PRACTICAL ACTIVITIES
FOR SMALL BUILDERS

SME Low Energy
‘Know How’

3rd. March 2015
ROLE OF THE ZERO CARBON HUB

PURPOSE AND STRATEGIC OBJECTIVES

- Facilitate the mainstream delivery of low and zero carbon homes
  - Provide leadership and create confidence
  - Reduce risk and clear obstacles
  - Disseminate information
BUILDING PROCESS AND THE GAP

Knowledge Gap

Stockwell
Procurement

Stan More
Construction
Testing

Handover

Turnham Green
Building Regulations Application

Sapping Forest
Building Regulations Certificate
under development

Key to lines

Designers
SAP Assessor
Manufacturer's Information
Sub Contractor Design
House Builder

© Richards Partington Architects
The 2020 Ambition

“From 2020, to be able to demonstrate that at least 90% of all new homes meet or perform better than the designed energy/carbon performance”
The Journey so far
Prioritisation of issues
- 15 Priority for Action
- 17 Priority for Research

AND cross-cutting themes

- KNOWLEDGE & SKILLS
- RESPONSIBILITY
- COMMUNICATION
AS-BUILT PERFORMANCE - PRIORITY FOR ACTION

CONCEPT DESIGN & PLANNING
- P2
  - Limited understanding of impact of early design decisions on energy performance

DETAILED DESIGN
- D1
  - Inadequate understanding and knowledge within detailed design team
- D2
  - Lack of integrated design between fabric, services & renewables
- EM6
  - Issues around use of U-value and thermal bridging calculation procedures
- EM7
  - Concern over competency of SAP assessors

PROCUREMENT
- PR2
  - Inadequate consideration of skills and competency at labour procurement

CONSTRUCTION & COMMISSIONING
- C5
  - Product substitution on site without consideration of energy performance
- C15
  - Poor installation of fabric
- C9
  - Poor installation or commissioning of services
- C13
  - Lack of site team energy performance knowledge & skills
- C6
  - Lack of adequate energy performance related QA on site

VERIFICATION & TESTING
- T3
  - Concern over consistency of some test methodologies & interpretation of data
- EM4
  - As-Built SAP not reflective of actual build
- V2
  - Lack of robust energy performance related verification, reliance on third party information
- V5
  - Lack of clarity over documentary evidence for Part L & Part F compliance
LIMITED UNDERSTANDING OF IMPACT OF EARLY DESIGN DECISIONS

Example

- Difference between the designed junctions and those built
- Stepped terrace
- Complex roof areas created, leading to difficulties in installing party wall edge seals

NB: This thermal bridge should be included in the SAP assessment but the assessor is often not aware that this step has occurred.
INADEQUATE UNDERSTANDING AND KNOWLEDGE WITHIN DESIGN TEAM

Example
• Design assumed compressed edge seal, insulation and wall tiles could be installed despite lack of space
• On site, it was discovered that the insulation and edge seal had been omitted
CONCERN OVER COMPETENCY OF SAP ASSESSORS

Example

- SAP Audits undertaken found errors in the original SAP assessments, based on a review of the design information only.
- When calculating roof U-value it is incorrect to assume the same thickness of insulation could be installed over the entire roof area.

Reduced space above joists makes installation of full insulation thickness impossible despite this being assumed in SAP calculation.
POOR INSTALLATION OF FABRIC

Example

• Incorrectly fitted insulation
• Detail when constructed deviates from the design

Incorrect edge insulation type and weak thermal break detail used at threshold

Design team provided no details as to how screed crossing cavity is thermally separated. Site team improvised by using masonry within the cavity.
LACK OF SITE TEAM ENERGY PERFORMANCE RELATED KNOWLEDGE AND SKILLS AND/OR CARE

Example

- Windows pulled forward from their design positions
- Overlap with the cavity closer well below the minimum requirements
- Mastic or foam fill interrupted by metal fixing straps
LACK OF ADEQUATE QUALITY ASSURANCE ON SITE

