

Moisture Risk and Health in Buildings: the role of products?

Neil May

UCL IEDE

UK Centre for Moisture in Buildings

STBA

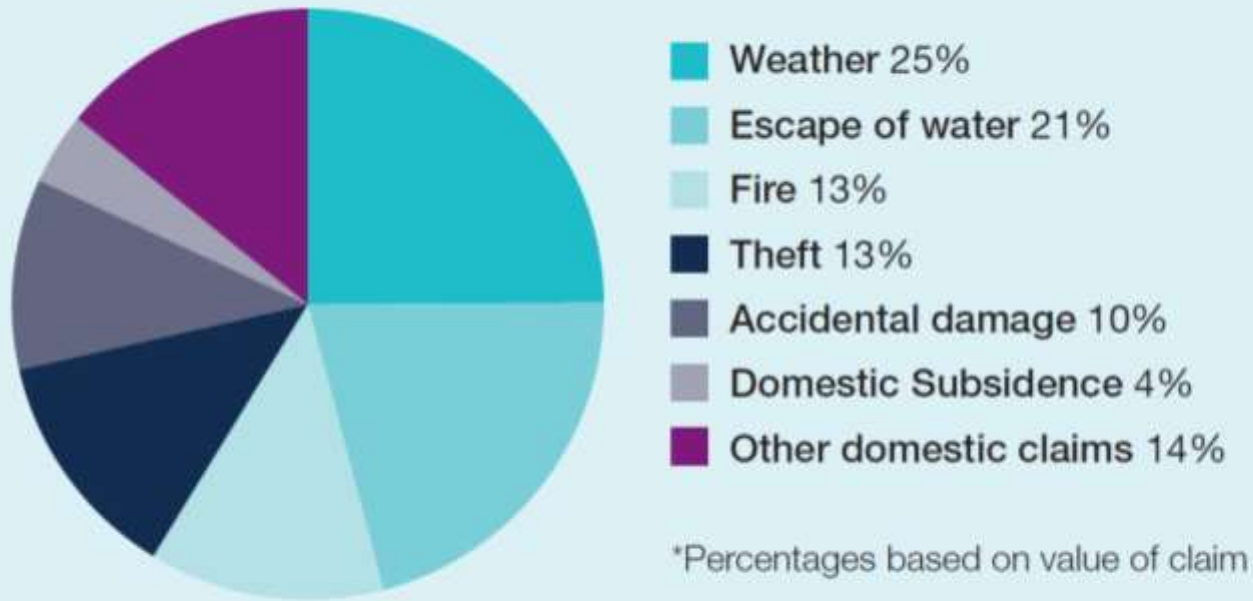
NBT

Why is moisture in buildings important?

- 70-80% of all building problems moisture related
- Significant health impacts
- Significant damage to fabric
- Significant costs
- Impact on energy, comfort, environment

Insurance perspective 2015

Domestic Property Insurance Claims, by type of Claim



Problems are changing

- Energy Efficiency drive: airtightness, insulation
 - New build
 - Retrofit of existing buildings
- Changing lifestyles
- Changing building forms, occupation and tenure – the housing crisis context
- Changing climate
- Changing knowledge and evidence

International concern – WHO report into Dampness and Mould 2009

- Clear connection between damp, moulds and ill health. However impossible to identify direct causal links for most microbial pollutants, due to complexity of interactions, multiple effects etc
- “It is estimated that damp affects 10–50% of indoor environments in Europe, North America, Australia, India and Japan. In certain settings, such as river valleys and coastal areas, the conditions of dampness are substantially more severe than the national averages for such conditions”
- Clearly linked to building condition, ventilation, design etc

Concerns here

- Inside Housing
 - Aragon Housing Association: a 300 per cent increase in requests from tenants for mould and damp inspections in 2014
 - In a survey of 30 landlords in 2014, Direct Works Forum, a consultancy which represents social landlords' in-house maintenance teams, found 90 per cent had 'encountered an increase in condensation problems.'
- PCA members report considerable rise in damp and mould problems, particularly in retrofitted properties
- Polygon UK also reports increases, also in new housing
- Colin King work for BRE on EWI
- Recent Preston Case at Bonfield review meeting

