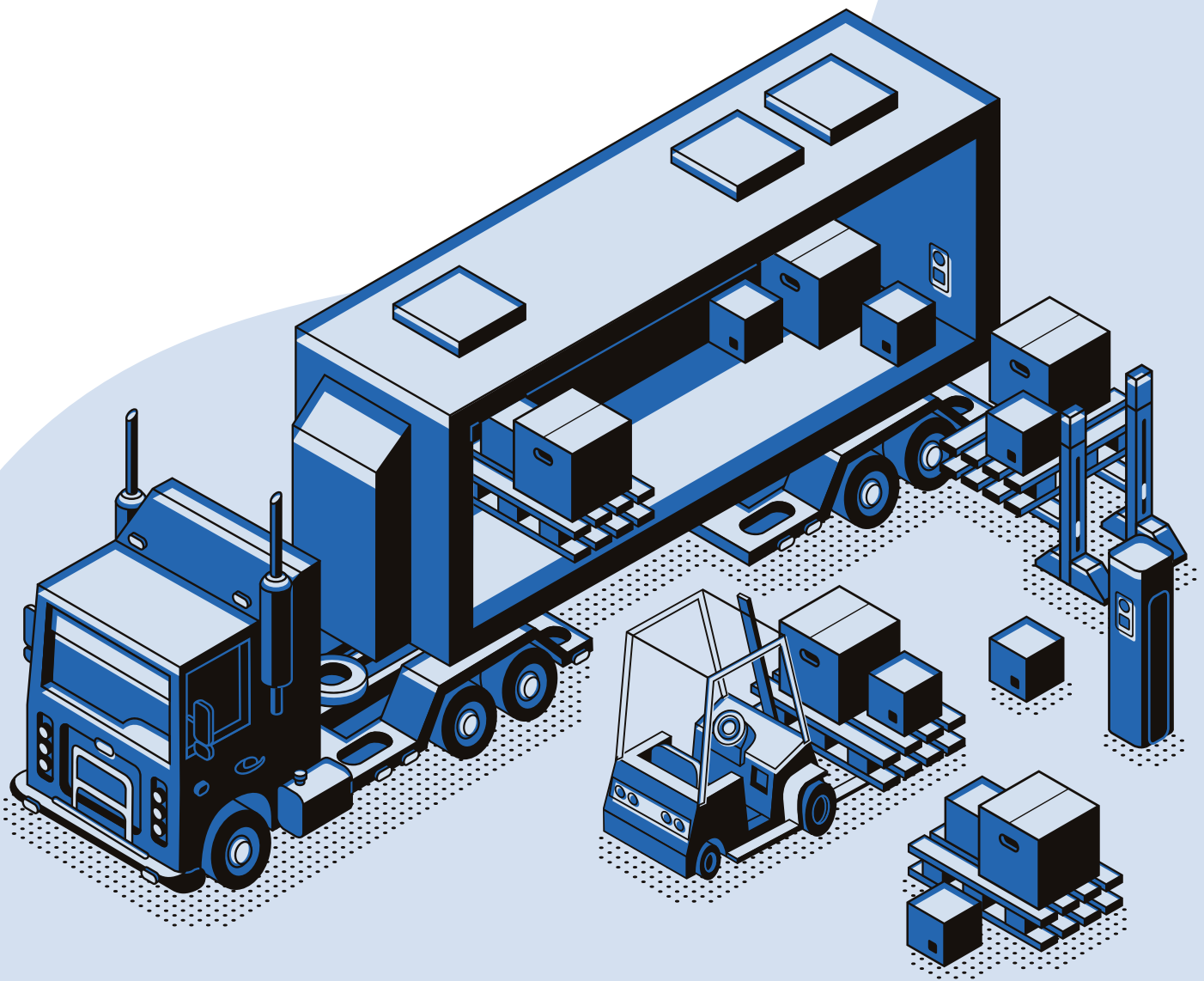


# Load stability testing: improve sustainability, safety and cost savings in goods transport



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# 1. Directive 2014/47/EU: zero fatalities objective

It is calculated that 25% of **road accidents** involving trucks are the result of a poor cargo securing. The European Union has decided to take action to address this through **Directive 2014/47/EU**, which regulates the stability and rigidity of loads to mitigate these figures.

The goal is to guarantee that transports travelling across European territory do so in a safe way, and that the **load is adequately secured** and has no risk of causing an accident.

## a. European regulations: main objectives and description

Directive 2014/47/EU has been enacted with the objective of preventing any more tragic events from taking place. This directive focuses on generating a **common European regulatory framework for the roadside inspection of commercial vehicles** and on the analysis of load stability and rigidity.

