Kevin McHugh, Bhargav Dave, Ray Craig
Integrating Lean and BIM Process for Modularised Construction

Commercial development consisting of three single-storey data centres, split into three phases, to be powered by a purpose built 220kV Substation (also part of the campus), on a 95 hectare (Ha) greenfield site in Clonee, Co Meath, Ireland. The 3rd phase of the project required the construction of a third single storey data centre building containing 4 data halls with a gross floor area of 25,400m² and a data capacity of 36MW and in addition, an ancillary administration and office building of 4,360m² and associated parking.
Traditional Methodology

- Approximately 25-30% of labour are MEWP “spotters”
- 25% of available time observed as motion waste. (MEWP movements, up/down & gathering materials)
For the communication ease, entire data centre is divided into four zones namely Zone-A, Zone-B, Zone-C, Zone-D. Each zone has specific number of modules to be installed. Accordingly, the schedule was developed with respect to the zones.
Collaborative Planning Meetings with Integrated Lean and BIM

- Look ahead meetings were held where micro level planning was conducted.
- VisiLean dynamically linked lookahead planning and production control to the 3D model, transforming BIM into a visual planning tool enabling anyone to see at a glance the current build status.
- The challenge was to assign all the makeready details not only to the modules but also to the subprocesses in the module production.
## Quality Control and Validation

**Work allocation**

To the particular organisation member. During the look ahead or weekly planning (final commitment).
Space Management and First Run Studies

Element linking
With the microlevel schedule

Makeready details feeding
Makeready date, location, priority, important documents, quantities, plan, constraints, notes etc.

Schedule elaboration
With the last-planners during phase planning
Trade to Trade Handovers

Execution tracking

Reviewing progress/status in the schedule and model simultaneously.
Reducing Waiting Time – Increase Efficiencies

Update progress (daily)

Complete task

“Alert” set for task

Task stopped
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Conclusions

- CLN1 installation time for Data Hall fit out sequence was 21 weeks
- CLN2 installation time for Data Hall fit out sequence was 16 weeks
- CLN3 installation time for Data Hall fit out sequence was 9 weeks
- Measurable benefits
  - 75% reduction in working at height,
  - 60% reduction in defects,
  - 43% improvement in program efficiency,
  - 45% reduction in labour spend.
- The team was able to reduce transport and congestion on site and improve real-time project transparency.
- Finally, the consistent data collected at the work face helped with continual improvement processes.