Work of Colin King for DECC

- Assessment initially just of EWI onto solid walls
- Over 400 properties visited

bre

Unintended consequences in Traditional Buildings

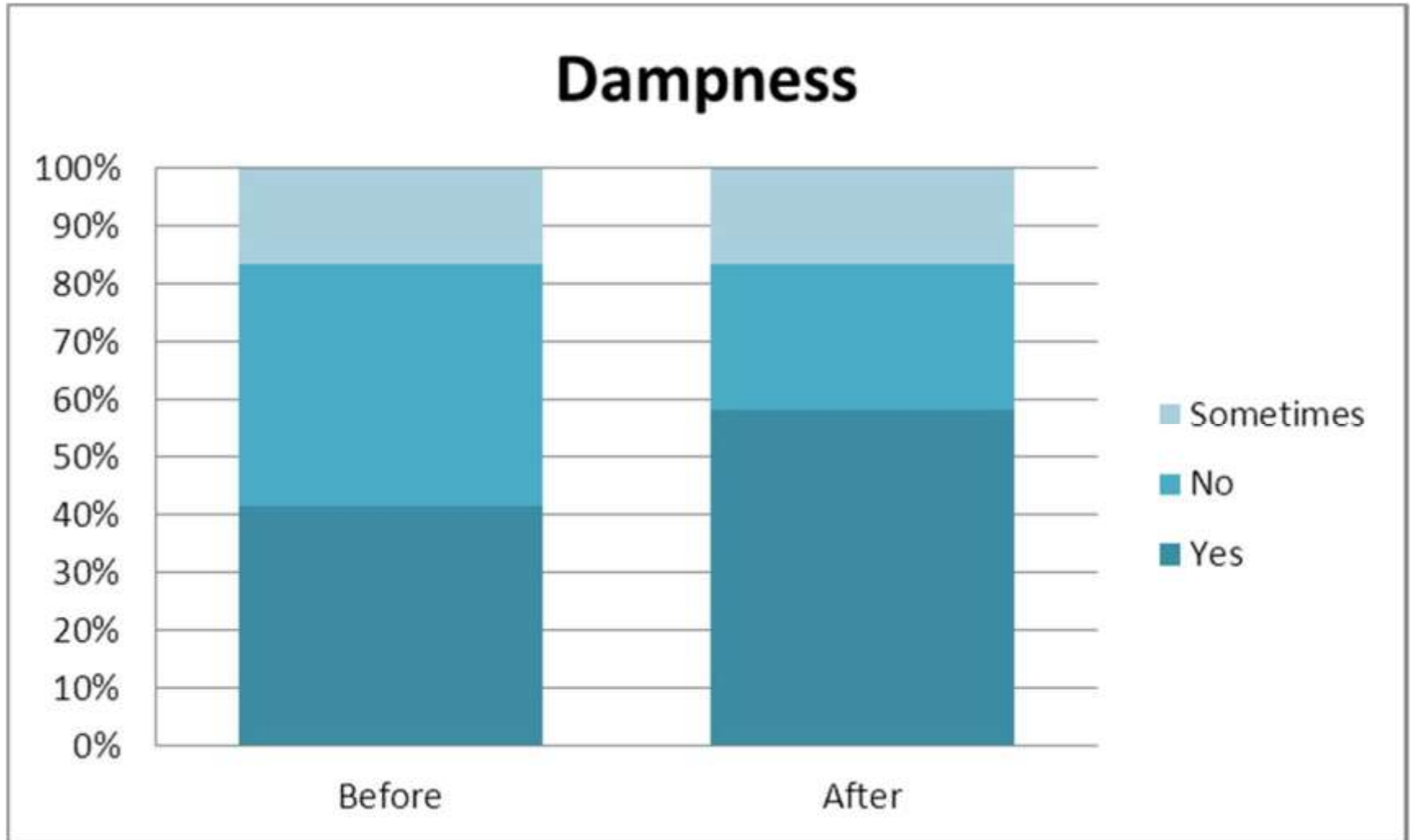
EcoBuild

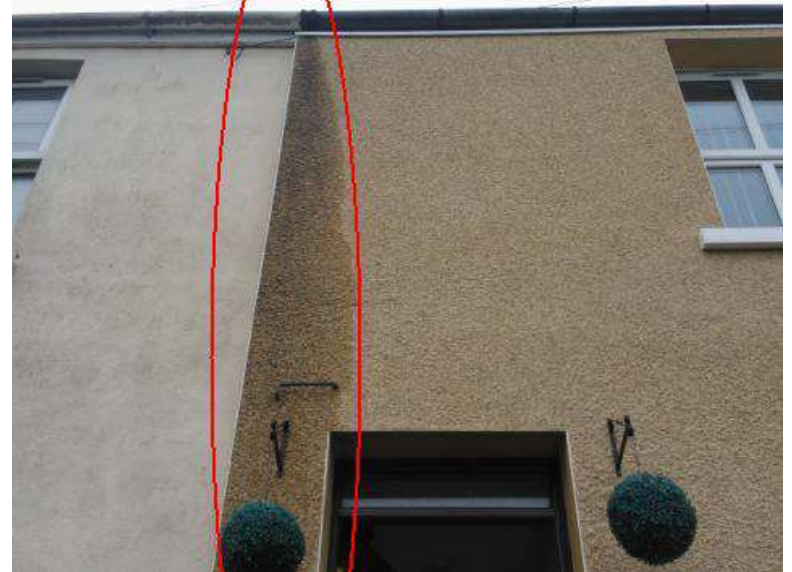
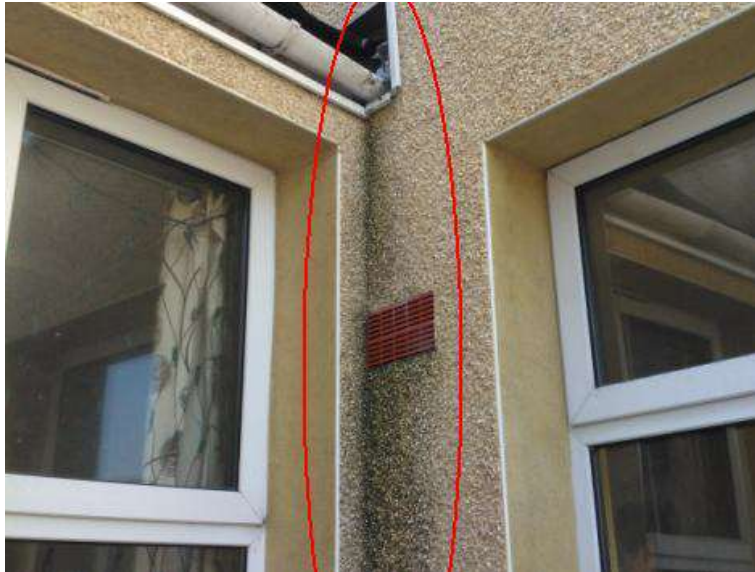
6th March 2014

