FORNEY vault®

CASE STUDY:
LafargeHolcim

Removing Human Error from Ready-Mix
Concrete Testing
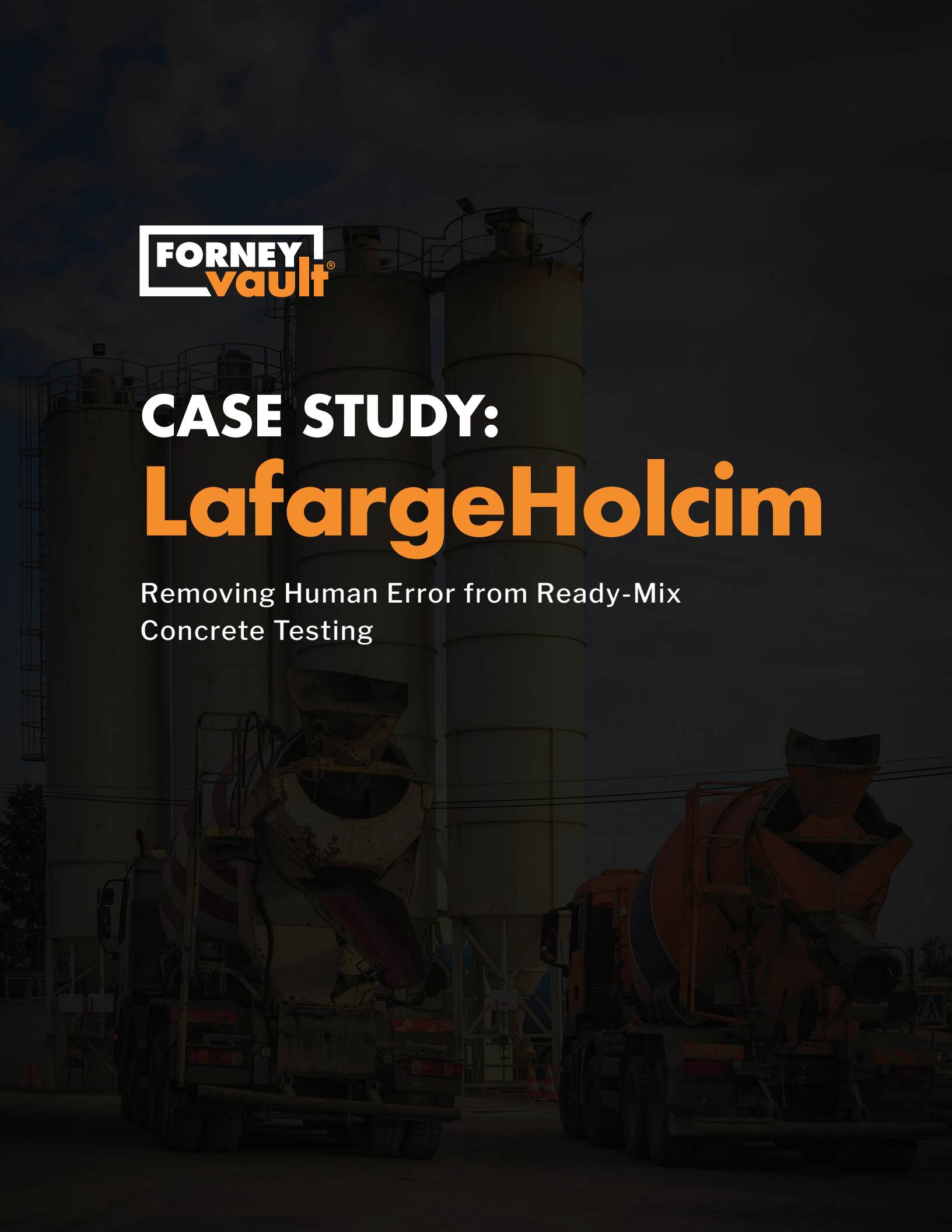
A global ready-mix manufacturer finds a way to cut errors and variance out of the mix.

LafargeHolcim is the global leader in building materials and solutions and active in four business segments: Cement, Aggregates, Solutions & Products and specialized offerings of Ready-Mix Concrete. Their solutions are precision-engineered to meet stringent safety and infrastructure needs for each market and application they service.

Their ambition is to lead the industry in reducing carbon emissions and accelerating the transition towards low-carbon construction. With the strongest R&D organization in the industry and by being at the forefront of innovation in building materials, LafargeHolcim seeks to constantly introduce and promote high-quality and sustainable building materials and solutions to customers worldwide – whether they are building individual homes or major infrastructure projects. LafargeHolcim employs over 70,000 employees in over 70 countries and has a portfolio that is equally balanced between developing and mature markets.

CHALLENGE: MINOR MISTAKES, MAJOR COSTS

> *"In the past, technicians would record results by hand and manually transfer the data. Typing errors, specifically, caused a lot of problems for our operations."*
> *– Javier Castillo*

Javier Castillo had an important job. As the national ready-mix concrete quality coordinator for Holcim Mexico, he and his performance team had to improve the accuracy, efficiency and transparency of ready-mix tests. **And find one solution that could do it.** But before launching a search, they had to study their ready-mix testing process. Knowing which areas needed help would be critical to finding the perfect solution.

They pinpointed three weaknesses:

1. Unreliable specimen assurance.

2. Inconsistent testing.

3. Incorrect data entry.

Unreliable Specimen Assurance

Holcim Mexico's ready-mix concrete segment had no defined method for specimen assurance. Instead, they relied on technicians to take proper care. But this had drawbacks.

