

Pallet stability

Costs, savings and avoiding rejected & damaged loads



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What's in this short report

This short report looks at:

- The scale of the problem of pallets experiencing movement in transit, using a small survey of major FMCG manufacturers
- Two quite different case study cost-benefit analyses showing improvements that can be made in pallet stability, plastic reduction and overall cost savings

It also takes a quick look at some of the modern materials available for pallet wrapping and scientific methodology for establishing pallet stability to EUMOS 40509:2020 standards - EUMOS is the European Safe Logistics Association. And even if you don't experience lack of stability in your pallets, but perhaps you work for a company which wants to reduce its impact on the environment, or find ways to cut costs, you will still find aspects of this report useful. Read on...

The scenario

Let's say you work for a supplier of quality FMCG products or similar. You probably work in the logistics team, or you might work in the packaging department or in continuous improvement. Your company has all sorts of quality checks during the manufacturing process. Your product gets to the end of the production line in tip top condition, is palletised and gets put on a truck. It looks beautiful.

On its journey to the customer, perhaps to a supermarket distribution centre, a car in front of the truck suddenly slams on the brakes, a child steps into the road, the truck driver misjudges the traffic lights... Anyway, the driver has to brake suddenly. Your pallets are suddenly subject to a significant G-force, particularly concerning if the product is liquid.



So your product gets to the supermarket DC, but the load is refused because of health and safety concerns around unloading, and the product has to be taken away. The trailer is tied up instead of being available for other work. Some of the pallets have to be rebuilt at your cost. There's delay in getting paid. You get penalised by the supermarket...

Pallet damage has always been an issue because of the associated costs and impact in areas such as product availability in store. But pallet stability is an area of increasing interest, possibly because of the rise in automation within warehouses. The normal solution to this problem is to over-wrap the pallet, using more resources and not always achieving a solution. Both the problem and the normal solution are costly. But by applying science you can get a solution.

This report is about how often this happens in a typical large FMCG company, what happens, what you can do about it, what it might cost (or, rather, save you!) and how you can go about tackling that problem.

Scale of the problem

The size of the problem and its scope can be gauged from an anonymous survey of FMCG manufacturers in the UK – a relatively small survey, but including major players.

75% of companies surveyed were experiencing at least weekly issues – some daily

Only one company was experiencing more than 1% of its truckloads being affected by movement in transit, but 75% of the companies surveyed were experiencing at least weekly issues, with a third of that group having daily damage. Think of all those lost sales!

There were eight responses, which may not sound very comprehensive, but the fact that less than 1% of truckloads for one company resulted in daily occurrences, gives you an idea of the volume of goods being produced and moved by of some of the companies which participated. And these daily occurrences are costing over £1K per truck to resolve, which means over a quarter of a million pounds per year for just one company.

Cost: >£0.25m

Pallets damaged due to movement in transit costing more than quarter of a million pounds per year for just one company

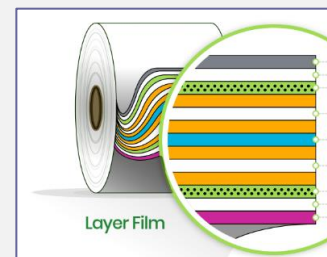
All companies surveyed were delivering into automated premises, with more than half of them causing issues to their customer/s due to the condition of palletised goods on arrival, and that's ignoring any additional problems caused by the condition of the pallet itself or labelling issues.

The one open question asked was about the process adopted for new packaging formats. All the companies surveyed have a trial process which includes a transit trial, usually sending the goods on a substantial journey. None appeared to use the type of formalised laboratory testing that is carried out by Lindum Packaging on behalf of their clients.

Solution

The results of movement in transit ranges from catastrophic collapse, through deformation (of a scale that means the goods can be recovered but are not accepted by the receiving customer), to pallets that have deformed but recovered. The objective is to wrap pallets in a manner which means they are able to recover from normal levels of in-transit deformation.

The quality of pallet wrapping is a relatively unseen and unconsidered element of the manufacturing process, when did you last hear it discussed or see reported on, so it's interesting to learn that the solution is often to pay more for higher quality material ...but use less of it, saving money, saving hassle and helping the environment. Nano films use multiple layers of the best quality polymers to give a consistent result with good stretch, so no snapping while wrapping and no pallet collapse in transit.



And/or there are quality products that include a substantial proportion of recycled material, therefore avoiding the plastic tax.

Saving while doing a better job!

The objective of this report is to put facts and figures around what is achieved by using better quality film and in the right manner. It's important to understand the numbers behind some of the claims. The cost-benefit analyses below include figures supplied by Lindum Packaging which have not been verified independently but **have** been accepted and agreed as reasonable representation by Lindum Packaging clients. Client names are not used in this report for reasons of confidentiality.

Both client case studies are for large drinks manufacturers – pallet stability is particularly important for liquid products as they are inherently unstable.

Case study A: Cost saving, less virgin plastic AND better stability

The first company was wrapping about 400K pallets per year – it was not experiencing significant pallet stability problems, as the product was in cartons, but it was using film made from 100% virgin material. Various options using product which included a proportion of recycled material were explored with this company, and a Lindum Packaging product was identified which was not only cheaper because it included recycled material* but which gave better restraint characteristics. This resulted in more than a 16% cost saving as well as more stable pallets and a small reduction in the quantity of plastic used.