Part of the BRE Trust



Assessment of a scheme in Wales





“Breathable” insulation





Exeter University research 2014

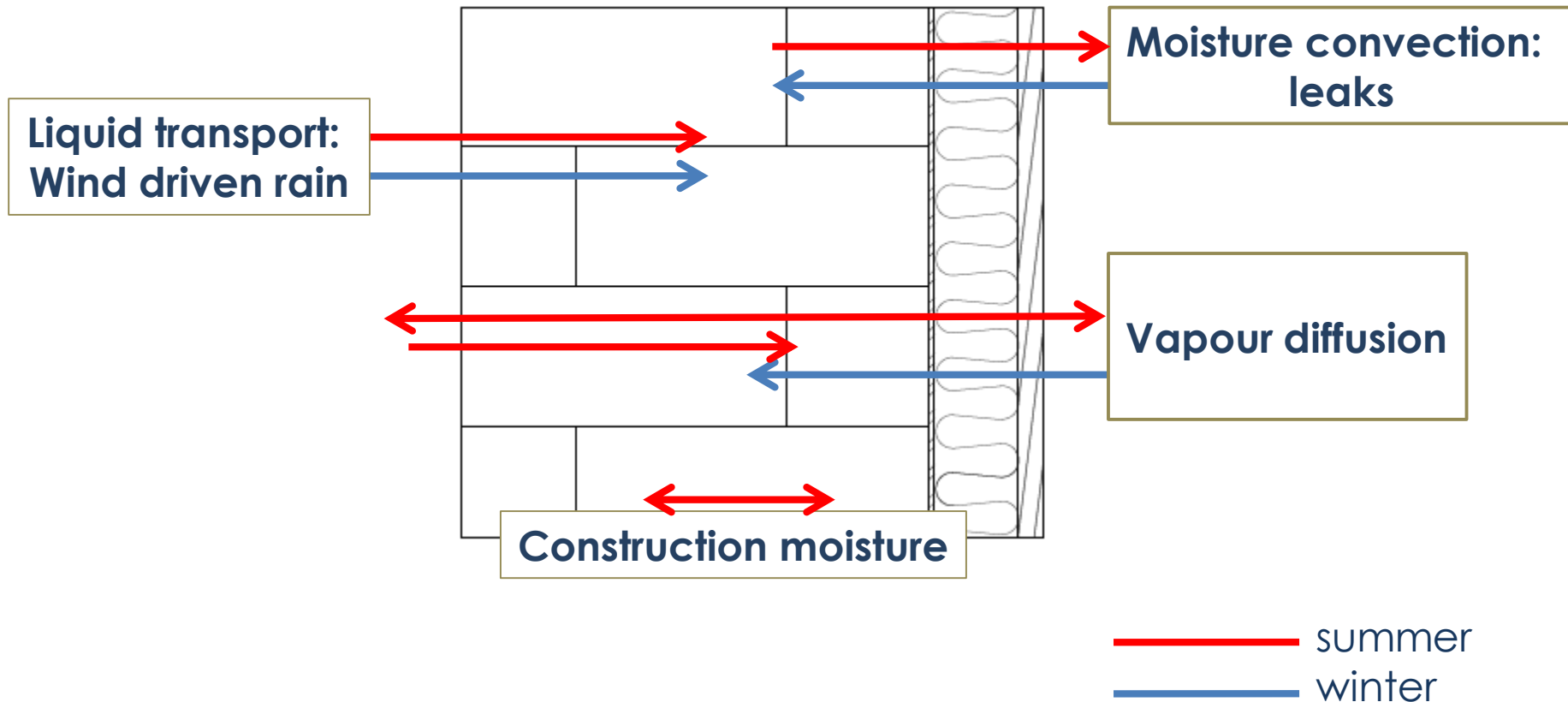
- Increase in asthma mirrors increase in SAP ratings following retrofit.
 - 3867 social housing
 - “A unit increase in household Standard Assessment Procedure (SAP) rating was associated with a 2% increased risk of current asthma, with the greatest risk in homes with SAP >71. We assessed exposure to mould and found that the presence of a mouldy/musty odour was associated with a two-fold increased risk of asthma (OR 2.2 95%; CI 1.3–3.8).”
