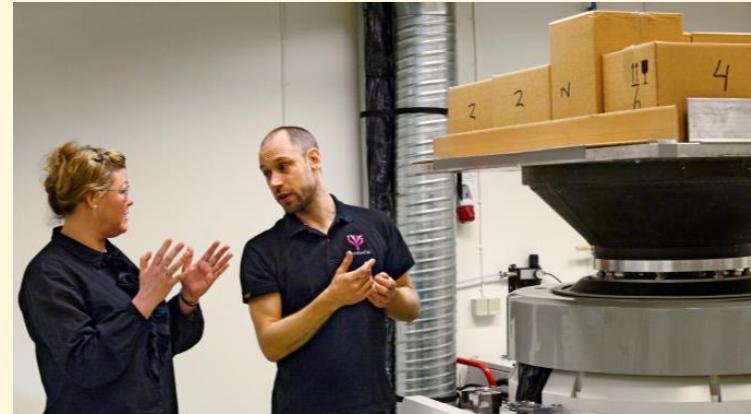


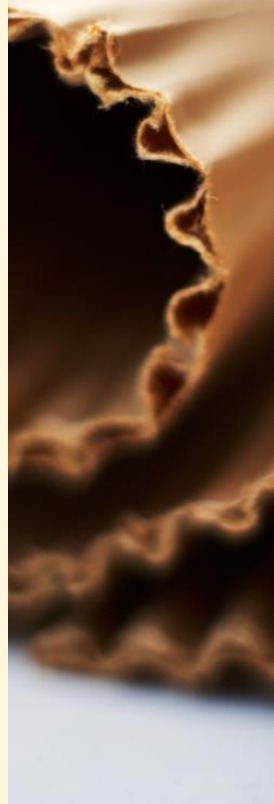
E-commerce studies at RISE

Thomas Trost, Elin Åkerlund

Unit: Packaging Performance

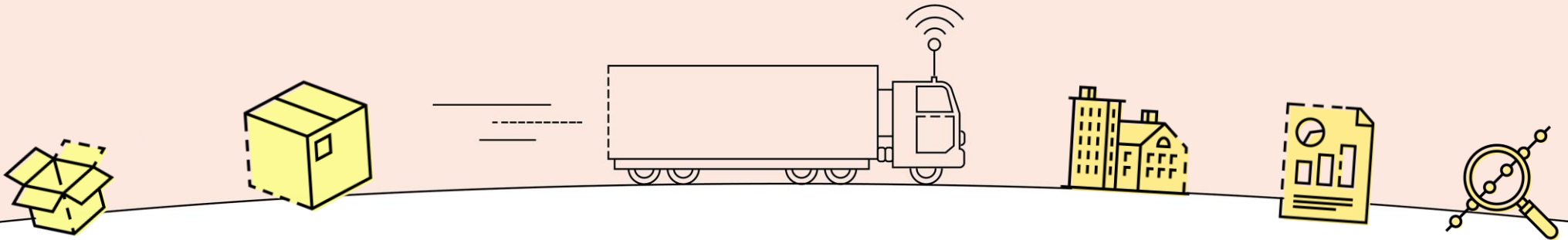


**RI
SE**



Summarized reports

During the last few years, RISE has made a number of scientific studies about e-commerce. This presentation compiles four of them.

