

Weigh-In-Motion-measurement system

imc measurement technology ensures bridge safety

Application Note



The right weight class for crossing bridges

At 5.5 Kilometers, the Suramadu Bridge is the longest in Indonesia. This cable-stayed toll bridge connects the cities of Surabaya on the island of Java and Bangkalan on the island of Madura. It has two lanes in each direction plus additional lanes for emergency vehicles and motorcycles.



SuraMadu Bridge, Indonesia

Weighing vehicles for a safe crossing

To ensure the safety of all who use the bridge, it is important to comply with certain load limits. Vehicles that want to cross the Suramadu Bridge may not weigh more than 10 tons. Before a vehicle gets the green light to cross the bridge, it must pass over a “Weigh-in-Motion” system. This presents particular challenges on both sensors and measurement systems. To accurately weigh trucks that are already in motion requires high-speed sensors and measurement systems that can operate in

real time. After all, the goal is to allow an uninterrupted flow of traffic.

For its Weigh-in-Motion system, the customer *Pt Struktur Pintar Indonesia* uses Kistler piezoelectric sensors in conjunction with imc C-SERIES measurement systems having real-time calculation functionality.



Compact measurement device: imc C-SERIES

Pt Struktur Pintar Indonesia installed Weigh-in-Motion systems at four locations and uses imc-C-SERIES devices at to measure vehicle weight data on two lanes.

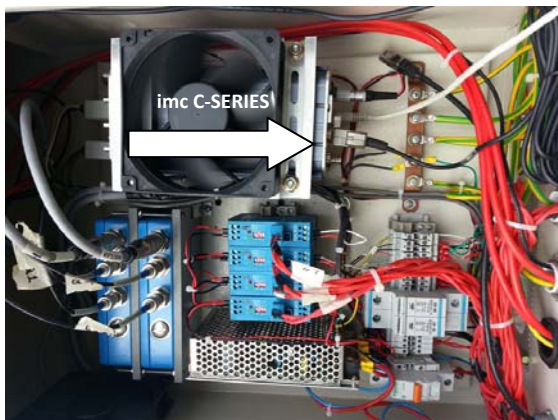


This is where the imc devices really show their benefits. The independent trigger-machines allow to capture and process data from each

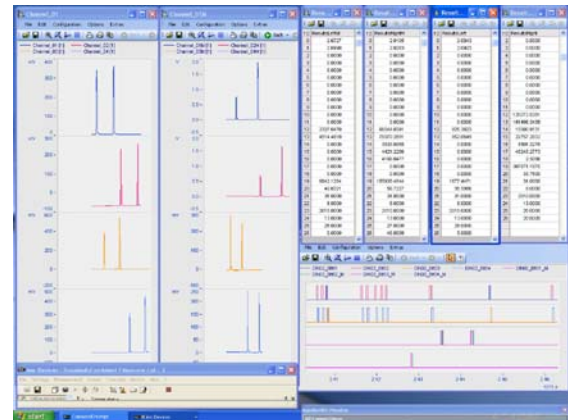
lane independently of the adjacent lane. The powerful trigger system selectively saves the most important data to permit simpler and time-efficient analysis. As the measured data are processed in real time, the vehicle's driver is given either the green or the red light, depending on whether the vehicle is respectively under or over the weight limit.

More advantages of the imc C-SERIES measurement device at a glance:

- Automatic self-start
- Autarkic operation possible without PC
- Remote controllable
- Flexible data storage options, removable Flash-card
- Reliable operation throughout an extended temperature range; high ambient humidity is no problem
- Intelligent power supply with short-term UPS provides secure operation even in unstable power supply conditions
- Guaranteed data integrity even in a power outage



Results in real time



The sensors provide load readings which are then calculated in real time by the imc Online FAMOS software on board the measurement system. This information reveals the axle count, axle distance, total weight and speed or provides notification of limit violations.

imc Online FAMOS performs synchronized, deterministic mathematical operations on multiple channels, compiles statistics, calculates comparisons and runs advanced open- and closed-loop control algorithms.

In this way, imc Online FAMOS saves time and money, since the need for subsequent analysis is either eliminated or substantially reduced.

Automated data transfer

Another gain in productivity is achieved through automated remote data transfer provided by imc LINK software. The four measurement devices are connected with the imc LINK software in parallel to send the computed data automatically, with a time-stamp, to *Pt Struktur Pintar Indonesia's* server.

Thus, imc LINK dispenses with manual operation of the measurement devices and guarantees seamless and secure automated data transfer from measurement devices – whether directly connected to a computer or not.

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For over 25 years, imc Meßsysteme GmbH has been developing, manufacturing and selling hardware and software solutions worldwide in the field of physical measurement technology. Whether in a vehicle, on a test bench or monitoring plants and machinery – data acquisition with imc systems is considered productive, user-friendly and profitable. So whether needed in research, development, testing or commissioning, imc offers complete turnkey solutions, as well as standardized measurement devices and software products.

imc measurement systems work in mechanical and mechatronic applications offering up to 100 kHz sampling rate per channel with most popular sensors for measuring physical quantities, such as pressure, force, speed, vibration, noise, temperature, voltage or current. The spectrum of imc measurement products and services ranges from simple data recording via integrated real-time calculations, to the integration of models and complete automation of test benches.

Founded in 1988 and headquartered in Berlin, imc Meßsysteme GmbH employs around 160 employees who are continuously working hard to further develop the product portfolio. Internationally, imc products are distributed and sold through our 25 partner companies.

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imc Test & Measurement GmbH is a system house that offers products and services for measurement applications. Our team of about 40 proven experts, having mainly backgrounds in engineering or science, work to realize customer-oriented and application-specific solutions on the subject of "electrical measurement of physical quantities."

imc Test & Measurement GmbH markets the recognizably innovative and powerful hardware and software products from their strategic partner, imc Meßsysteme GmbH, Berlin.

We complement these products with our comprehensive engineering services. These range from design, consulting and sales, with pre-and after-sales service, as well as customer and application-specific extensions, system integration, commissioning, training, rental of measuring systems, personnel contracting and much more.