

The Ultimate Strength of Hexa-node for Double-Layer Lattice Cooling Towers

Mahmoud Heristchian¹, Hoshyar Nooshin², Pouyan Pourakbar³

1- Assistant Professor, IAU, South Tehran Branch, Iran, heris@azad.ac.ir

2- Professor Emeritus, University of Surrey, Guildford, UK, h.nooshin@surrey.ac.uk

3- Graduate IAU, South Tehran Branch, Iran, pouyan.pourakbar@yahoo.com

Abstract. The paper studies the ultimate strength of Hexa-node, the structural node used in the construction of a number of double-layer funnel lattice steel cooling towers in Iran. Understanding the ultimate and the working strength and stiffness of the possible connections is required for the design of a spatial structure. Comparison of numerical modelling with the experimental results is the most useful method to investigate the structural behaviour of the joints. The geometry and proportions of a particular connection depends on various factors such as the magnitude of forces, the size of the structural members, the end-details of the elements, the method of construction and economic factors. Considering various factors, hexa-node was selected for the design of a number of lattice steel cooling towers. The numerical modelling is used to obtain the structural strength of the hexa-node with Abaqus 6.10-1. Several multi-directional load conditions that could occur during the life-time of the tower were considered in obtaining the load-displacement diagrams of the hexa-node.

Keywords: spatial structures; lattice cooling towers; hexa-node; ultimate strength.