

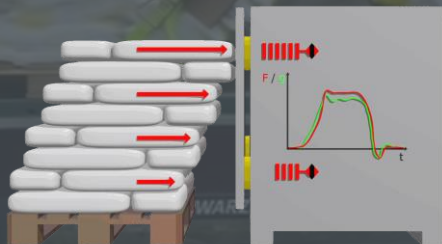


SV-BÜRO
ING. GERALD RIEGER
GUTACHTEN SEMINARE BERATUNG

cargo test & training

presents:

LLS



Load and Lash Stability

real dynamic
load forces measuring system



LLS Load and Lash Stability

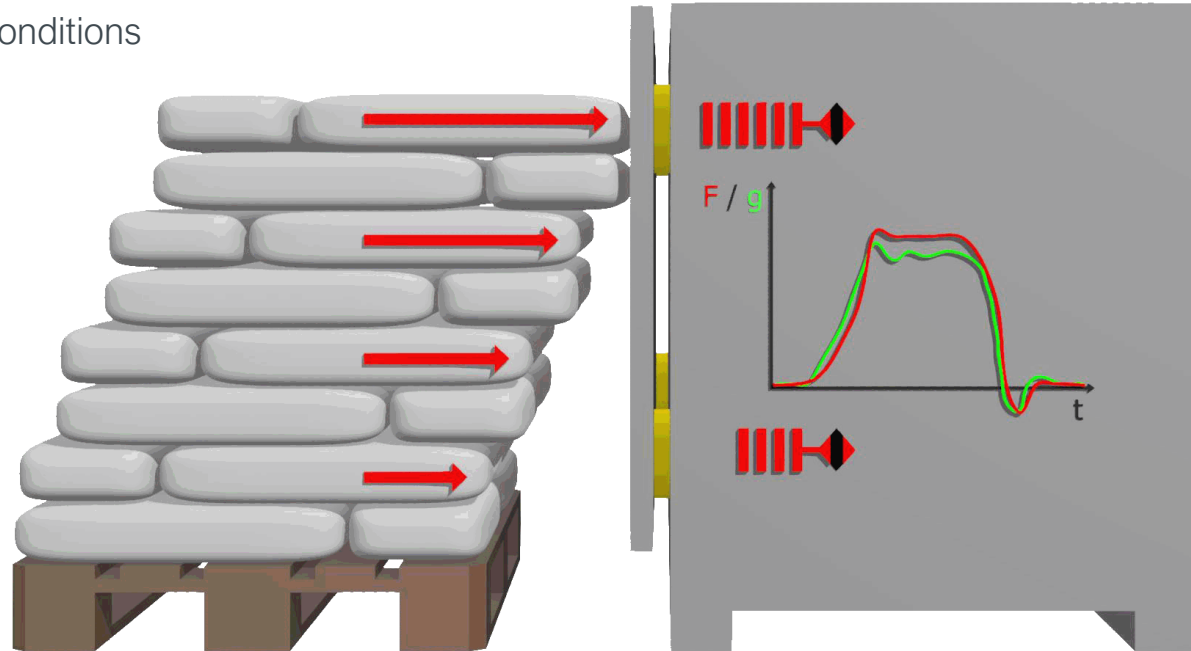


LLS test and measuring system for:

- real dynamic measuring of load displacement forces
- packaging / load securing testing and improving under real conditions

directly on truck / container / train / ship / . . .
or adapted to existing test stands

- modular in different sizes
- modular in all 4 directions
- free number of sensors / measuring segments
- free design of user interfaces
- parallel video recording
- and much more . . .



LLS Load and Lash Stability



LLS test and measuring system / a new and patented standard:
advantages / start of a new age of cargo safety / as an extension to existing test methods:

- independent from location and self-sufficient for trucks / containers / railway / ship . .
- most types of (secured / unsecured) load possible
- measurements directly on site at the producer / shipper or somewhere under real conditions
- vertical oscillations, shocks and torsions have an effect (friction losses up to approx. 20%)
- actual state and changes can be compared immediately on the basis of values
- checking the entire system: packaging / securing / vehicle-stability
- very long impact- and force-durations possible
- sizes / segmentations / force-directions / designs acc. to customer requirements
- freely expandable industrial measurement technology, sensors, software, video and display
-



LLS Load and Lash Stability



LLS test and measuring system in use / example 01:

