The pretension cable of SCS fitted to the neutral surface or the upper chord. As a result, two kind of SCS are able to get. In this paper, the experimental subject is narrowed down to SCS with the pretension cables that set to neutral surface.

At first, the constructional experiment was worked. The chains are used for the lower chord of SCS. The method of control to length of the lower chord is to shift the fixing position of the chain, and makes it easy to control the structural shape of SCS without replacement members. This method inevitably change contact positions between C-members. As a result, the change in the stress distribution of each members of SCS occurs.

At next, the load experiments were worked to verify the change in this stress distribution and the stability & PS effect of beam-shape SCS. For this experiment, SCS with 7 unit of C-members is used. The conditions of this load experiments are as follows.

*Load condition : All Load

*Rise-Span ratio of beam or arch : 0, 0.16, 0.32

*Pretension : 0N, 60N, 120N

References

- [1] A. Tanaka and M. Saitoh, "Proposal of String Crescent Structure - About concept and structural characteristic for String Crescent Structure - ", Proceeding of 12th Asian Pacific Conference on Shell & Spatial Structure (*APCS2018*), Penang, Malaysia, October 29-30, 2018, pp. 579-589.