HAMSTAD Benchmarks Using COMSOL Revisited

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Abstract

In 2000, the European Union initiated the HAMSTAD (Heat, Air and Moisture STAndards Development) project on standardization procedures and certification in the field of heat, air, and moisture transport in building constructions [2-3]. In the total of five different benchmarks were developed. Amongst others van Schijndel [5] developed several models using COMSOL Multiphysics® to simulate HAMSTAD benchmarks. Although the results were already satisfactory at that time, it did not contain all benchmarks so far. With this paper, we revisit the HAMSTAD benchmarks using the latest version of COMSOL and present a complete updated overview of all five benchmarks. The models and report [1] are available at the HAMLab webpage [4]. Again we conclude that COMSOL provides satisfactory results on all benchmarks.

Reference

[1] S. Goesten, Hygrothermal simulation model: Damage as a result of insulating historical buildings, MSc report Eindhoven University of Technology (2016)
[2] C.-E. Hagentoft, HAMSTAD – Final report: Methodology of HAM-modeling, Report R-02:8. Gothenburg, Department of Building Physics, Chalmers University of Technology (2002)
[3] C.-E. Hagentoft et al., Assessment Method of Numerical Prediction Models for Combined Heat, Air and Moisture Transfer in Building Components: Benchmarks for One-dimensional Cases, Journal of Thermal Envelope and Building Science, Vol. 27 (4), pp. 327-352 (2004)
[4] HAMLab, http://archbps1.campus.tue.nl/bpswiki/index.php/Hamlab (2016)
[5] J. v. Schijndel, Heat and Moisture Modeling Benchmarks using COMSOL, Proceedings of the COMSOL Conference, Hannover (2008)

Figures used in the abstract

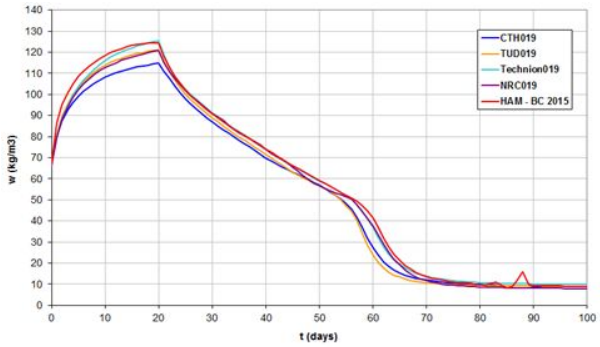

Figure 1: The result of HAMSTAD Benchmark 3 where COMSOL is compared with others.