And they are not alone – the United States also has several organizations that are working on **palletized load testing protocols**, due to its criticality in transportation safety.

Applying this regulation offers various advantages. Not only does it lead to a higher road safety by eliminating a great number of avoidable accidents, but it also significantly reduces the **CO2 footprint** of the transport and **reduces** packaging **costs** and potential damage to the goods.



## b. Roadside truck controls and inspections

Directive 2014/47/EU **regulates the inspections** that the different member states will need to carry out on commercial vehicles travelling across European territory. It additionally establishes the obligations that handlers and transport companies have in regard to the securing of their cargo.

*The law states that a yearly inspection will be performed **randomly** on at least 5% of registered industrial vehicles that travel on European roads, regardless of their nationality.*

The purpose of these inspections will be to verify that the load is adequately secured in a way that does not present a hazard to the driving of the vehicle. To this end, police organizations will perform a **visual** and a **technical inspection**. The latter will make use of measuring and verification devices, including tension meters, angle gauges, fixed & mobile scales and stowage calculators.

## c. Scope

Directive 2014/47/EU especially focuses on **vehicle technology**, which will need to comply with certain requirements related to stowage safety. Inspections and controls will be applied to:

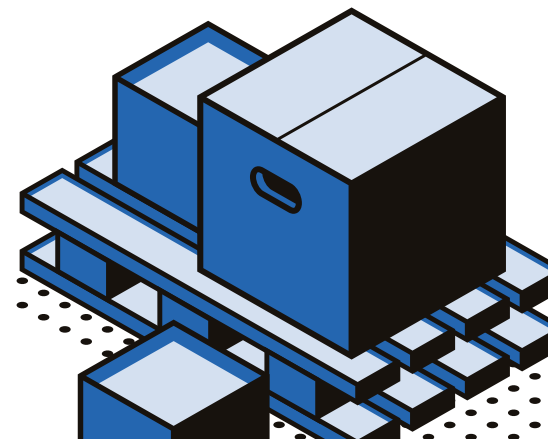
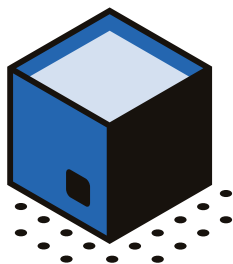
- Motor vehicles designed for the carriage of **persons and luggage**.
- Motor vehicles designed for the **carriage of goods**, with a maximum mass exceeding 3.5 tons.
- **Trailers** for the carriage of goods or persons, as well as the accommodation of persons.
- **Wheeled tractors of category T** with a nominal maximum speed in excess of 40 km/h.
- Light commercial vehicles of **category N1**.

## d. Structure and characteristics of the regulation

The directive (available [here](#)) includes 6 chapters and 5 annexes outlining the regulation and its application by means of inspections.

- **Chapter I** specifies the object on which the law is applied, defines used concepts and explains its scope. It literally states that “this Directive establishes minimum requirements for a regime of **technical roadside inspections of the roadworthiness of commercial vehicles** circulating within the territory of the Member States.”
- **Chapter II** establishes the technical roadside inspection regime and the general obligations set forth by the law, such as the **5% minimum** commercial vehicle **technical roadside inspections**. Additionally, it explains the **system for the classification of risks** that are inherent to the transportation of goods and defines who will be responsible for complying with the regulation.
- **Inspection procedures** are explained in **chapter III**, which include from the vehicle selection criteria to the methods to be applied.
- **Chapter IV** outlines how member states will have to cooperate and exchange information in relation to this regulation.
- Issues related with the delegation, updating or adaptation of parts of the directive are explained in **chapter V**.
- **Chapter VI** deals with the final provisions, including penalties in case of a noncompliance with the regulation.

Lastly, the **annexes** explain the components of the risk classification system, the scope of the technical roadside inspection, the method for the inspection and evaluation of vehicles, and the principles and regulations that apply to cargo securement, among others.



## 2. Implementing the law: EUMOS tests

**EUMOS tests** imply quality standards that aim to maximize the safety of goods transportation.

Among these we can find the testing method **EUMOS 40509-2012**, outlined in Directive 2014/47/EU as the system for verifying that a load is being safely transported.

*The EUMOS 40509-2012 test is a dynamic testing method that evaluates the **rigidity and safety of a cargo unit** that is subjected to horizontal accelerations and decelerations that are typical of road transportation aboard industrial vehicles.*

This test is to be used by **packaging laboratories**, palletized product manufacturers, cargo safety experts and cargo safety inspectors.