1+2+2 pallets / total 5t salt in bags /
each row lashed down

all data immediately readable

displacement-force max. 450 daN

during braking deceleration $\approx 0,7g$

and in blue / yellow

lashing-strap pretension during

braking approx. 120 daN increasing



LLS Load and Lash Stability

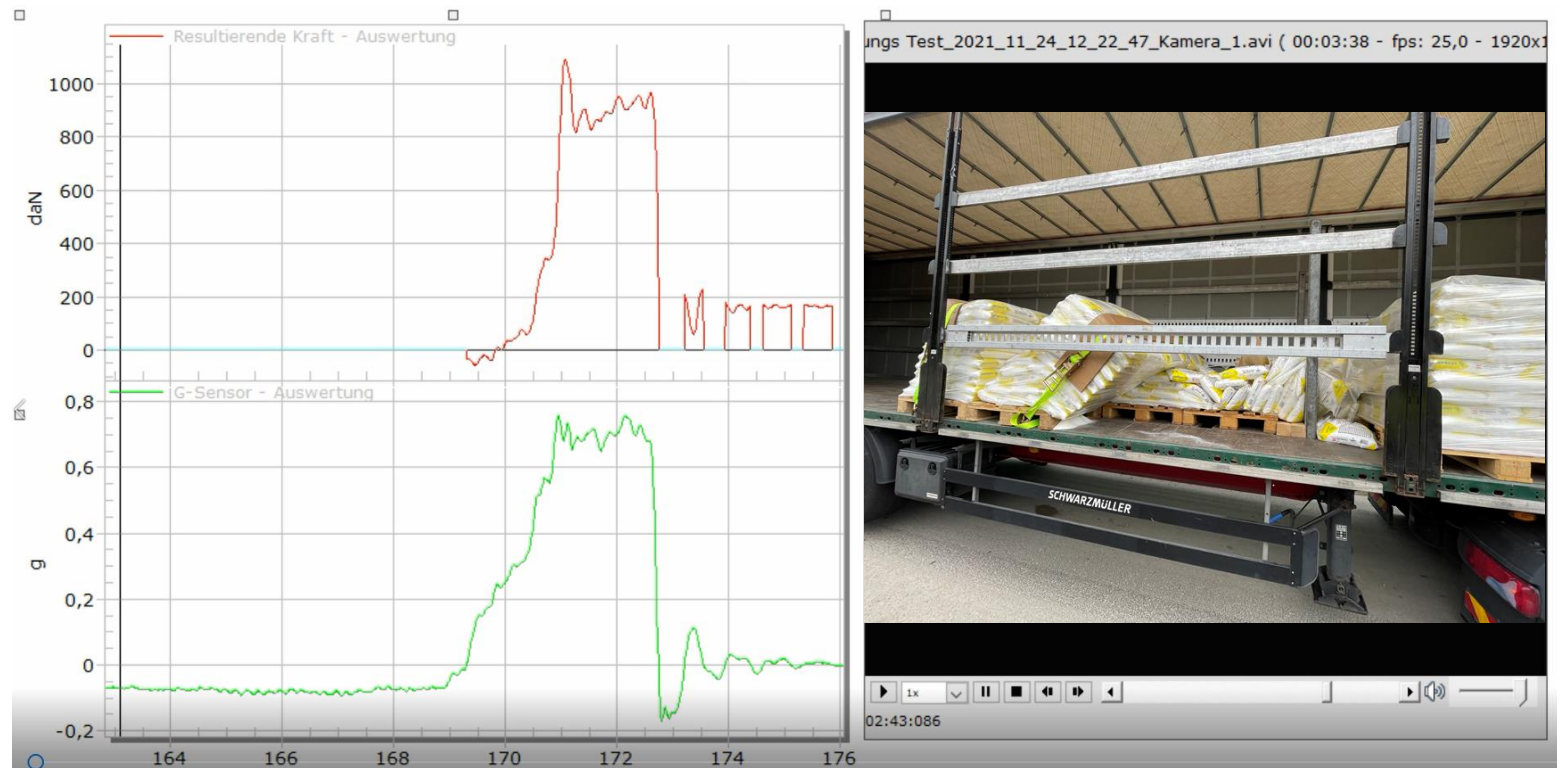


LLS test and measuring system in use / example 02:

1+2+2 pallets / total 5to salt in bags /
unsecured !