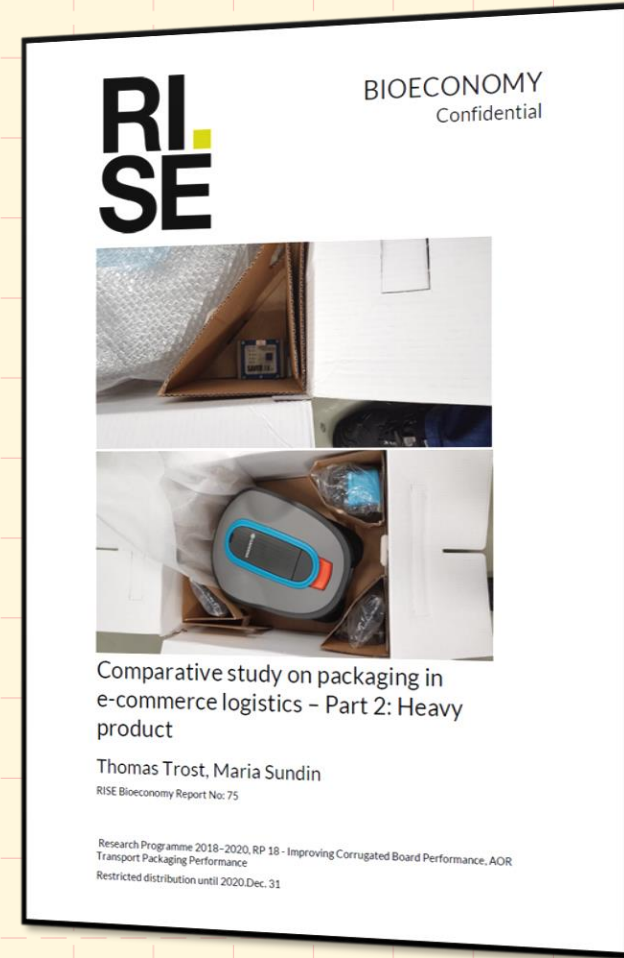


Comparative study on packaging in e-commerce logistics – Part 2: heavy product

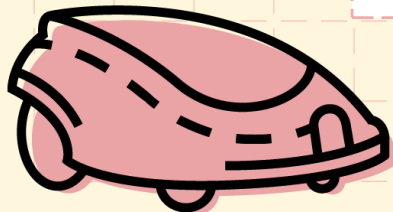
E-commerce packages with robotic lawn mowers

Field study – sent from Germany to a private customer in Sweden

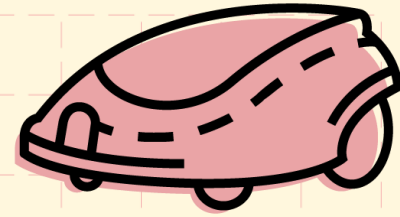
Laboratory test – ISTA 6 Amazon - Ships in Own Container (SIOC)



Thomas Trost
Maria Sundin



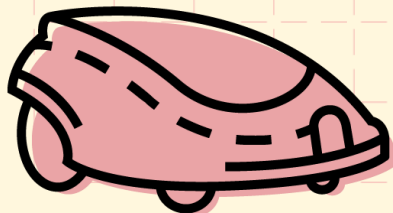
Field study – sent from Germany to a private customer in Sweden



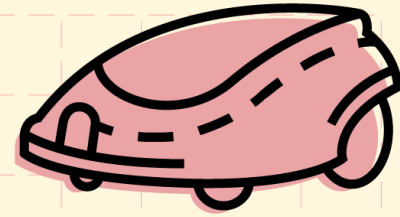
Parcel A: Compressed/deformed on the outside of the box and the inserts were compressed/deformed. The handle was broken. The product was in perfect condition.

Parcel B: Minor compression on the outside of the box and minor compression on the inserts. The product was in perfect condition.

Parcel C: Minor compression on the outside of the box and minor compression on the inserts. Handle was broken. The product was in perfect condition.

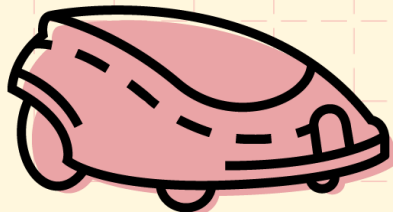


Laboratory test – ISTA 6 Amazon - Ships in Own Container (SIOC)



Parcel D: Only some indentation at a few corners after the drop sequences. However, the handles were not tested in ISTA test schedule.

Parcel E (different insert material): Much more damaged box due to fixation issues of the product with the new insert material. Cracks on one edge after the first sequence of drops. Handles were not tested.



