DYNASTEE
NEWSLETTER ISSUE 2024/22

Foreword

We received some good news on the 21st of June: The proposal for a new IEA-EBC Annex developed by professors David Allinson, Cliff Elwell and Richard Fitton has been approved by the EBC board. Annex 94 "Validation and verification of in-situ building energy performance measurement techniques" will follow up on the work of Annex 58 and Annex 71, and now enters the preparation phase.

As in previous Annexes, DYNASTEE will support the new Annex 94 through dissemination and the organisation of training events, such as the annual Summer School. This year's Summer School takes place in Almería (Spain) from 11 to 18 September. An overview of the topics covered is included in this Newsletter.

After the Summer School, a seminar on Building Modelling in the Urban Environment will take place at the Plataforma Solar de Almería on 19-20 September. You'll find the details of this event in this Newletter as well (abstract submission is open until 15 July!).

We wish you a good summer holiday, and hope to see you at one of the events or meetings in the autumn.

Twan Rovers

CIESOL at the University of Almería

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IEA-EBC Annex 94 "Validation and verification of in-situ building energy performance measurement techniques"

By Richard Fitton

A new IEA-EBC Annex has been formed. Annex 94 'Validation and verification of in-situ building energy performance measurement techniques', will commence its preparation phase this autumn.

The annex was proposed by Prof Cliff Elwell (UCL) Prof David Allinson (Loughborough) and Prof Richard Fitton (Salford). There will be a kick off meeting in autumn 2024, location and date TBC. The annex has the following aims:

- Provide datasets and findings to accelerate the development of measurement methods.
- Establish a methodology for validating these methods and achieving consensus on approaches for calculating uncertainty.
- Generate a database of real measured buildings and calibrated energy models.
- Develop new and improved methods of HTC (Heat Transfer Coefficient) measurement virtually.
- Focus on potential applications of these methods and requirements to meet user demand.
- Investigate translating HTC results into actionable insights.
- Study investigative techniques to disaggregate the HTC for detailed performance gap analysis.
- Collect a large global dataset of typical dwellings under different climates.
- Enable the development of measurement techniques for cooling-dominated climates, addressing the current research focus on heating-dominated climates.

For those wishing to follow or join this annex, please complete the following link:
https://forms.office.com/e/bQnMuetmMM

11 – 18 September 2024, Dynastee Summer School 2024 in Almeria, Spain

Whole building energy performance assessment. From in-situ measurements to smart metering data.

Dates: 11 – 18 September 2024 in Almeria, Spain. Note that the Summer School will start on Wednesday 11 September at 10:00 and will end on Wednesday 18 September at 17:00.

Course Schedule: the course will be 6 days with 3 days – weekend – 3 days. The aim of the Summer School is to train the participants on the application of analysis techniques towards whole building analysis from in-situ measurements and metering data. The main goal is the assessment of the HTC (Heat Transfer Coefficient) using real data from experiments. This Summer School will support the recently introduced IEA-EBC Annex 94.

New is the introduction course on metering data and a dedicated exercise by applying statistical analysis methods to metering data. Three days will be devoted to linear regression and discrete time methods by applying the user-friendly software tool LORD. After the weekend, 3 days will be devoted to continuous time methods also, like CTSM-R and applied to high quality real data. The course concept will remain the same as in previous years, which means about half of the time is devoted to lectures and the other half to performing exercises using benchmark data. This schedule leaves a weekend between the first and second parts of the course that the participants can use to dig into the training material or just to have a rest. A social event will be organised during the weekend break.

Venue: CIESOL at the University of Almería, Spain. Almería can be reached in different ways. The most common travelling option is to fly to Madrid or Barcelona and then to change for Almería. It is also possible to fly to Malaga or Granada and then take a bus to Almeria. For further information feel free to contact mjose.jimenez@psa.es.

Lecturers are arriving from several European universities and are specialists in thermal experiments in buildings as well as the analysis of the collected data.

Wednesday 11 September. Start 10:00

General information on building physics and mathematical techniques that will cover an introduction to tools and Benchmark data.

Application of analysis techniques to the provided data (Average method, linear regression techniques, lumped and the Siviour analysis).

Introduction to the user-friendly software tool LORD.

PSA data introduction and documentation.

Exercises will cover linear regression and discrete time methods.

Thursday 12 September. Start 10:00

Data and tools; first assessment, examples plots and data reduction (space, time)

Sensors and instruments; the physical and practical measurements

A presentation on the performance gap, e.g. what could be the sources of difference between, measured and calculated (expected) performances.

Exercises will cover the application of LORD to PSA data

Friday 13 September. Start 10:00

From building physics to mathematical models. On HTC, HLC and EPC

How to use real smart metering data for an energy signature

Requirements for on-site thermal experiments in buildings.

Plenty of time for exercises and Q&A

Saturday 14 September. Social event and dinner.

Monday 16 September. Start 10:00

HTC Assessment from in-situ monitoring data

Uncertainty, noise and error sources will be discussed

Methodologies for building envelope and whole building performance assessment

Exercise using the presented data applied by your preferred method.

Tuesday 17 September. Start 10:00

Time series analysis (a crash course)

Introduction to CTSM-R, continuous time methods and the R-environment.

Exercises; the application of CTSM to PSA data and in-situ data.

Wednesday 18 September. Start 10:00; End 17:00

Importance of model simplification of building physics represented by measured signals.

Variability of the environments and the uncertainty of data.

Measured data and not-measured phenomena and how to build a mathematical model based on the available input.

Exercises; the application of CTSM to data and in-situ data.

