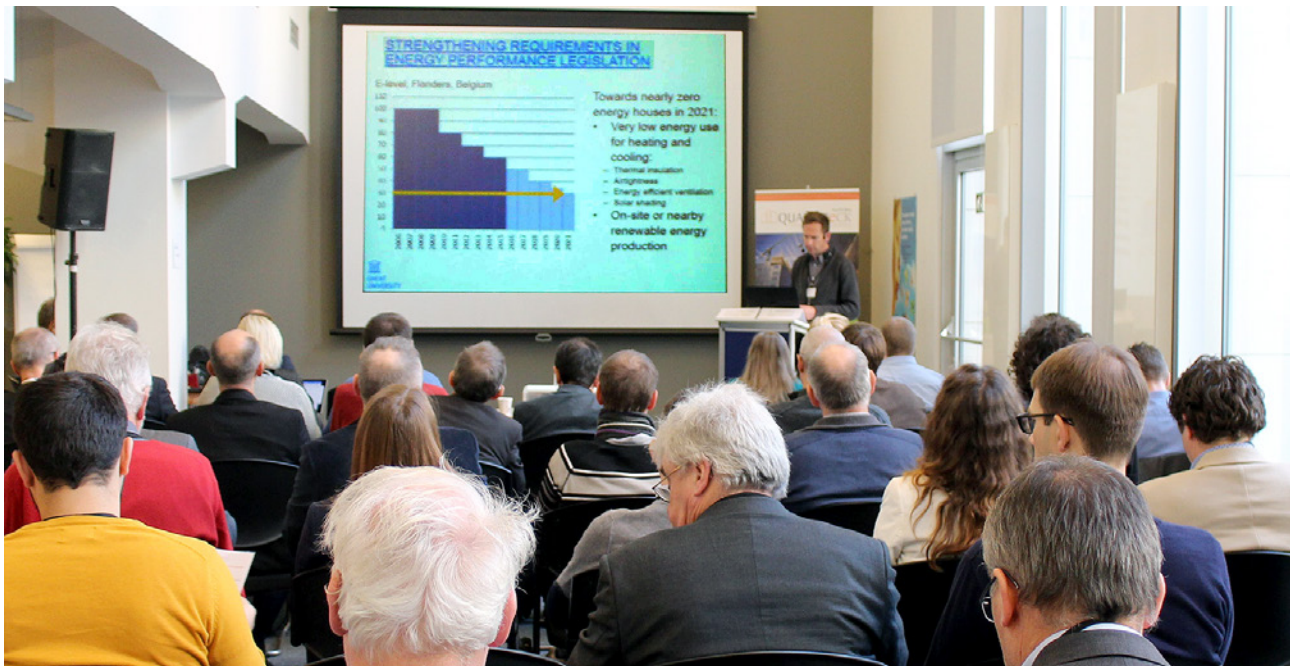

The QUALICHeCK International Workshop on Transmission Losses

Keywords: thermal transmission, thermal bridges, compliance and quality, super insulation, building envelope

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During the international workshop held in Brussels on December 15, 2016, 59 participants from 13 countries exchanged their experience and views on ways to improve the quality of installed insulation systems as well as to secure the compliance of insulation product and system data.

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Of course, these concerns are part of a much broader picture, in particular the European Union's willingness to lead the clean energy transition with the so-called "Clean Energy for All Europeans" legislative proposals. Because of its very significant share in energy use and GHG emissions, the

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building sector is largely concerned by these proposals, although a long-term vision for the building sector in 2050 as well as targets for the renovation of the existing building stock, where most of the potential lies, are missing (See Frances Bean's presentation[1]).