 - Conclusion: “Energy efficiency may increase the risk of current adult asthma in a population residing in social housing”.

A complex subject

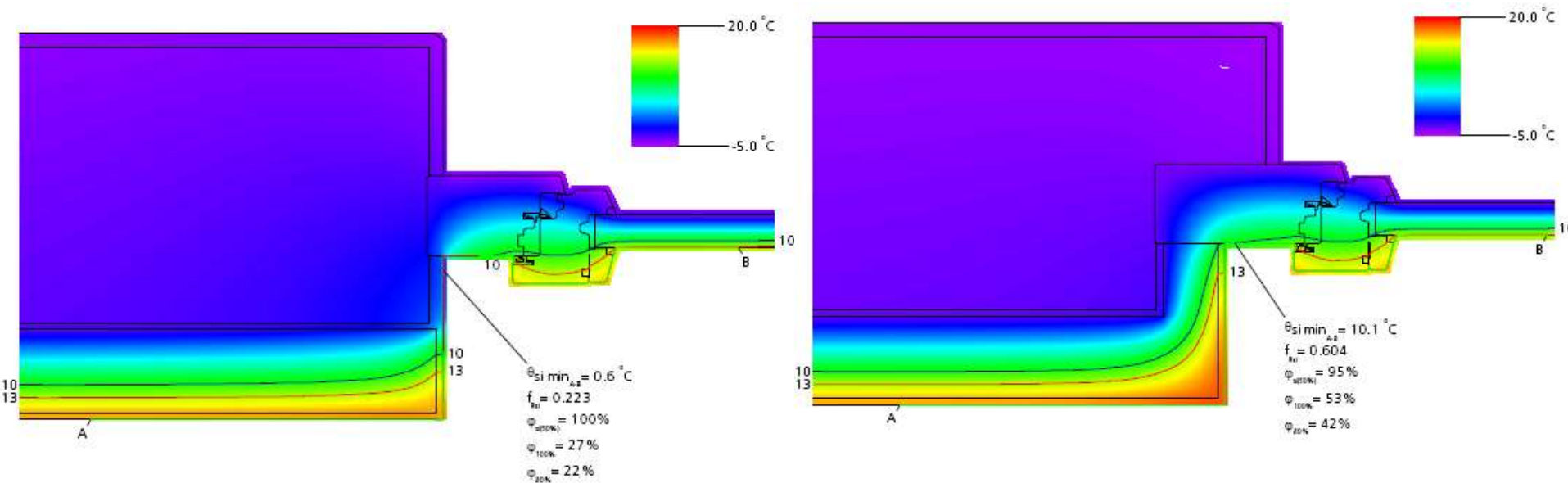
- What is relationship of moisture to health?
 - Uncertainty
 - Context not abstraction
 - Balance not perfection
 - Chronic (systemic) and acute (specific) health problems
 - Interactions with other health issues
 - Interactions with VOCs and other toxins
 - Conflicting values

