Iarnród Éireann (Irish Rail) Train Drivers Building

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A Sustainable Choice for our Railways and our Future.

Passive Principle Integrated into Architectural Design – deep solar control overhang, large south facing glazing, thermal mass of stone floor, highly insulated building fabric, excellent day lighting.

In August 2011 The Train Drivers Building In Portlaoise became the first Passivhaus building for any railway company in the world and the first certified commercial building for the State and Semi State sector in Ireland. It achieved this using highly sustainable building materials, construction methods and technologies all of which complement and reinforce the sustainable nature of rail travel.

The selection of sustainable materials adhered to a descending scale as follows

- Sustainably managed renewable sources – primarily FSC certified timber products but also linoleum and natural linseed oil coatings to timber and ‘fresh air paint’.
- Materials from waste stream sources – primarily the cellulose insulation made from recycled newspapers so often left behind on trains but also GGBS concrete.

- Abundant Resources – Primarily Granite Rainscreen cladding – Granite is the most abundant stone in the world and its use as a demountable ‘DfD’ rainscreen ensures the granite can be recycled in the future.
- Materials that either have a large recycled content or which can be easily recycled intact at the end of their life it this construction – Primarily Structural Steel and Air handling ductwork adhere to the ‘DfD’ philosophy.
- Materials that may not be sustainable in their own right but which make a significant contribution to the performance of the building – Primarily Triple Glazing, Mechanical and Electrical Equipment, Air Tight membranes and tapes.

Design for Deconstruction (DfD).

As shown above the final choice of materials and construction methods was decided by considering how the material could be ‘deconstructed’ intact at the end of the buildings life.

Architectural Design.

Many so called ‘eco buildings’ are often criticised for being architecturally naive or awkward. I believe that harnessing the Passivhaus principles in a design can generate a sophisticated aesthetic by creatively solving issues such as thermal bridging (shown left) to give this new architecture a unique style.

Results.

- Building type: 228 square metre single-storey accommodation building for Iarnród Éireann locomotive drivers including changing, toilets, offices, training and rest areas.
- Space heating demand (PHPP):12 kWh/m2/year Heat load (PHPP): 12 W/m2
- Airtightness: 0.31 air changes per hour at 50 pascals pressure
- Floor U-value: 0.070 W/m2K, Walls U-value: 0.084 W/m2K, Roof U-value: 0.072 W/m2K
- Windows & doors: OptiWin Alu2Wood triple-glazed U-Value of 0.6 W/m2K installed U-value of 0.77 W/m2K.
- Heating system: The building is heated by delivered heated air supplemented by radiant heating panels during significantly colder weather. Hot water is provided by a complete Kingspan Thermomax HP 200 evacuated tube collector system with a collector surface area of 11.3732 and an absorber surface area of 8.01m2 and a 500L storage tank.
- Ventilation: Non certified Drexel und Weiss AeroSmart L compact heat pump unit with an effective heat recovery efficiency of 78% and an electric efficiency of 0.29 W/(m3h).
- Green materials: Cemex GGBS in concrete, Warmcel cellulose insulation (using recycled newspapers), FSC certified timber, Linseed oil to treat timber, Auro Airfresh paint to the internal walls, linoleum flooring, rainwater harvesting for toilet flushing.