COMMON LEARNING OUTCOMES FOR EUROPEAN MANAGERS IN CONSTRUCTION PART VI

CLOEMC VI
2022-1-PL01-KA220-HED-000087357

Work Package 3

Table of contents for Manuals (WP4 – WP10)

FINAL DRAFT July 2023

INTRODUCTION

Partners of the CLOEMC VI project are:

- Civil Engineering Faculty of Warsaw University of Technology, PL
- Technische Universitat Darmstadt, DE
- Ferrara University, IT
- Gebze University, TR
- Reykjavik University, IS
- Polskie Stowarzyszenie Menedzerów Budownictwa, PL
- Korporacja Radex S.A., PL

RESULTS OF THE PROJECT EXPECTED

WP3. Evidence based learning outcomes (establishing final needs and lists of contents for all manuals). Although initial contents were already recognised by the Partners in previous LdV and ERASMUS+ projects and afterwards with the use of questionnaires and other methods, there is a need for updating (due to the fast-changing economic conditions in EU) and fine tailoring (to sectoral and geographical needs) of detailed innovative contents of manuals – WP4-WP10. These evidence-based learning outcomes addresses modern skills needs of construction engineers and managers, stakeholders and associations in the construction sector, SMEs and companies (construction sector), VET providers, and technical universities, delivering the European solid, reliable and comprehensive pedagogical tool.

M33	DESIGN AND EXECUTION OF FACADES FOR CONSTRUCTION MANAGERS
M34	DIGITAL TWIN IN CONSTRUCTION
M35	URBAN MINING IN CONSTRUCTION
M36	ENVIRONMENTAL IMPACTS OF EARTHQUAKES AND MINING FOR CONSTRUCTIONS MANAGERS
M37	LOGISTICS IN CONSTRUCTION
M38	GREEN TECHNOLOGY FOR CONSTRUCTION MANAGERS
M39	TALENT MANAGEMENT AND FUTURE COMPETENCES OF CONSTRUCTION MANAGERS

WP4. Manual 33 – leader: RADEX / co-leaders: PABM / WUT

TITLE: Design and execution of facades for construction managers
List of potential authors: (see list of authors in the file CLOEMC VI MANUALS ISBN authors editors 29082023.docx – to be developed)

This manual covers:
tall buildings need sustainable and responsive facades to last a long time. Facades define a building and the taller the building the more unique it needs to be as it stands out as a pinnacle in the middle of urban space. The design needs to be unique and sustainable. The most important step is to plan the facade in coordination with the master programme of other building components and sequence of operation.

1. Introduction
1.1. Aim and Scope
1.2. Primary assumptions
2. Facades - basic properties, classification
2.1. Classification of Facades
3.1 Ecological aspects
3. Facades - Basic Properties, Assembly, Preliminary Actions
3.1. Assembly Methods for Facades
3.2. Basic Information, Preliminary Assumptions and Actions for Design and
3.3 H&S issues during the assembly (including falls from heights)
4. Technology of Works
4.1. Preliminary Actions
4.2. Basic Assembly Rules
4.2.1. Accompanying and Temporary Works
5. Assembly of Facades
6. Construction products: Declaration of Performance, CE marking and systems of Assessment and Verification of Constancy of Performance (AVCP)
7. Case studies
8. Bibliography and further reading

WP5. – M34 – leader: UNIFE / co-leaders: WUT / GTU

TITLE: Digital twin in construction
Authors:

Manual will cover:
modern and innovative aspects of construction managers life (e.g., scanning, use of drones, GIS, BIM, IOT, Augmented and Mix Reality).

Table of contents

"A digital twin is a digital representation of real-world entities or processes. Digital twins use real- time and historical data to represent the past and present, and create models to simulate future scenarios".
"A virtual representation of a city's physical assets, using data, data analytics and machine
learning to help simulation models that can be updated and changed (real-time) as their physical equivalents change. Some may consider a digital twin only describing reality (and the history of it), while it is the additional applications that bring the real intelligence and help create the common picture of reality that is the value-added of a local digital twin".

