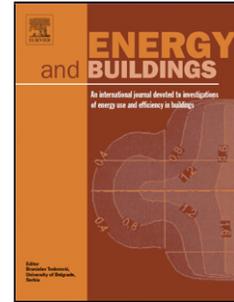


Accepted Manuscript

Title: Improved prediction of deep retrofit strategies for low income housing in Ireland using a more accurate thermal bridging heat loss coefficient

Authors: James Pittam, Paul D. O'Sullivan



PII: S0378-7788(17)31355-5
DOI: <http://dx.doi.org/10.1016/j.enbuild.2017.08.088>
Reference: ENB 7917

To appear in: *ENB*

Received date: 14-4-2017
Revised date: 15-8-2017
Accepted date: 24-8-2017

Please cite this article as: James Pittam, Paul D.O'Sullivan, Improved prediction of deep retrofit strategies for low income housing in Ireland using a more accurate thermal bridging heat loss coefficient, Energy and Buildings <http://dx.doi.org/10.1016/j.enbuild.2017.08.088>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31

Improved prediction of deep retrofit strategies for low income housing in Ireland using a more accurate thermal bridging heat loss coefficient

James Pittam^a, Paul D O'Sullivan^{a,b},

^a Mechanical and Energy Systems Simulation and Optimisation (MeSSO) Research Group, Cork Institute of Technology, Cork, Ireland

^b Department of Process Energy & Transport Engineering, Cork Institute of Technology, Cork, Ireland

Abstract

In order to improve the energy efficiency of buildings, thermal insulation plays a pivotal role, however increasing external wall thermal insulation without also addressing construction details can lead to increased thermal bridging and increased mould growth. Detailed knowledge of a buildings thermal envelope is paramount to correctly analysing existing problems that promote cold bridging and low surface temperatures. No detailed database exists for housing in Ireland which describes the geometrical configuration of the existing stock. This paper presents findings from an investigation into the prediction of heating energy consumption performance for external envelope retrofit measures when adopting default standardised coefficients for thermal bridging as opposed to simulated values based on accurate geometrical information. Using a remote extraction methodology to obtain geometrical information on house typologies, this paper presents a study that produced a detailed building component database premised on stock aggregation theory using Cork City's local authority housing as a case study. Three construction types; block on flat, cavity and composite cavity are identified with representative construction details for housing typologies modelled in Psi-Therm 2d enterprise. Linear thermal transmittance and minimal surface temperatures are evaluated and an energy efficient external retrofit for each construction detail is proposed. Thermal characteristics for each house archetype are developed using information extracted from 1551 asset rating surveys. Three case study terraced house typologies are then modelled using Ireland's national asset rating software to demonstrate the importance of obtaining more accurate information regarding the building stock. The results highlighted up to 21.5% variation in energy performance when substituting default thermal bridging coefficient for calculated values.

Keywords: Stock aggregation; Retrofit; Thermal bridging; Local Authority Housing

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات