

WAREHOUSE & LOGISTICS NEWS WHITE PAPER

Sponsored by Kite Packaging

Load Retention & Stretch Film – Are You Safe?

Raising awareness and understanding of Load Retention best practice in UK industry



***Warehouse
& Logistics News***



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Executive summary

Workplace Safety - Your business is at stake

Manufacturing, logistics and distribution industries all have inherent risks, as the official statistics confirm.

In 2017/18 the Health & Safety Executive (HSE) reported **1.4 million working people** suffering from work-related illnesses. **144 workers** were killed at work during the period: there were **71,062 non-fatal injuries** to employees reported under RIDDOR: **30.7 million working days** were lost due to work-related illness and workplace injuries. In the same report the HSE estimated the cost of injuries and ill health from conditions in the overall working environment in 2016/17 at **£15 billion**.

Then if you look at the road transport sector, a crucial area of working life, the DfT's latest National Road Traffic Survey reports **263**

fatal accidents in 2017 involving HGVs and **1,793 fatal or serious incidents** in total.

Businesses have a responsibility for workplace safety and one of the biggest areas of safety we need to address in our operations is **Load Retention**.

This involves ensuring that loads are adequately secured while being moved on public roads or around the business, including when being moved in and out of storage in the warehouse, and minimising the likelihood of objects or whole loads coming loose and falling. This White Paper is designed to help mitigate the risks in this area. Anyone with an interest in minimising these risks in their business should read this document.

Charles Smith, Warehouse & Logistics News.

Introduction

Load Retention & Stretch Film – Are You Safe?

As a country the UK is a world leader in the quality of its supply chains, delivering goods on time. Underpinning this is a robust road freight industry, and state of the art warehousing.

But despite our road freight industry being the envy of the world, at times the safety of our pallets leaves much to be desired.

Load Retention is a crucial aspect of workplace Health & Safety procedures, concerning everyone involved in moving goods inside warehouses and distribution centres and on public roads. As an industry we cannot afford to fall short when it comes to ensuring that palletised loads remain stable and stay securely in place during transit through the correct application of stretch film and wrap. The products we are concerned with in this review are hand film and machine film.

So why is Load Retention so important?

Quite simply, maintaining pallet load stability and safety standards is the responsibility of everyone in the business, from boardroom to warehouse floor. Loads that are not secured properly and shift on the vehicle carrying them can cause accidents and fatalities. Negligence carries harsh penalties: businesses can lose their Vehicle Operator Licence, face prosecution by HSE and even face the prospect of corporate manslaughter. In addition, the cost to the business can also be clean-up, stock loss, re-delivery and customers may reject the deliveries, which will result in damaged reputation.

Under present UK law, the maximum penalty for an offence under the Road Traffic Act 1991 if committed in respect of a goods vehicle is a £5,000 fine, plus 3 penalty points and disqualification.

There is also the international dimension to consider. On 29 April 2014 three directives of the EU 'Roadworthiness Package' were published in the Official Journal of the European Union. The 'Package' becomes a worldwide legal requirement in May 2018.

While the 'Roadworthiness Package' relates primarily to the on road condition of vehicles and changes to the MOT test, one of the key points is ensuring packages and unit loads are suitably secured on vehicles to withstand the stresses to be expected under normal transport conditions. It has yet to be seen how this will be implemented but the FTA advises that it is likely to mean introducing Europe-wide vehicle load securing inspections at roadside checks.

This White Paper is sponsored by Kite Packaging, a leading supplier of Load Retention solutions, including stretch films and application equipment. In this paper, issues surrounding Load Retention and the available solutions are examined, as part of their commitment to leading the industry and helping everyone derive the maximum possible benefit from this technology.

The Survey

In the first section, The Survey, it is described how industry professionals were surveyed to give an overview of the current state of knowledge and understanding of Load Retention in UK and

European industries and look at who takes responsibility for this crucial area within different organisations.