displacement-force max. 1.100 daN !!!
during braking deceleration $\approx 0,7g$

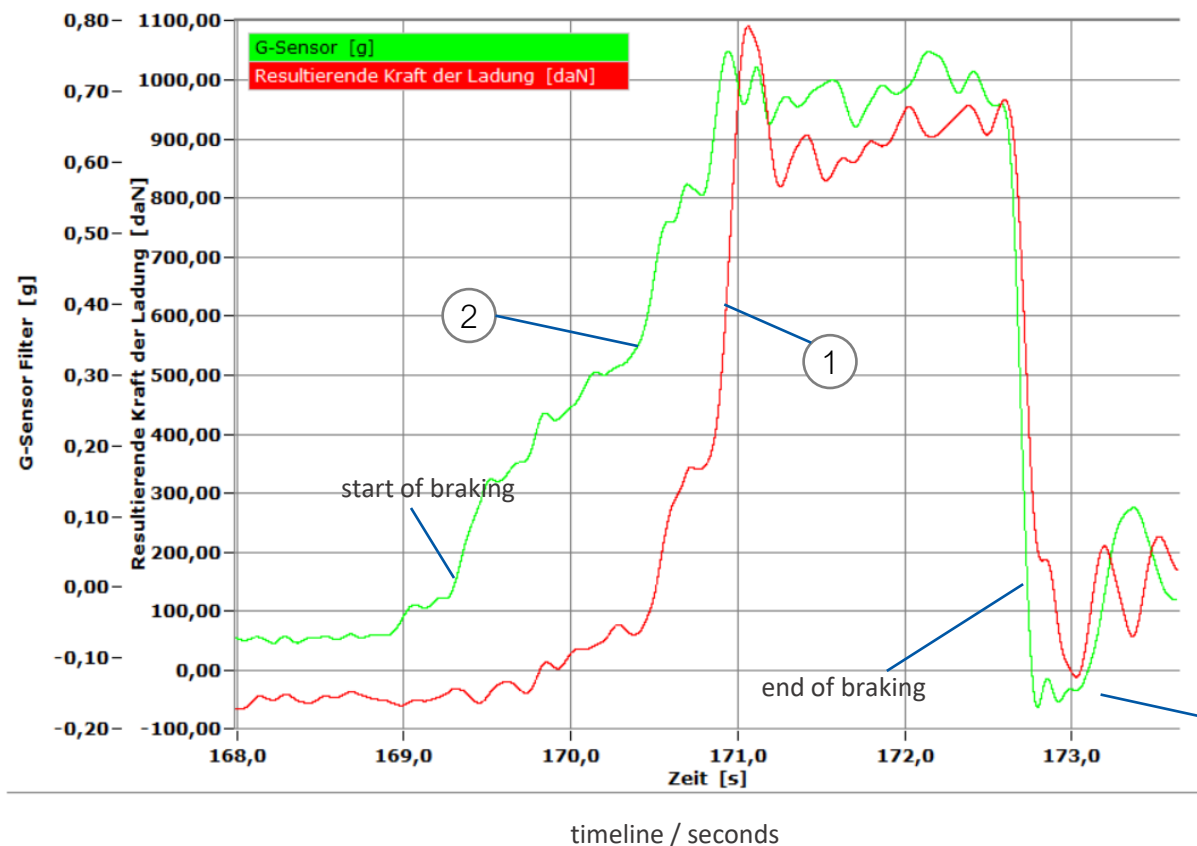
compare values from example 01 (450 daN)!



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LLS measuring details: braking test / example 02 (5 pallets salt / 5t without lashing):



G-Sensor Filter	
Anzahl Werte	1046633
Minimum	-0,1702 g
bei	172,8 s
Maximum	0,7561 g
bei	170,9 s

2 g-forces
max. g-force at test 02 (= 6,87 m/s²)

Resultierende	
Anzahl Werte	1046633
Minimum	-76,68 daN
bei	155,5 s
Maximum	1090 daN
bei	171,1 s

1 net load forces
max. net load-force
moving forward
(coming from front pallet)

