Modeling Thermal Bridging at Interface Conditions: Analysis of Solutions for Reducing Thermal Bridges Effects on Building Energy Consumption

Carla Balocco[1], Enrico Marmonti[1]

[1]Dipartimento di Energetica, Università di Firenze, Firenze, Italy

Abstract

In Europe considerable building activity can be expected over the coming decades. At present to the so called Net Zero Energy Buildings (nZEB), refers to a type of building with minimal or no traditional heating or cooling, until maximum 15 kW/m^2. In both cases this requires very well insulated buildings with minimal thermal bridges, that cause added energy use and interior surface condensation problems. Concrete balconies that extend the floor slab through the building envelope are a common example of thermal bridging, where structural steel highlights heat conduction. Our work investigates acoustic and energy performances of thermal bridges belonging to typical example of existing buildings. Simulations were performed with COMSOL Multiphysics to analyze the incidence of thermal bridges on the global heat exchange and sound transmission. The aim of our work is to provide an integrated approach for understanding thermo-physical and acoustic phenomena that can be useful for energy efficient design solutions.