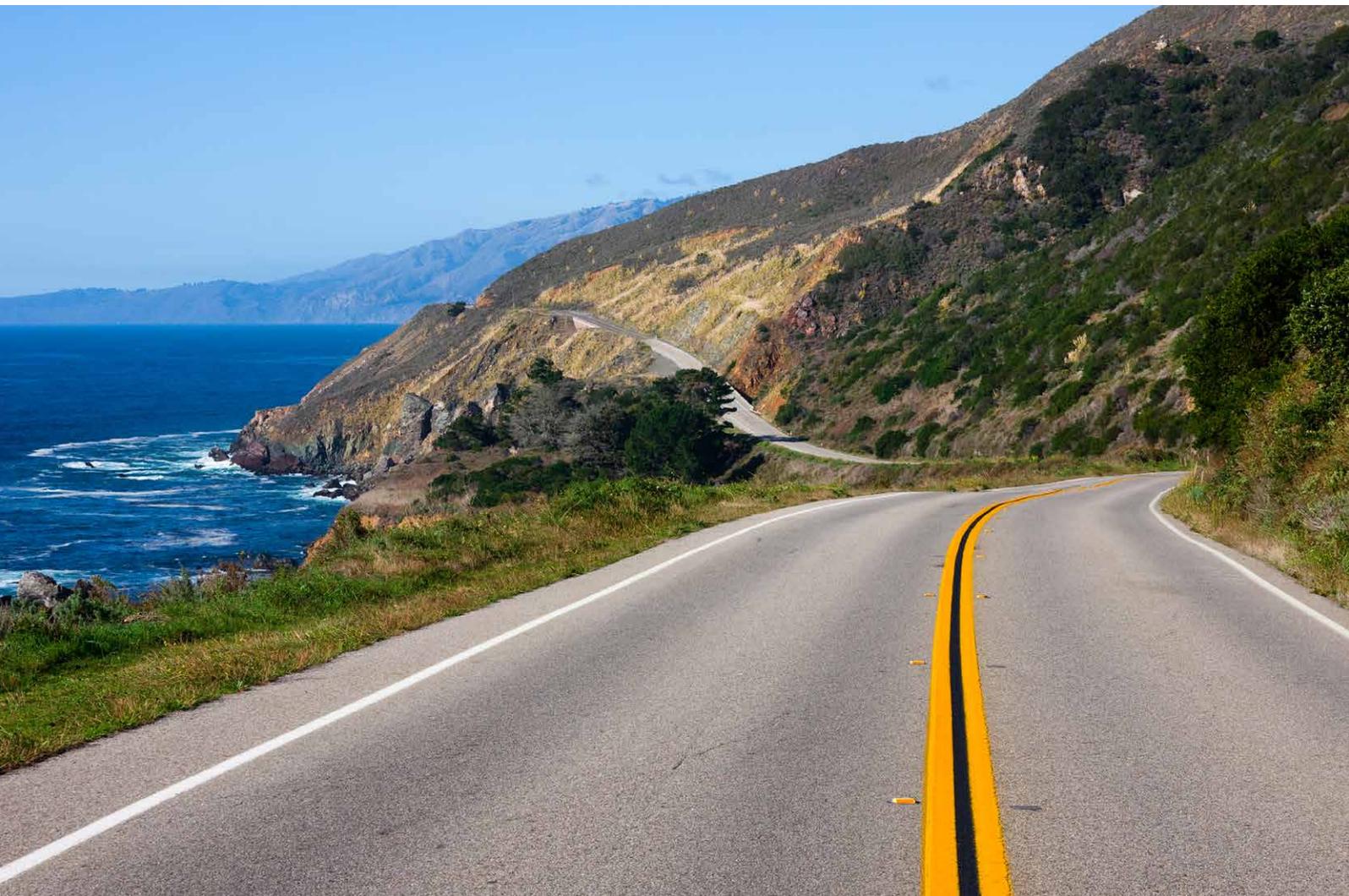


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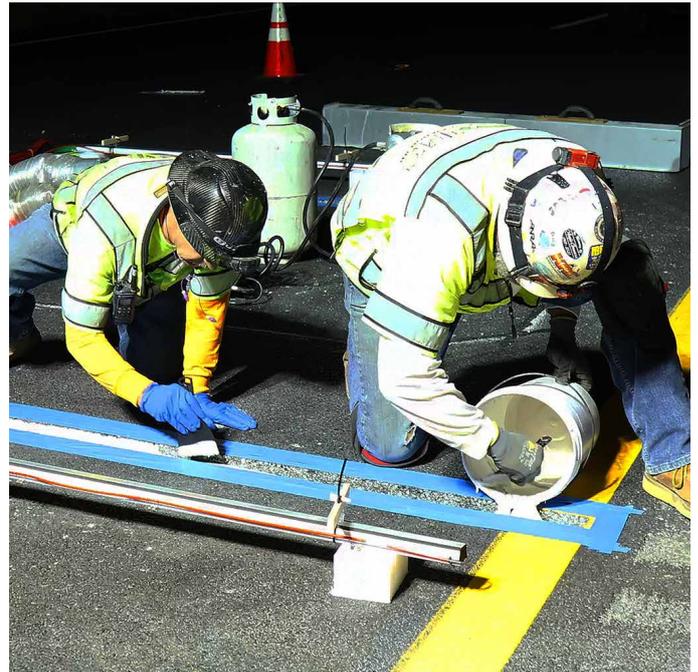
Smooth ride on the data highway

How Californian infrastructure provider Caltrans takes traffic monitoring to the next level with KiTraffic Statistics from Kistler.

Overseeing the road network of the most populated U.S. state is nothing short of a mammoth task. To help with the job of counting and classifying vehicles, the Californian infrastructure provider Caltrans relied on an old low-cost technology. While they were able to make it work, a solution to improve the robustness and data provided by the network was needed. With KiTraffic Statistics (KTS), Kistler provided a system to Caltrans that met both their need for longer lasting equipment and superior data – while still going easy on the budget.

The road network of the Golden State totals more than 50,000 miles of pavement, a distance that would go round the globe more than twice. Caltrans, a state organization that divides the state up into 12 sub-districts, is tasked with keeping this road network safe and reliable. Its core business is to constantly monitor traffic volume in the respective districts and plan the infrastructure accordingly. For years, Caltrans District 3 had relied on equipment that was cost-effective but lagged behind in terms of robustness, longevity and technological performance. The need to update a large number of sites in one project gave Kistler the opportunity to prove their competency along the whole measuring chain.