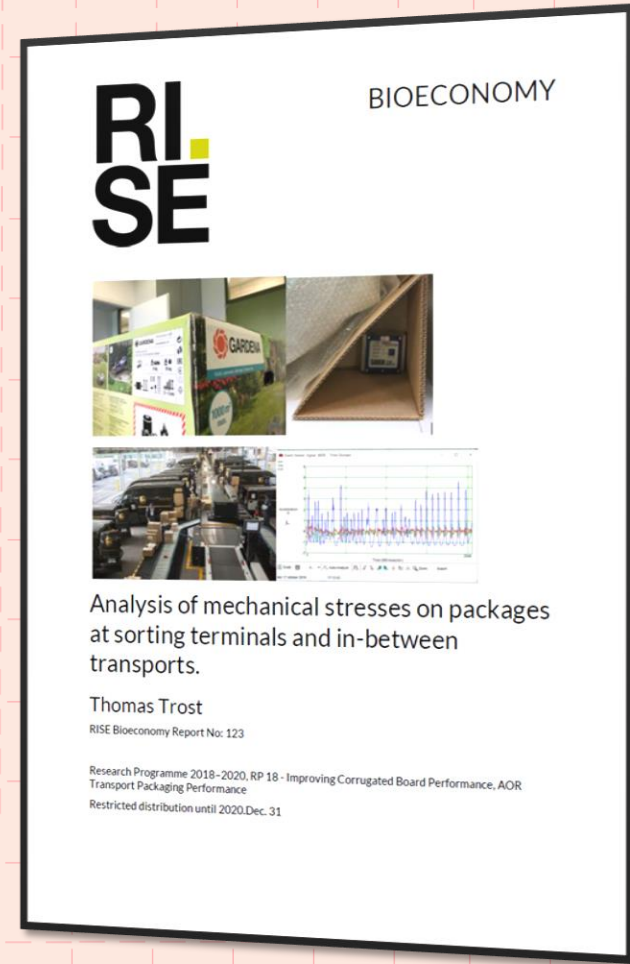
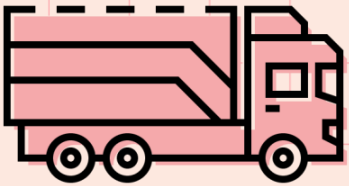
Analysis of mechanical stresses on packages at sorting terminals and in-between transports

Deeper analysis of the data recorded during the field study and the simulated laboratory transport test

The severity of the package handling was different in different terminals

Ranking of terminals is possible with the method of having logged parcels addressed to customers.

To get a good ranking estimate of the mechanical handling, several packages of different size and weight could be logged over time.

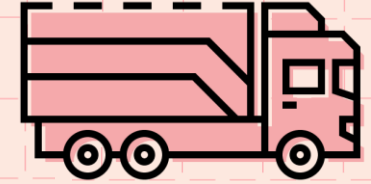


Thomas Trost



Analysis of mechanical stresses on packages at sorting terminals and in-between transports

Terminals/ Transport	Distance from start (km)	Duration (h. m)	# of signal triggered events	Mean of 25 highest G values	Mean of 25 highest Grms levels
1. Ulm, GE	0	1.22	123	5.30	0.456
2. Transport	193	2.42	39		0.193
3. Nürnberg, GE		5.37	76	9.43	0.639
4. Transport	695 (502)	8.03	317		0.195
5. Langenhagen, GE		17.38	133	13.07	0.852
6. Transport	1151 (456)	7.00	1078		0.211
7. Gløstrup, DK		3.53	109	3.18	0.282
8. Transport	1491 (340)	54.43	39		0.149
9. Jönköping, SE		2.25	9		
10. Transport	1514 (23)	11.36	1504		0.548
Summary	1514	6d, 2h, 28m	2872		



Most demanding terminal.

May be due to mechanical handling equipment used, organization of the goods flow in the terminal and the motivation and education of the personnel.

