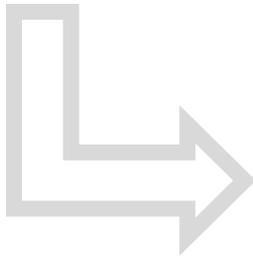


Building Physics & construction at the Roundhay Passive House

Richard Spencer, LEDA

20th century standard to 21st century standard



About the project

- In June 2015 we purchased a 1960s three bedroom detached house with a South facing main elevation (North side towards the road shown in the images).
- We explored options for retrofit and extension, but quickly concluded that knocking the house down and rebuilding would be more economic and allow us to achieve a better in use energy performance.
- We demolished the house in mid 2016 and started the new build with a builder who hadn't built to this standard before in November 2016 and were largely complete mid 2018.
- The building is registered on the Passive House database and is aiming to certify in the next few months.
- Key parts of a low energy build are the insulation, airtightness and ventilation strategy, so I'll focus on those.

Insulation



Insulation

- The builders understood why it was needed and what quality was needed for the installation. Implemented well in the large areas, more challenging in window overlaps and filling up under cavity trays; around services through the floor and walls. Insulation in the roof settles and needs to be topped up to maintain the required thickness. It is important to avoid more conductive materials bridging the insulation.
- Images: wall insulation fully filled, below slab insulation fully filled; below dpc insulation fully filled; roof insulation and detail of the thermal bridge in the inner leaf mitigated using aircrete blocks.
- Basalt fibre teplo ties were used to avoid thermal bridging in the walls. The builders preferred the new style ties with the plastic ends for handling, fixing in the mortar and safety on site.

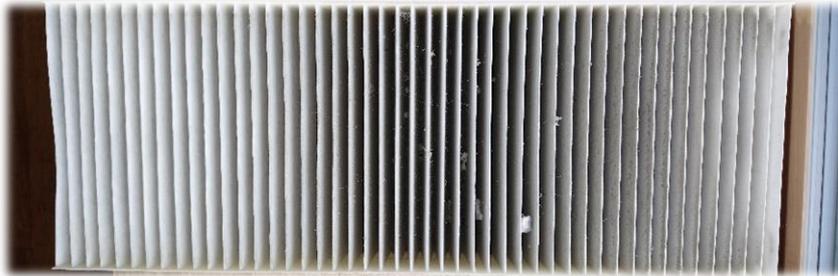
Airtightness



Airtightness

- Project needs a plan using tapes, mastic, parge, grommets and paint on products and membranes as appropriate.
- Detailing and sequence are important.
- Roof – vapairtight boards, taped – worked well where it was drawn and detailed in the spec. It was more troublesome in areas where not drawn (e.g. end of the ridge beam)
- Walls – good quality blockwork and parging, also use of blowerproof in corner and wall-floor junction (as long as it doesn't get rained on while wet as it is water based)
- Top sequence images – for soil pipe airtightness - vacuum cleaner is the airtightness champions friend, floor primed and grommet over soil pipe and then taped to floor. Easy if there is plenty of space around the soil pipe and done before internal walls etc. are put in
- Bottom sequence - tricky junctions (door bottom corner – not drawn, so has to be worked out on site – here not taped before plasterboarding, time consuming to fix later and not as robust as if it had been done at the right time in the construction sequence)

Ventilation



Ventilation

- Requires a strategy, good design, quality install and commissioning
- MVHR – space needed – above for ducts, silencers and plenums; and for condensate drain below
- Ductwork long lengths installed when the first floor is built – the builders realised this needed to be done, but we missed a horizontal soil pipe that was then difficult to put in later.
- Ductwork coordination with structure is important in design and installation.
- Keeping it clean (ends bagged) – worked well for installed ducts, but should also be done for ducts prior to installation.
- Filters – 3 months – intake showing dust up to moths and leaves, exhaust showing dust and polystyrene (which must have been in the installed duct work). Not having this dust in the internal air helps to improve air quality for the occupants.
- Filters need replacing by occupants, fine for self-build where the occupant is involved in the specification, but more challenging to do when the housing is built to be occupied by tenants or sold to market.

We're open for the Passive House Open Days 9-11th November



www.leda.coop/PHOD18

Conclusions

- While I conclude, please enjoy some pictures of things that can be made with materials reclaimed from the site skip (shelf supports, a bug hotel and a shoe rack)
- A good builder can produce a building to this quality with the right support.
- They may need to learn some new skills, behaviours and to build confidence in the methods required. Applying the same quality as is done to final finishes to the fabric of the building that we don't see.
- Feedback from completed projects to the main contractor and subcontractors is needed to ensure learning is embedded (what went well and improvements for next time). The structure of our project teams makes achieving this challenging, but we need to do it.
- Find out more: the house will be open for the International Passive House Open Days 9-11 November (see www.leda.coop/phod18 for details)