



Time to take decisions



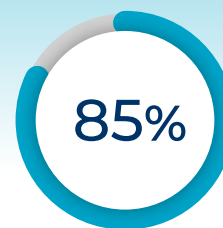
From when the manager went to site to take the point cloud until available results

Costs saved



Estimated cost savings of rework to correct every stair of the project in case all were deviated. \$730 per element

Increase in productivity



Estimated productivity upgrade after subtract spent hours on the same inspection with traditional methods

About the project:

- Location: Madrid, Spain.
- Industry: Office building

- Work phase: Above Ground - Structure
- Data capture method: iPad Pro (Sitescape)

- Size: 232737.27 ft2
- Project value: \$16.5M

The problem

Errors when pouring concrete in the structural phase of a project can represent high rework costs that can be prevented with the use of technological tools. Reviewing the correct construction of formwork can reduce the risk percentage of the project.

Operation process & scope

To ensure that the element's concrete was poured correctly, the site manager inspected the ground floor of the side to:

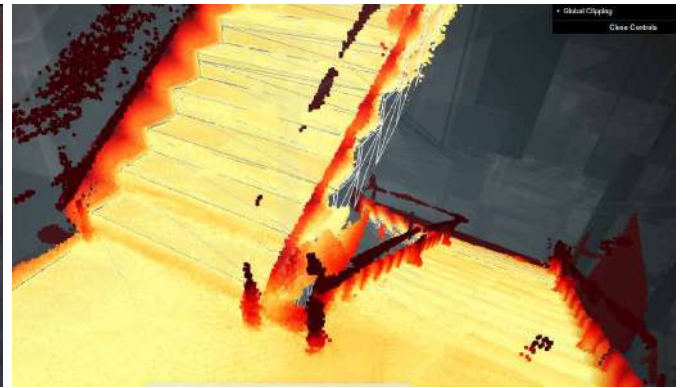
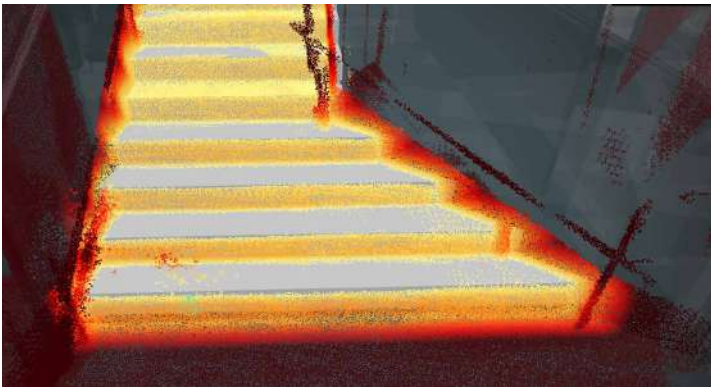
1. Test the quality of the point cloud that contains the concrete formwork before pour-in-place.
2. Upload models (BIM & POINT CLOUD) to execute the inspection on-site.
3. After having results, vary the displacement of the model from solid to wireframe and activate the heat map on the point cloud to highlight the deviated areas.
4. Share the inspection to the involved stakeholders to determine how to proceed.



1st INSPECTION RESULTS

The reality capture method involved non-traditional hardware. Since the inspection was focused on elements that were not part of the BIM model, the used point cloud contained “noise”. That did not present any difficulty for the C2B system in its automatic processing to identify the deviations.

The first inspection was executed on the stairs in the central access tower of the project, between the first and second floor. At the moment of the operation the element’s concrete wasn’t completely poured. Thus, the system was able to confirm the formwork alignment on the constructed element and the remaining part to pour.

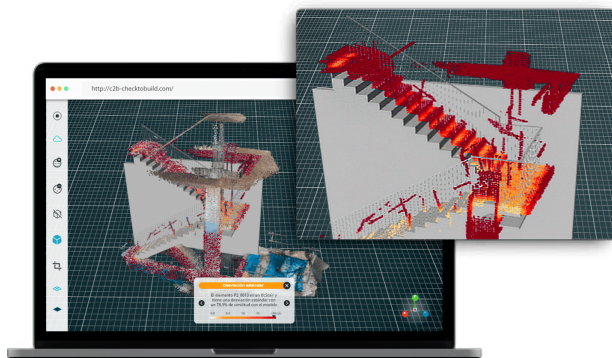


The system has made a very good comparison of the stairs in formwork, without having finished pouring all the concrete. Actually, it is evident that the edges of the steps are detected as being part of the formwork and not the model, but the already poured concrete is perfectly flat