Last-mile distance: 23 km

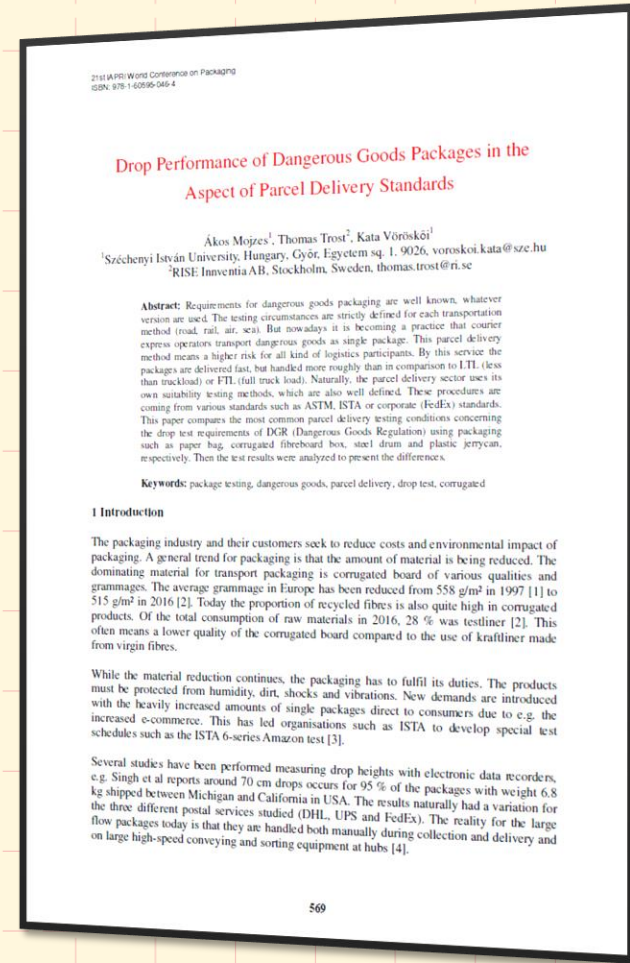
Duration: > 11 hours

Drop Performance of Dangerous Goods Packages in the Aspect of Parcel Delivery Standards

Important to choose relevant test sequences and the order of them

The height of drop is not the strongest influencing factor of the damages, rather the number of drops.

Different materials and package constructions have different damage mechanisms



Akos Mojzes, Thomas Trost, Kata Vöröskői
Together with Széchenyi István University in Győr, Hungary

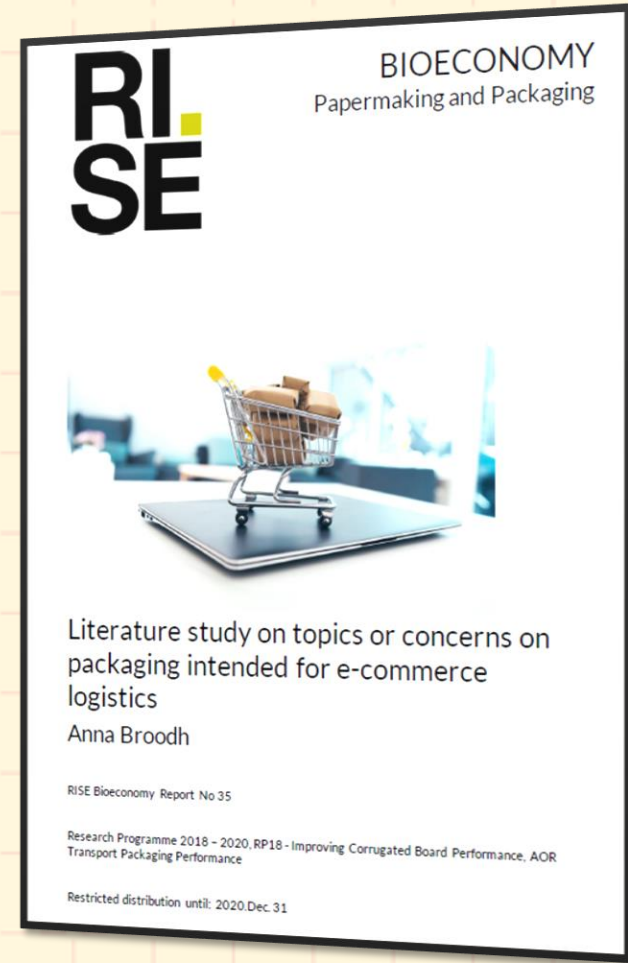
Literature study on topics or concerns on packaging intended for e-commerce logistics

Less automated supply chain, plenty of touch points, high return rate

A typical product in the e-commerce logistic chain will experience between 20–30 touches before it reaches the consumer

Return rates for e-commerce packages are 20–30 % compared to 8–9 % for retail sales

Increased hazard rate due to that multiple items are consolidated into one shipping unit



Anna Broodh



Take aways from the studies

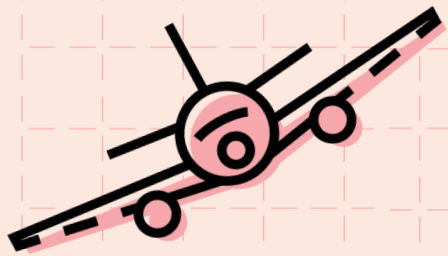
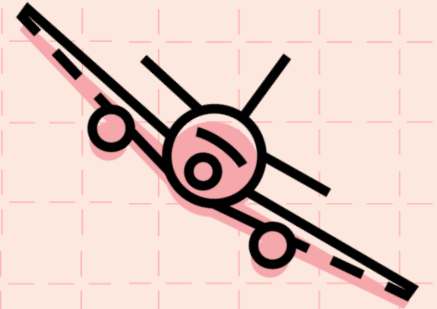
The e-commerce logistic chain is complex

