

Success Story

Safe and sustainable access to Silicon Island

Bridge protection: Weigh In Motion enables 24/7 heavy traffic enforcement on Penang Second Bridge

The Malaysian trade and technology area around Penang Island gained another vital traffic artery in 2014 with the opening of the Penang Second Bridge. Since 2022, a Weigh In Motion system from Kistler has been providing bridge protection through heavy-duty vehicle measurements in free-flow traffic, delivering accurate data for traffic analysis, maintenance planning, and enforcement against overloaded trucks.

Malaysia, a country made up of two separate territories, has experienced remarkable growth in recent years. Located at the southern end of the Southeast Asia peninsula, with Singapore at its southern tip, Malaysia's western mainland carries the majority of the country's economic and social activity. The eastern part of the country, situated on the island of Borneo within the Indonesian archipelago, is less densely populated and better known for its natural beauty and resources.

Penang Island, located in the far northwest of Malaysia near the Thai border, is a major economic powerhouse in the Asia-Pacific region. With a strong focus on the automotive and 3C industries, it ranks among the country's most important trade centers and is therefore often referred to as "Silicon Island." A key factor in Penang's rise as a regional technology hub was the opening of the first Penang Bridge in September 1985. With a total length of 13.5 kilometers, it established a direct traffic connection between Peninsular Malaysia and the island. Since then, companies from around the world have settled in Penang. Today, the greater metropolitan area known as the George Town Conurbation, with George Town as the capital of Penang and a UNESCO World Heritage Site since 2008, is home to nearly three million residents.

Automated traffic enforcement for Penang Second Bridge

To further support regional development and reduce the traffic load on the first Penang Bridge, construction of a second bridge began in 2008. Officially named the Sultan Abdul Halim Muadzam Shah Bridge, it was inaugurated in March 2014. With a total length of 24 kilometers, including 16.9 kilometers over water, it is one of the longest bridges in Southeast Asia and ranks among the world's largest sea-crossing bridges. Designed as a dual three-lane cable-stayed structure with two lanes for cars and one lane for motorbikes in each direction, and equipped with anti-earthquake elements, the bridge connects the southern part of Penang Island, where Penang International

Airport is located, with the city of Batu Kawan on the mainland. In 2022, a Weigh In Motion system from Kistler was installed as part of a national traffic monitoring and enforcement initiative.

24/7 overloaded truck enforcement with Weigh In Motion

The Weigh In Motion system plays a central role in monitoring increasing heavy traffic on the bridge and is strategically important for ensuring long-term availability and effective maintenance. It delivers real-time measurements of axle loads, gross vehicle weight, and vehicle speed, while enabling profiling and classification without disrupting traffic flow.

The system relies on Lineas quartz sensors and piezoelectric technology. Embedded directly in the road pavement, the sensors provide accurate, continuous measurements under all traffic and environmental conditions. Penang's tropical climate, characterized by high temperatures and humidity, poses challenges for the reliability of many technical systems. Despite these conditions, the stability and availability of the Kistler Weigh In Motion solution have met operational expectations, even in hot, humid, and corrosive marine environments. This performance demonstrates the robustness of the sensor design.

Installation, calibration, and system integration were carried out by certified local Kistler partner Quatriz System Sdn Bhd, ensuring full compliance with industry standards and government specifications. Hussin bin Mohammad, Head of the Operation Division at Jambatan Kedua Sdn Bhd, the concession company responsible for the bridge, comments: "Since commissioning, the automated traffic enforcement system has consistently delivered reliable data and maintained accuracy well within the required tolerances. Its performance and stability have met our operational expectations for continuous vehicle monitoring and load assessment."

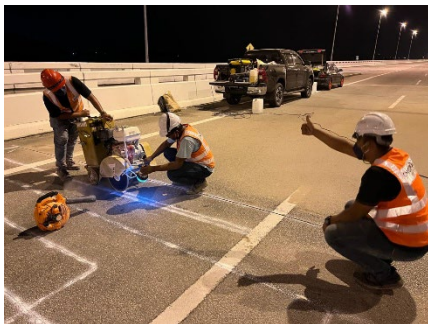
Improved bridge protection: less overloaded trucks, more road safety

Commercial vehicles entering the bridge are monitored around the clock and can be enforced at the toll plazas if found to be overloaded. Beyond enforcement, the Weigh In Motion system enables a wide range of additional benefits. Based on the collected data, analytics support congestion forecasting and maintenance planning. Road safety and infrastructure protection have improved as fewer heavy-duty vehicles operate above permitted weight limits, while the bridge itself is protected from pavement damage and premature structural fatigue. Hussin bin Mohammad concludes: "We are very satisfied with the product quality and technical support provided by both Kistler and Quatriz."

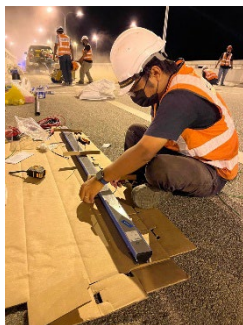
Image material (please name the Kistler Group as picture source)



The iconic Penang Second Bridge with its characteristic S-shaped silhouette is equipped with a Weigh In Motion system from Kistler since 2022.



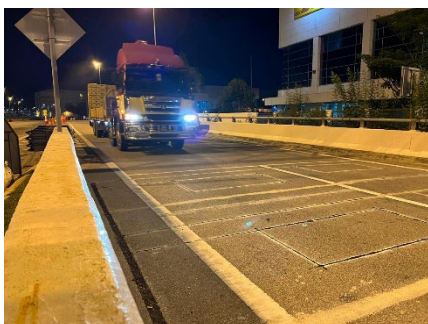
Bridge protection: the Weigh In Motion system from Kistler delivers reliable heavy traffic data and enables 24/7 traffic enforcement in free flow.



The Lineas quartz sensors for Weigh In Motion from Kistler get prepared for road integration on the Penang Second Bridge.



Weigh In Motion back panel: a look into the roadside cabinet with pre-wired Kistler WIM components and additional network gear.



Heavy traffic enforcement in preparation: A test truck for calibration approaches the newly constructed Weigh In Motion site on Penang Second Bridge in Western Malaysia.

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About the Kistler Group

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