It all started in San Jose in 2016, when Dean Campbell, Senior Transportation Manager, and Gurdeep Sidhu, Electrical Engineer, met traffic professionals from Kistler at the ITS (Intelligent Transportation Society of America) exhibition. Dean Campbell reported issues with his measuring system in the district which includes the Sacramento area. Again and again, the B/L-piezo cables inserted in the road surface would break after a few years of service. Constant repair work and temporary lane closures were adding additional costs to the program as well as obstructing the flow of traffic. Also, the data management was an issue. U.S. departments of transportation – such as Caltrans – are required to disclose their collected data to the public. Caltrans' existing data management system was meeting the basic requirements but had challenges with data migration into the



The close cooperation between the partners paid off: Thanks to the efforts of PacEx in particular, the project was finished on schedule despite a delay in material supply.

required systems. On top, it provided no 'real-time' traffic information. Lastly, the existing measuring technology was limited to solely counting and classifying vehicles according to their type, e.g. passenger cars, buses, or trucks. For Caltrans to effectively plan maintenance, design roads and keep bridges in good condition, additional data on vehicle loads is critical.

KiTraffic Statistics fits the needs

After reviewing Caltrans' requirements, a Kistler team proposed KiTraffic Statistics (KTS), a solution suited to the needs of the infrastructure planners from the district. The system features unique Lineas Compact quartz sensors installed into the roads in combination with the Kistler Data Logger installed at the road



The Kistler Data Logger is installed at the road site to collect and process data, which is then transmitted to the control center and displayed in a user-friendly interface for evaluation.