Load Retention In Action

In the section 'Load Retention In Action,' blind tests were carried out on a selection of machine films and hand films and the questions these raise about product quality are reported on. In the section 'How To Tell If My Load Is Safe' Kite's technical experts advise on the methods available for testing stretch film and arriving at the ideal solution for securing a given load. By following these recommendations, those involved in transporting goods by road can be sure of immediate safety and performance improvements in their operation.

We trust this White Paper will prompt debate about the need for better working practice in the area of Load Retention and encourage end users to look again at this crucial part of their day to day operations.

Charles Smith

Charles Smith,
Warehouse & Logistics News

Load Retention

A working partnership



Employee-owned packaging distribution group Kite Packaging's dedicated Load Retention specialists work in close partnership with customers. They are tasked with sourcing innovative solutions which are designed through scientific analysis for retaining and stabilising loads and delivering cost savings.

Kite audits customers' stretch film requirements, analysing clients' stretch wrap material and machines to identify opportunities to reduce costs and increase efficiency.

The Kite Load Retention team has over 30 years' experience examining stretch film and identifying problems to be solved. They look at how customers' film machines are working and how the film is reacting. They investigate what the products do, not only when they are wrapped but also after they are wrapped. The nature of the transport chain can have massive implications on the load.



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Case Study: #1

Improving reputation and reducing product damage



The problems in question are sometimes not evident to the people Kite sees initially at a client organisation, as they might be recorded in different areas of the business. In recent experience a large national food company asked Kite to solve an issue where they were having multiple pallets fall over each week, causing costly damage to goods and reputation. Kite came up with a system for wrapping pallets, with the following outcomes:



- ➔ Improved health and safety issues when wrapping, including reduced worker fatigue
- ➔ Eliminated pallets collapsing
- ➔ Customer satisfaction restored to 100%

Case Study: #2

Improving stability and speed

In another scenario, a large international company was wrapping pallets using three turntable machines, with no apparent issues needing improvement. Kite investigated and found the machines were in fact performing inefficiently. The holding force was less than optimal and condensation was causing issues with the boxes collapsing. After a detailed analysis, Kite proposed a fully automatic line with a high performance film, which gave a payback in less than a year on an investment of over £100,000.

This project had the following results:



Improved load stability and safety



Increased production throughput



Condensation issues overcome



Case Study: #3

Reducing risk

In a third customer case study, Kite Packaging visited a large national oil company that had a RIDDOR (the reporting of injuries, diseases and dangerous occurrence regulations 1995) incident for manual handling due to wrapping pallets by hand. Kite was able to offer a viable solution and introduced a semi-automatic pallet wrap machine. By installing this machine, the risk of injury was removed as was the risk of dangerous occurrences, as wrapping pallets by hand can often not be sufficient to provide adequate load stability for the pallet. The cost of wrapping pallets was also reduced.

This project had the following results:

- ➔ Introduced a semi-automatic pallet wrap machine
- ➔ The cost of wrapping pallets reduced
- ➔ Significantly improved load stability



The Survey - Sponsored by Kite

Load Retention & Stretch Film – Are You Safe?

As a key part of this White Paper on Load Retention, senior contacts at various client companies were invited to answer the following questions that all companies should be asking themselves yearly as a risk assessment.

Q1. Do you use stretch film? **Yes:** 86% **No:** 14%

Q2. Do you use stretch film/wrap on loads that will be transported on public roads? **Yes:** 84% **No:** 16%

Q3. Have you ever had a professional stretch film audit?
Yes: 26% **No:** 74%

Q4. Does the person who is responsible for health and safety in your organisation carry out audits relating to your stretch film and load stability? **Yes:** 42% **No:** 58%

Q5. How many UK businesses do you think lost their Operator's Licence due to poor loads in 2013?

A: Over 500: 37% **B: Over 1,000:** 42% **C: Over 2,000:** 21%

The answer is C: over 2,000 (Source DVSA)

Q6. How many UK road accidents do you think were caused by loads shifting whilst in transit on public roads in 2013?

