



TUS

Comparative study of traditional masonry Vs ICF Construction

Paraic Donnellan

Aim of the Project

This dissertation aims to provide an in-depth analysis of both insulated concrete form construction and traditional masonry construction under the headings of sustainability, construction method and construction cost.

Background

Insulated concrete form construction is a modern building method originating in the 20th century (AMVIC, 2018). It uses expanded polystyrene forms that are filled with reinforced concrete creating a robust, highly insulated, and energy efficient structure (Altherm, 2023). Insulated concrete form construction is all associated with greatly higher building costs compared to traditional building methods (Kyriakidis & Aimilios Michael, 2016) (NBCMSO, 2024). Traditional masonry construction remains a cornerstone of the Irish building sector (M.T.Copeland, 2025). The techniques of building this form of construction have changed over time but the fundamental materials have stayed the same, this method relies on materials such as brick, stone and mortar (brick-industry, 2023).

Objectives

- 1.To conduct research on general construction practices in Ireland.
- 2.To conduct an in-depth analysis of insulation concrete form construction and traditional masonry construction.
- 3.To carry out interviews and surveys with industry professionals.
- 4.To carry out several case studies on insulation concrete form construction.

Research Methodology

How this project was researched

- Literature review
- Surveys
- Interviews
- Case studies

Literature Review:

The literature review was done using books and journals to gain a understanding on both forms of construction under the headings of cost of construction, sustainability and construction process.

Surveys:

A survey was carried out to gain first hand information on both forms of construction form industry professionals which were sourced from the online platform LinkedIn.

Interviews:

Two interviews were carried out to gain primary information on both forms of construction. One interview was carried out with a insulated concrete form professional and one interview with a local building developer in the local area. Questions for theses interviews revolved around the topics of sustainability, cost of construction and construction process

Case Studies:

Five case were conducted during the process of this project. Three case were done to conduct research on insulated concrete form construction under the headings of cost of construction, sustainability and construction process. Similarly two case studies were carried out on traditional masonry construction to gain information under the headings of cost of construction, sustainability and construction process.



Figure 1: ICF Construction

Results

ICF Cost of Construction			
Item	Lowest recorded cost	Highest recorded cost	Average recorded cost
Insulated concrete framework per m ²	€29.75	€41.65	€35.70
Builders day rate	€214.20	€297.50	€238.00
Ready mix concrete price per meter	€77.35	€101.15	€89.25
Ready mix concrete delivery price	€95.20	€178.50	€107.10

Figure 2: Cost of Construction comparison

Construction Process Comparison		
Aspect	ICF Construction	Traditional Masonry Construction
Speed	Faster due to labour requirements and assembly.	Slower as bricks must be laid individually.
Labour Requirements	Does not require specialized training and also requires fewer workers.	Requires a larger, more skilled and specialized workforce.
Weather Sensitivity	Less affected by adverse weather.	Weather-dependent; mortar must dry between layers.
Structural Strength	Highly resistant to wind, seismic activity, and water damage.	Durable but prone to weather-induced deterioration and pest infestation.
Ease of Modification	Difficult to alter post-construction.	Easier to modify or extend.

Figure 3: Process of construction comparison

Comparison of Sustainability in both forms of construction:

In conclusion, when considering sustainability through the lenses of embodied carbon, thermal performance, waste generation, and energy consumption, it is evident that insulated concrete form construction continuously displays a lesser impact on the environment. It is a forward-thinking solution for environmentally responsible building in the Irish climate due to its unique design, the use of recyclable materials, and the capacity to create high-performance buildings that are breathable without allowing air to escape. In spite of the fact that conventional masonry construction continues to be popular due to its long history, the availability of materials, and the known techniques it employs, it runs into difficulties when it comes to satisfying modern sustainability goals without considerable adjustments. Insulated concrete form systems are becoming an increasingly tempting alternative for future-focused building projects as the construction industry continues to push towards approaches that are more environmentally friendly and efficient.

From the results gather it was clear to see that:

- Initial cost of construction is higher using the method of ICF
- Construction process is very different as traditional masonry construction a larger more skilled workforce as the construction process more labour intensive.
- In theory ICF construction is more sustainable but from research conducted this is debateable as even do most material is recyclable it is unsure how much waste is being recycled.

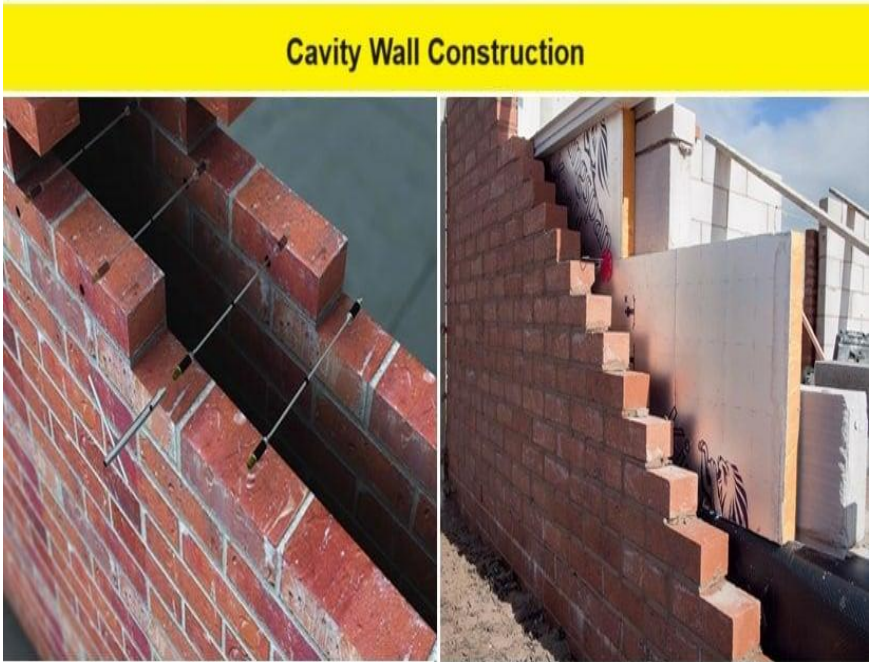


Figure 4: Cavity wall Construction

Conclusion

From completing this project, it is important to understand that both methods of construction have both advantages and disadvantages in their construction method, sustainability and costs. From completing this project, it has made it more clear why there is a need for both methods of construction and why one method of construction is more dominate in my area.