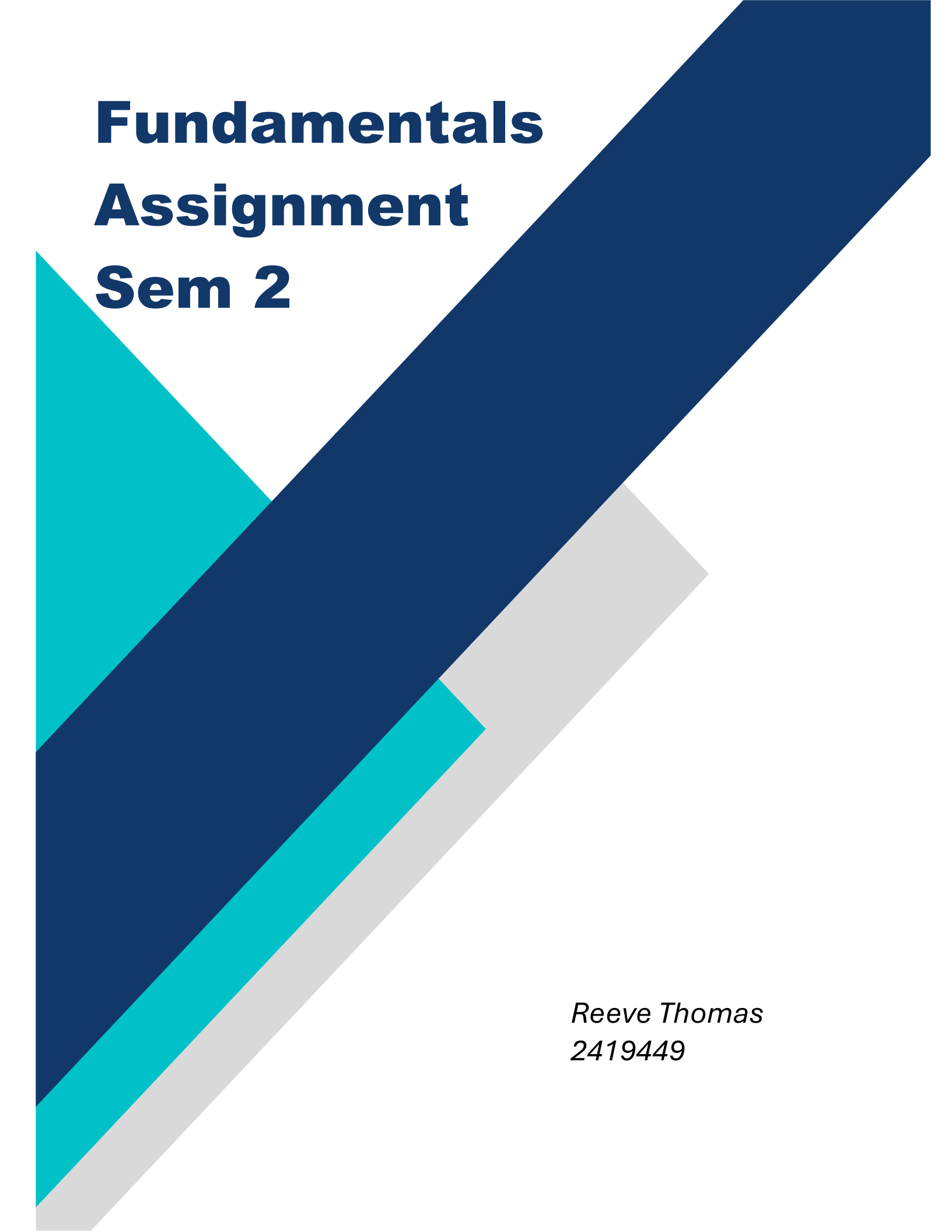




Fundamentals Assignment Sem 2

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1. Offsite Construction Methods



Produced by pbctoday for pbctoday, Produced on (10th November 2018) *The Ultimate Guide To Modular Construction* [Online] Available at: <https://www.pbctoday.co.uk/news/mmc-news/modular-construction-guide/44042/> [Accessed 10th April 2025]

a. Modular construction

Offsite construction methods can be ideal for a project that wants to be quick and sustainable. Offsite construction methods can include modular construction. This construction method can be very popular these days, and it involves creating different sections to a building that is produced in a factory setting but still holds a very modern aesthetic to a building. The sections will come with whatever the design requires such as the type of insulation, electrical layout and even the plumbing features like radiators. Once produced it is then shipped to site and the building can be created in a matter of a month.