- Between Dr Damp and the Ostrich

Moisture movement is also dynamic and complex



Thermal Bridges: Moisture issues

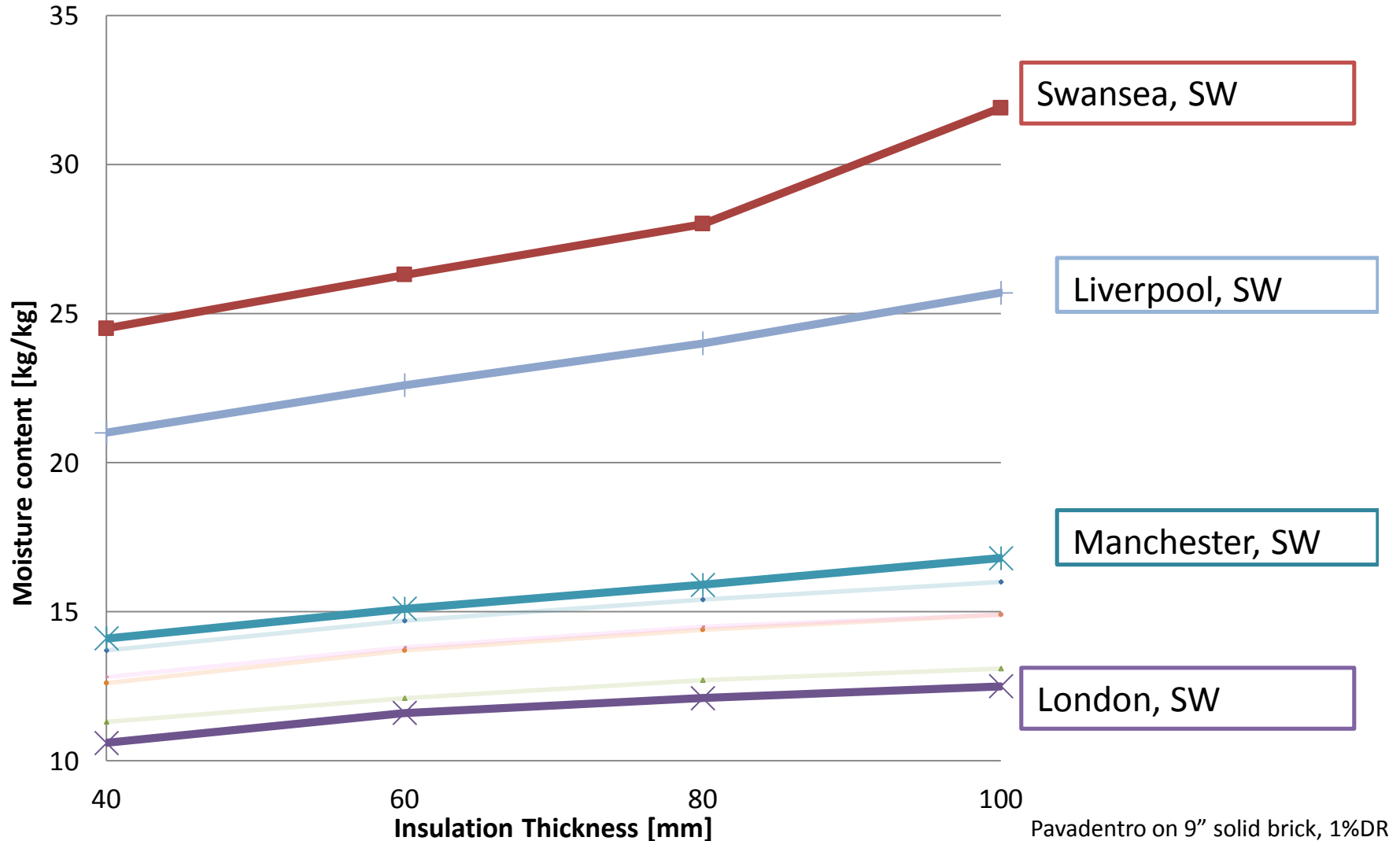


Refurbishment of a traditional stone wall with 60 mm insulation on the inside

- Reveal not insulated
- Reveal now insulated with 40 mm insulation
- Note importance of internal RH and ventilation

