Reducing Costs & Increasing Efficiencies

Introduction to Digital Twin Technology

September 27, 2018
Capital projects are complex & distributed
Complexity results in rework → unsafe & expensive

- 90% of projects go over-budget
- 17% average schedule delay
- 30% average cost overruns
- Annual industry waste globally: $1.6 T

Case Study: Optimization of well pad construction project

**Problem**

Well pad modules arriving on construction site suffered from quality & fit issues, resulting in schedule delays, rising costs and unsafe conditions.
Step 1: Site reality captured & ingested along with design
Step 2: Components digitally matched with site reality
Step 3: Fit errors detected and corrected prior to shipping
Step 4: Perfect modules arrive on site...
... resulting in an “ikea” fit!

Cost per well pair reduced by over 50%!!
Types of reports / insights available

Actual vs. Plan for selected range (94%)

Quantity by soil type

Progress

Steel Installation Status

16" Pipe Installation Status
The platform ingests plans & reality data via sensors and third-party data adapters.

Algorithms process & analyze ingested data to compare plans against reality, calculate quantities, track progress & identify mismatches.

Global stakeholders access processed data & analysis via web browser and Virtual Reality.

Automatic ingestion of multiple data types & formats.

Plans vs Reality

Progress Tracking

Early Issue Detection

Hyper-collaboration in real time.
### Execution certainty throughout the project lifecycle

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<thead>
<tr>
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<th>Engineering</th>
<th>Fabrication</th>
<th>Construction</th>
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<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>Heavy reliance on incorrect / outdated as-built, prepared manually using tapes, measures and temporary scaffolds</td>
<td>Manual quality checks in the yard, resulting in fit errors and mismatches which are expensive to correct on site</td>
<td>Progress tracking &amp; reporting is delayed by weeks, relying on incorrect information from manual surveys</td>
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<td><strong>Application</strong></td>
<td>Accurate digital as-built created and made available to project engineering &amp; SCM teams</td>
<td>Fabricated components digitally verified with models and existing site reality prior to shipping</td>
<td>Near-real time digital progress tracking &amp; reporting available for all project stakeholders</td>
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<td><strong>Benefits</strong></td>
<td>Eliminate expensive and unsafe site visits, and increase execution certainty on vendor bids</td>
<td>Components fit perfectly on site, reducing cost overruns and schedule delays</td>
<td>Early detection of issues and availability of true progress in near-real time</td>
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Single source of truth for all project stakeholders
Questions?

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