

# Case Study

## Cronk-Y-Berry Primary School, Isle of Man

### Pioneering new energy strategy 'fabric first' approach



Cronk-y-Berry Primary School on the Isle of Man is of relatively modern construction, having been built within the last 15 years. As is to be expected, the insulation levels of the building are relatively good. However, the annual heat energy usage divided by the floor area of the school is 188kWh per m<sup>2</sup>. This far exceeds the CIBSE benchmark for schools of 160kWh. The school is heated by gas boilers feeding both a radiator system and air handling units.

#### The Air Leakage Test

Stroma carried out an air leakage test, revealing that the building had an air permeability rate of 31m<sup>3</sup>/(hr.m<sup>2</sup>) @ 50Pa. For schools built under current Building Regulations, the maximum allowable air permeability rate is 10m<sup>3</sup>/(hr.m<sup>2</sup>) @ 50Pa.

#### Air Sealing Survey

A survey was carried out to explore the potential of improving the school's air-tightness. It was predicted that a result of between 12-14 m<sup>3</sup>/(hr.m<sup>2</sup>) @ 50Pa could be achieved through remedial air-sealing.

#### Dynamic Simulation Model (DSM)

In order to predict the impact of the improved air tightness on the building's demand for heat energy a DSM of the school was produced. The annual heating demand was simulated based on typical occupancy patterns, local ambient temperature and solar gain levels at an air tightness of 31 units. A comparative percentage improvement in heating load could then be calculated for the upper (14) and lower (12) improved air permeability rate. This percentage improvement was then overlaid onto the existing energy bills to calculate the estimated cost/carbon improvement. Based on this data, the Department of Education decided to implement the remedial work.

#### Remedial Work

Remedial air-sealing work was carried out on the building and a re-test undertaken. The school's new air permeability rate was 13.2 m<sup>3</sup>/(hr.m<sup>2</sup>) @ 50Pa. The DSM model was then used to estimate the heat energy saving associated with this improved air tightness.

Current Annual Heat Energy Cost (exclusive of VAT)	£28,964	
Reduction in Energy Consumption 31%	31%	
kWh Saved per Annum	225,000	
Reduction in Energy Cost per Annum (exclusive of VAT)	£8,980	
Total Cost of Remedial Works	£25,120	
Payback period	Months	Years
	33.5	2.8
Reduction in Carbon Emissions per Annum	43.5 tonnes	

N.B Figures based on DSM output



#### Minister for Education, Hon Mrs Anne Craine MHK commented:

*"This has been an interesting project and one that has been well worth doing. The energy audit produced some surprising results. For example, it is not always the oldest buildings in our stock that are the most inefficient. Some of newer buildings were shown to have the greatest heat loss and with the energy audit data, we will now be able to take the necessary remedial actions, to hopefully achieve a marked reduction in our energy consumption. We, as a government, are trying to reduce our CO<sub>2</sub> emissions by 20% by 2010 and this exercise has enabled us to identify our heat loss problems and as a result, will prove a great contributor in meeting that target. I welcome the fact that it has given the Department of Education a 'green' feather in our cap."*

#### PROJECT

Cronk-Y-Berry Primary School, Isle of Man

#### ARCHITECT

Isle of Man Government  
Department of Education

#### CONTRACTOR

Stroma Contracting

DATE - 2009