A Digital Revolution in Construction: Using Digital Tools in Planning and Executing Technical Construction Projects

Procter & Gamble Mason Business Center Expansion
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• $300 million, 500,000 SF expansion of the largest technical center globally for P&G. Similar to a Life Sciences facility.

• Four buildings being designed and constructed using BIM with a focus on coordination in the construction phase.

• HDR/Jedson Engineering, M+W/AEComm Construction, Jones Lange Lasalle and P&G partnering from conceptual to start up.

• Original schedule was 42 months, now compressed to 36 months.

• P&G has staffed with less than 5 full time personnel.

• P&G’s first project using full scale BIM for Construction & Utilities/Facilities.
Why Owners Need to Drive the Use of BIM

Owners pay the ultimate price for their (stellar or poor) strategies – We must drive rapid learning and productivity to redefine traditional execution processes.

*We want to Lead in our markets* – BIM enables us to anticipate and adapt to our changing innovation environment as well as develop fast track schedules, getting our products to market *FIRST.*
Why Owners Need to Drive the Use of BIM

We want to Reduce Operating Costs so we can Invest in Innovation that Improves our Consumers’ Lives - BIM enables cost reductions throughout the Life Cycle of Assets.
Why Owners Need to Drive the Use of BIM

We want to deliver **Improvements in Safety, Quality and Planning** with **Less Resources**.

#BIMForumED  @Lead_Everyday, @UncleCharlieA
P&G purchased LOD 200/300 from the engineering firms.

The construction strategy was based upon BIM utilization, brought to P&G by the CM team.

Late issuance of MEP scope and the need for trade coordination highlighted the gap between the design detail and the fabrication requirements. This caused a delay in structural and masonry work by 6 weeks. *This was our AH-HA moment!*

Started using 4D with Construction Mgr/Subs to optimize sequence to achieve schedule compression.

We started using BIM/Virtual Reality with subcontractors, leadership and end users to drive an improved understanding on the finished spaces.

Construction is delivering LOD 500.
Importance of Complete Design (LOD) – Our Learning

Coordinate upstream so the focus in construction is on:

• Scheduling to enable focus on Coordination vs Change Management
  • L Building MEP Early in building shafts, penthouses

• Planning to enable the use of the model in construction procurement
  • Drove deeper understanding of scope, cost and schedule
  • Reduced changes in the construction phase by 15%

• Sequencing to enable Lean construction
  • Construction sequencing enabled just in time delivery of materials;
    • Concrete placements, structural steel, precast wall panels, masonry, air handling equipment and room finishes
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4D Virtual Construction Sequence
Planning & Scheduling virtually compressed the construction schedule 15%.

- Simulation completed by construction manager BIM team
- Input from Field superintendents
- Results of simulation optimized sequence and schedule
- Changed field execution elements
4D Virtual Construction Sequence

What changed?

• Established site logistics
• Established shoring plan
• Coordination between steel and concrete
• Optimization of crane locations, movements
2D Presentation of Penthouse AHU and Duct

- Looks open and Accessible
- Bidder gets impression and looks at effort required for Duct Installation
- Doesn’t Consider work of others
Multiple Layers of Duct

- Welded Exhaust Duct
- Insulation
- Sequence and Coordination with Piping
Sequence of Construction is critical

- Trades must be coordinated
- Hangers; Fireproofing; Sprinkler Piping must be coordinated
L Building Penthouse
Benefits of a VDC Room

In Phase 1 P&G **eliminated** the VDC room **due to cost**! Phase 1 Coordination did not contractually include **onsite** BIM Coordination.

**FIRST IMPACT:** We stopped the steel erection for 3 weeks because BIM coordination was behind.

**SECOND IMPACT:** We stopped the critical path masonry for another 3 weeks because BIM coordination was behind due to the gap in LOD between design and construction. **This was our AH-HA Moment!**

The six week delay has continued throughout Phase 1 of the project and used all the schedule float.

The VDC room and onsite BIM coordination was added back into the project for Phase 2 after P&G attended the Fall 2016 BIMForum.
Top of Aerosol Rooms – Coordination was KEY
Benefits of Virtual Reality – Aerosol Lab

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Facilities Operation & Maintenance

In the beginning of the journey......

**Fields:**
- Name
- Barcode
- Serial Number
- Tag Number
- Asset Identifier
- Description
- Location Path
- Warranty
- Manufacturer
- Model Number

Planning on digital construction turnover to deliver future operations and maintenance cost savings.