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A calibration methodology for building dynamic models based on data collected through survey and billings

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• Abstract

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A correct dynamic building modeling requires a proper definition of all 14 the parameters that can affect the model outputs. While a preliminary 15 survey will lead to a precise design of the building envelope, other param-16 eters, such as the temperature set-point and the air leakage, are difficult 17 to accurately evaluate, thus introducing errors in the model. Further-18 more electrical and thermal consumption invoices are based on monthly 19 records while simulations tools use hours or even more detailed time 20 steps. For all these reasons, the present work is aimed at the definition 21 of a a calibration process based on survey, billings and dynamic modeling 22 that takes into account the operator-dependent parameters. The inno-23 vative idea behind this calibration process consists of the comparison 24 of the real and simulated energy signatures. 176 + 40 simulations were 25 run in order to find the set of parameters that most accurately overlap 26 the simulated and real energy signatures leading to the calibration of 27 the model. The case study is a retail superstore of 3544 m^2 floor area 28 built in central northern Italy. Results demonstrate the validity of the 29 approach proposed showing a calibrated signature with about 1% dis-30 crepancies from the real case one. The approach can be extended to 31 different simulation software since the main advantage of the energy sig-32

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