Step by step towards EnerPHit

Earlier issues of Green Building have shown us the benefits and challenges of renovating single family homes to the Passivhaus refurbishment standard; EnerPHit. But what of much larger buildings, and situations where EnerPHit is the eventual goal but the current budget doesn't match this aspiration? Adam Tilford offers some insight ...

These are some of the challenges that a new EU funded project called EuroPHit aims to overcome. Led by the Passivhaus Institute and with partner organisations across Europe, EuroPHit will apply 'passivhaus' principles to energy efficient refurbishment on a step by step basis.

A step by step, or phased approach to comprehensive refurbishment is about more than simply staging the cost of work over a period of years, although in some cases that may be a financial necessity. There is the lifespan of each part of the building to consider. It is most cost effective to carry out potentially expensive renovation and replacement of parts of the building only when it is actually needed. For example, it is most cost effective to insulate the façade of a building when the façade needs replacement. If maintenance (eg. re-rendering) and improvement (insulating) aspects of refurbishment are carried out independently, several years apart, then the overall cost will be much higher and cost effectiveness of the subsequent insulation reduced; the full cost of the work will have to be paid for via the resultant energy savings, rather than being partly offset against essential maintenance.

If we are to carry out energy efficiency improvements to the building in stages, as each part of the building comes up for renewal, then we need to ensure that the integrity of the building envelope is not compromised by a lack of understanding of building physics. Improving the airtightness substantially, perhaps as part of an internal refurbishment and replacement of the windows, with the intention to address the thermal insulation and ventilation strategy several years later, could cause condensation problems during the intermediate period. It is therefore sensible to develop a plan to define the measures to be taken and the order in which they will be implemented, taking into account both the remaining life of existing parts of the building and maintaining sound building physics. The technical feasibility should also be considered. For example, if the façade of a building is to be externally insulated but the windows not replaced as they still have 10 years useful life remaining, then an intermediate window detail should be designed to ensure that the windows can be replaced at a later date, without wrecking the newly insulated façade.

Each of the partners involved in EuroPHit is providing technical assistance to one or more case study buildings in their country. The case studies will be used to investigate the real work feasibility of step by step refurbishment. In the UK our case study is Wilmcote House, a large residential building containing 100, three bedroom maisonettes of around 90m^2 and 7, one bedroom flats of around 47m^2 arranged in three towers linked with common stair cores. The building is owned by Portsmouth City Council. It will be the largest refurbishment project to target EnerPHit in the UK to-date, and the intention is to carry out the work with tenants in situ due to the difficultly in providing alternative accommodation for such a large number of families. The building is a prime candidate for refurbishment according to the principles laid out above. Built 1968 using the Bison REEMA prefabricated reinforced concrete panel system, its remaining life is likely to be around 30 years without significant repairs so it makes financial sense to improve the energy efficiency at the same time essential structural work is completed.

High heating bills currently contribute to fuel poverty so it is important to refurbish the building to the highest feasible standard, EnerPHit, from the outset, even if this is a step by step process. The up-front budget is limited, thus a step by step approach will be needed in some areas. The design team, led by ECD Architects, with technical support from the BRE as the UKs EuroPHit partner, is taking on the challenge of ensuring that the EuroPHit aspiration can be met in spite of the technical difficulties working with this type of building. The building will be externally insulated and re-glazed to Passivhaus standards. Ventilation will be improved using MVHR. Thermal bridging will be minimised by bringing what are currently external access ways inside the thermal envelope.

The final aspect of the EuroPHit project is examining the financing of very low energy refurbishments. It is currently common that the energy cost saving of a particular measure will be compared to its capital cost to determine its cost effectiveness. This can be an inappropriate way to determine the real value of the measure. An alternative is to compare the investment cost and energy cost saving per square metre of the measure per year. On this basis many improvement measures offer a real cash return.

The EuroPHit project will run for three years, with work stating on most of the Europe wide case studies early in 2014. Further updates on the refurbishments will be available in due course.

Adam Tilford

For more information on the EuroPHit project visit:
HTTP://WWW.EUROPHIT.EU

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