Analysing the Impact of 20 Years on Building Regulations within a Consistent Architectural Framework

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Aim

The aim of this dissertation is to see if the building regulations have improved over 20 years or if they actually make a difference.

Objectives

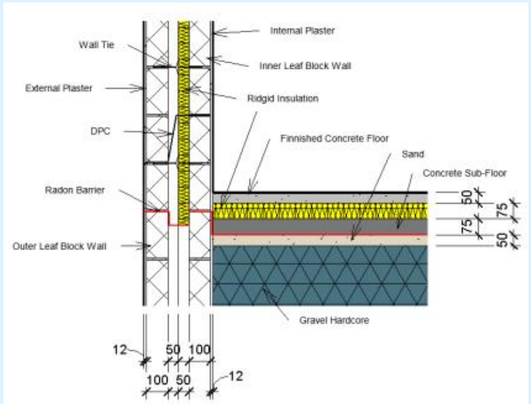
- Review past and present building guidelines.
- Model the current dwelling and conduct an analysis using appropriate software.
- Remodel the dwelling to modern day building standards and conduct an analysis using appropriate software.
- Compare the differences of the dwellings throughout the years of the building regulations.

Background

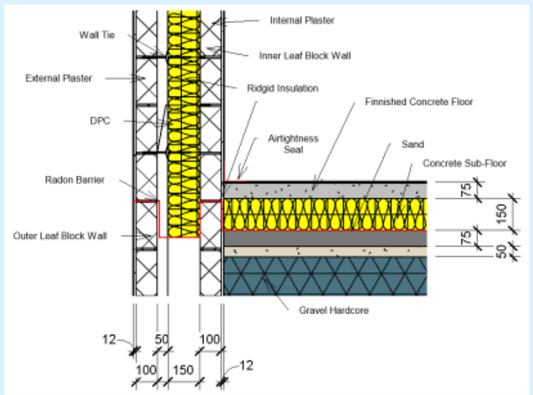
This project looks at building regulations throughout a 20-year period. This is from 2002 to 2022. The reason for this is because my home house was built under 2002 building regulations and the latest version of the building regulations are 2022. The building regulation are a set out by the government in the Technical Guidance Document Part L. These regulations are updated and changed on a regular basis's. So as my house was built under 2002 building regulation this house will then be used as a test house as the overall footprint of the house will not change but it will be built to different building regulations from 2002 all the way to 2022. These regulations will be compared on the energy usage of the house and how much carbon they produce. This can all be done using the DEAP software from SEAI.

Revit Modeling

The house which I currently live in was built under the 2002 building regulations so for this there was a Revit model made of the house which can be seen in the top left corner. There was also a section detail made of what the wall looks like which is shown below.

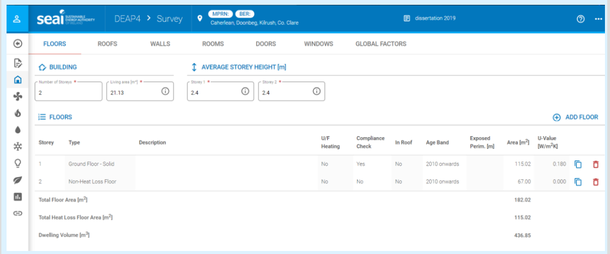


There was also a Revit model made of what the house could look like if it was constructed under 2022 building regulation which is shown in the top right corner and there was a section view made of what a new wall would look like shown below.

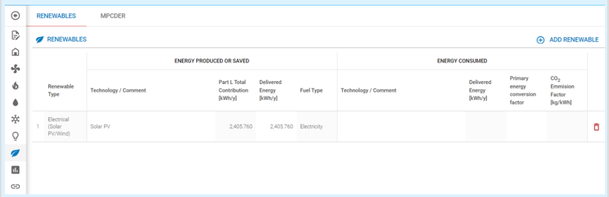


DEAP Software

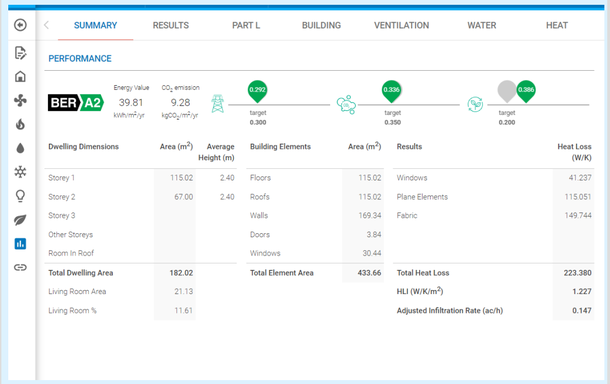
The DEAP software is a software created by the SEAI to give a house a building energy rating (BER) this considers a number of factors and rates the house accordingly. One thing it factors is the building factor and its elements. Below shows a snip of the DEAP software and how the floors would be added.



The next snip below shows another factor which would be the renewables and how they are inputted.



The final snip is what the results section of each study ran would look like.

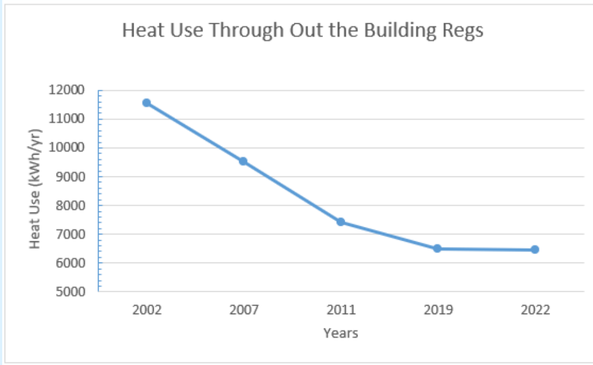


Results

From the DEAP software there was 5 studies conducted according to different years of building regulations. The below table shows all the results from the different years.

Years		2002	2007	2011	2019	2022
BER		B2	B1	A3	A2	A1
Energy Value	kWh/m²/yr	122.07	81.77	63.78	40.15	22.7
CO_2 Emissions	kg/m²/yr	28.6	18.47	13.57	9.35	2.91
EPC		0.896	0.6	0.468	0.295	0.167
CPC		1.035	0.668	0.491	0.338	0.105
RER				0.204	0.38	0.529
Heat Use	kWh/yr	11563.35	9500.52	7421.86	6474.01	6458.54
Delivered Energy	kWh/yr	18850	13158	10183	7300	2361
Primary Energy	kWh/yr	22220	14884	11610	7307	4131

From these results graphs were constructed to display the data to analysis it easier and find trends. The below graph is a graph showing the heat used in the house thought the building regulations.



Conclusion

With everything taken into consideration a house built under 2022 building regulations is a better house then a house built under 2002 building regulations. So, in the past 20 years the building regulations have improved Irish homes