A: Over 5,000: 66% **B: Over 10,000:** 28% **C: Over 20,000:** 6%

The answer is C: over 20,000 (Source DVSA)

Q7. In your organisation, who is the decision maker for stretch film purchasing? **Warehouse Operative:** 8% **Warehouse Manager:** 34% **Purchasing Officer:** 29% **Other:** 29%

Q8. Is the same person also responsible for Workplace Health & Safety? **Yes:** 47% **No:** 50% **Not Known:** 3%

The Survey Findings



Sources:
Kite Packaging Survey 2017

Questions 5 and 6:
DVSA Load Securing Vehicle
Operator Guidance

Analysis

Survey findings



The companies that were surveyed ranged from SMEs to blue chip international companies.



Only 26% have ever had a professional film audit of some kind. The 74% who have never had an audit include some of the UK's largest food and drink companies. Not auditing the film they use is like not servicing the vehicles they drive. In addition, the cost implications of load stability failure are massive.



Only 16% of respondents did not use public roads to transport the goods, as they were being moved for internal storage only. This still raises load stability issues, as the loads are stored sometimes as high as 15 metres up in the air and could cause death if the goods fell on workers.



Less than 50% of the people in charge of health and safety in these organisations regularly checked the load stability and performance of their film. Those that did carry out checks were probably using outdated methods, thereby making these checks almost pointless.



The large companies that did not audit their film were companies which have an established health and safety policy within the warehouse and first class procedures for workplace safety, but do not see the need to apply similar disciplines to their use of stretch wrap, despite the fact it involves high level of risk.



As with the Operator Licence question, people surveyed have no idea how many accidents are caused by loads shifting because the majority feel there is nothing wrong with the film they buy, as it appears to be fine when it leaves the warehouse. Furthermore, they never test their films' fitness for use in changing road conditions.



The survey shows that most people underestimate the problem of businesses losing their Operator Licenses due to poor loads. This is a reflection of people not regarding load stability as an important issue, although losing an operator licence or a prosecution by the HSE is clearly debilitating to any business.



In some of the larger organisations surveyed, the Health & Safety person has no real link to the person responsible for purchasing film. Over 50% of the people responsible for stretch film purchasing were unaware of Health and Safety issues related to this product, not involved with workplace Health & Safety, or didn't know who the relevant person was.

Load Retention

In Action

As part of the research for this White Paper, blind tests on a selection of film bought in a mystery shopping exercise from competitors of Kite Packaging were carried out, with the following findings:

Machine Film

25% of the film tested was below tolerance and showed in many cases 'sharp practice'. The main focus for 'sharp practice' in machine film, is to increase the weight of the core, as paper is cheaper than film so there is less film on the roll and the customer pays by the kilo.

25% of the film tested was in a thicker and cheaper micron than stated, with fewer metres on the roll than stated (further potential 'sharp practice'). This results in a high cost per pallet wrapped. Also, buying the incorrect grade of film would have significant effects on load stability, as the correct amount of film may not be applied.



Testing film thickness.

Hand Film

Of the samples tested:

30% of the hand film was thinner than the stated micron as well as being shorter than the stated length per roll. This is effectively financial fraud, where the customer is not getting the full length of film but also the thinner film will not give the same load stability.

40% was thicker than the stated micron, as well as being shorter roll lengths. This is also financial fraud. In addition a thicker film needs more effort from the operator to stretch and if not stretched properly will cause load stability issues.

15% was down to pure financial 'sharp practice', where the roll weight was less than it should be.

15% of film had fewer metres on the roll than stated but the weight was boosted by an over-weighted core to give the impression the roll weight was correct.

That's 100%, yes 100% of the hand film tested was outside industry tolerances. Many stretch film suppliers are trying harder and harder to mislead customers in more imaginative ways meaning film looks and feels correct, but is in fact further 'sharp practice'. The outcome, more often than not, results in reduced load stability and pallets potentially



collapsing. The end result in a worst case scenario could be the load falling on a worker and causing fatalities.

Up to standard?

All film is required to be made to a given specification. Testing methods need to be certified and most testing is accredited under ASTM standards (for further details see www.astm.org) and typically using Highlight Industries' test equipment (see <http://www.highlightindustries.com/lab-test-equip>)

How to tell if my load is safe?

