ENG40

UNIVERSITY OF BOLTON

SCHOOL OF ENGINEERING

BSC (HONS) FACILITIES AND BUILT ASSET MANAGEMENT

SEMESTER TWO EXAMINATIONS 2023/24

SUSTAINABLE TECHNOLOGY AND PRODUCT INNOVATION

MODULE NO: IDCE6003

DATE: MONDAY 13TH MAY 2024 **TIME: 10.00 – 12.30**

INSTRUCTIONS TO CANDIDATES:

This exam paper contains SIX questions

Answer ANY FOUR questions

All questions carry equal marks

Marks for parts of questions are shown in brackets.

This examination paper carries a total of 100 marks.

University of Bolton
School of Engineering
BSc (Hons) Facilities and Built Asset Management
Semester 2 Examination 2023/24
Sustainable Technology and Product Innovation
Module – IDCE6001

1. Introduction to MMC in Facilities Management

Define Modern Methods of Construction (MMC) in the context of facilities management. 5 marks

Discuss the key principles and advantages that MMC brings to the construction and management of facilities. 10 marks

Provide examples of MMC techniques commonly used in the industry. 10 marks

Total 25 marks

2. Integration of MMC and Sustainability

Explore the relationship between Modern Methods of Construction and sustainability in facilities management. 10 marks

How do MMC practices contribute to environmental sustainability, and what are the considerations that facilities managers should take into account when implementing MMC to align with sustainable practices? 15 marks

Total 25 marks

3. Cost-benefits of MMC in Facilities Management

Outline the costs and describe the benefits in comparing traditional construction methods with Modern Methods of Construction in the context of facilities management. 5 mark

Taking into account the drivers and mission of your organisation and its culture, analyse the potential cost savings and efficiency improvements associated with MMC. 10 marks

What challenges might be encountered, and how can they be addressed? 10 marks

Total 25 marks

PLEASE TURN THE PAGE

University of Bolton
School of Engineering
BSc (Hons) Facilities and Built Asset Management
Semester 2 Examination 2023/24
Sustainable Technology and Product Innovation
Module – IDCE6001

4. Smart cities and the role of MMC

Examine and assess the role of technology and robotics in the implementation of Modern Methods of Construction. 9 marks

How can emerging technologies and automation enhance the efficiency and effectiveness of MMC in facilities management? 8 marks

Provide current examples and discuss potential challenges. 8 marks

Total 25 marks

5. Legislation and compliance

Analyse the role of the specifier, client and manufacturer in the adoption of Modern Methods of Construction. 5 marks

Considering the role of the facilities manager in maintaining the asset, how do MMC techniques align with building codes and standards? 10 marks

Discuss any potential legal or regulatory challenges during the lifetime of the asset that facilities managers should be aware of when implementing MMC. 10 marks

Total 25 marks

PLEASE TURN THE PAGE

6. Case Study Analysis

Using the following fictional case study where Modern Methods of Construction have been successfully applied from a facilities management perspective, give details of the specific methods potentially used and analyse the various aspects, identify and appraise the challenges the developer and stakeholders would have faced and the likely outcomes achieved.

Discuss the lessons learned from the case study and provide recommendations for other facilities managers considering similar approaches.

25 marks

Case Study: Pinnacle Heights - A Modern Approach to Student Accommodation

In the bustling university town of Coventry, UK, the demand for student accommodation has surged with the increasing student population. Pinnacle Heights, a prominent property development company, undertook the ambitious project of constructing a state-of-the-art student accommodation facility using Modern Methods of Construction (MMC).

Background:

Pinnacle Heights recognised the need for innovative solutions to address the growing demand for student housing while maintaining sustainability and efficiency. The company aimed to set a new standard in the industry by integrating MMC into the construction of Pinnacle Residences which was a four-story accommodation complex.

MMC Techniques Implemented:

The construction team at Pinnacle Heights embraced various MMC techniques to expedite the project and enhance its environmental footprint. Prefabricated modular units were manufactured off-site, reducing construction time significantly. These units, equipped with cutting-edge smart home technology and energy-efficient features, were assembled on-site like building blocks, minimising disruption to the surrounding area.

CASE STUDY CONTINUES ON NEXT PAGE

PLEASE TURN THE PAGE

CASE STUDY CONTINUED

Challenges experienced:

The design team promised advantages in using MMC and the project encountered challenges typical of pioneering projects. Planning and building regulations were considered in the context of the forthcoming Building Safety Act and Pinnacle Heights had to work closely with stakeholders to ensure compliance. Skills became an issue and locating operatives familiar with MMC techniques posed a challenge, necessitating collaboration with training programs to upskill workers.

Outcomes:

The implementation of MMC at Pinnacle Residences resulted in many positive outcomes. The project was completed 30% faster than a traditional build, showcasing the efficiency of MMC in meeting tight deadlines. The smart home features reduced energy consumption, aligned with sustainability goals and satisfied the certification scheme it was procured against, not least for its environmental considerations.

Lessons Learned:

The Pinnacle Heights team gained valuable insights from the project. Clear communication and collaboration with stakeholders were critical for navigating complexities. The company also recognised the need for continued investment in workforce training to ensure a skilled labour pool capable of handling MMC projects effectively.

CASE STUDY CONTINUES ON NEXT PAGE

PLEASE TURN THE PAGE

CASE STUDY CONTINUED

Recommendations for Future MMC Projects:

Based on the Pinnacle Residences experience, Pinnacle Heights offers recommendations for future MMC projects. First and foremost, comprehensive planning and collaboration with regulatory bodies are essential. Early engagement with the local community and transparent communication about the benefits of MMC can help garner support and address concerns.

Pinnacle Heights concluded that their first use of MMC for student accommodation serves as an inspiring case study. The successful completion of Pinnacle Residences the student accommodation development highlighted the potential of MMC to revolutionise the construction industry, particularly in meeting the demands of fast-paced urban development and forthcoming smart cities.

They considered the lessons learned and subsequent recommendations contribute valuable insights for future MMC projects in the UK and beyond, marking a significant milestone in the evolution of modern construction practices.

END OF CASE STUDY

END OF PAPER