Performing this test requires **horizontal stability testers** that are capable of performing the tests as per the EUMOS standard.

The **required test** to comply with this testing method is the specific acceleration of the load for at least 0.3 seconds, to then decelerate, with the period between the resting position and the acceleration being no longer than 0.05 seconds.



### 3. How to accomplish a safe load stowage

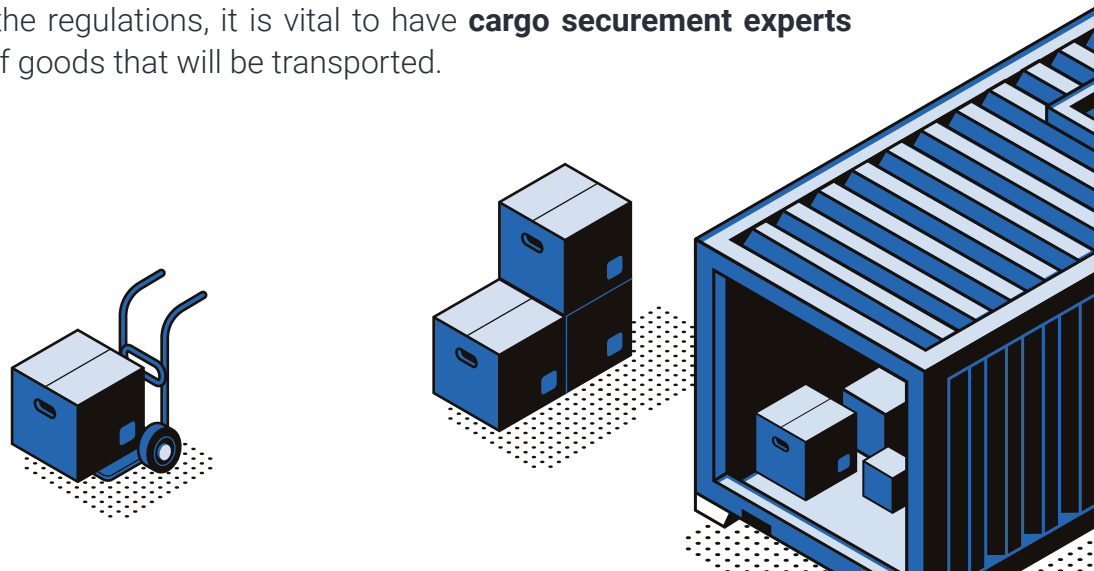
Directive 2014/47/EU turns the safe stowage of a load not only into an essential issue for safety, but also into an **obligation** that additionally results in penalties for those who fail to perform it.

The regulation specifies what the safe stowage of a load exactly means: one where the load **cannot slide, tilt, roll, balance, deform or rotate** in any direction. **Closures, anchors and lashes** will be used to prevent these motions. The most adequate method will be estimated based on the cargo being carried, since it is not the same to transport loads with anchorage points than smaller, more homogenous packages.

Chapter 4 of the ['European best practices guidelines on cargo securing for road transport'](#) outlines the necessary equipment for a safe cargo securement. This includes:

- **Lashing** through the use of web lashing, chains or steel cables.
- Equipment to **increase friction** such as linings, anti-skid rubber pads and other materials and anti-skid sheets.
- **Blocking** bars.
- **Dunnage**.
- **Edge protectors**.
- **Nets** and covers.
- Other securement materials.

In any case, when selecting the method, and thereby to guarantee safety and the compliance with the regulations, it is vital to have **cargo securement experts** analyze the type of goods that will be transported.



## 4. Machinery for goods carriage safety: innSlide by Safe Load TT

Safe Load TT offers a series of machines whose purpose is to assist in complying with horizontal stability regulations: **the innSlide family**.

One of them is the **horizontal stability tester**, manufactured to perform the EU-MOS 40509:2012 method. It is designed for packaging laboratories and universities that wish to perform any kind of research related to the acceleration and deceleration of palletized loads. It allows different parameters to be modified with precision, allowing for personalized tests, such as roundabout simulations. Additionally, one of the newest developments is the **innSlide Boomerang** tester by **Safe Load**. This machine, which is much more compact than the one above, allows for the performance of a horizontal stability test through the use of more advanced technology.

*This unit combines power and design in a compact size and allows you to **simulate in a reliable way** the accelerations and decelerations experienced during transportation.*

This machine was created in a way that allows any product manufacturer to **test pallets and cargo units** in-house in a fast, reliable and professional manner.