Kite Packaging's advice



80% of UK pallet wrap machines operate at less than 80% efficiency



Kite can show you how to improve the productivity of your machine



Kite will demonstrate how to save money and reduce environmental waste



Data analysis is provided to prove your load is safe



Our engineers will conduct regular re-visits to ensure maintenance of best practice quality & safety

How can you tell if your load is safe? Kite Packaging's Load Retention experts offer the following advice.

Palletised goods are loaded on a pallet purely for transportation and storage, but currently around 40% of UK loads are insufficiently wrapped.

When wrapping with pallet wrap or stretch wrap the determining factor that holds the goods on the pallet is not the thickness of the film being used but the level of load retention.

Film can be very thick and feel strong, but if the

film is of a low quality or the film is not stretched enough it will have very poor Load Retention.

When film is stretched the determining factor that gives the proper Load Retention is the elastic memory of the film, which takes effect when the film is stretched. The more stretch that is applied the more the elastic memory will activate, just like an elastic band.

The film quality determines how much stretch can be given to the film before it snaps and how much puncture resistance the film can take before it holds. You need a film that will stretch to the desired level but also not snap under the pressure.

If you are wrapping a load by hand with traditional film, you will only ever get around half of the desired stretch before you run out of effort or the film breaks, whilst with machine film it all depends on how well the machine is working and if it is regularly serviced.

Using your hand to pull the film away from the pallet provides a basic check, but also pulling the film to see how much stretch is still left in it gives a better rough evaluation that the load could be potentially dangerous. Using traditional hand pallet wrap also has some serious health and safety risks as are shown in the schematic.

EMUS 40509 – Roadworthiness Directive

In 2014 the European Union published the EMUS 40509 Roadworthiness Directive, which will become a worldwide legal requirement in May 2018. One of the Directive's main points is "ensuring that packages and unit loads are suitable to withstand the stresses to be expected under normal transport conditions."

Inherent Risk



The Directive requires people carrying out vehicle load securing inspections to make the following evaluation of load deformation:

- ➔ **Permanent deformation:** Is where the pallet shifts but does not recover to its original position, this must be less than 5%
- ➔ **Elastic deformation:** Is where the pallet shifts but recovers to its original position, this must be less than 10%
- ➔ **Vertical gap:** The change in the vertical

height of the pallet after deformation must be less than 2%

- The following certification is required in a load securing inspection under the EU Directive:
- ➔ Detailed product description
 - ➔ Detailed packaging passports
 - ➔ Picture before and after test
 - ➔ Name and signature of responsible person

How to tell if my load is safe?

Testing methods



Highlight Industries electronic force/puncture test.

Kite Packaging's Load Retention experts use the following methods to test film quality and performance:

Highlight Industries manual pull plate test

This test using Highlight Industries equipment looks at how much force (kg) is required to pull a circular disc from inside the film on the pallet.

Highlight Industries electronic force/puncture test

This test using Highlight Industries equipment measures the force of the film with electronic pressure pads at the top middle and bottom of the pallet and sends

the data to a laptop in the form of a graph. It shows how the force of the film changes over time and shows if the film loses retention at critical points on the pallet after being wrapped.

Technology Lab testing

Kite can test palletised goods in a laboratory to look for key factors that may impact on load stability. Many factors in the transport chain will put pressure on the load.

Typically the lab will look at:

- In-depth testing and analyses of the safety of load units secured with secondary packaging and transport packaging
- Development of a transport packaging

- concept for an individual customer
- Prevention of product and transport damage
- **Certification** of the applied packaging concepts
- Legal protection through compliance with national and international testing standards

Horizontal Impact testing

The "Horizontal Impact" test technology essentially consists of a computer-controlled driving carriage, which is applied with specific accelerations to the respective test pallet. The objective is to simulate any horizontal influences on certain loads in order to prove stability of the pallet.

