Optimisation and Investment Analysis of a Floating Offshore Wind Structures Manufacturing Process Through a Digital Twin Based on 3D Discrete-Event Simulation

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1. INTRODUCTION

SAVING POTENTIAL

- New turbine technology and innovative design options (e.g. 2 blade option, drive train solution, tower concepts)
- Innovative design concepts and use of standards for serial production (e.g. new jacket structures)
- Optimized logistics and new installation concepts (e.g. footprint optimization, new vessel concepts)
- Standards for converter platforms and inclusion of new investors for grid connection (e.g. Anbaric & TenneT)
- Increased control of project and reduction of interface risks (e.g. EPC models/partnership model)
- Innovative O&M concepts and joint use of offshore service stations (e.g. SLAs, asset management strategies)

High potential for cost reduction  Low potential for cost reduction
2. DISCRETE-EVENT SIMULATION

«Modeling and Simulation of Offshore Wind Processes» is one of the Research Lines that make up the Joint Research Unit (UMI) "Shipyard 4.0. The Shipyard of the Future".

This Joint Research Unit is part of the Digital Transformation Plan being carried out at Navantia.
3. BUSINESS CASE STUDY

- 6 workstations in Berths
- 3 workstations in Piers

Load Out
Lower + WEP
Lower + WEP + Upper
Components
Arrivals
Assembly 2 (2-3)
Assembly 2 (1-23)
4. METHODOLOGY

- 15 workstations in Berths
- 8 workstations in Piers
5. EXPERIMENTAL RESULTS

➢ Return of the investment in 4 years and 2 months.

TIR = 31.56% (> 30%)
5. EXPERIMENTAL RESULTS

Base Line Model

Investment Model
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