Experimental method for estimating the effect of solar radiation on the inner surface heat flux of opaque building envelope elements

Irati Uriarte, Aitor Erkoreka, Hans Bloem, Maria-Jose Jimenez, Koldo Martin-Escudero

International Association of Building Physics (IABP) Vol 47, Issue 6, https://doi.org/10.1177/17442591241238436

There still exists a considerable difference when comparing the real and the design energy consumption of buildings. The difference between the design and the real building envelope energy performance is one of its main reasons. The building envelope can be characterised through the individual characterisation of its different building envelope components such as opaque walls or windows. Therefore, the estimation of parameters such as their transmission heat transfer coefficient (UA) and their solar aperture (gA) is usually implemented. Although building components have been analysed over the years, the thermal characteristics of buildings have mainly been estimated through steady-state laboratory tests and simplified calculation/simulation procedures based on theoretical data. The use of inverse modelling based on registered dynamic data has also been used; however, unfortunately, the models used tend to significantly simplify or neglect the solar radiation effect on the inner surface heat flux of opaque building envelope elements. Therefore, this work presents an experimental, dynamic and inverse modelling method that accurately models non-linear phenomena through the use of a user-friendly simulation programme (LORD). The method is able to analyse in detail the effect of the solar radiation on the inner surface heat flux of opaque building envelope elements, without the necessity of knowing their constructive details or thermal properties. The experiment is performed in a fully monitored test box, where different

models are tested with different opaque walls to find the best fit. Finally, the solar irradiance signal is removed from the best models so as to accurately quantify the weight of the solar radiation on the inner surface heat flux of each wall for two extreme periods, one for sunny summer days and other for cloudy winter days.

Seminar on Building Modelling in the Urban Environment

(Reduced order models, data based models, etc.)

URBAN MOME Network. Towards efficient **URBAN** *environments through* **MO***delling,* **ME***asurement, and control in the built environment*

Plataforma Solar de Almería. 19 – 20 September 2024

The URBAN MOME Network organises a Seminar on "Building Modelling in the Urban Environment" (Reduced order models, data based models, etc). This seminar is organised in the framework of the Working Group 3 of this Network on "Efficient buildings that interact with their environment".

This Seminar will take place after the DYNASTEE Summer School, to be held in Almería 11 – 18 September 2024. Participants in the Summer School are welcome to attend the URBAN MOME and vice versa, but notice that both events require independent registration. For more information on the DYNASTEE Summer School, see www.dynastee.info

The participation in the URBAN MOME Seminar will be free and will consist in an oral presentation (10 minutes) and an optional poster. Presentations will be followed by discussion (5 minutes). Face to face participants will have the opportunity to visit Plataforma Solar de Almería. Interested participants should send title and abstract to Roberto Garay (e-mail: roberto.garay@deusto.es) before the 15th of July.

The URBAN MOME is a Spanish National Network integrated by research groups of CIEMAT, TECNALIA, ITE, IREC, CARTIF and the Universities of Oviedo, Valladolid and Deusto. Additionally, the Universities of Navarra, Sevilla, Almería, and Politechnic of Madrid, Politechnic of Valencia, CIMNE and IETcc-CSIC participate as invited groups.

The general objective of this Network is to create a forum for the exchange of information and knowledge on modelling, measurement and control, in the built environment, and with the aim of improving the energy efficiency of urban environments. To this end, the following specific objectives are set:

- Integrate the most significant work groups at the (Spanish) national level that develop their activity in the lines of research related to the general objective of this Network, and identify synergies between these groups.
- Identify priority research topics on the subject of the Network during the meetings of its members.
- Share specialized knowledge among the members of the Network on modelling methodologies, monitoring, control and operation of unique scientific-technological facilities, and other specific topics of interest, through monographic seminars.
- Facilitate the coordinated participation of Spanish groups in international forums that work on issues aligned with the theme of the Urban MOME Network, as well as the interaction between this Network and said international forums.
- Dissemination of network knowledge in the scientific field with seminars aimed at researchers, and in the technological field by holding conferences aimed at professionals and companies in the sector. These seminars and conferences will have the participation of foreign researchers of recognized prestige in certain lines of research aligned with the theme of the Network.
- Facilitate the access of the scientific community to the most relevant advances, achievements and events on the subject of the Network, through the creation and regular updating of a web page.
- Favour the coordination of future research initiatives making use of lessons learned in previous experiences, and optimizing the use of resources and facilities.
- Provide these future research initiatives with access to stock of experimental data, unique scientific facilities and equipment available among the members of the network, which are key elements in research to achieve energy-efficient urban environments.

The Network is structured around four Working Groups focused on the following topics:

- WG 1: Design and planning of cities.
- WG 2: Urban energy networks.
- WG 3: Efficient buildings that interact with their environment.
- WG 4: Measures for the transition of urban environments.

Thematic Network URBAN MOME – 2023-2025. Reference: RED2022-134655-T. Funded by the Spanish National Research Agency (Agencia Estatal de investigación, AEI)

Plataforma Solar de Almería

Announcement of International Retrofit Conference 2025

The International Retrofit Conference (IRC'25), is aimed at bringing together experts, professionals, researchers, and industry stakeholders from around the world on domestic, non-domestic, social housing, and district/neighbourhood retrofit. It will take place from Wednesday 2 July to Friday 4 July 2025 at the Salford's New Adelphi.

Abstracts may be submitted from 1 July 2024 tot 15 September 2024. For more information, please visit: https://energyhouselabs.salford.ac.uk/conference/international-retrofit-conference/

University of Salford's New Adelphi building