



PASSIVHAUS TO ZERO CARBON HOMES ALLAN THOMPSON – TOLENT LIVING









SETTING THE SCENE

• The Government has committed to reducing all carbon emissions to be reduced by 80% by 2050 and UK housing is estimated to account for c. 30% of all carbon emissions

•The Government did want UK new build housing to be zero carbon by 2016 (plans abandoned in 2015)

•Fuel costs in the UK continue to rise –annual electricity and gas bills up by 80% since 2003

• Europe has been building environmentally friendly housing far longer than the UK and so has much more knowledge and experience in this area





DEFINITION OF PASSIVHAUS

The term "PassivHaus" refers to a specific construction standard for buildings with good comfort conditions during summer and winter, without the need for a traditional heating system. (Data: Passive House Platform)

Design concept developed in Germany

- Space heating 15 kWh/m2/year
- Primary energy 120 kWh/m2/year
- Airtightness 0.60 times its volume per hour at a pressure of 50 pascals







PROJECT OVERVIEW

Name: Racecourse Estate Bungalows

Type: 28 No. affordable bungalows for the elderly with 25 No. Passivhaus accredited :-

- 25 x 2Bed/3Person
- 2 x 2Bed/3Person wheelchair
- 1 x 2Bed/4Person wheelchair

Build type: Timber frame faced with brickwork and render

Location: Houghton le Spring, Sunderland

Occupancy: Occupied since January 2012 **Budget**:£3.4M











SUMMARY – CONTRACTOR CHALLENGES

- Every opening/junction/joint in the building had been specifically designed
- Air tightness is so stringent that even letterboxes were not permitted
- It was vital the new homes were built exactly as shown on the drawings
- Stage by stage tests determined whether the required quality of construction was being achieved and if it was not where the home was failing and therefore where responsibility lay
- The build quality was unique and very real challenge for **everyone** involved in the project







Air-tightness requirements of PassivHaus







SUMMARY – CONTRACTING APPROACH

- Site induction video produced
- Dedicated quality manager appointed
- Air tightness 'culture' instilled on site
- Site based workshops/toolbox talks
- 3 detached plots as a 'test bed'
- All detail drawings have a comprehensive inspection checklist
- Interim air testing by site team







DESIGN V AS BUILT PERFORMANCE

Graph summarising co-heating test results from LMU database



"In context, the measured and predicted whole house heat loss for both dwellings represent the two best performing dwellings out of a sample of 21 other new build coheating tests undertaken by Centre of the Built Environment at Leeds Met over the last decade." Technology Strategy Board

Building Performance Evaluation Report 25th March 2013



Tolent

Bed 2

Bath

Hall

Kitchen

"The passiv bungalows are

fantastic, I absolutely love my

home and have settled in well

THE END RESULT !



" It's great in the cold weather my new home is cosy and warm and I don't have to worry about heating costs any more as I rarely use it." I really like living here the bungalows are brilliant!"

"These bungalows are beautiful, we haven't had our heating on yet! My husband was always cold before we came here."





PASSIVHAUS TO ZERO CARBON





RACECOURSE ESTATE – HOUGHTON LE SPRING

ESTON ECO VILLAGE – SOUTHBANK MIDDLESBROUGH





ZERO CARBON BASELINE

Airtightness – 0.60m3/hr/m2 (5m3/hr/m2)

U values – ground floor 0.10 (0.17), ext wall 0.10 (0.24), roof 0.09 (0.10), windows 0.90 (1.30), ext doors 0.90 (1.20)

Solar thermal – 4.2m2 (4.2m2)

PV – 4.70 kWp (none)

MVHR (none)

Passivhaus principles but not formal PH accreditation



BLUE = SPECFICATION TO MEET CSH LEVEL 3





ESTON ECO VILLAGE – Gentoo SOUTHBANK MIDDLESBROUGH

Tolent Living Limited













LESSONS LEARNT/OBSERVATIONS

- The same site team have built Zero Carbon homes using PassivHaus principles but not PassivHaus certified products
- Our Zero Carbon homes have been traditionally constructed no Modern Methods of Construction
- Using PassivHaus principles of high levels of air tightness and insulation is an easily understood tangibly beneficial approach
- We found the traditional masonry construction of the Zero Carbon homes much easier to design, procure and build, being much more familiar territory for us as a house builder
- Passivhaus approach gives best correlation between design and as built performance





WHERE ARE WE NOW ?

• 2006 UK Gov. all new build homes zero carbon by 2016

Abandoned in 2015

- 2008 Zero Carbon Hub set up to oversee the road to zero carbon
 Closed in March 2016
- Department of Business, Energy & Industrial Strategy

Department of Energy & Climate Change dissolved in July 2016

- June 2016 UK Gov. targets 57% reduction in CO2 emissions by 2030
 Emissions Reduction Plan ???
- June 2016 now looking at 6th UK Housing Minister since 2010





WHAT DO WE NEED NOW ?

- Clarity & certainty about future policy direction
- Strong Public Sector Leadership
- Policies which cover new build and more importantly existing housing





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