Drop tests are tough

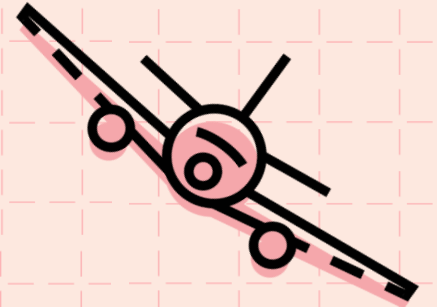
Different materials and package constructions have different damage mechanisms

The severity of the package handling is different in different terminals

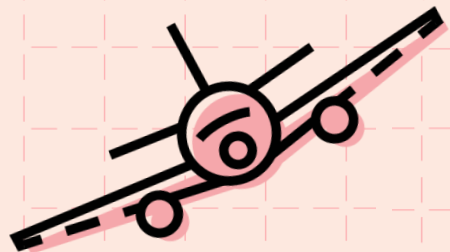
Vibration profiles mimicking different kinds of vehicles travelling at different locations in the world are essential for laboratory simulations



The remaining question



Is there an existing standard that simulate what e-commerce packages are exposed to during their distribution chain good enough to be appointed as the e-commerce standard to use when evaluating packages for the e-commerce distribution chain?

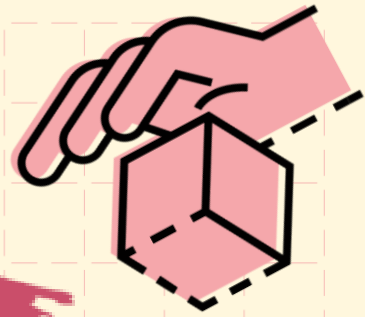


What are the differences in logistics around the world and how should one take this into account?

- Different climate
- Different vibrations due to different road infrastructures
- Different vibrations and stresses due to different vehicles used
- The severity of the package handling is different in different terminals



How to test for e-commerce



Climate test

Few drops but several drop sequences instead of several drops divided into only one or two drop sequences

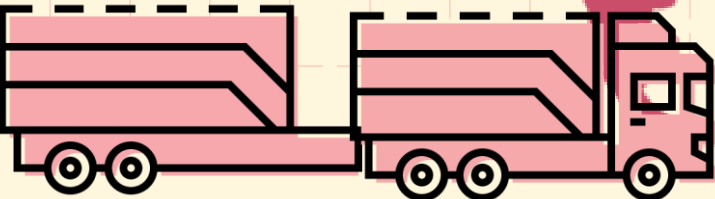
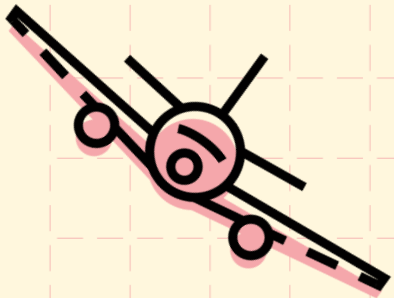
Drop test at varying drop heights

Vibration profiles should be different for different parts of the world as the road quality and infrastructure differs

Also of importance:

Test carrying handles and perforations

Test for co-packing



E-commerce < 20 kg	National	National	International
	Truck	Truck + air	Truck + air
Open any existing handles			
Climate (required)	Choose from chart (+ alternative for boat shipment)	Choose from chart (+ alternative for boat shipment)	All climate zones from chart, including boat
Drop	5 drop (height 1)	5 drop (height 1)	5 drop (height 1)
Vibration with top load	Truck National	Truck National + Air	Truck International + Air
Drop	5 drop (height 2)	5 drop (height 2)	5 drop (height 2)
Vibration without top load (incl. last-mile?)	Truck National	Truck National + Air	Truck International + Air
Drop	5 drop (height 3)	5 drop (height 3)	5 drop (height 3)
Low pressure		60 min	60 min
Drop on hazard	height 4	height 4	height 4
Carrying handle/perforation			

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