see LLS short video: from min. 1:00 to 1:09

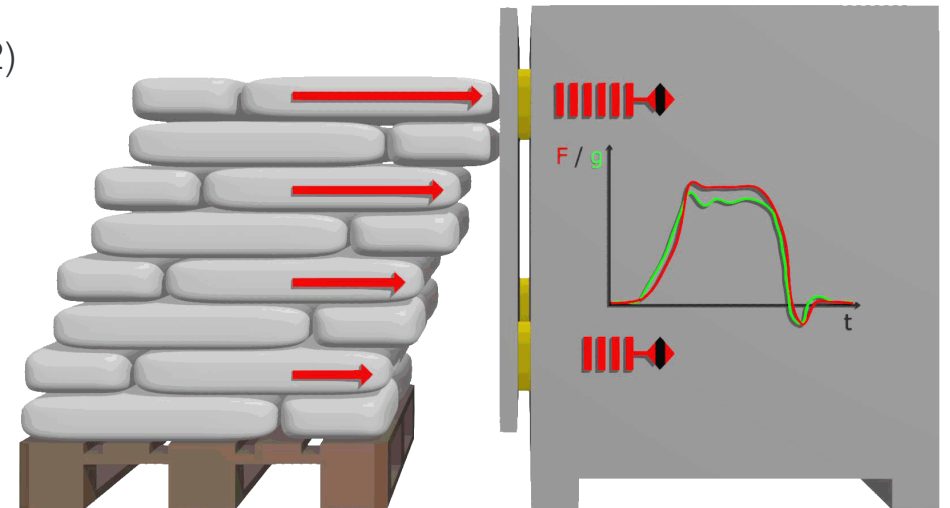
trailer and load rebound

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LLS test and measuring system / current equipment:

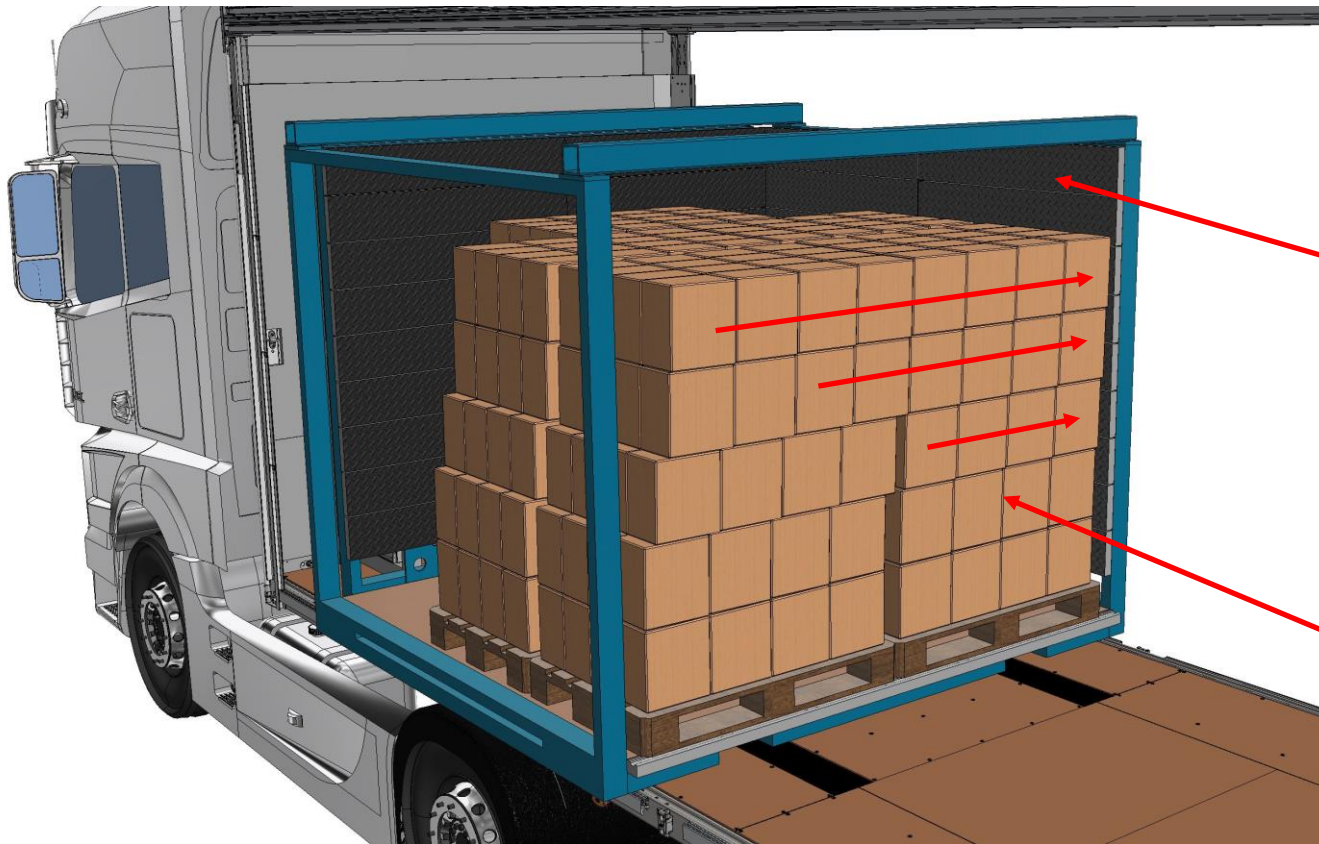
- effective measuring platform area: 1.500 x 1.500 mm
- range: 0 – 10.000 daN
- reproducibility: +/- 10 daN
- 4 load-force transducers with a nominal force of: 5.000 daN each (accuracy class 0,2)
- 1 accelerometer: -2g to +2g (1-axis, +/- 5mg)
- 2 lashing-force transducers with a nominal force of: 5.000 daN (class 0,2)
- standard measuring rate = 4.800 Hz
- integrated amplifier with 8 channels (galvanically isolated)
- video recording with 25 fps – HD 1920x1080
- data acquisition software with flexible data analysis / visualisation
- self-sufficient power supply / battery life approx. 5 hours