b. Precast Concrete



Produced by G K for LinkedIn, Produced on (18th October 2024) *Precast Concrete Buildings: Key Structural Design Considerations* [Online] Available at: <https://www.linkedin.com/pulse/precast-concrete-buildings-key-structural-design-considerations-g-k-nf0rc/> [Accessed 10th April 2025]

There are also other construction methods such as Precast concrete. It is also ideal for projects that need to be fully completed in a short amount of time. As the precast concrete can be one of the best qualities for an offsite construction method. The costs can save the project a lot of money compared to the other construction methods. The only downside to this method is that there can be a size restriction to the design of the building. It can also be very hard to connect the pieces onsite as it is not as simple as the modular build.

c. 3D Printing



Produced by Designing Buildings The Construction Wiki for Designing Buildings The Construction Wiki,

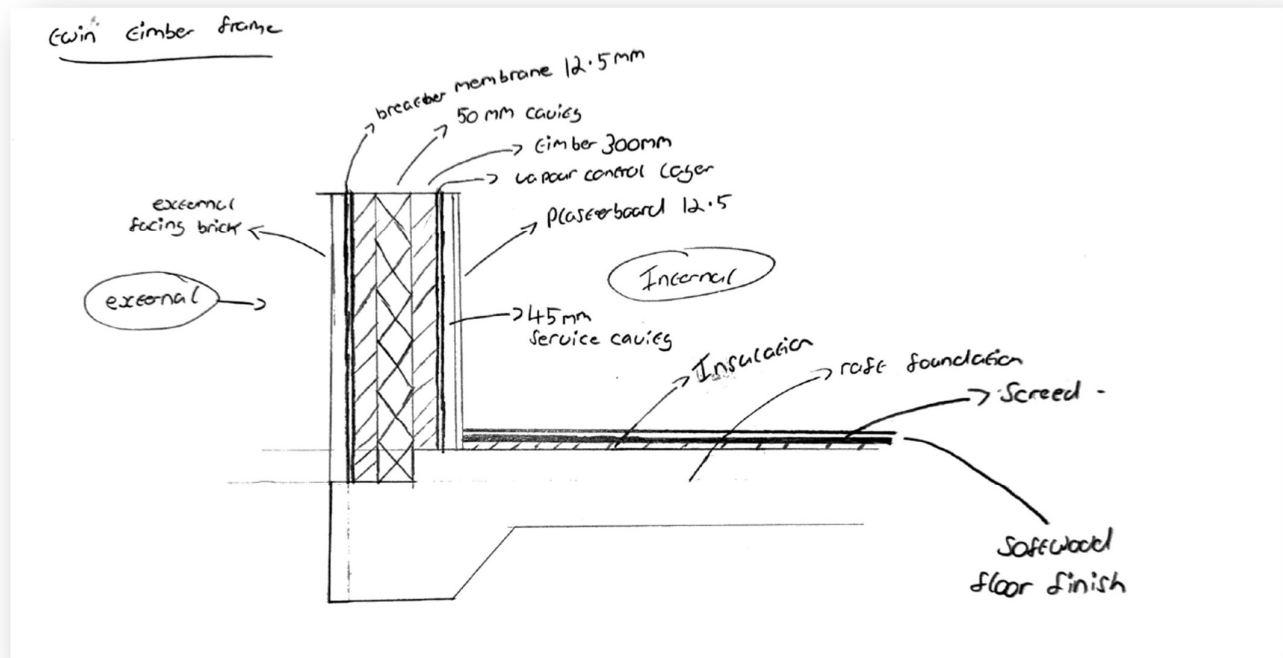
Produced on (19th August 2022) *3D Printing In Construction* [Online] Available at:

https://www.designingbuildings.co.uk/wiki/3D_printing_in_construction [Accessed 23rd April 2025]

A very modern way of offsite construction can include 3D printing. The first 3D printed building was built in Dubai on the year of 2016, and it took 17 days for it to be fully completed. It consists of reinforced concrete being distributed out of a large robotic arm as the machine is scanning the drawings.

