

Case study
Water utility engineering

Brown and Caldwell

From legacy methods to digital transformation: Brown and Caldwell's Fulcrum journey

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Sean Kilpatrick
Senior Principal Engineer

Challenges



Legacy paper-based processes that included time-consuming – and error-creating – transcription tasks



Workflow coordination and connectivity challenges are encountered when coordinating multiple crews, especially in areas with limited connectivity



Inability to easily incorporate national standards and client requirements into inspection processes



Preserving institutional knowledge



Fulcrum provides a simple, mobile interface that replaces paper forms, streamlining data collection and reducing errors



Fulcrum's integrated GIS mapping and offline data collection capabilities allows for smoother workflow coordination, ensuring that inspection crews can work efficiently without being hindered by connectivity issues or location discrepancies



Fulcrum's customization features enable the rapid creation and deployment of inspection applications, utilizing standardized forms as a starting point to provide guidance and minimize setup time



Fulcrum serves as a repository for critical data, facilitating knowledge transfer and ensuring operational continuity

Background

Brown and Caldwell was founded in 1947 to solve engineering challenges and apply technology to emerging environmental problems. Some 75 years later, Brown and Caldwell continues its mission of “safeguarding water, maintaining infrastructure, and restoring habitats to keep our communities thriving.”

Brown and Caldwell is 100% employee owned, with 50 offices and over 2,100 professionals across North America and the Pacific. Senior Principal Engineer Sean Kilpatrick has been with Brown and Caldwell for over 25 years and was one of the early champions of adopting a SaaS field data collection and process management solution.

Before Fulcrum

Before the switch to mobile technology, the Brown and Caldwell team gathered water infrastructure historical data from record drawings into GIS and exported them to paper map books. Inspection crews would then attempt to locate these structures. “We had a rough idea of where we were going but we found that as many as 10% of the structures were not in GIS or no longer existed, so there was a lot of back and forth. And we were doing it all with paper forms and maps,” recalls Kilpatrick.

Overall, project workflows were large, complicated, had intersecting tasks, and were prone to disruption.



Using Fulcrum on a regional project

As an example of its projects, Brown and Caldwell was retained to help a municipality reduce sewer overflows by creating hydraulic models for its sanitary collections system, using updated location and condition data. In the first phase of the project, Brown and Caldwell located and inspected half of the community's 60,000 manholes, then switched to Fulcrum to complete the inspections in Phase 2.

Working with Fulcrum, paper forms were transferred into a simplified, smooth mobile interface. Dots on a map book were now shown using the integrated GIS mapping, and photos were captured and automatically associated with their corresponding assets. Inspection crews could adjust manhole locations on the map as needed. These updated locations and the pictures stored within the app allowed the following survey crew to do their jobs more efficiently. Crews could work without mobile connectivity, taking advantage of Fulcrum's offline data collection and syncing capabilities.

No paper forms meant no data transcription was required, and there were fewer possibilities for errors, resulting in less time spent doing QA on the data collected.

Brown and Caldwell noticed significant time savings when they transitioned to using Fulcrum. "The aim is to boost efficiency to handle more work and take on additional projects. Comparing our pre-Fulcrum days to now, we've seen a 30 percent reduction in data QA and management time," says Kilpatrick.

Fulcrum in action today – key features and use cases

Since adopting Fulcrum in 2015, Brown and Caldwell's utilization has significantly grown, transitioning from a handful of users to an enterprise-level subscription. Following are a handful of standout features and real-world applications illustrating Brown and Caldwell's utilization of Fulcrum.