The robust KiTraffic Statistics system is easy to install and provides valuable data for effective road planning.

site and offering a user-friendly interface for comprehensive data evaluation. This type of system is able to register traffic volume, classification, and weight by default. As no other Caltrans district had gathered experience with this alternative technology before, Dean Campbell thoroughly assessed the Kistler solution. "The technological superiority of the Kistler solution soon became clear to me. But budget was still a limiting factor," he recalls. "What tipped the scale in favor of KTS was that it comes at a really affordable price. Also, with less maintenance efforts, it will prove to be the more cost-effective choice in the long run."



Dean Campbell, Senior Transportation Manager at Caltrans, thoroughly assessed the Kistler solution, which registers traffic volume as well as vehicle classification and weight.

When the deal was signed in 2019, the project started right away – considering the pressing need, there was no time to lose for Caltrans. They ordered sensor equipment for 294 lanes at 64 sites, to be installed within an aggressive time schedule. "Our top priority was to keep lane closure time as short as possible," Dean Campbell says. To begin with, Kistler ran a thorough inspection of all sites. Jess Helmlinger, Regional Manager N. America – Business Unit Traffic Solutions at Kistler, stresses this inspection: "We needed to know about the quality of the roads, as cracks and bumps, for example, directly influence the accuracy of the data." Where the road spec did not match the requirements for installation, Kistler gave recommendations for repositioning the measuring spots. "After all, we were able to exceed the desired confidence interval of ± 15 percent gross vehicle weight accuracy at all sites. In fact we overachieved with ± 10 percent at all sites despite some challenging road conditions," says Helmlinger.

Reliable partners are key to success

As the project geared up in the spring of 2020, it threatened to be abruptly thwarted by the start of the COVID-19 pandemic. The supply of materials across all industries was delayed, as were many other goods and services. Pacific Excavation (PacEx) was the prime contractor and responsible for delivering the project, including the road installation of the quartz sensors. As Jess Helmlinger remembers: "The project wouldn't have had the same success if it hadn't been for their ingenuity, flexibility, and efficiency."

In response to the supply delays, PacEx pre-assembled the AVC (Automated Vehicle Classification) cabinets in their warehouses instead of on-site. After this preparation, the cabinets were easy to distribute and install in the field. Additionally, PacEx more than doubled the usual size of their installation teams on-site to minimize traffic obstructions and speed up construction schedules. Kistler's easy-to-handle hardware helped them stay on track as well. "Compared to the former thin piezo cables, the Lineas Compact sensors are straightforward to install. It's a standardized process," Jim Paxin, Vice President of PacEx, recalls. Eventually, the project was finished within project time despite the challenges faced in the past two years.

Added value along the whole measuring chain

One of the key strengths of KTS is its seamless integration of hardware and software. Every 30 seconds, data from the roads reach the control center. This gives Caltrans the opportunity to monitor almost in real-time – and to identify peak times and typical bottlenecks. Thus, the results provide a solid blueprint for effective road planning. Other stakeholders such as the public and federal authorities now also gain more value from the data: as required, Caltrans offers full transparency with no extra effort. Thanks to the standards-based open architecture of the Kistler software, data can easily be migrated to Caltrans's proprietary performance measurement system PeMS. Once into the project, additional opportunities to streamline data and make it more easily available were identified. The Kistler team was able to satisfy this additional request utilizing the KTS system.

"The system is robust and provides valuable data, including the weight of the vehicles. This is going to be highly beneficial for us and the public respectively to better understand traffic flows and manage the infrastructure."

Dean Campbell, Senior Transportation Manager at Caltrans

Throughout the entire project, the close cooperation between Kistler and its partners from Caltrans and PacEx has been a key success factor. For the right installation and calibration, Kistler provided more than 100 hours of support as well as training and certification to PacEx workers. "The on-site training has been far superior to anything we have ever dealt with," states Peyton Gastelum, project manager at PacEx. Caltrans staff has also been trained on-site and off-site on the complete KTS system. This gives them the flexibility to check on the installation at any time with no added service costs.

The first KTS sites have been in operation for roughly two years now, and, according to Dean Campbell, Caltrans hasn't experienced any maintenance issues since. "The system is robust and provides valuable data, including the weight of the vehicles. This is going to be highly beneficial for us and the public respectively to better understand traffic flows and manage the infrastructure." Thus, it's no surprise that Dean Campbell's pioneering project has already caught the attention of other districts.

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