Texts CARGOMETER DIM-WIM-SIM

Title

CARGOMETER – "On-the-fly" freight dimensioning

Summary

CARGOMETER offers "on-the-fly" freight dimensioning for moving forklift trucks: Package dimensions, weight, and barcode (2D code) are recorded in real time as the truck moves through the loading gate, and are immediately transmitted in digital form to the customer system. This has the advantage that workflows continue uninterrupted, by contrast with stationary or manual measurement. With the innovative freight dimensioning system, cargo space can be billed correctly and fleet utilisation can be optimised.

Product and purpose

Empirical studies have shown that more than 15 % of all pallets transported in less-than-truckload logistics are billed at rates that are too low. As a result, European cargo carriers are missing out on EUR 2.4 billon each year. The basic problem is that cargo carriers rarely measure dimensions and weight of their freight because of the artificial bottlenecks that current measuring systems create in transshipment terminals. As a consequence, the entire sector relies on guesswork when billing its most valuable resource – cargo space.

CARGOMETER develops fully-automatic systems for freight dimensioning without disrupting established intralogistic processes. The company's main innovations consist of "on-the-fly" metering and weighing on the forklift truck while it is moving and the location of the measurements: the loading gates of the transshipment terminal where each pallet needs to pass through. With this method, CARGOMETER guarantees that the intralogistic processes remain unaffected and that cargo space will be billed correctly.

CARGOMETER's powerful software processes individual low-resolution images collected by an inexpensive 3D image sensor, creating a high-resolution 3D model for every measurement run:

- **Dimension-in-Motion** records the dimensions (length, width and height) and volume of each package up to a speed of 10 km/h

- **Weigh-in-Motion** uses forklift scales to weigh the freight during travel

- **Scan-in-motion** replaces manual scanning of two-dimensional barcodes (e.g. QR codes) with fully-automatic recognition

Innovations

CARGOMETER is based on low-cost hardware. This means that sensors can be installed on every loading gate and forklift truck at the transshipment terminal. The measurement process does not affect the workflow in the terminal (no extra time required, no diversions), does not require space for approach pathways and measurement units, and does not need any additional staff to operate it.

This contrasts with the technical approaches typically used at present, which are based on expensive laser scanners and require the objects either to be free-standing and at rest, or moving steadily on a conveyor belt. Neither of these options is suited to rapid cargo handling as they create an artificial bottleneck in the transshipment terminal.

Why are CARGOMETER's software solutions innovative? Firstly, due to a combined measurement of load and vehicle, which is then separated algorithmically. Secondly, because of the ability to handle moving components by spatially and temporally combining sequential 3D images from each measurement run to create a high-resolution 3D model. Furthermore, the measurement structure is designed so that as the object moves through the measurement area, the sensors view the object from various different angles. Finally, the Scan-in-Motion algorithm facilitates fully-automatic recognition of a two-dimensional barcode, allowing the tracking number of the package to be associated with the volume and weight measurement.

With CARGOMETER, what used to be seen as a problem for measurement – motion – is transformed into a real advantage for measurement and process.

Market relevance

In the 28 EU countries, 540 million tonnes of less-than-truckload cargo are moved every year between around 4,000 operational locations, boasting a total of some 80,000 loading gates. Experts from Fraunhofer SCS estimate that Europe has a less-than-truckload turnover of around EUR 47.5 billion. Empirical studies in less-than-truckload logistics have shown that more than 15 % of all pallets transported are classified into tariff groups that are too low. This results in an overall loss in turnover of around 5 % – or the potential to increase profits by EUR 2.4 billion. Given the typical margins in the industry of 3-5%, this represents a doubling in profit.

The data from the CARGOMETER system is not just useful for correct billing: it furthermore represents an essential foundation for digitalisation and "big data" analyses – that is, for Logistics 4.0. Precise digital freight data can be used to determine truck loading, optimise the transport network and increase fleet utilisation... all resulting in cost reductions for fleet, fuel, and workforce. Freight digitalisation means that, for the first time, transparent transport processes can be established, with effective control options and fewer delivery delays... which means: higher quality, increased customer satisfaction, and a lighter environmental footprint.

Beyond the less-than-truckload market, "on-the-fly" freight dimensioning has also been identified as relevant to markets for warehouse logistics, contract logistics, air freight, and monitoring container loading to optimise utilisation.

Main advantages

CARGOMETER is an innovative, cost-effective freight dimensioning solution for measuring cargo "on-the-fly" on moving forklift trucks. CARGOMETER has clear logistical advantages in comparison to the stationary measurements that are currently common practice, or any kind of manual measurement:

- CARGOMETER **identifies pallets that have not been allocated to the correct tariff**, meaning unprofitable shipments can be adjusted appropriately.

- Package **dimensions, volume and weight** are captured as it moves by, and are available instantly in the customer system. Images, videos, and a complete PDF report can be accessed directly.

- Automatic recognition of **2D barcodes** (e.g. QR codes) – no need for manual inbound and outbound scans.

- **The workflow can continue without interruption**. Terminal processes do not have to be modified.

- **Terminal floor space is optimised** – no more need for approach pathways and measurement stations.

- **Complete digitalisation** of all shipments creates a foundation for supply chain optimisation and "big data" analyses: Logistics 4.0.

- By making accurate, real-time volume and weight information available, it is, for the first time, possible to optimise utilisation in the Europe-wide less-than-truckload networks using real data. The result: massive cost savings and significant **reduction in environmental footprint**.