To avoid breakdowns of load units, the following measures are widely used for load stability validation:

- Applying testing parameters such as impact duration, pulse intensity or thrust to apply horizontal forces on the test pallet of up to 15 g.
 - In practice horizontal influences often arise from hitting walls or other loads through sudden acceleration or braking.
 - In addition, Kite is able to analyse load units with a high-speed camera system.
 - With knowledge gained from simulation and analysis, it is possible to work out an individual concept for load security.
- These methods of restraining load units are applicable to any kind of transportation.



Horizontal impact testing.

How to tell if my load is safe?

Testing methods

Vibration testing

Due to permanent transport-related influences, goods in transit face the constant danger of product damage. Therefore, secondary packaging has to affect not only the formation of load units but also make a significant contribution to the protection of the goods to be delivered. A permanent burden on load units in vertical directions is the demand for high stability of the packaging.

Supported by the Vertical Vibration Table, vertical shocks and vibrations can now be investigated to give the necessary assurance of the reliability of packaging, both primary and secondary.

With this technology the behaviours of load units triggered by truck suspensions and turbulences as well as the influences of handling in warehouses and distribution centres can be examined, along with the

effect of structural vibrations of vehicles and containers.

Working with this technology Kite is also able to provide test methods to determine the damage rate of products such as, electronic components. Through these different ways of evaluating transport conditions customers gain the confidence of a working package together with perfectly matched load security.

In conjunction with the Vertical Vibration Table, this system allows Kite to gather detailed experience about the performance of primary and secondary packaging and any specific weaknesses in either can be revealed.

The functional interaction with the Vertical Vibration Table covers a huge variety of application-oriented requirements. Due to the

possibility of applying several influences at one time, the testing conditions cannot be more practical.

The challenges that load units will have to withstand when placed among other load units can also be investigated using this technology.

Pitch & Roll testing

The Pitch & Roll Module has been developed especially for the evaluation of rotations around the horizontal axis. These influences generated during transportation affect the stability of whole cargoes and therefore the security of your goods.

Due to the arrangement of the technology periphery, especially the construction of the "Vertical Vibration and Pitch & Roll" test units within the climatic chamber, Kite can provide a unique testing environment for the investigation of complex loading requirements in connection with climatic influences.

Kite can investigate different kinds of requirements in combination for both primary and secondary packaging.

The evaluated test results will enable Kite to optimise and redefine the requirements for packaging solutions, in order to implement the most suitable load restraining methods.



Pitch & Roll.

How to tell if my load is safe?

Testing methods

Climate Chamber testing

Flexible packaging materials have numerous advantages for the distribution sector.



Climate Chamber.

Stretch films in particular provide a very simple and quick solution for the packaging of the goods to be transported. However, the films' strength and resistance are influenced by the prevailing climatic conditions in each case and adequate attention must be given to the selection and processing of the film.

To examine a film's likely performance in given climate conditions and assess the likely effect on the security and stability of load units, Kite has a test chamber that allows simulating both extreme humidity and temperature. This technology can be applied in conjunction with the Vertical Vibration Table and the Pitch & Roll Module.

By means of adiabatic technology it is possible to simulate ambient temperatures from -25° C to +80° C and relative humidity from 15% to 95%.

Practice Performance Index (PPI)

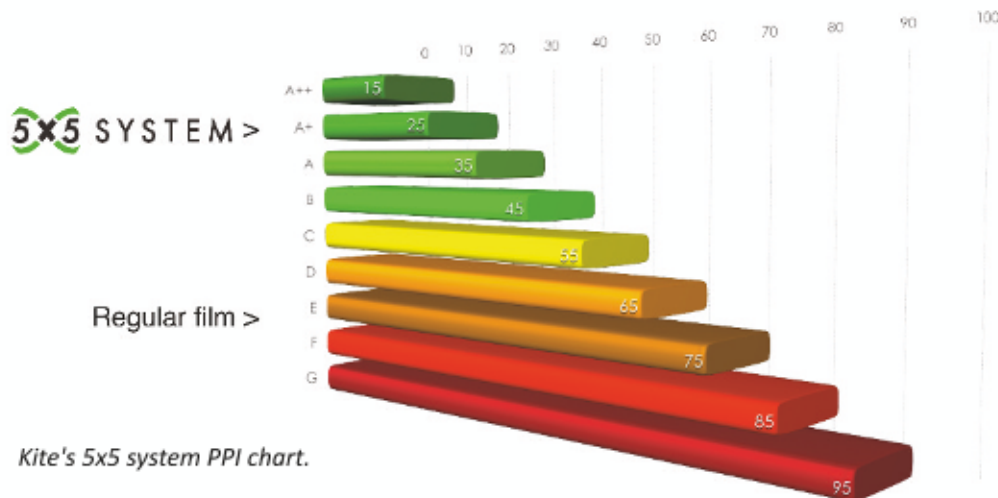
PPI is the weight of film needed to achieve 10kgs force to load based on 500 mm wide film. The lower the value, the better the performance.

