FE Analysis on Inhomogeneous Weaving of Metal Mesh by Corner Model of Plain Woven Structure

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ABSTRACT

This paper discusses the plastic behavior of wires in metal mesh for discussing the structure of woven warp and weft with their inhomogeneous by using the Finite Element Method (FEM). In the FEM, an isotropic plasticity is adopted as constitutive model of woven wire, but inhomogeneousness between warp and weft is discussed to evaluate the mechanical characteristic of the mesh as an industrial product. Here, fundamental relation of power law hardening rule is adopted to represent the plasticity, but physical parameters of it will be controlled for the discussion of plasticity on mesh weaving. A unit cell model of corner[1] type is adopted to simulate the weaving process of the mesh. The inhomogeneous weaving of mesh structure is one of the key technologies to control product quality of metal mesh, and the mechanics of plasticity of metal mesh should be discussed for the development of product. In this report, the differences of material parameters and tension during weaving process are targeted on the discussion. Some conditions on the wires of warp and weft are examined in weaving process by FEM.

REFERENCES

[1] Hikaru MIYAKI, Atsushi SAKUMA, Proc. ASME-IMECE, (2018), IMECE2018-87459.