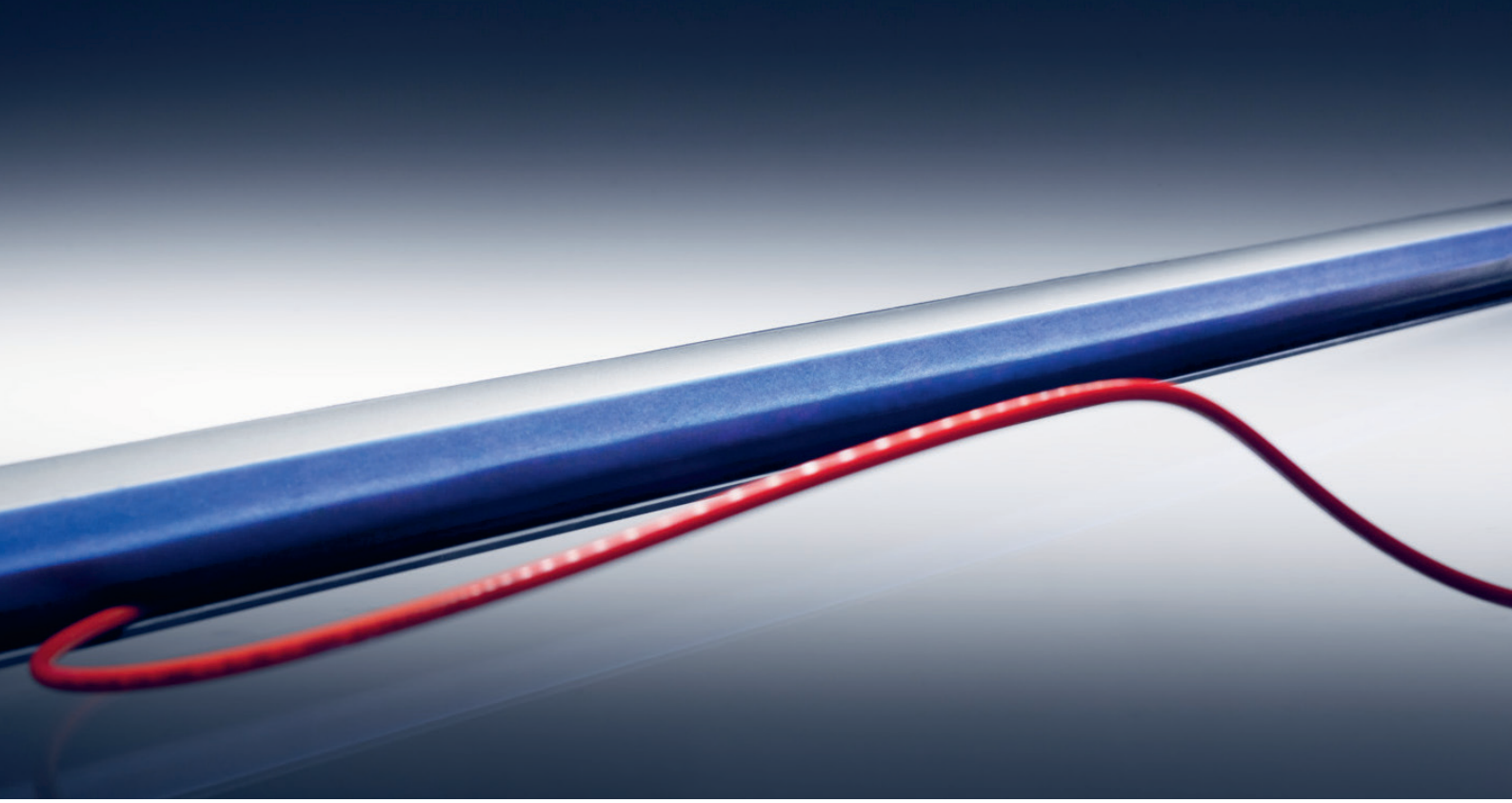
KISTLER

measure. analyze. innovate.

Safe passage across the sea

Weigh In Motion solution from Kistler protects Philippines' new iconic bridge



At the heart of the Weigh In Motion system for CCLEX are Lineas quartz sensors from Kistler – 12 units with a length of 1.75 meters cover a total of six lanes on both sides of the passage over this part of the Pacific Ocean.