Example

- Cavity insulation board stopping short of cavity closers at openings
- Gaps between boards leading to increased heat loss
INDUSTRY RECOMMENDATIONS
Industry Recommendations

SKILLS AND KNOWLEDGE DEVELOPMENT

2) Ensure that as-built energy performance knowledge, including learning from ongoing research and development, is embedded into training and up-skilling for professionals and operatives.
ZCH Builder’s Book – Contents

Fabric

Foundation/Ground Detail
Beam and Block Floor
Solid Floor
Cavity Wall – partial fill
Cavity wall – full fill
Cavity wall – injected bead
Floor Joists – intermediate floor
Party wall
Window cavity closer
Window installation
Door installation
Bay /Dormers windows
Eaves/wall
Eaves/roof
Roof truss
Dryline/plaster - finals

Services/Renewables

First fix - general
Second Fix - general
System 1 and 2 ventilation
MVHR
Boiler/radiators/controls
PV solar panels
Commissioning
Other Renewables
**Do**

- Keep cavity and wall ties free from mortar – especially outer side of concrete block which must be smooth for insulation board
- Fill all joints with mortar for airtightness
- Ensure insulation is closely butted tight together both vertically and horizontally
- Ensure there are NO gaps in continuous insulation, and it is tight against block work.
- Ensure continuous dabbing of plaster or a continuous parge coat to all inside of internal leaf room junctions
- Ensure rigid board is installed below DPC
Cavity wall - Full fill insulation

Checklist (detail tbc)
• Keep cavity and wall ties free from mortar – especially outer side of concrete block which must be smooth for insulation board
• Fill all joints with mortar for airtightness
• Ensure insulation is closely butted tight together both vertically and horizontally
• Ensure there are NO gaps in continuous insulation, and it is tight against block work.
• Ensure continuous dabbing of plaster or a continuous parge coat to all inside of internal leaf room junctions
• Ensure rigid board is installed below DPC

Notes
1. The edges of the slab must be supported during casting so that they do not bug into the cavity and restrict the cavity fill.
2. Similar detailing has also been used in ex-mining areas liable to subsidence; e.g., Sheffield.
3. Much the same detail; i.e. a suspended reinforced concrete floor, may be used at intermediate floors, more easily giving an airtight seal than a wooden floor. This is normal in the rest of Europe and increasingly common in Ireland.
4. If the DPM has been positioned below the insulation, it should still form a continuous barrier through to the internal face of the inner masonry skin in order to ensure long term airtightness.
Also add in thermography to illustrate certain elements? Perhaps in introduction and common issues page.
Thankyou!
Chris Carr
Chair, FMB Home Builders Group

Zero carbon and SME builders

Tuesday 3rd March 2015
Introduction

• Carr & Carr Builders
• FMB and SME house builders
• Work with Zero Carbon Hub
  o Design vs As Built
  o Over-heating and ventilation
  o Skills, know how and capability
The zero carbon policy

• Target set in 2006 – all homes zero carbon from 2016

• Key elements:
  o Fabric efficiency
  o Carbon target (renewables)
  o Allowable Solutions (payments or actions off-site)
View of SME house builders

- Keen to build more energy efficient homes
- SMEs typically build to higher standards
- But some concerns…
  - Steep learning curve (cost and complexity)
  - Small developments (awkward for renewables)
  - Bespoke designs (awkward for fabric efficiency)
- SMEs need a voice
Industry learning curve

• Design vs As Built performance gap

• 2 year ZCH study
  o Walk-throughs
  o Implementation of designs
  o Thermal bridging
Lessons to be learned

• Better knowledge transmission (professionals to operatives and operatives to professionals)
• Procurement and product use
• Education and skills
  – Updated curriculum
  – Upskilling of existing workforce
Upskilling & knowledge sharing

• ‘Low Energy Know-How’ events

• Small builders book
Any Questions ?