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# Evolution of bulk handling

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Liebherr SmartGrip®

[www.liebherr.com](http://www.liebherr.com)

**LIEBHERR**

Port and transshipment solutions



# Mode of operation

SmartGrip® operates as an intelligent system which optimises grab filling rates in a self-learning manner and has the potential to significantly increase bulk turnover. Test and analysis in the field have shown an average grab filling rate of 70%. With the help of SmartGrip®, the full capacity of the grab can be utilised.

## System

Without any additional driver interaction the algorithm learns the machine settings and material properties autonomously within only a few lifts. During operation the self-learning system automatically adjusts its behaviour by recognizing bulk density, compression and granularity as well as current frame conditions such as depth of impression or type of grab.

## Driver

For crane drivers the estimation of the material density and the right grabbing angle may turn out to be a real challenge. Using SmartGrip® the driver just controls the closing of the grab. The system controls the filling of the grab to suit the load curve of the crane. This leads to a perfect crane utilization with a significant reduction of overloads.

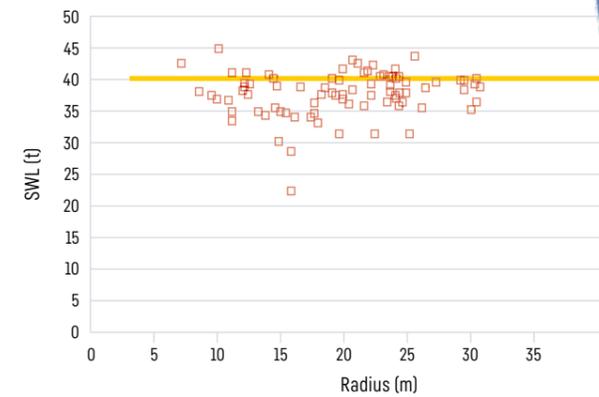


# SmartGrip® benefits

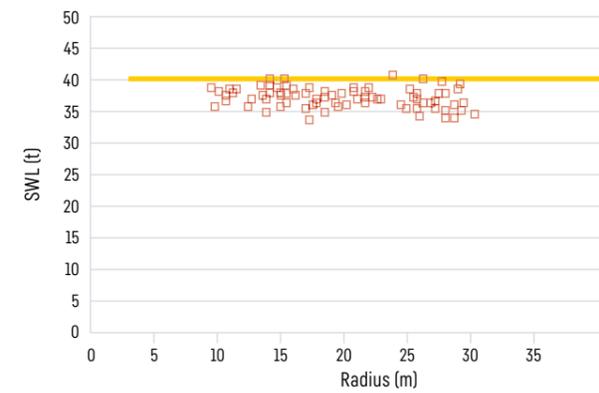
## Turnover

Turnover depends on many issues (drivers, materials, logistics, etc.). SmartGrip® addresses various parameters to improve performance by up to 30% for land based and 25% for floating applications.

Load diagram without SmartGrip®



Load diagram with SmartGrip®



### Optimized filling rate

- Independent of incident angles
- Grab volume fits to max. outreach

### Reduced cycle times

- Less time for grab filling
- No grab re-opening required
- Less power needed

## Lifetime

### Extended crane lifetime

- Reduced dynamic overload peaks
- Bigger grabs can be used

## Driver

### Reduced stress

- The system adjusts to different materials and densities
- Significant improvement of less skilled drivers