2. Wall Details

I. Twin Timber Frame



a. Advantages

In the image shown above illustrates a twin timber frame that will meet the requirements located in the scenario. The twin timber frame method outlines many different advantages that can be brought to a two-storey detached domestic building. These advantages can include:

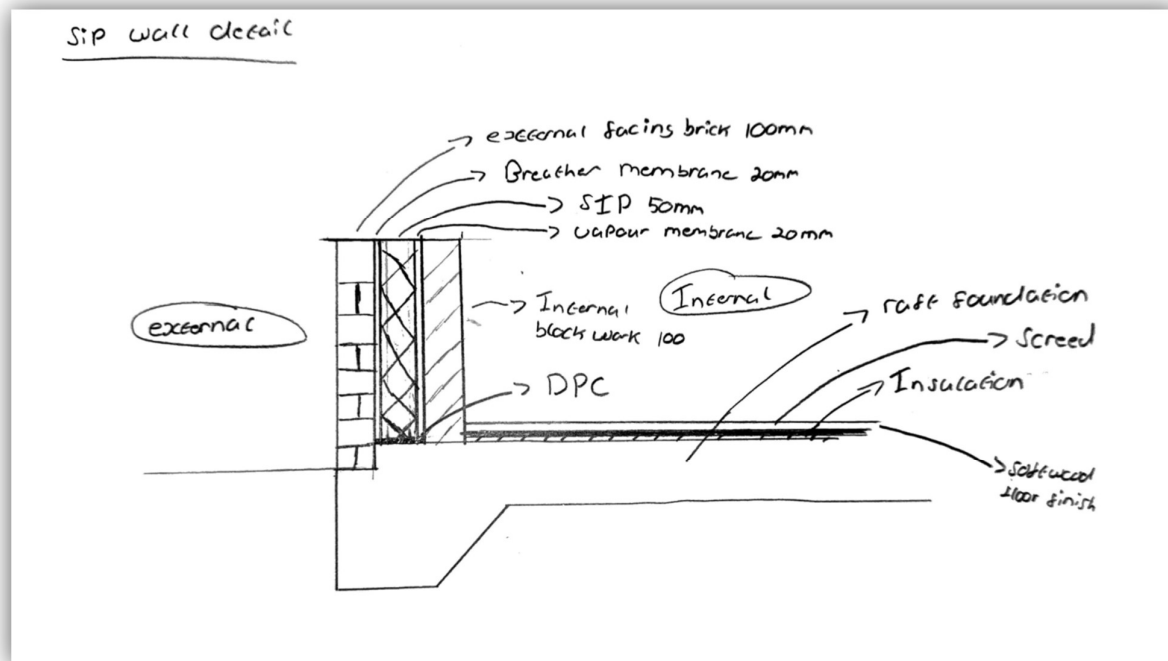
- Enhanced structural stability.
- An increased strength to allow greater design flexibility
- Modern aesthetic appearance
- Environmentally friendly
- Thermal performance
- Because of this the house value monthly will be decreased compared to other buildings
- Durability

b. Disadvantages

Where there is up there is also a downside to this construction process. The disadvantage towards this method includes:

- A high purchasing cost compared to the other forms of traditional construction
- Skilled Labour is required
- Can be time consuming
- M&E Design concentration
- Moisture damage can also be a big disadvantage
- It can be Flammable
- Timber frame is known for insect infestation if not properly maintained

II. SIP



a. Advantages

This form of construction can be very different from the twin timber frame wall this is because of the different advantages and disadvantages, from my drawing shown above the SIP construction method can be effective as some advantages include:

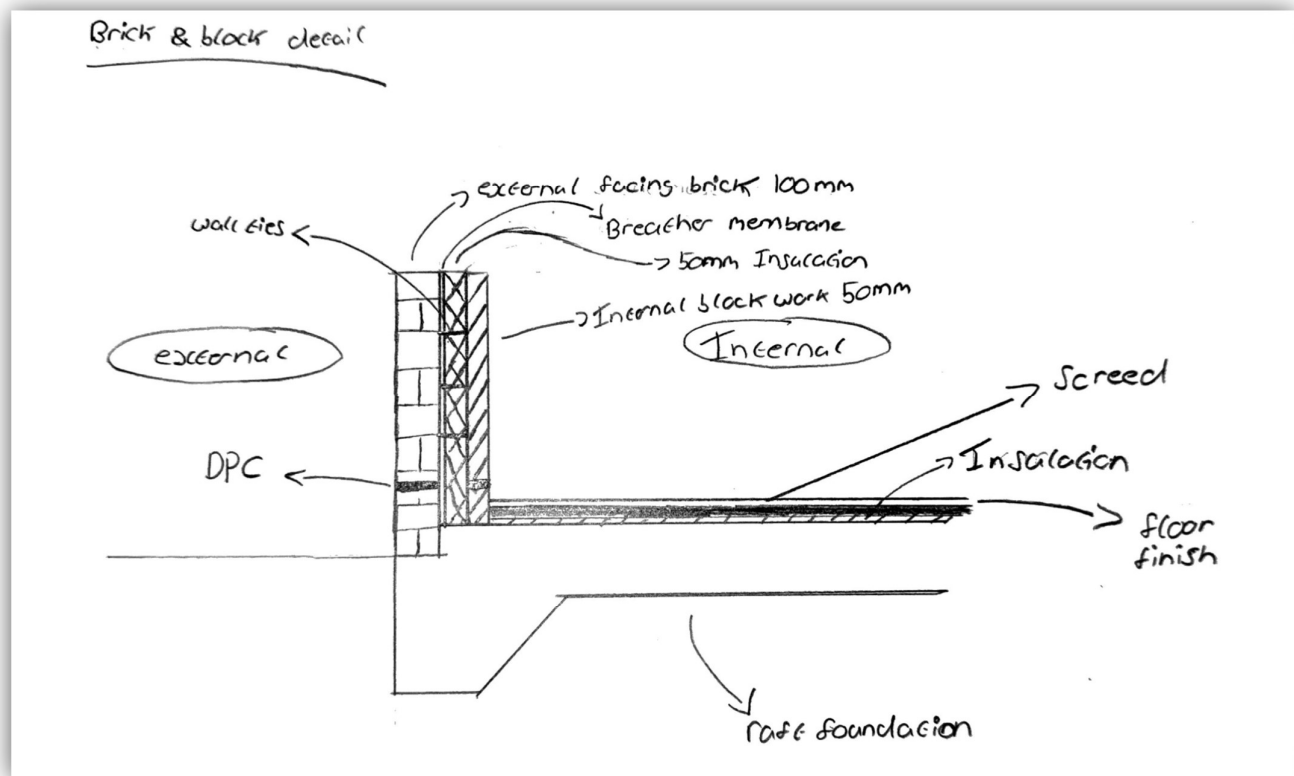
- The Sip walls are known as one of the best for insulation purposes
- They can provide the wall with excellent strength and integrity
- SIP construction can save money by the waste subject as they produce less waste
- They can also create less air gaps in the wall, so you don't have to worry about drafts
- Sound proofing
- When working with the SIP construction method they can be quite swift compared to the other methods

b. Disadvantages

The disadvantages to this construction method can include:

- SIP construction can cause a fire as it is very flammable
- Moisture can creep in if certain materials are not inserted into the wall like a Vapour Membrane
- Difficulty installing services
- Thermal bridging

III. Brick & Block



a. Advantages

The advantages of the brick and block can consist of:

- The durability of this construction can be 100 times better than the other forms of traditional construction listed in the report
- Brick and Block construction can also be fire resistant
- It has far better weather resistance
- It can be used for any type of design
- It offers a very classic aesthetic that is not hard to maintain
- This construction method will also provide great sound insulation to the building

B. Disadvantages

There is also a downside towards this construction, this includes.

