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

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AGENDA

- 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

• 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?
• 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

• Characteristics:
  - Interpretation of 2D documents
  - Manual data treatment
  - Incomplete / inaccurate information
  - Cost estimate

• Results:
  - High uncertainty levels
  - Experience-based system
  - Time-consuming process
  - Error-prone process
CASE STUDY #1

- 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

• 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

- 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

• 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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