Prior to the test itself, technicians would manually label a specimen and store it for curing. Any mistake here could lead to improper testing or even biased results. For example, if the label smudged or the original handwriting was illegible, the next technician in the workflow could misread the ID. This might mix up results with another specimen and skew the data.

Human error, unfortunately, is inevitable. Even the best technicians make mistakes. Trusting that they were assuring and pulling specimens correctly was not enough for Holcim Mexico. They needed a way to *verify* it.

Inconsistent Testing

Holcim Mexico labs utilized manual machines to conduct most of their tests. This was a major bottleneck for technicians, though, as they had other important tasks to manage. Additionally, the test process on manual machines was itself inconsistent and variable because so much of it relied on human operation.

Again, human error is unavoidable. Fatigue from manually preloading and running tests all day will affect people in different ways. Five technicians can produce five distinct tests.

But how accurate can a data set be if the results were generated inconsistently? This was a question Castillo's performance team kept coming back to.

Incorrect Data Entry

The final and most egregious weakness that Castillo's performance team discovered was incorrect data entry.

To start, data entry was a time-intensive process: technicians at Holcim Mexico were spending up to two hours per day manually typing results from their clipboard into SAP for analysis. This was time not spent running tests and completing other projects.

But it wasn't just an opportunity cost. It was also an actual cost. Looking at their KPIs, Holcim Mexico noticed higher costs and traced it back to higher variance, a metric measured through the standard deviation of test results. They homed in on another source of variability: typing errors.

Taken together, unreliable specimen assurance, inconsistent testing and incorrect data entry were increasing the cost of their products. The variability impacted their total cement consumption – the most expensive material used in the ready-mix concrete production process. In order to control costs, improve overall operations and solidify their reputation, they needed to transform their construction materials testing process into something more consistent and reliable.

From research and experience, Holcim Mexico knew that there was only one solution that could solve their problems: automation.

SOLUTION: A PROCESS OF ELIMINATION

> *"We knew right away that we needed automation to mitigate costly errors. What we didn't know, however, was just how automated we could become in other areas of our testing process."*
> *– Javier Castillo*

At first, Castillo's performance team conducted a general search for an automated Laboratory Information Management System (LIMS). But when it came to addressing human error at all stages of the testing workflow, including the before and after, the solutions they found were underwhelming – or too conceptual and lacking real-world applicability.

While LIMS and other construction materials testing software offered great project management or billing value, Holcim Mexico needed a solution that could integrate the entire CMT process. Something that would fill in the broken links and remove potential for human error. Something that even went beyond addressing human error by actually improving human performance. Something that, as of yet, didn't appear to exist.

On top of that, the company wanted a true partner. Someone well-established that was still forward-looking and innovative. Someone like them (Holcim Mexico roots stretched back all the way to 1833).

Through networking, Castillo discovered Forney, LP, the leading manufacturer of testing equipment for the construction industry. Founded in 1916, Forney had deep knowledge and experience in the CMT space, innovating thousands of scientific testing, measuring and processing instruments for the concrete, soils and asphalt industries worldwide. They seemed to understand testing protocols and know the industry's pain points.

That's why, when Castillo was introduced to ForneyVault – Forney's flagship integrated construction materials testing platform – a lightbulb went on.

RESULTS: TRULY AUTOMATED TESTING

> *"Since implementing ForneyVault in Mexico City, we've seen a 95 percent error reduction in our labs."*
> *– Javier Castillo*

Holcim Mexico found what they were looking for. Castillo's team in the Mexico City lab were the first of many Holcim Mexico labs to implement ForneyVault. And they were able to all but eliminate the potential for human error from their ready-mix testing process, from specimen assurance to data analysis.

Because the platform integrates directly with LIMS and other third-party software, lab technicians no longer had to manually type results into their SAP system. Data from the testing machine could automatically transfer to their database for storage, analysis and trends.

But it wasn't just the results workflow – the machines were smarter too.

ForneyVault automatically feeds specimen data to the machine *before* the test. This means the machine "knows" what it's testing. With the preloaded data, it can verify that the right specimen is being tested on the right day according to the right protocol.

Holcim Mexico had transformed their entire testing workflow with one solution. And it produced staggering results.

"Since implementing ForneyVault in Mexico City, we've seen a 95 percent error reduction in our labs, which has translated to a lower variability and allows us to optimize the cost of our products due to lower cement consumptions," explained Castillo. "Plus, our trends over time are more accurate, which means we can continuously improve on our ready-mix offerings."

Also, because test results physically can't be altered or mistyped from machine to database, Holcim Mexico can now confidently *prove* that they really do offer the most consistent and reliable product.

"It is not possible to modify or delete any result. ForneyVault guarantees traceability to all the test results at any time," commented Castillo.

The benefits didn't end there.

"We moved from two hours a day on data entry to two minutes. From three technicians for three machines to *one* technician for three machines. We saved in not just error reduction but also technician optimization and time," said Castillo.

Most of Holcim Mexico labs use automatic machines, allowing for more consistent and repeatable testing. But even the two remaining labs still running manual machines can connect to ForneyVault via the ForneyLink™ touchscreen interface. So, every lab receives the benefits of automated data transfer and undeniable verifiability.

After the success of the Mexico City lab, Holcim Mexico didn't waste any time. The firm immediately deployed ForneyVault in five more labs. And in 2020, they plan on rolling it out to seven more.