Consequences for locations

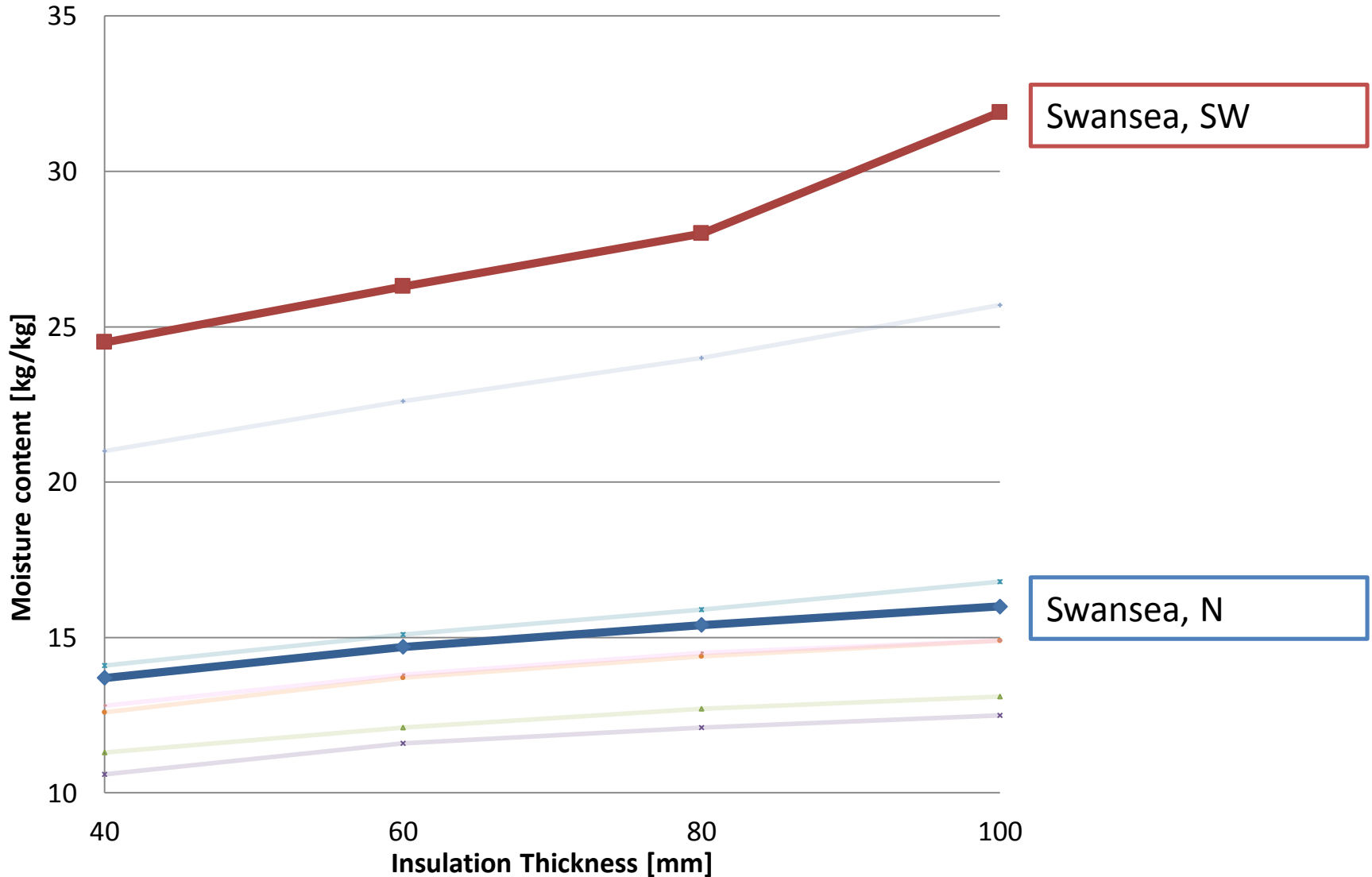
Moisture content - location



Pavamento on 9" solid brick, 1%DR

Consequences for orientation

Moisture content - orientation



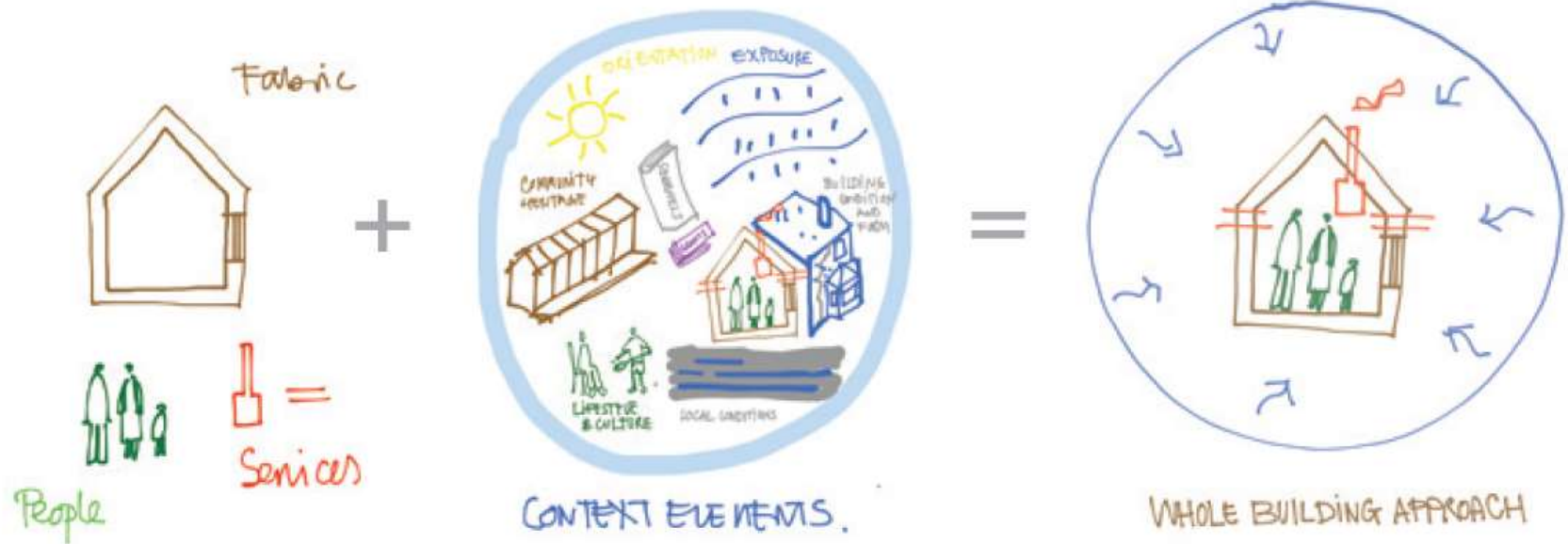
Standards, regulation and policy

- Reductionism
 - Separation of moisture types, moisture mechanisms, moisture risks. Incomplete physics
 - Separation of building elements. Lack of connective effects
 - Separation of fabric, people and services. Lack of interface effects.
 - Lack of context
 - Lack of reality
 - Lack of systemic effects
 - Lack of process understanding
- Moisture management as an add-on, not integral
- Lack of learning or willingness to face uncertainty