The Cebu-Cordova Link Expressway (CCLEX), opened in 2022, is the longest and tallest bridge in the Philippines and has already become a national icon. Indra, a leading global technology engineering company managing the traffic part of this ambitious project, opted for Weigh In Motion (WIM) technology from Kistler: with its Lineas quartz sensors it prevents overloaded vehicles from accessing the bridge, thus optimizing its safety and ensuring its durability.

The Philippines, a south-east Asian island state officially comprising 7,641 islands and home to over 115 million people, is on the rise. Wealth is growing here thanks to dynamic economic development in the vibrant Asia-Pacific region; tourism is booming, and increasing numbers of infrastructure projects aim to bridge the gap between the more highly developed north of the country (mainly consisting of Luzon Island and the capital, Manila) and the less developed south.

> "We are truly satisfied with Kistler as our partner for Weigh In Motion in the CCLEX project. Measurement accuracy is within the specifications for all six lanes, and the WIM system is well integrated into our overall solution – including automatic data transmission."
>
> Esteban Esteso, Project Manager for Transport and Defense at Indra

One such project is the Cebu-Cordova Link Expressway (CCLEX): with a total length of 8.9 kilometers, this elegant bridge construction with its sweeping curves is the longest in the Philippines. The CCLEX connects Cebu City (on the western side) with the small island of Mactan (to the east), where the nation's second largest airport is located – an important hub for the future development of infrastructure in the south of the archipelago. Construction of CCLEX commenced in 2017 and was completed in 2022: following the official inauguration on April 27 of that year, the number of vehicles crossing the bridge is expected to rise to 40,000 per day. With a main span navigation clearance of 51 meters, the CCLEX is not only the longest but also the tallest bridge in the Philippines, allowing most ships to navigate freely in the area.

Complete traffic management – including Weigh In Motion from Kistler

The bridge has four lanes (two in each direction). Crossing the CCLEX requires payment according to vehicle class; the only toll plaza is located on an artificial island just before the entrance to Mactan Island. To optimize monitoring and maximize safety on the bridge, the Philippine authorities specified a complete traffic management system which was installed by Indra Sistemas SA, a leading global technology and consulting company serving the transportation, mobility, aerospace and defense sectors (among many others). Headquartered in Spain, Indra has almost 57,000 employees, a local presence in 46 countries, business operations in over 140 countries, and annual revenue of EUR 3.851 billion (2022). The traffic management system from Indra consists of incident surveillance, license plate recognition, speed measurement and more: all the functions are fully automated and integrated in one control center.

To monitor vehicle loads and prevent overloaded and potentially harmful vehicles from passing over the bridge, Indra opted for Weigh In Motion (WIM) technology from Kistler. The WIM solution is highly integrated into the overall traffic management system: it automatically detects and reports overweight vehicles with loads above 13.5 metric tons per axis (as prescribed by

Philippine law). Once trucks are identified as overloaded, they are directed to the static weighing station at the toll plaza where a confirmation check is performed. The Weigh In Motion technology is based on Lineas quartz sensors from Kistler combined with inductive loops for vehicle presence detection and WIM Data Loggers for data processing – a Kistler solution that has already been installed in over 50 countries worldwide, with a track record of success spanning several decades.

Automatic vehicle measurement and data processing

Kistler's solution for CCLEX comprises two WIM installations, each with features that differ due to local conditions. The western installation is located some distance before the bridge, still within Cebu City, because the long and curved ascent ahead of it is not appropriate for a WIM installation. Four lanes had to be equipped in this case, requiring eight Lineas sensors: two per lane, each with a length of 1.75 meters. They are integrated into the road pavement in a staggered layout, together with eight induction loops for vehicle presence detection. For data processing, all the devices are connected via 40-meter cables to two WIM Data Loggers from Kistler housed in a nearby roadside cabinet.

At the eastern end of the bridge on Mactan Island, a more standard installation was possible: four Lineas WIM sensors, four induction loops and one WIM Data Logger cover the two lanes at the CCLEX exit. All necessary electronic components for the WIM solution – including FEIG loop cards, Data Loggers, cabling and switches – are supplied by Kistler as prewired components on a DIN rail for easy integration into the roadside cabinets.