## a. Frequently asked questions about innSlide

### What are the exact specifications of the innSlide Boomerang machine?

This solution stands out for being at least **70% smaller than the standard size** available on the market for these types of systems: its measurements are 2.7 meters long, 1.4 meters wide and 2.9 meters in height, though the height can be reduced to 0.9 meters for transportation. Its weight is around 1400 kgs.

The machine is also **scalable** based on the testing limits required by the client's tests. The most usual tests involve loads of up to 1400x1400 mm, with a maximum acceleration of 0.5g for 1000kg and 0.8g for 550kg, with an effective travel that is much shorter than usual (0.8m).

### What are the advantages of its reduced size and weight?

Thanks to its size, innSlide Boomerang can move from one point to another in the laboratory where it has been installed, or be **transported in a cargo vehicle (van or small truck)** to perform onsite tests and be able to work with pallets wrapped by the wrapping machine used in the location.

### What type of companies are interested the innSlide Boomerang solution?

This is the first machine within the Safe Load's VERIFY product line, aimed at the creation of testing equipment for companies of the packaging sector and brand owners. This machine **simplifies some of the most complex functionalities** from other Safe Load equipment: its main purpose is to verify that a package complies with quality standards and applicable regulations.

It is therefore the **perfect system** for any company that:

- Develops **products for packaging** – in particular, those made of plastic and cardboard.
- Deals with a **product that may get damaged during transportation** or whose pallets may get deformed, endangering the safety of the transportation.

On the other hand, the traditional horizontal stability machine is aimed at packaging laboratories that need to perform more complex and customized tests in their studies and researches.

### **Besides its size, what other improvements does innSlide Boomerang offer?**

This system includes cutting-edge technology developed specifically for the machine. Since the effective travel length during testing is smaller, at Safe Load we have tried to find a way to obtain results and information in record time. For this purpose, we developed and installed an **artificial vision system** (innSlide Vision Pro) that records the test and automatically performs the necessary measurements.

### **What kind of data and reports does this system provide and how can they be used?**

Two technologies developed by Safe Load for innSlide Boomerang allow for a **more reliable parameter measurement, which eliminates human error and streamlines the testing process.**

Thanks to information obtained by the artificial vision camera, the *ad hoc* software is subsequently able to **analyze the data collected and issue a report** with the results, with a processing time that is under 10 seconds. Thanks to the innSlide Vision Pro camera, this report **includes photos and videos** showing the deformation of the cargo unit frame by frame.

The obtained data clearly and simply shows **whether the cargo has successfully overcome the test** or if changes are required.

In a complementary manner, at Safe Load Testing Technologies we **offer training** to the technicians in charge of the test, so that they are able to interpret the obtained data.

### **What other systems are there on the market that are similar to innSlide Boomerang?**

There is currently no other machine on the market that has the features of innSlide Boomerang. In other words, our commitment to develop a small-sized technology with *ad hoc* technology to issue detailed reports in real time have turned innSlide Boomerang into a **system like no other in the world.**

### **What other tests can the machine perform?**

The innSlide machine allows for testing the rigidity or stability of **any load** that may be transported by truck, regardless of whether it will be palletized or not. In addition to the EUMOS method the **US FMCSA Cargo Securement requirements** stand out.

## b. How to perform the **EUMOS tests** with innSlide

The machines of the innSlide family are designed to perform the **EUMOS tests** in a **simple and intuitive** manner. In order to perform the test, you only need to place the load on the platform and select the desired acceleration using the HMI interface.

In particular, innSlide Boomerang is designed to reduce the effective travel down to a smaller run than other machines.

In **under 10 seconds**, it is possible to perform the test and obtain a clear and concise report that outlines whether the test has been passed as per the EUMOS requirements or others specified by the client. Based on the test, it is possible to confirm whether the palletized cargo is suitable or not, and to apply any improvements to the package to optimize it.



## 5. Why you should choose Safe Load Testing Technologies

At Safe Load TT we have already helped a number of companies such as yours to attain a safe product transportation.

Such is the case of a **leading multinational manufacturer in the stretch film and packaging film market**. The company entrusted us with the creation of their new Technology Center for the optimization of personalized load safety concepts. For this purpose, they acquired the following equipment by Safe Load:

- Multi-axis 3D system.
- Horizontal impact tester.
- Environmental chamber.
- Data recorder.

Thanks to the application of these simulation technologies, this film manufacturer is capable of offering transport simulation tests to optimize the product + packaging system. In this way, they have **increased their turnover by 16.5%**, helping their clients **reduce their packaging expenses by 30%**, as well as their **costs due to damaged goods by 20%**.

