VIRTUAL DESIGN AND CONSTRUCTION APPLICATION DURING THE BIDDING STAGE OF INFRASTRUCTURE PROJECTS

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AGENDA

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- Introduction
- The bidding process and its challenges
- Virtual Design Construction
- Case Studies
- Results

INTRODUCTION

- Increasing interest in applying VDC concepts in the AEC industry
- Lack of successful implementation strategies
- Focus on construction stages
- Gap concerning bidding stages
- VDC term was defined by the Centre for Integrated Facility Engineering at Stanford University
- The theory dates back to 2001

QUESTIONS

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- How can VDC be implemented during the bidding stages of infrastructure projects?
- What are the benefits of implementing VDC during the bidding stages?
- What are the barriers against it?

LITERATURE INPUTS

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- **Collaboration** and **integration** are crucial
- **Standards and templates** promote promptness, flexibility and reliability
- **BIM functionalities** in preconstruction (rapid generation and evaluation of construction plan scenarios)
- **Collocation** is also advisable to reduce latency and foster knowledge sharing
- The better a project team **understands the purpose** of a project, the better the final performance should be

THE BIDDING PROCESS

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- Characteristics:

Interpretation of 2D documents

Incomplete / inaccurate information

Manual data treatment

Cost estimate

- Results:

High uncertainty levels

Experience-based system

Time-consuming process

Error-prone process

CASE STUDY #1

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- Bidding of a bulk terminal
- No 3D nor BIM model inputs from the Owner
- Designers 500km away of the bidding team – videoconferences for "collocation"
- Training
- Modelling guidelines
- Workflow design workshops

CASE STUDY #1

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- Results:

First versions of VDC application workflow
First version of BIM modelling guidelines
Conception of different planning scenarios

The model did not comply with all the guidelines (Example: model breakdown structure was different from work and planning breakdown structures)
Issues when converting the IFC model (interoperability)
Difficulty in assessing metrics

CASE STUDY #2

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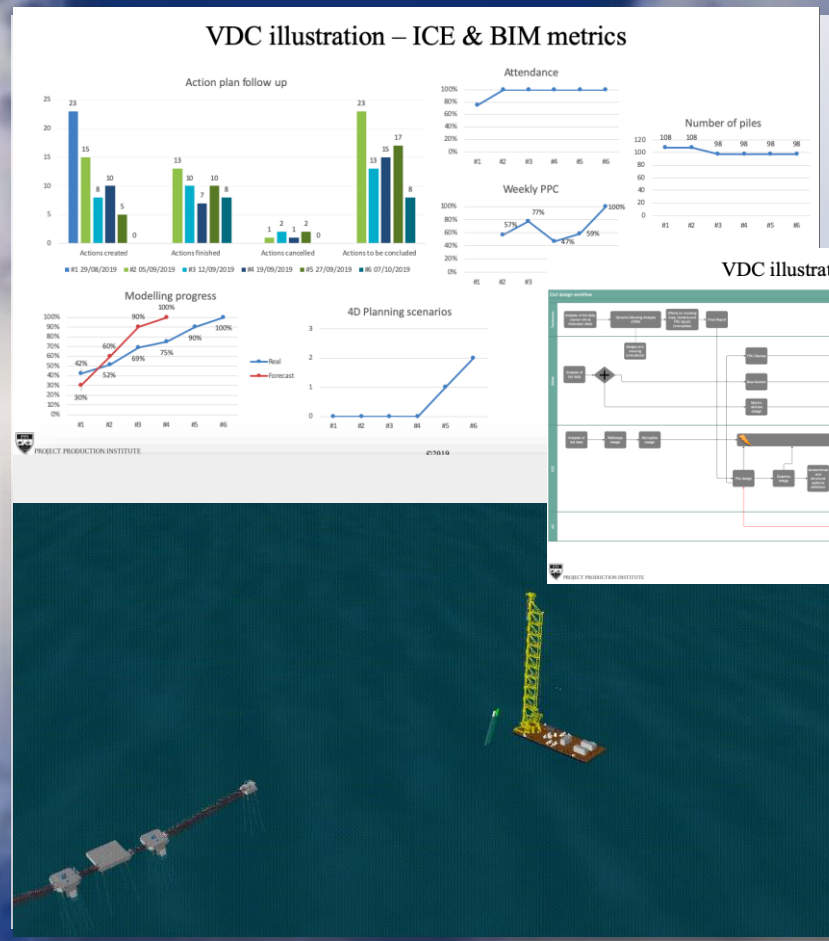
- LNG Terminal
- 2 different design companies subcontracted to do the modelling
- Use of case study #1 workflow and BEP templates
- Discussion of the metrics during the ICE sessions
- Different 4D planning scenarios



CASE STUDY #2

- Results:

Faster definition of modelling requirements (due to the use of the template and previously designed workflows)

6 ICE sessions performed

Metrics assessed and reviewed during the ICE session

Maturity gains

No bad results!

RESULTS

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- The tight schedules of the bids **did not prevent** VDC implementation
- Templates, workflows and standards **do facilitate** VDC implementation
- The review of metrics **was crucial** to a better alignment and a shift in performance (for the better)
- Other benefits: clearer understanding of the process and deliverables, as well as integration of the teams
- Challenges: Cultural change needed and interoperability

THANK YOU!

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