A Generic Discrete-Event Simulation Modelling Framework to Plan and Control Production Systems in Construction

Work-In-Progress

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Detrimental effects of traditional construction management approaches on performance (e.g. heuristic methods, intuition and experience)

Traditional approaches neglect the highly dynamic, uncertain and complex nature of production system in construction.
Applying analytics to make decisions

Discrete-Event Simulation (DES)

- DES is a powerful computer-based operation research modelling approach with proven capabilities to assist decision-making.
Developing a generic DES modelling framework to provide more effective production planning and control in construction
3D visualization
SIMULTANEOUS ASSESSMENT OF PRODUCTION AND ENVIRONMENTAL PERFORMANCE

Total Project Time - TPT (hr), 0-180
Total Carbon Emission - TCE (kg CO2 eq.), 0-25000
Total Machineries Working Time - TMWT (hr), 0-1200
Total Project Cost - TPC ($), 0-26000
Total Machineries Fuel Cost - TMFC ($), 0-7000
Total Machineries Hiring Cost - TMHC ($), 0-19000
Total Fuel Consumption - TFC (lit), 0-9000
Total Carbon Emission - TCE (kg CO2 eq.), 0-25000

Model 1
Model 2
Model 3
Model 4
Model 5
Model 6

Research Significance

- Transparent planning and control of construction operations
- Decision-making in spite of uncertainty and complexity
- Developing customised and reusable solutions
- Unambiguously understanding the logic of production system in construction
- Simultaneous assessment of production & env. performance
- Trade-off analysis between production & env. variables

THANK YOU!

Q & A