In addition, we have also been chosen by a **leading multinational brewery** to help them in designing a safer packaging through the use of our equipment.

In this case, our client was trying to optimize its packaging costs and comply with **Directive 2014/47/EU** while minimizing the environmental impact of its logistical processes.

After contacting us, at Safe Load we started working, analyzing the brewery's cargo units and reproducing their film stretching parameters. Concurrently, we **analyzed the stability of the load by applying the EUMOS 40509 method**, concluding that it was necessary to use a different tertiary packaging design, with a new stretch film and different stretching parameters.

By applying our proposal, the brewery attained **safer loads** with an optimal packaging. Furthermore, they obtained the following advantages:

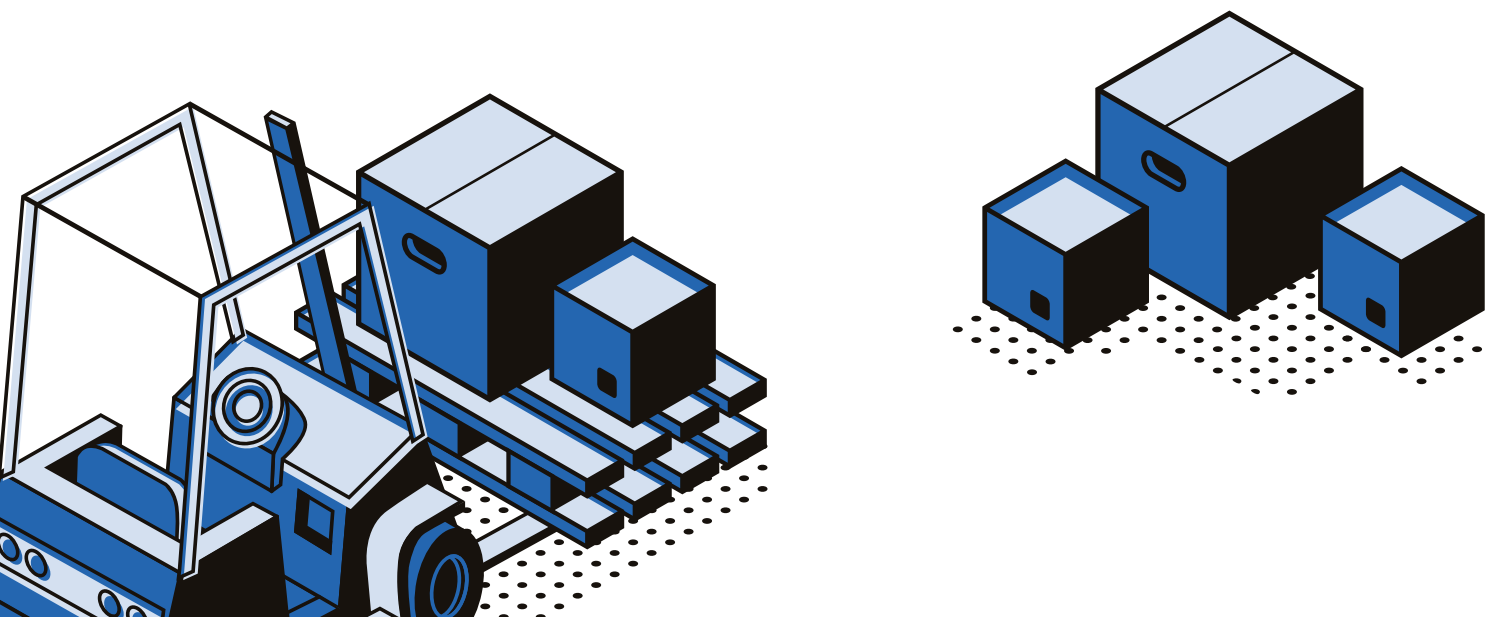
- They reduced the use of the wrapping machine by 1,500 hours.
- They accomplished savings of 110,250€ per year.
- They avoided the emission of 185 Tn of CO2 to the atmosphere per year.
- They complied with applicable regulations, including Directive 2014/47/EU.

**Do you need to optimize your packaging and guarantee the safe stowage of your cargo?**

**Do you want to comply with Directive 2014/47/EU but don't know where to begin?**

At Safe Load TT we are at your service to **bring you closer to your objectives, guarantee the safety of your loads and comply with the regulations.**

**Get in touch with us**





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testing technologies

**SAFE LOAD TESTING TECHNOLOGIES S.L.**

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