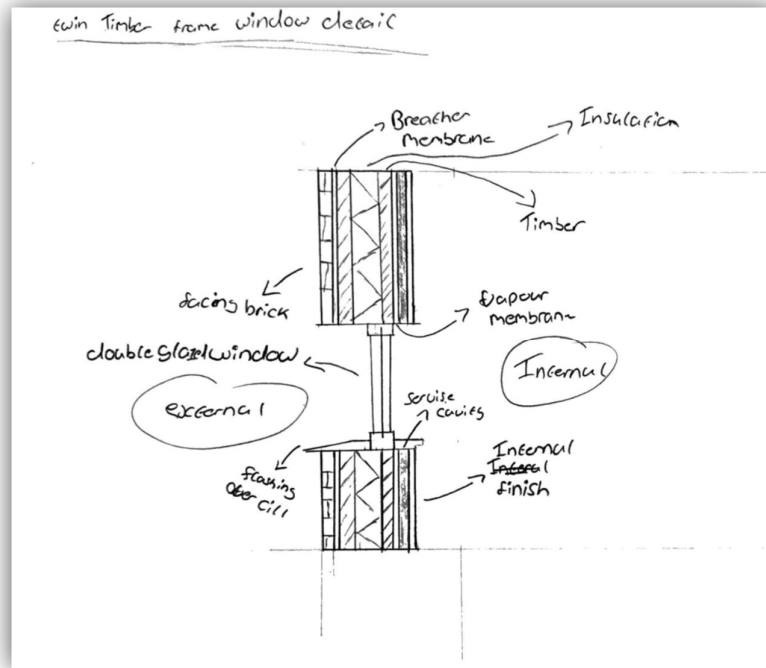
- There can be high labour costs for this method to be successful compared to the other construction methods
- It can be a slow process
- The method requires heavy material
- Ground expansion & compression from different climates can lead to subsidence
- If repairs are needed it can be very difficult to repair or replace



Produced by Alamy for Alamy, Produced on (16th July 2017) *Insulation inside a new cavity wall with spacers between bricks and breeze blocks on a conservatory external dwarf wall. Uk, Britain* [Online]
Available at: <https://www.alamy.com/insulation-inside-a-new-cavity-wall-with-spacers-between-bricks-and-image155668830.html> [Accessed 23rd April 2025]

3. Window Details

I. Twin Timber Frame



a. Advantages

When looking at the Twin Timber frame method for windows, you can see from the image above that it is still stable, you have a number of advantages that also comes with it, such as:

- It will make sure that it provides excellent insulation for the house
- Soundproofing
- Cheap to maintain
- Lower energy bills
- Stability for window
- Modern aesthetic
- Soundproof
- Eco-friendly
- Easy to fit different designs
- Durable with proper maintenance

b. Disadvantages

The disadvantage of this method consists of:

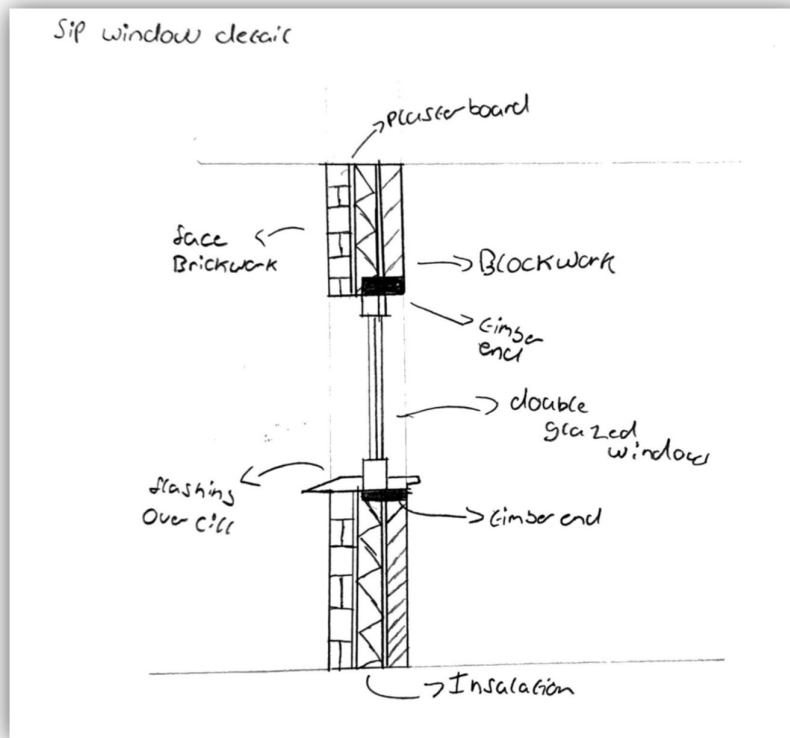
- Quite expensive when purchasing
- Requires a lot of maintenance

- Expansion and compression issues
- Flammable
- Airtight compared to the other methods



