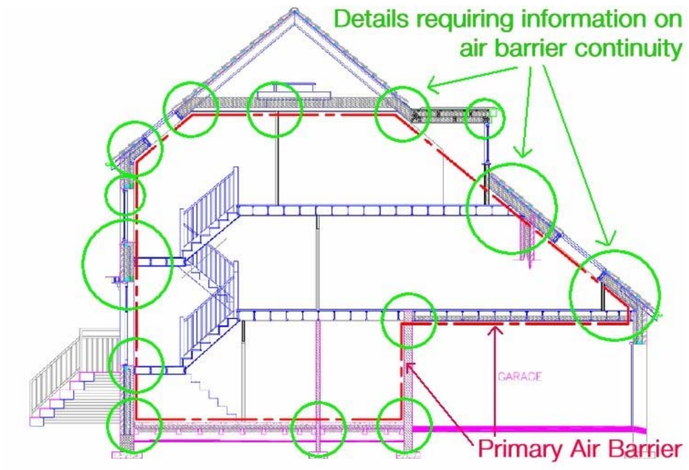
LowCarb4Real; Process collection: Construction planning

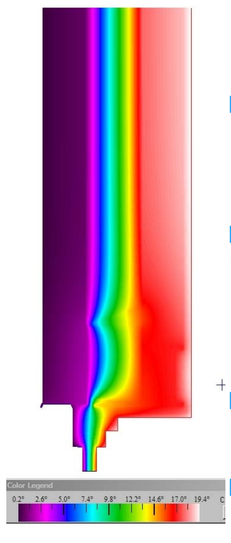


Airtightness

- Any scheme must have a clearly defined strategy for airtightness; a clearly designated air barrier in the design of all dwelling types (including variations) with all drawings showing the location of the air barrier with notes on specific airtightness measures such as sealing and taping.
- There should be a clear understanding of the airtightness strategy by the client, design and construction teams and subcontractors.
- Routine pressure testing of dwellings should be undertaken throughout, ideally including pressurisation testing of each dwelling at a point at which the air barrier is complete and exposed so defects can be readily identified and rectified.

Ventilation

- The design of the ventilation system needs to be considered in conjunction with the airtightness strategy. It is likely that the energy requirements for future developments will require very low levels of air permeability. Hence the ventilation strategy will be one based on mechanical ventilation, increasingly with heat recovery.
- The ventilation strategy should also consider the risk of summer overheating. This might include an option for overnight purge ventilation combined with exposed thermal mass.
- The requirement for a mechanical ventilation system would place additional requirements for dwelling design to ensure that duct runs and space provision for fans and vents are an integral part of the building design.



Fabric Design and Performance

- The design of the thermal envelope must be addressed very early in the design process with realistic estimates of U-values and thermal bridging effects. This is crucial since there are compromises that may have to be made between thermal performance and aesthetic design.
- Design culture is inclined to minimise the problems of detailed design at concept and master planning stage. It is crucial that this does not happen to avoid subsequent compromises in detailed design and thermal performance.

Process, Production and Quality Control

- These issues are deep-seated and difficult to address in a single development, they should be considered as longer-term goals for any developer or associated organisation.
- Both initial work and contracts for later stages need to ensure that design and construction teams are capable of demonstrating how they intend to verify performance.

Cost Engineering

- The cost engineering process must be designed to fully consider the effects and risks of any proposed changes in products, materials or processes on thermal performance, airtightness, ventilation, buildability, maintainability, condensation risk, thermal comfort and any other performance factors.

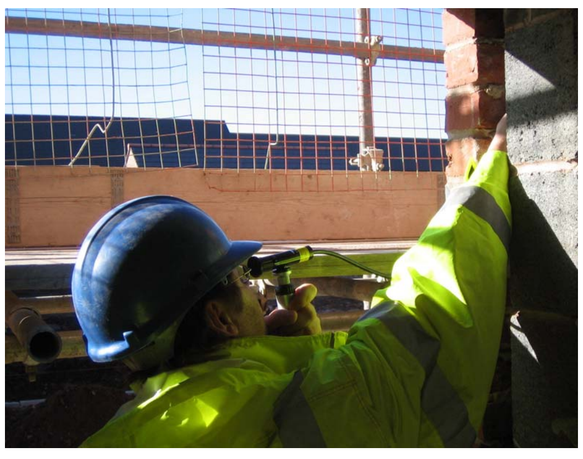
Training

- The training programme should involve a review of existing processes so that they can be used as training materials, as well as using material from other sources such as Stamford Brook, GHA members and the Passivhaus programme.
- Initial training programmes should be planned from the start and incorporated into budgets.
- Training should be continually reinforced, refreshed and updated to ensure that messages are not forgotten and that all teams are able to learn from each other as work progresses.

Design Changes

- Design change and production substitution processes must be set up to fully consider the effects and risks of any proposed changes in design, products, materials or processes on thermal performance, airtightness, ventilation, buildability, maintainability, condensation risk, thermal comfort and any other important performance variables.
- Training of construction teams and sub-contractors should highlight the potential problems of uncontrolled *ad-hoc* design changes and product substitutions.

Inspectability, Compliance Measurement and Performance Checking



- The choice of construction processes and detailing should take into consideration ease of inspection.
- The development of the required inspection methods and compliance checking protocols should be part of the overall construction plan. A similar approach to measurement and testing should also be taken.
- As with training, the development budget should take into account the need for enhanced inspection and testing processes.

Feedback and Continuous Process Development

- A formal procedure of continuous process development should be used to ensure that process and product improvement become an integral part of the overall design and construction process.
- A range of tools are available around which to form a framework for continuous process development, most of which are based on some form of PDCA cycle (Plan, Do, Check, Act).
- All of the above criteria are vital to the development of an effective feedback process. Maximum benefit will only be achieved by planning the entire construction process holistically, in addition to developing each individual significant area listed above.

UrbanBuzz Project—Developing Low Carbon Housing: Lessons from The Field—LowCarb4Real
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