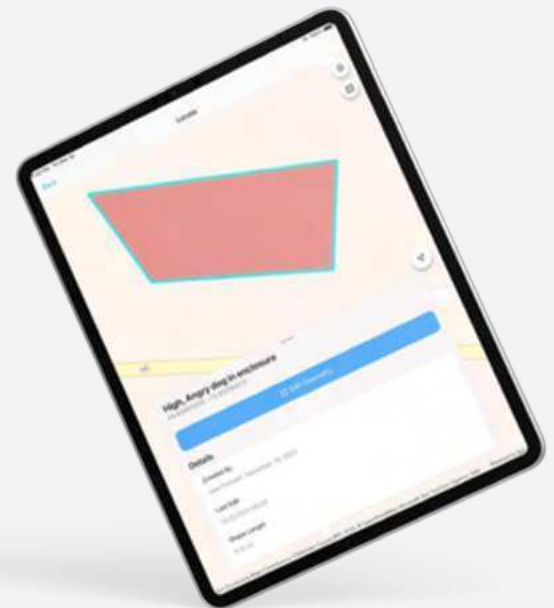
Making the case for digital processes

Engineering clients and contractors often opt for paper-based processes because they are most comfortable with them. Kilpatrick explains, "If a contractor is preparing for a site visit, they must access a digital form, which can take a few minutes,

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and then ensure they have a device to access the form. This process can lead them to believe that paper would be simpler.”

Kilpatrick pushes back against this notion. “Maybe getting a piece of paper is initially easier, but how about the second piece after you capture that data? What do you need to do with it? Are you going to have to go back to the office or back to your home and type it in? And what are you going to have to do to be able to use this data you’ve collected on a piece of paper?”

With Fulcrum, Brown and Caldwell bypasses the “second piece” of what to do with the data written on paper. Once collected, the data seamlessly integrates into its workflow, eliminating the need for additional steps.

Fulcrum as a data management platform

Brown and Caldwell not only uses Fulcrum to collect data in the field but also keep track of workflow. “Fulcrum is a crucial partner for Brown and Caldwell, simplifying data management of many of our projects requiring mobile data collection,” says Kilpatrick. “We’ll direct people out to the field to do inspections, and then they change the status to say it’s inspected. Then we can have a surveyor

go and do a survey, and they can change the status to surveyed.” Using Fulcrum as the single source of truth for the data collected – and the status of project tasks – helps keep everyone on the same page.

Standardization (and customization) to aid compliance

A common Brown and Caldwell task is performing condition assessments that involve both national standards as well as individual company preferences. Using Fulcrum significantly shortens the time it takes to create the application and get started quickly on inspections. “With Fulcrum, we streamlined this condition inspection process with standard forms containing typical requirements so every project manager doesn’t need to start from scratch. We begin with NASSCO [National Association of Sewer Service Companies] guidelines and then incorporate the client’s individual requirements. It lets us minimize the time it takes to get our teams up and running,” says Kilpatrick.

Daily construction reports

In addition to using Fulcrum for site surveys and inspections, Brown and Caldwell leverages the platform for daily construction reports. “We’ll use

Fulcrum for people to record what happened at the site they're at," says Kilpatrick. "Like, I'm at this site, this is who came, these are the trucks that came, this is how many hours we were there,' that sort of thing."

Brown and Caldwell's contractors also use the daily construction reports for their internal processes. "We're using the daily reports as a backup for contractors who are billing," says Kilpatrick. "When the contractors saw the information we were collecting, they thought it was great. They wanted a copy of the report as a PDF which they'd then save to a drive and then put into long-term project file storage." Using Fulcrum, Brown and Caldwell created a workflow so that when a daily construction report is created, it's automatically copied to a SharePoint site where contractors can easily access it. "We love it," says Kilpatrick. "This really helps both our and our contractors' data management processes."

Integrated project delivery

In discussing the integration of project delivery methods, Kilpatrick notes the prevalence of integrated project delivery, particularly in large projects. "A lot of municipalities are moving towards this approach with collaborating between contractors, teaming partners, and engineers aimed at streamlining processes and minimizing finger-pointing," says Kilpatrick. "This strategy is faster, more efficient, and more effectively addresses permitting and administrative tasks to ensure smoother project execution." Fulcrum serves as the system of record for data collection and workflow functions, while also seamlessly integrating across applications, platforms, and companies.

Safety to save – and make – money

Brown and Caldwell has tackled billion-dollar projects using integrated project delivery, all while prioritizing health and safety. With multiple consecutive years incident-free, they consistently outperform industry safety standards. "This helps us get work with safety-minded companies, as well as lower our health insurance premiums," says Kilpatrick. "In fact, Brown and Caldwell is a nine-time



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winner of the National Safety Council Million Work Hours Award, so safety is very important to us.” Fulcrum plays a key role in supporting its safety efforts, facilitating daily reports and tailgate safety meetings.