LLS Load and Lash Stability



LLS extensions possible:



measuring devices variable in size and design

for example:

1 measuring platform in front +
1 measuring platform on the right (cornering)

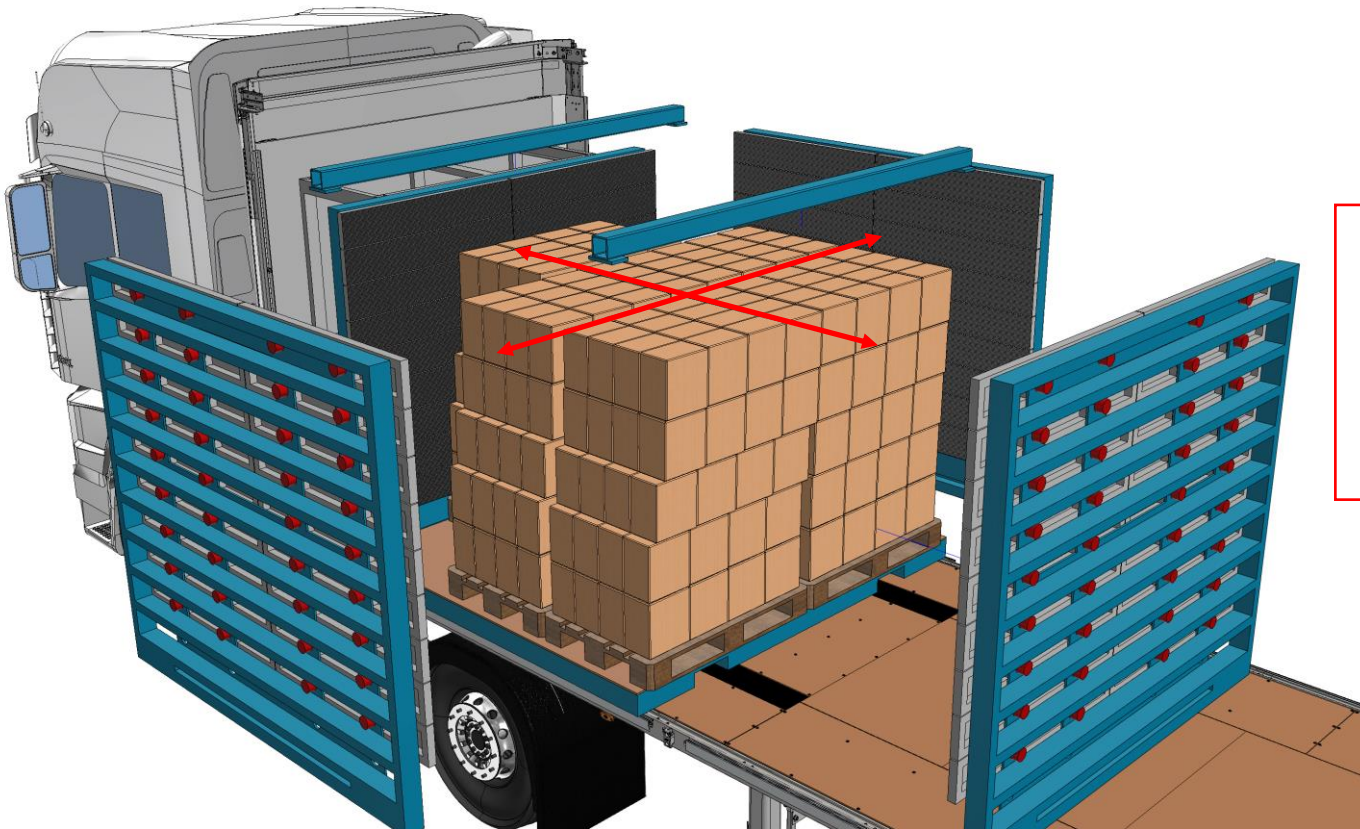
various cargo types



LLS Load and Lash Stability



LLS extensions possible:



measuring devices variable in size and design

for example:

modular system in all 4 directions



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