Produced by Pinewood Structures for Pinewood Structures, Produced on (19th August 2022) *Why is Embodied Carbon a Problem and Could Timber Framed Housing be the Solution?* [Online] Available at: <https://www.pinewood-structures.co.uk/news/why-is-embodied-carbon-a-problem-and-could-timber-framed-housing-be-the-solution/> [Accessed 23rd April 2025]

II. SIP



a. Advantages

Furthermore, some of the advantages to this construction methods are:

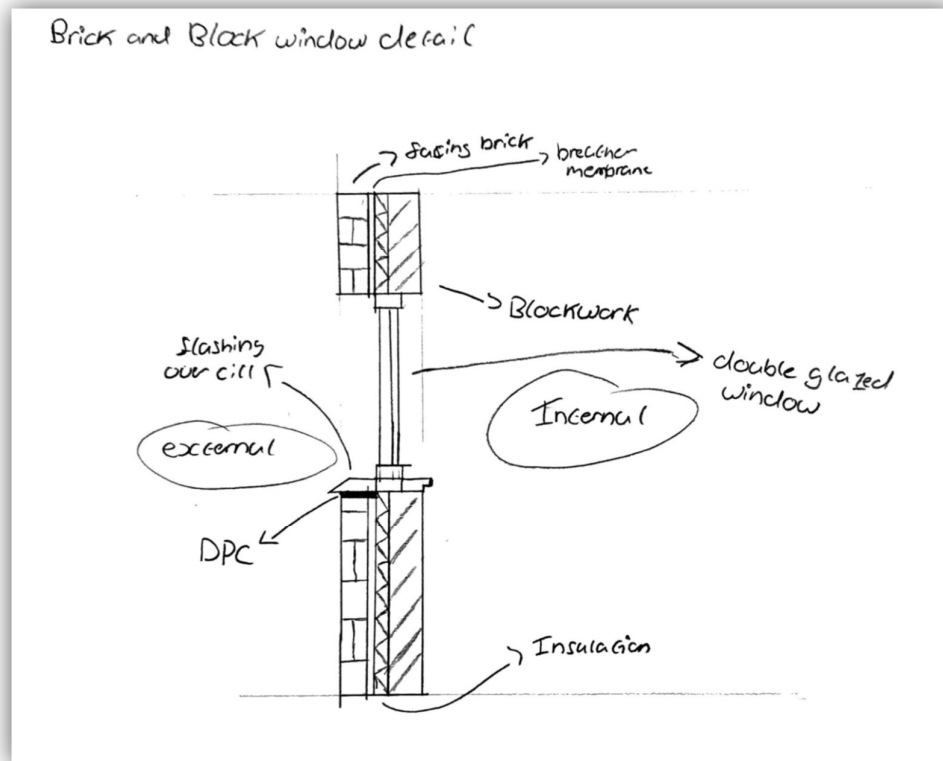
- It can be quick to install compared
- High energy efficiency
- Environmentally friendly
- Timber end for stability for the window
- Soundproof

b. Disadvantages

When looking at the disadvantages of this method they include:

- They can have a high initial cost
- High cost to maintain
- Without the timber end there would be no support for the window
- Transportation costs
- Requires skilled labour
- Limited availability

III. Brick & Block



a. Advantages

This method in the drawing above has some unique advantages such as:

- The Fire resistancy
- Durability
- Strength
- Stability
- Weather resistant

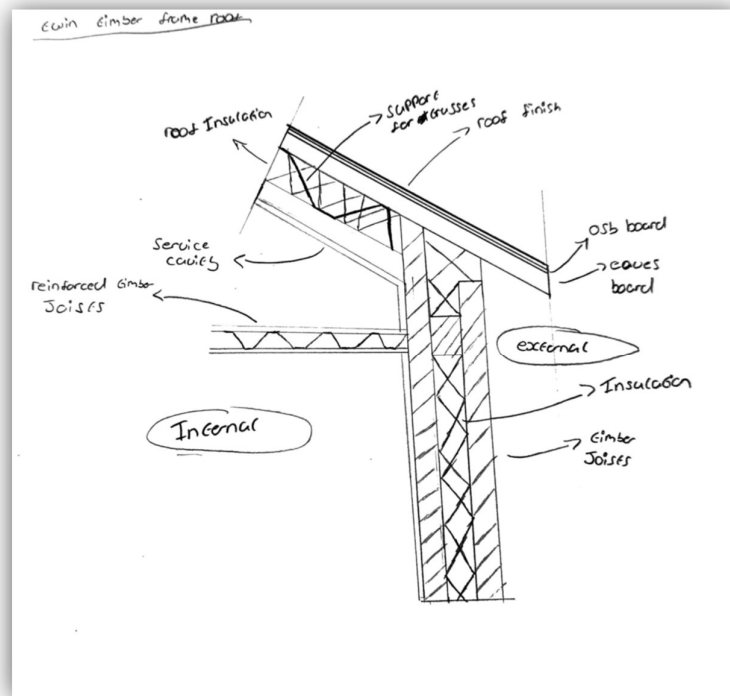
b. Disadvantages

The disadvantages of this method can include:

- Requires precise labour
- Maintenance
- Potential leaks
- Increased costs
- Installation complexity

4. Roof Details

I. Twin Timber Frame



a. Advantages

Moving onto the roofs there is many advantages for a twin timber frame roof, this consists of:

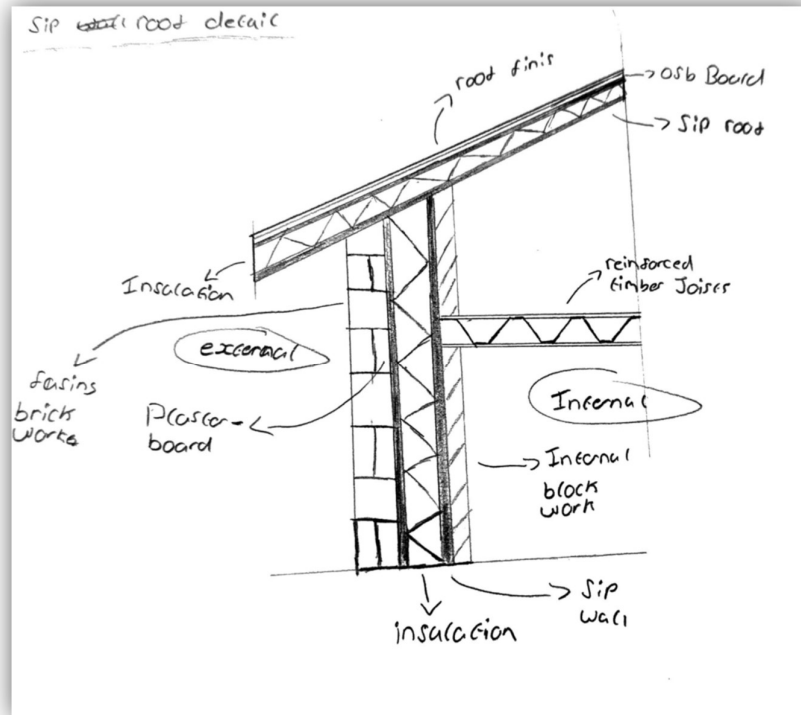
- Waterproof with correct maintenance
- Unique aesthetic
- Design flexibility
- Quick assembly
- Eco-friendly material

b. Disadvantages

The cons of twin timber frame roofs can include:

- Insect infestation
- Costs
- Size restrictions
- Flammable
- Skilled labour
- Regular maintenance

II. SIP



a. Advantages

The advantages that come with SIP Roofs consist of:

- High Insulation
- Sound insulation
- Very good quality
- Fast installation
- Environmentally friendly