Leveraging existing knowledge

A consistent challenge with any business is how to use existing knowledge, and not lose it when people move on. Kilpatrick provides an example of surveying water treatment plant assets. “So, who knows this information? Where are all the assets? Maybe there’s a guy named Joe who knows all this stuff, but Joe’s getting ready to retire. So how do we get all that information out of his head into something that can be handed to someone else?” This is where Fulcrum comes in. It serves as a repository for all the information, from the snapshot in time condition of assets to larger inspections for compliance or permitting, or even projects for upgrades and replacements. Using Fulcrum preserves essential data, site conditions, and changes over time, ensuring continuity and efficiency in operations.

Ensuring compliance

In addition to knowledge retention challenges, other issues may arise, such as ensuring compliance with permitting regulations. As Kilpatrick explains, “Part of my job do is making sure that other folks do what they say they’re going to do.”

This involves verifying that parties adhere to their commitments, compliance standards, and other regulations. Often, regular inspections and monitoring are required, ranging from weekly to annual assessments. Consolidating these inspections and monitoring efforts is essential for efficient management, and can all be done through Fulcrum.

Streamlining data collection

Fulcrum also aids Brown and Caldwell in enhancing its data collection processes, providing user-friendly features like drop-down menus and conditional formatting. “For our asset management jobs, we’ll often use three dropdown menus,” Kilpatrick explains. “We’ll rate the equipment’s condition and performance on a scale of 1 to 5. Then the last piece, we’ll put in what we need to do; whether a repair is needed, and what the urgency is. And then all the data is there for next steps.”

Conditional formatting also serves to streamline the data collection process and eliminate the possibility of missteps. “With conditional formatting, whenever there’s an issue, users are prompted to note that they’ve reached out to address it. This way, we keep track of all remediation efforts and make sure nothing slips through the cracks.”

Onboarding

In the process of onboarding new staff, Brown and Caldwell often incorporates Fulcrum to facilitate training and ensure a smooth transition. This may involve various methods, such as weekly check-ins or tailored lessons to address specific tasks. One strategy involves starting with a small pilot area before tackling larger projects, allowing teams to familiarize themselves with the platform and procedures. During the initial stages, extra support and guidance are provided, with frequent checks to verify data accuracy. “For the first day or two, we have the new people sync at lunchtime so we can check in,” explains Kilpatrick. “Does everything look good? Having any problems? No? Great.” This approach minimizes surprises and ensures that staff members feel confident and competent in their job tasks.

Lines and polygons

Brown and Caldwell finds Fulcrum’s in-app lines and polygons feature especially beneficial for horizontal projects, as it allows field teams to directly access, create, modify, and share geospatial lines and polygons within the Fulcrum platform. “Some of the work we do is vertical, inside of plants, where it isn’t as important,” says Kilpatrick. “But on the linear side, we need to know exactly where things are. The lines and polygons functionality is really important to help us do that.”

Being able to use lines and polygons directly within the Fulcrum app is particularly beneficial to help streamline operations. “We love the ability to do sketches right in Fulcrum without having to use a third-party app,” says Kilpatrick. “Keeping everything within the one app is great.”

Brown and Caldwell has even integrated high-accuracy GPS data to further pinpoint location, showcasing Fulcrum’s integration capabilities and advanced GIS functionality.





The Future with Fulcrum

Since adopting Fulcrum in 2015, Brown and Caldwell's utilization has soared from a handful of users to a comprehensive enterprise subscription, boasting over 100 active users, 300 operational apps, and an impressive database of more than 130,000 records. Kilpatrick reflects on this exponential growth, stating, "That's our testimony about the utility of Fulcrum. How much we use it, and how much we expanded our use of it."

This remarkable expansion underscores the indispensable role Fulcrum plays in streamlining Brown and Caldwell's operations, enhancing efficiency, and facilitating data-driven decision-making across its organization.

Achieve operational excellence with Fulcrum

Inspired by Brown and Caldwell's success? Our Fulcrum experts are ready to show you how seamless, accurate, and efficient your field operations can become. **Connect with us today** to get started!