*The Plastics Packaging Tax came into force at the start of April 2022 and applies to plastic packaging with less than 30% recycled content - companies have to pay £200 for every tonne of plastic packaging they use that does not contain the minimum recycled material.

400K pallets
per year

16% cost
saving by
moving to
30% recycled
wrap

More stable
pallets as a
bonus

Case study B: Additional load stability AND plastic saving

The second company which was reviewed was wrapping about 4.5K pallets per day. In this case, there was probably a cost saving of 8% or more, although it's not possible to be more precise as the exact cost of the existing wrap wasn't known. But here, the real benefit came from the improved stability along with the plastic saved. A nano stretch film from Lindum Packaging's Carestretch range was shown to give a 59% improvement in pallet stability compared with current packaging format. This was a lighter weight film compared with the existing wrap, resulting in nearly 12% plastic being saved - more than a third of a tonne per day!

It's worth noting that a second test was carried out just as an experiment. The Lindum Packaging product could achieve the same level of stability as the existing wrap using 57% less plastic, but that level of stability was known to be unsatisfactory.

After a 26-pallet trial of the pallet-stable format had done a 150-mile test trip, it was described by the receiving 3PL as a 'textbook load' on a product SKU that was renowned for poor stability.

4.5K pallets
per day

~8% cost
saving by
moving to
thinner wrap

59% improved
pallet stability

And a third of
a tonne of
plastic saved
every single
day!

It's important to note that these cost-benefit analyses **only** include direct savings and do not include some of the savings that could be identified in a full supply chain review: damage costs, cleaning up, trailers tied up, rejected loads / redeliveries, repackaging costs, KPI-based fines... as well as, for example, health & safety benefits.

Testing for stability

Lindum Packaging has recently invested in its innovation centre, which aims to allow experimentation with the client's palletised product ensuring that a combination of the film and machine settings are giving a good result for the types of stress that the pallets undergo when in transit. As well as having staff with formal packaging qualifications, much of Lindum Packaging's expertise has been developed in-house.



Lindum Packaging has the only mobile pallet stability test lab in the UK that is EUMOS 40509:2020 (EUMOS is the European Safe Logistics Association) and ISO 17025:2017 accredited. Mobile, so it can come to your premises and test pallets on site – the test bed is mounted inside a truck which first came into service during the pandemic. It's unique.

The test uses a horizontal acceleration-deceleration bench to propel a pallet down a track before bringing it to a sudden stop. A specialist camera is used to measure the movement and deformation of the pallet, tracking target labels that have been added to the test pallet. This test aims to recreate the force a pallet experiences during an emergency braking situation. It can test from 0.3G (an emergency stop in an urban situation) through to 0.8G (motorway emergency stop) if required.

A video is taken of the pallet during the test, so the maximum deflection and the angle to which it returns can be recorded and analysed. While to the untutored eye the sight of the wooden pallet lifting on one side off the truck bed feels shocking, I've learned that this is actually one sign of a well-wrapped pallet as it is retaining its integrity during the staged emergency stop.



The change in stability is based on a measurement of the 'holding force' of the film on the pallet. 'Holding force' is an indicator of the level of pallet stability – but it isn't an exact science. For example, an 800kg pallet with a holding force of 10kgs at the base might be very stable if it's a solid product packed in boxes, brick stacked – but an 800kg pallet of bottles of water is an entirely different story.

This small section has been included for completeness – for those who haven't come across this before, you can learn much more by visiting Lindum's website and following for LinkedIn posts.

In conclusion

This report has been independently compiled by Kirsten Tisdale of Aricia Limited during July & August 2023. It includes figures supplied by Lindum Packaging which have been accepted and agreed as reasonable representation by Lindum Packaging clients. Aricia Limited has a non-disclosure agreement with Lindum Packaging and client names are not used in this report for reasons of confidentiality.

Kirsten notes: This wasn't an area I'd been deeply involved with in the past, and I've been impressed with the approach that Lindum Packaging take – selling pallet stability, rather than just concentrating on selling product. And I've been convinced of the benefits of taking this approach.

As with many things in life, you may have to prioritise, but there are such a variety of potential benefits. Just in the two case studies I examined, in one you could get a 59% improvement in pallet stability AND nearly 12% plastic saved. Or in the other case study, a 16% cost saving as well as more stable pallets and a small reduction in the quantity of plastic used. If you'd like to see the detail of the cost-benefit analyses, please do ask.

For any supermarket or supplier out there that is interested in getting to the bottom of what this is costing throughout the supply chain, there is a long list of potential areas for savings and other benefits – please do ask. If you'd be interested in a project to see what fixing this problem of movement in transit looks like, please do use the contact details to get in touch.

About the author: *Kirsten Tisdale* works with clients who are planning change – helping to develop concepts, put facts & figures around options and to de-risk decisions - she is known for her analytical approach.

Kirsten is a Fellow of the Chartered Institute of Logistics & Transport and an RHA Professional Member - she graduated in Mathematics from Imperial College.

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Aricia Limited is a consulting company, established by Kirsten in 2001, usually specialising in logistics, data & geographic analysis, supply chain modelling and industry research.

Aricia is a member of Logistics UK and an associate member of the Cold Chain Federation & the UK Warehousing Association.

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Lindum Packaging develops and supplies high performance stretch films and other transit packaging products, but its main selling point is that it will sell you pallet stability and save you costs.

Information about Lindum Packaging can be obtained on their website.

www.lindumpackaging.com

For any pallet stability queries contact Lindum directly on contacted:

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