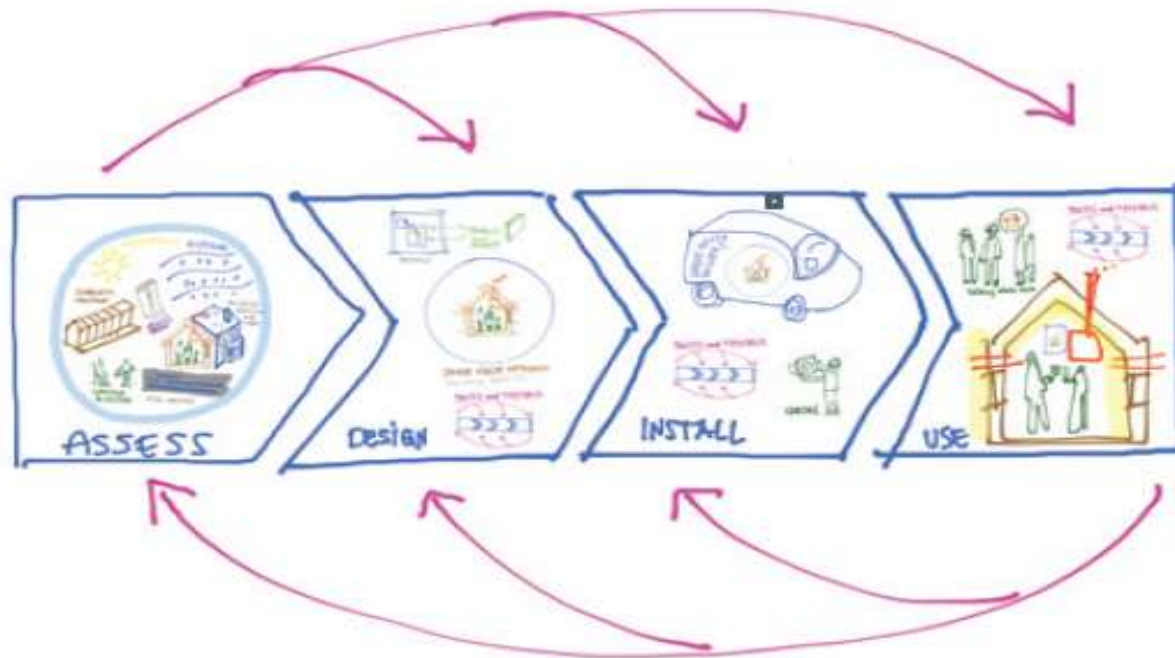
A new approach – BSi White Paper

- Whole Building Approach
- Joined up Process
- Principles primary (supported by prescriptive guidance and modelling)

Whole Building Approach



Joined up Process



ByggaF model

- Moisture Safety Expert
- Moisture Safety Officers

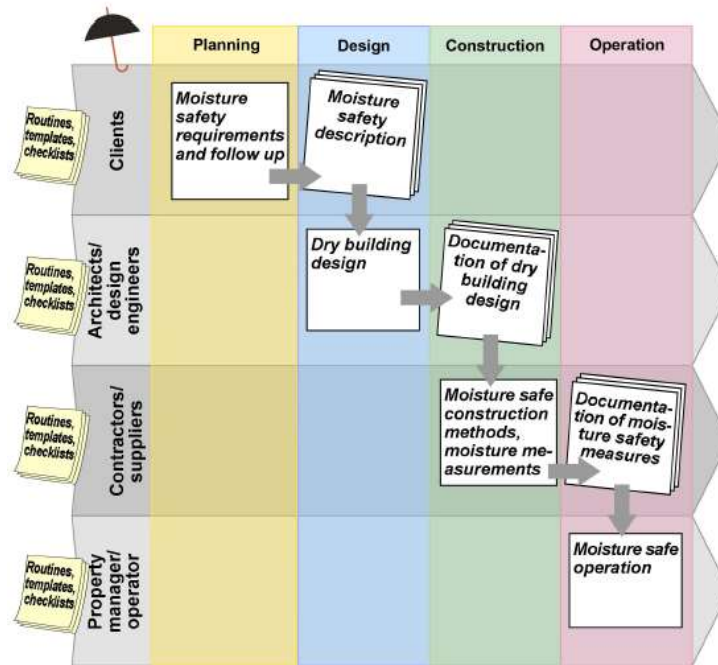


FIG. 1: A schematic description of the method.

Principles

Main Principle	Sub-Principle
Compatibility with Context	Geographical
	Form
	Materials and Construction Method
	Condition
	Use
Coherence	Coherence of moisture approach
	Thermal coherence
	Airtightness
	Weathering/waterproofing
	Ventilation, heating and insulation
Capacity	Design
	Process
Caution	Usability
	Maintenance
	Monitoring
	Feedback

Consequences for design and product/ systems developers

- Products cannot be viewed in isolation. Must be part of the whole
- Products effect is on whole building system and liability/ responsibility must be accepted for that.
- Have to manage context, uncertainty, chronic effects and conflicting priorities

Consequences for sustainability

- Satisficing not optimising
- Balance and integration
- The art of the possible
- Need to re-think what good means
- Need to re-think methods and practice



UKCMB
UK CENTRE FOR
MOISTURE
IN BUILDINGS

neil.may@ucl.ac.uk