b. Disadvantages

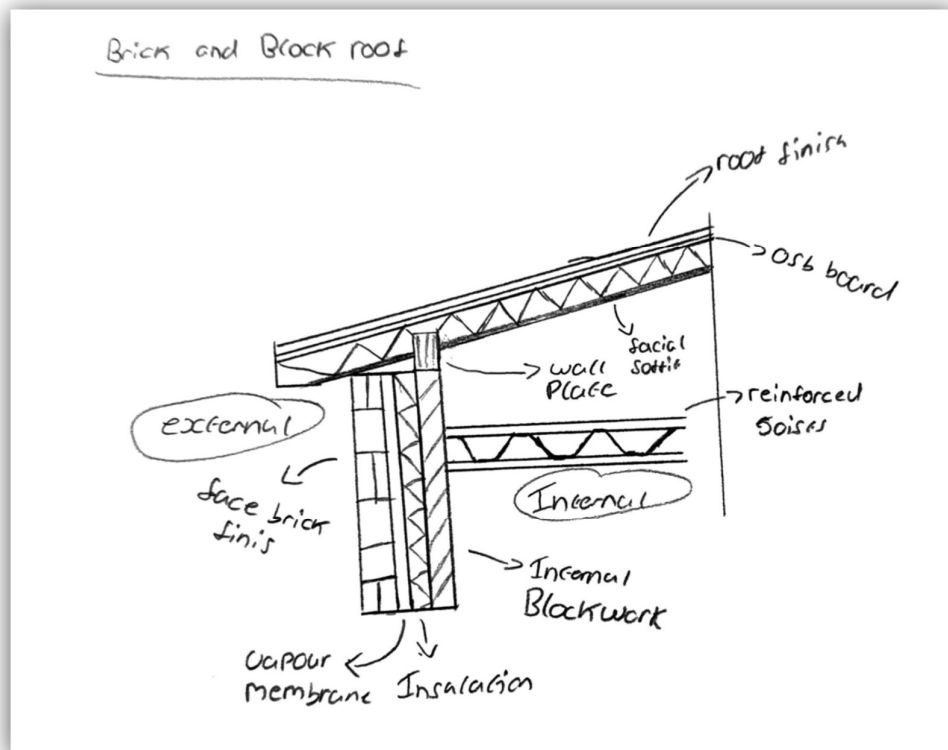
There are many different disadvantages for SIP roofs, such as:

- Electrical services
- Moisture damage
- Flammable
- Design Limitations
- Sealing



Produced by Premier SIPS for Premier SIPS, Produced on (19th February 2024) *No More tape Measures: The Simple Process of SIPS Installation* [Online] Available at:
<https://sips.premierbuildingsystems.com/blog/how-easy-is-it-to-install-structural-insulated-panels>
 [Accessed 23rd April 2025]

III. Brick & Block



a. Advantages

This method is ideal for:

- Durability
- Strength
- Aesthetic appeal
- Energy efficiency
- Resistant to pests
- Long lifespan
- Low maintenance

b. Disadvantages

Where there is up there is down the method can also have a number of disadvantages this includes:

- It has a high cost
- Complex installation
- Heavy weight
- Difficult to repair
- Stains due to moss and algae

5. Comparative

Therefore, in each of the construction methods shown above they all have a similarities and differences. Twin Timber frame construction ideal for its stability especially when engineered correctly. SIPs on the other hand offer high strength to the weight ratios in the building while brick and block is ideal for its compressive strength. It is highly known for its solid long-lasting structure and resistant to different climates and not as flammable as the other construction methods.

Furthermore, when it comes to insulation the SIP construction is excellent for compared to the twin timber frame and the brick and block construction. In some instances, brick and block will require and extra insulation to meet the modern energy standards. This then leads into the speed all construction methods require skilled labour, but SIP has the fastest construction to completion time. The twin timber frame it might take a little longer than the SIP as it requires precise assembly which can extend the process. This method is faster than the brick and block as it this is more of a heavy method and can waste the labourers energy and can't be completed using a machine. When it comes costs timber frame can be very expensive, the SIP can have very decent costs and brick, and block can be very cheap compared to the other construction methods.

Therefore, twin timber frame can have a low moisture difference and needs maintenance to maintain it. If SIPs are not properly sealed it can create a lot of moisture entering into the building. When it comes to brick and block, they can succeed in this section as normally you can put damp proofing material down to help. Each of the construction methods can be long lasting with the correct maintenance brick and block also is ideal for the longevity as this type of construction was made to last. SIPs and Twin timber frame will need a lot of maintenance for it to last a long time.

6. Conclusion

In conclusion, I think the construction methods that you have picked out are great for a 2-storey domestic building. But there is 1 out of the 3 that I think would be the better fit. This method is the Twin Timber Frame method, as it can be faster than the brick and block whilst still being durable and to still hold its strength. This method can be quite popular for this type of building, it will create the best environment for yourselves or whoever buys it. Due to the strength of this method, you can create large open spaces in the building that will create a more modern aesthetic. If you like the look of offsite construction, I will highly recommend modular construction as it is known for being very fast and very high quality compared to the other offsite construction methods.