WP6. – M35 – leader: WUT / co-leader: TUDA

TITLE: Urban mining in construction
List of potential authors:

Manual will show in detail the ways of recycling in construction, construction and demolition waste usage.

Introduction
Aim and Scope / Definitions
Basics of the methods, techniques and technologies
Recycling and utilisation of different materials
Hazardous materials treatment
Waste processing / Environmental aspects
H&S in waste management
Economy of urban mining, feasibility
ESG reporting in urban mining
Case studies
Bibliography and further reading

WP7. – M36 – leader: GTU / co-leaders: WUT/RU/UNIFE

TITLE: Environmental impacts of earthquakes and mining for constructions managers
List of potential authors:

Manual will show impact of earthquakes for daily managers job in construction – from designing to maintenance of the building, as well as – specific for mining areas.
1. Introduction
1.1. Risk-associated with earthquakes
1.2. Risk-associated with mining
1.3. Observations From Past Events
1.4. .....
2. Environmental Impacts of Earthquakes
2.1. Earth shaking
2.2. Surface faulting
2.3. Landslides
2.4. Liquefaction
2.5. Tsunamis
2.6. .....
3. Environmental Impacts of Mining
3.1. Ground effects on structures
3.2. Environmental issues (Air quality, water quality, noise level, deforestation, etc.)
3.3. Mitigation of mining-associated impacts
3.4. .....
4. Resilience to Earthquakes
4.1. Introduction
4.2. Effects of earthquakes on various structural systems
4.3. Basics of seismic design
4.4. Innovative methods for mitigation of seismic risk
4.5. Performance-based Design Approaches
4.6. Seismic Retrofitting
4.7. .....
5. Structural Health Monitoring
5.1. Basic principles of structural health monitoring
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5.2. Historical buildings
5.3. Modern buildings
5.4. Infrastructure systems
5.5. -----
6. Management Operations in Seismic and Mining Regions
6.1. Disaster management (Pre- and post-disaster)
6.2. Logistics
6.3. Planning
6.4. Health and safety principles
6.5. Implementation of earthquake-resistant construction projects
6.6. .....
7. Case Studies
8. Conclusions and Recommendations

WP8. – M37 – leader: TUDA / co-leaders: WUT / GTU

TITLE: Logistics in construction
List of potential authors:

Construction logistics has been identified for some time as one of the success factors in the realisation of construction projects and is therefore of outstanding relevance for construction managers.

1. Definitions
Logistics
The planning, execution and control of the movement and supply of people and/or goods and the supporting activities related to that movement and supply within a system organised to achieve specific objectives.
Construction logistics
Construction logistics is the provision, transfer and transfer control of elementary factors such as labour, resources, materials, data and information for the transparent, effective, efficient and sustainable realisation of construction projects. It includes construction logistics planning services and construction logistics execution services.
...
2. Process model of construction logistics
2.1 Construction logistics initiation
2.2 Construction logistics planning
2.3 Construction logistics organisation
2.4 Construction logistics implementation
2.5 ...
3. Attributes of construction logistics
3.1 Site security and safety services
3.2 Supply systems (electricity, water ...)
3.3 Waste management (waste water, recyclables, waste materials...)
3.4 Transport organisation within the construction site
3.5 Space management of construction site facilities
3.6 Container management
3.7 Lifting equipment
3.8 Communication
3.9 ...
4. Construction logistics organisation
4.1 Tasks of the building owners/client/investor
4.2 Tasks of the construction companies
4.3 Tasks of construction suppliers: building materials, auxiliary building materials ...
4.4 Lean Construction and Construction Logistics
4.5 ...
5. Sustainability requirements for construction logistics (Circular Economy
6. Construction logistics in the context of digitalisation (BIM ...)
7. Case studies

WP9. – M38 – leader: PABM / co-leaders: WUT

TITLE: Green technology for construction managers
List of potential authors:

1. Introduction to Green Technology in Construction
1.1. Definition of Green Technology
1.2. Benefits of Implementing Green Technology in Construction
1.3. Circular Economy in Green Technology applied in Construction :
1.3.1. Materials reuse and recycling: By using materials that have been salvaged or recycled, construction projects can help reduce waste and conserve natural resources.
1.3.2. Closed-loop supply chains: In a closed-loop supply chain, waste from one process becomes raw material for another, creating a closed loop of materials use and reuse. This can help reduce waste and conserve resources in the construction industry.
1.3.3. Building deconstruction: Rather than demolition, building deconstruction involves carefully removing and salvaging building materials for reuse in future projects. This can help reduce waste and conserve resources, and can also provide cost savings for construction projects.
1.3.4. Renewable energy sources: By incorporating renewable energy sources into building designs, such as solar panels or wind turbines, construction projects can help reduce their dependence on finite resources and create a more sustainable energy system.
1.4. Overview of the Manual

2. Materials and Resources Management in Construction
2.1. Overview of Sustainable Materials
2.2. Recycling and Reusing Construction Materials
2.3. Life Cycle Assessment of Construction Materials
2.4. Case Studies of Sustainable Material Use in Construction

3. Energy Efficiency in Construction
3.1. Overview of Energy Efficiency in Buildings
3.2. Techniques for Improving Energy Efficiency
3.3. Energy Audits and Monitoring Systems
3.4. Case Studies of Energy Efficient Buildings

4. Water Conservation in Construction
4.1. Overview of Water Conservation in Construction
4.2. Techniques for Reducing Water Usage
4.3. Water Harvesting and Reuse Systems
4.4. Case Studies of Water Efficient Buildings

5. Indoor Environmental Quality
5.1. Overview of Indoor Environmental Quality in Buildings
5.1. Techniques for Improving Indoor Air Quality
5.3. Lighting and Daylighting Design
5.4. Case Studies of High-Quality Indoor Environments

6. Site Development and Land Use
6.1. Overview of Sustainable Site Development
6.2. Techniques for Minimizing Site Impact

6.3. Green Landscaping and Stormwater Management
6.4. Case Studies of Sustainable Site Development

7. Implementation and Best Practices
7.1. Steps for Implementing Green Technology in Construction
7.2. Barriers to Implementation and How to Overcome Them
7.3. Best Practices for Implementing Green Technology
7.4. Case Studies of Successful Implementation

8. Conclusion
8.1. Summary of Key Points
8.2. Future of Green Technology in Construction
8.3. Final Thoughts and Recommendations.

WP10. – M39 – leader: RU / co-leaders: WUT/GTU/PABM

TITLE: Talent Management and Future competences of construction managers.
List of potential authors:

The manual shows new trends, coming slowly but surely to construction industry: volatility, uncertainty, complexity and ambiguity (VUCA), staff development.

1. INTRODUCTION
2. The concept of talent
2.1. What is talent?
2.2. Talent in the construction industry
2.3. Skills, competences and talent
3. Talent management in the construction industry
3.1. What is talent management?
3.2. The purpose of talent management
3.3. Overview of the talent management process
3.4. IT systems supporting talent management
3.5. Ethical aspects of talent management
4. Talent management and strategy in the construction industry
4.1. Talent management and projectivisation
4.2. Talent management and organisational strategy
4.3. Talent management and governance framework
4.4. Talent management and project management
5. Identifying talent in the construction industry
5.1. The talent management process
5.2. Participants in the talent management process
5.2.1. Identifying talent (within and without)
5.2.2. Attracting talent
5.2.3. Talent acquisition and selection
6. Talent development in the construction industry
6.1. Talent management vs human resources management
6.2. Talent management with coaching
6.3. Talent management with mentoring
6.4. Talent management with training
6.5. Talent management with on-job learning
6.6. Talent development with the CDIO model
7. Keeping talent in the construction industry
7.1. Talent leadership vs talent management
7.2. Some reasons why talent leaves the organisation
7.3. Retention strategies for talent management
7.4. Maintaining talent loyalty
7.5. Maintaining talent commitment (The “golden chain”)
7.6. Maintaining motivation
7.7. Opportunities for carrier development
7.8. Work-Life balance
8. Special issues related to talent management in the construction industry
8.1. Talent management and performance management
8.2. Talent management and altruism and meaning
8.3. Talent management and mindfulness (e.g. SCARF)