Heat losses through the building envelope usually represent a substantial share of the energy losses of a building. Therefore, any gap between the actual and theoretical performance of systems implemented to reduce those losses (e.g., the U-value of an insulation panel) can result in very significant unexpected energy losses (See Arnold Janssens' presentation[2]). In the past 10 years, part of the Belgian approach to reduce this gap has been to build a set of measures to secure consistency between actual and reported performance and to have trustworthy sources to derive product characteristics. More specifically, the 3 Belgian regions developed a website with product characteristics to be used in energy performance assessment for many product families in order to facilitate the work of the expert who has to select input data (See Peter Wouters' presentation[3]). Quality frameworks were developed for existing cavity walls and internal insulation to ensure that the products would be installed according to specifications (See Timo de Mets' presentation[4]).

The issue of thermal bridges was specifically addressed during this workshop because their influence is magnified in (nearly) zero-energy buildings. In fact, there can be more heat losses through thermal bridges than through walls in such buildings if the designer overlooks their influence. A review of calculation methods in 9 EU member states showed that, although thermal bridge impacts were addressed in all countries, compliance and verification processes were often missing. How tabulated or default values correspond to the real values of as built solutions in construction site, is therefore often not known (See Jarek Kurnitski's presentation[5]).

Super insulating materials such as vacuum insulation panels (VIP) or aerogels represent a small market share as of today; however, they show great potential for the renovation market. Many examples in Europe but also in the USA, China, Japan were presented showing how these could be implemented, including in listed buildings with strong aesthetics and architectural constraints, or in expensive districts to save floor area (See Daniel Quenard's presentation[6], and Par Johansson's presentation[7]). Significant progress has been made over the past few years to make these materials less fragile and easier to handle.

Research is on-going to characterise the in-situ performance of super insulation systems and specify the conditions under which they can be installed. A CEN Technical Committee (TC 88) is working on the characterisation of the long-term performance of vacuum insulation panels, in particular as they are subjected to temperature and humidity stress (See Roland Cap's presentation[8]).

Technical approval frameworks are meant to assess risks, to check the fitness for purpose, and to document specifications for workmanship for a given product or system. They go beyond harmonised standards and European Technical Assessments which are limited to product characteristics to be declared in relation to its essential characteristics as defined in the Construction Product Regulation (305/2011). During a round table discussion, panel members shared their thoughts about an increasing need for technical approvals to have common references for issues not covered by harmonisation such as workmanship. Note that there already exist several technical approvals for vacuum insulation panels and aerogels that provide reliable data for their properties and durability as well as specifications for their implementation on site (See Daniel Quenard's presentation[9]).

There are interesting initiatives to guide the market toward achieving high performance insulation. For example, there exists an array of tools to secure the quality of External Thermal Insulation Composite Systems (ETICS) including the EAE's European Application Guideline for ETICS or certification schemes operational in Austria and Germany (See Ralf Pasker's presentation[10]). As for the thermal performance of residential pitched roofs, the European Insulation Manufacturers Association (Eurima) insisted on a system approach and basic understanding of building professionals of the challenges, for instance, when wind "washes" the insulation and therefore degrades its performance. The presenters also insisted on appropriate quality checks and showed positive feedback from their implementation in social housing retrofit in Eeklo, Belgium (See Ross Holleron and Jelle Langmans' presentations [11]).

Finally, the workshop was the occasion to discuss the perspectives given by information technology to ease the documentation and checks in building construction. The construction and commissioning phases account for 10-30% and 15-30% each of the gap between expected and actual energy use in a building. To contain these problems, smart phone applications developed in the Built2Spec project help perform and document quality checks during the construction phase, for instance, with a user friendly interface to archive georeferenced pictures as evidence. User friendly interfaces are operational or under development with innovative solutions to measure building airtightness, acoustic and indoor air quality, and 3D scanning (See Andrea Costa's presentation[12]). The perspective for such tools, in a context where the need for evidence of compliant product and installation is increasing, seems promising.

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Presentations

Presentations of the workshop are available on: http://qualicheck-platform.eu/events/workshops/

1 http://qualicheck-platform.eu/wp-content/uploads/2017/01/QUALICHeCK-Workshop-Brussels-1.3-Bean.pdf
2 http://qualicheck-platform.eu/wp-content/uploads/2017/01/QUALICHeCK-Workshop-Brussels-1.2-Janssens.pdf
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