When testing film, the end user needs to understand the minimum holding force required and the holding force the film being used can offer.

The following independent bodies also advise on measures and specifications for film:

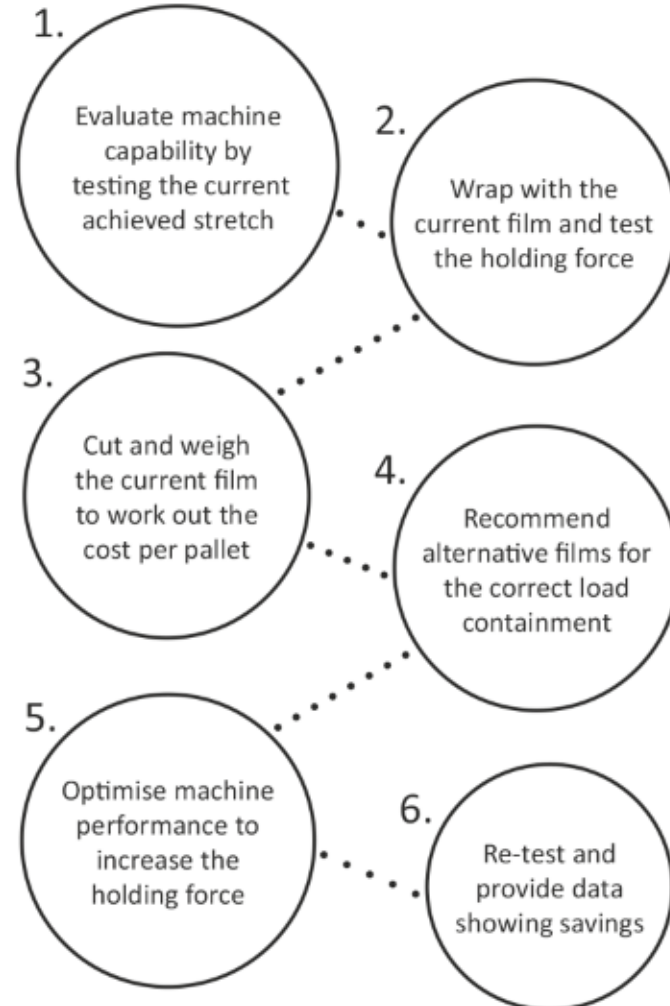
- The standard test body ASTM (www.astm.org)
- Highlight Industries
- Prostretch

Practice Performance Index



ASTM Audit Process

(www.astm.org)



Conclusion

Load Retention & Stretch Film – Are You Safe?

The conclusion from the report is that stretch wrap, whether it is applied by hand or machine, is a vital part of the supply chain and cannot just be dismissed as a low cost but necessary purchase. The results from the survey found that there is lack of testing, lack of awareness and a lack of responsibility, as there is often not a connection between the purchaser of stretch film/wrap and the people responsible for health & safety within the business.

If the stretch wrap/film, machine or both prove to be unfit for purpose, they are potentially going to cause damage to your products at the very least.

An accident caused by stretch wrap, wrapping machine or both not meeting the necessary load retention requirement is likely to result in lost product and damaged company reputation. Such incidents can cause, and have caused, serious harm and fatalities to workers and innocent road users.

**For further information or help: Phone: 02476 420065
or Email: loadretention@kitepackaging.co.uk**



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