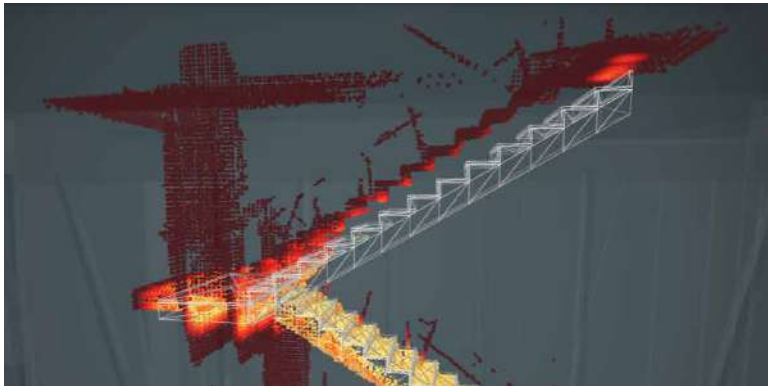
Something similar happens around the side corners of the stairs, where we can observe that the biggest difference between the point cloud and model is in the protruding formwork elements, nevertheless the percentage estimated to be inside of tolerance (which we call “Similarity Percentage”) is of around 97%

2nd INSPECTION RESULTS

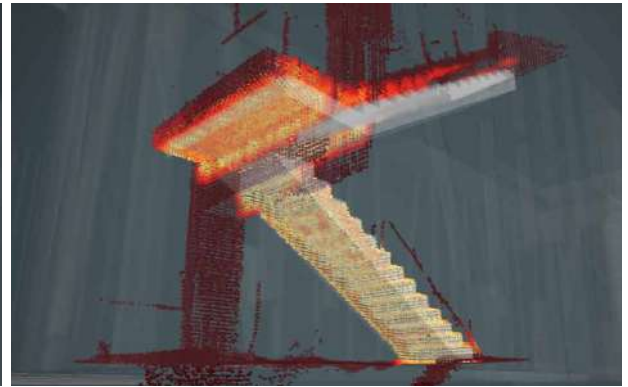
Due to a specific company objective, from the beginning of the project the use of multiple data capture techniques was required. The client provided multiple as-built models (varying the software or hardware used). and uploaded them to CHECKTO-BUILD’s C2B Platform to prove if it offered results at least as precise as if they decided to use other traditional “reality capture” techniques. The second inspection was executed on the stairs element in the west access tower of the project, between the first and second floor. With the difference that on this occasion the element was already poured before being able to verify the formwork.



C2B Platform aligned, self-corrected and cleaned the as-built model to automatically provide results 34h faster than the traditional methods.



The second section of the stair has a higher inclination than that of the model. Its most distant area would represent an extra cost of 40.28ft³ of concrete



The element has 61% of similarity (points inside our tolerance values) with the projected element in the model

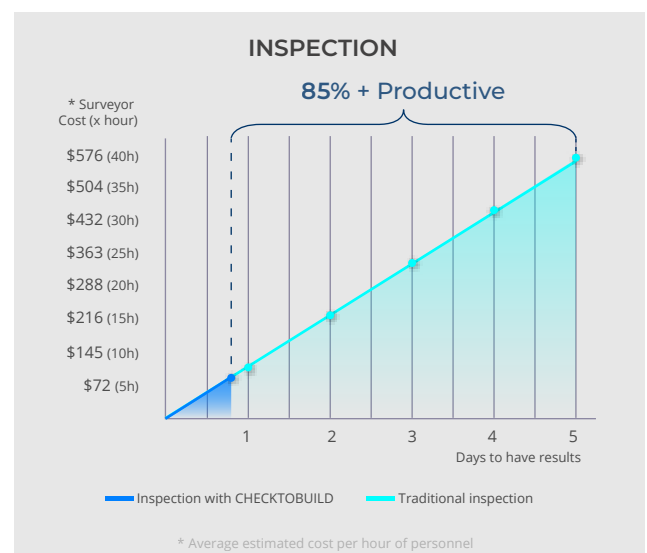
Conclusion

Throughout both inspections the ACERTA's team proved that CHECKTOBUILD's C2B Platform definitely offers results with the same accuracy level as other traditional "reality capture" techniques with the advantage of reduced time to obtain results and take decisions.

Since in the two inspections of similar elements, the use of formwork was necessary, it was concluded that in the case of the second inspection, when the operation was carried out after the pouring, deviations were incurred in the concrete that could have been corrected in advance. As verified in the first inspection case; where the inspection was carried out on the formwork and only 70% of the concrete had been poured, That, allowed the team to verify the correct alignment of the formwork to the model.

Key findings

Even when the Platform is capable of processing data generated with multiple "reality capture" applications, a good quality of the as-built model is only obtained with applications that work in point clouds rather than polygonal meshes, which are not effective for construction inspections that are not mere wide and smooth surfaces.



Want to know more?
We're a message away!

Contact us at info@checktobuild.com