The Kistler Lineas sensors for the Weigh In Motion installation at CCLEX (Cebu City side) are checked prior to installation.

These also contain connectivity devices and remote control units to connect the WIM system to the overarching traffic management system based on SCADA.

Vehicle data provided by the Kistler WIM solution and automatically transferred to Indra's traffic management system includes:

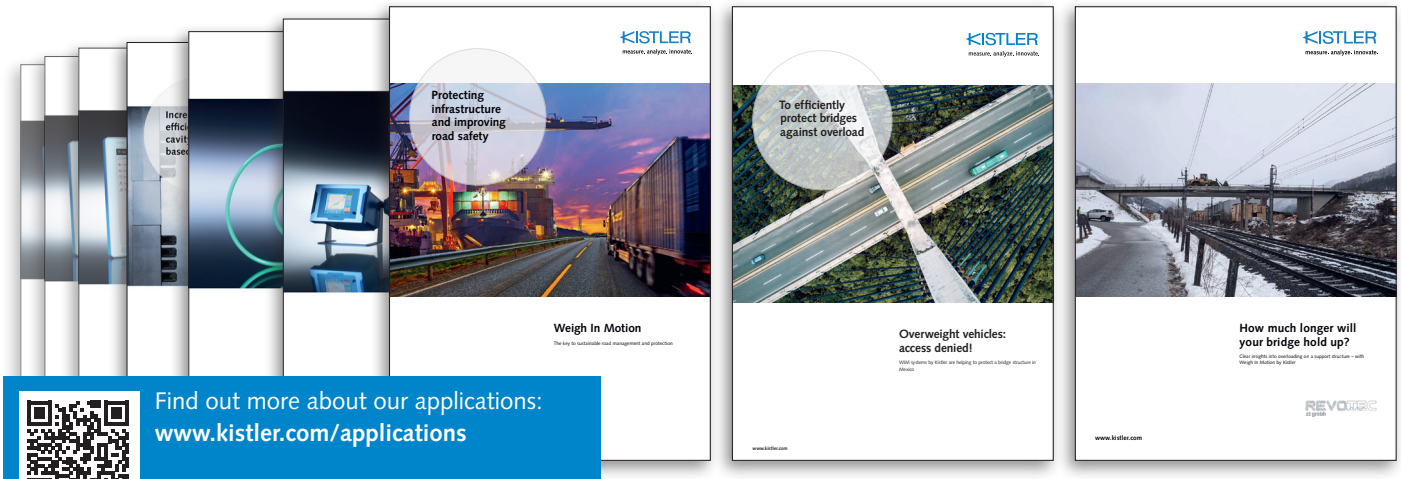
- Gross vehicle weight
- Axle load (0 to 50 metric tons)
- Axle distance
- Number of axles
- Vehicle speed (3 to 250 km/h)
- Vehicle length

Efficient long-term bridge protection thanks to accurate vehicle data

After overcoming initial challenges and completing calibration, the WIM solution is now an integral part of the Indra traffic management system for CCLEX. Technology from Kistler ensures that access for overloaded vehicles is restricted, thus enhancing the bridge's safety and durability while reducing maintenance effort. As Esteban Esteso, Project Manager for Transport and Defense at Indra, comments: "We are truly satisfied with Kistler as our partner for Weigh In Motion in the CCLEX project. Measurement accuracy is within the specifications for all six lanes, and the WIM system is well integrated into our overall solution – including automatic data transmission."

In the course of the CCLEX project, three engineers from Indra were trained and certified by Kistler as WIM installation experts for future projects. In an island state that is experiencing rapid development, it is highly probable that more infrastructure projects will be undertaken – including bridge construction in particular. Esteso again: "We are in close contact with highway and bridge operators in the Philippines, and we will certainly be relying on Kistler Weigh In Motion for upcoming WIM installations."

All Kistler Weigh In Motion components come prewired on a DIN rail for easy installation in the roadside cabinets for CCLEX, which are connected to the traffic management system from Indra.



Find out more about our applications:
www.kistler.com/applications

Kistler Group
Eulachstrasse 22
8408 Winterthur
Switzerland
Tel. +41 52 224 11 11

Find your local contact at
www.kistler.com

KISTLER
measure. analyze. innovate.