Unit 202: Changing practices over time

# Worksheet 3: 21st century construction techniques (tutor)

**Task 1**: Defining sustainability

1. Without using the internet, define sustainability in 20 words or less.

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1. Explain what is meant by embodied energy in relation to construction materials.

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1. Fill in the missing words using the list of words provided.

Energy efficiency and embodied energy are critical for achieving the zero-carbon target in construction. Energy efficiency involves designing buildings that minimise energy consumption through efficient systems and technologies. This reduces carbon emissions and offers environmental sustainability. Embodied energy refers to the energy consumed throughout a building's life cycle, including materials extraction, manufacturing and transportation. By choosing low-embodied-energy materials and sustainable construction practices, the carbon footprint of the building can be minimised. By integrating energy efficiency and considering embodied energy, construction projects contribute to the goal of zero carbon emissions, promoting cost savings, reducing reliance on fossil fuels and creatingenvironmentally friendly built environments.

**Task 2:** The Well-being of Future Generations (Wales) Act 2015​

Fill in the gaps using the words provided.

The Well-being of Future Generations (Wales) Act 2015 is a law in Wales that aims to promote the well-being of present and future generations. It requires public bodies, including those in the construction industry, to consider the long-term impact of their decisions and take actions that contribute to the Act's well-being goals. In relation to the construction industry, the Act emphasises public projects, requiring projects to be designed and executed with sustainability in mind. It promotes collaboration and integration among different stakeholders, including local communities, and encourages long-term thinking to future-proof construction projects. The Act also outlines well-being objectives that public bodies, businesses and organisations, including construction organisations, must work towards, such as sustainability, health, equality**,** prosperity and resilience. Construction companies involved in sustainable development need to report on their progress towards achieving the well-being goals, ensuring accountability and transparency. By aligning their activities with the Act's objectives, the construction industry can contribute to a more sustainable and prosperous future for Wales and its future generations.

**Task 3:** Answer the following true or false questions on the Well-being of Future Generations (Wales) Act 2015.

1. The Act focuses on the actions of public bodies.

True

1. The Act focuses on building and site safety.

False

1. The Act helps the construction industry contribute to a more sustainable, resilient and prosperous future.

True

1. The Act places a strong emphasis on sustainable development.

True

**Task 4**: Modern Methods of Construction (MMC): Answer the following questions about MMC and construction.

List four different types of MMC used in construction.

1 Volumetric

2 Modular

3 Panelised

4 Precast concrete elements

**Task 5:** Identify five different benefits of off-site construction and explain how these are benefits reduce environmental impact?

1 **Reduced waste**: Off-site construction allows for precise manufacturing of building components, leading to less material waste during the construction process.

2 **Energy efficiency**: Off-site construction enables the use of advanced manufacturing techniques and technologies, leading to higher energy efficiency in the production process.

3 **Lower carbon emissions**: By minimizing on-site construction activities and using more efficient transportation methods for prefabricated components, off-site construction reduces the carbon footprint of the construction process, helping to combat climate change.

4 **Resource conservation**: Off-site construction enables better resource management. By carefully planning and optimizing material usage, it reduces the demand for raw materials, conserves natural resources, and minimizes environmental degradation associated with extraction and processing.

5 **Reduced site disruption**: Off-site construction involves significant assembly and fabrication work done in a factory setting, reducing the need for on-site construction activities. This leads to reduced noise, dust, and disruption to the surrounding environment during construction, benefiting local communities and minimizing environmental disturbance.

**Task 6**: 21st century construction technology

Read the following statements on BIM vs traditional processes and decide whether they are true or false. **Circle** the correct response.

1. In traditional design processes, each discipline works independently without sharing information.

True

1. BIM allows for improved collaboration and communication among project stakeholders.

True

1. BIM can help identify and resolve design clashes and conflicts before construction begins.

True

1. Traditional design processes rely heavily on 2D drawings and manual coordination, which can lead to errors and delays.

True

1. Traditional design processes are more efficient and cost-effective compared to BIM.

False

1. BIM enables the creation of detailed virtual models that can simulate construction processes and aid in project visualization.

True

1. In traditional design processes, each discipline works independently with limited sharing information.

True

1. Traditional design processes rely heavily on 2D drawings and manual coordination.

True

1. Traditional design processes rely heavily on 2D drawings and manual coordination.

True

1. Traditional design processes provide a higher level of accuracy and consistency in project documentation.

False

**Task 6:** Identify if the following statements relate to either traditional or modern surveying methods. Circle the correct response.

1. Uses measuring tools like chains, compasses and theodolites.

Traditional

1. Uses GPS, laser scanning and aerial photography.

Modern

1. Has limited accuracy and is more time consuming and labour intensive.

Traditional

1. This method offers greater precision, quicker data collecting.

Modern

1. This method can generate information to be used in 3D and 2D models.

Traditional

**Task 7:** List three potential limitations of current 2D and 3D software.

1 Cost of this software is expensive.

2 Capability and expertise, Some construction software can be complex and require extensive training to use effectively.

3 Lack of real-time collaboration: Many current 2D and 3D software used in construction may not support real-time collaboration among team members.