Carbon footprint

declaration

Hydraulic yard spreader - YSX45

Assembled at:
Bromma,
Ipoh, Malaysia

In accordance with ISO 14040, ISO 14044, and ISO 14067.
Version: 1.0, LCA date: 20-12-2023

BROMMA

Introduction

This carbon footprint declaration summarizes the results of a life cycle assessment (LCA) conducted for Bromma's hydraulic yard spreader.

Bromma in brief

Bromma is the industry market leader in ship-to-shore spreaders, mobile harbor crane spreaders, and yard crane spreaders. A pioneer in the container handling industry, Bromma is focused on lifting the productivity of its customers through more reliable spreaders. Bromma has delivered crane spreaders to 500 terminals in 90 nations on 6 continents, and Bromma spreaders are in service today at 99 out of the world's largest 100 container ports. Bromma's industry-leading all-electrics spreaders and recent products such as the Spreader Monitoring System are part of this continuing effort.

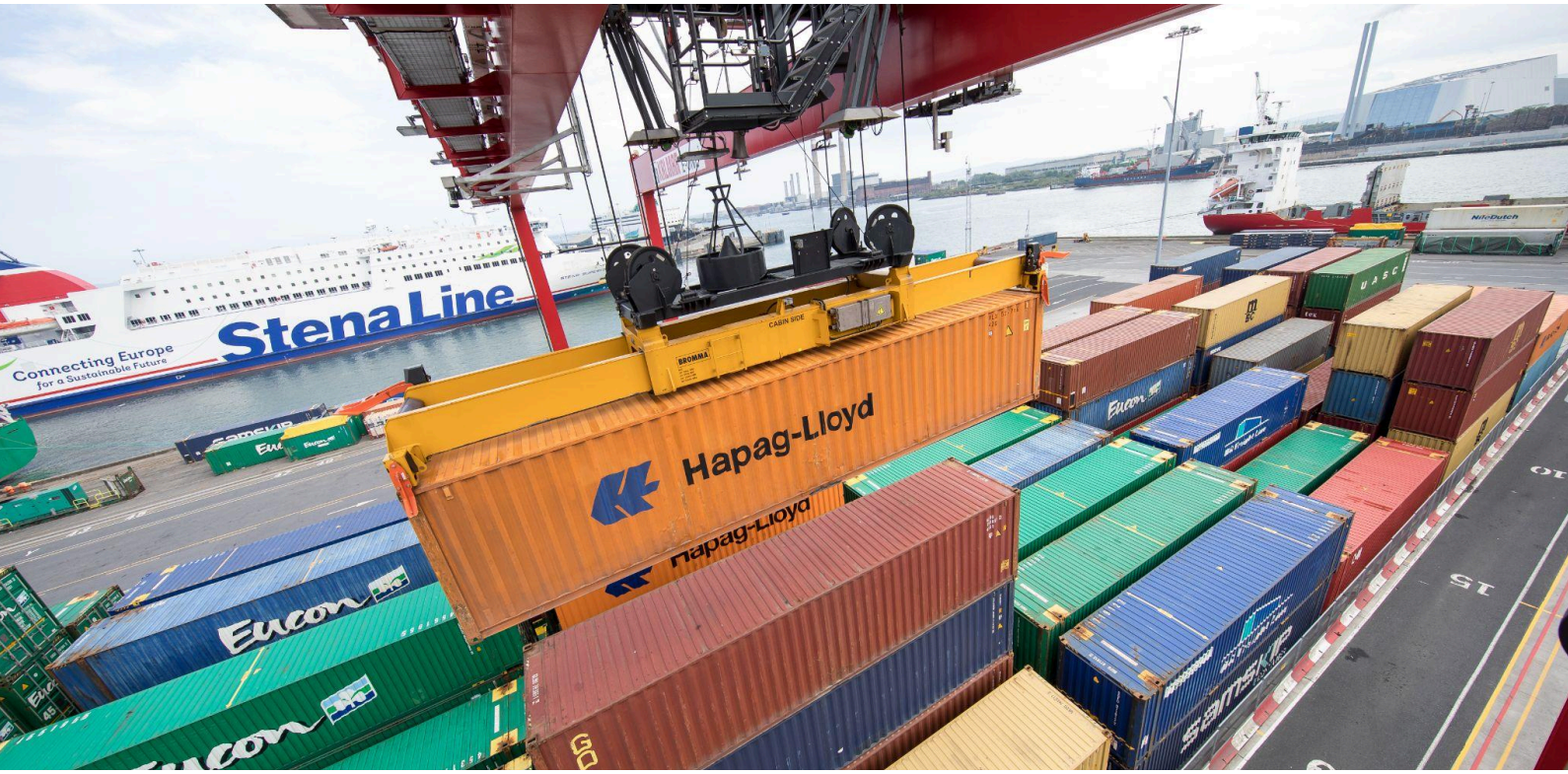
Product information

The Bromma YSX45 is a heavy-duty yard crane spreader with mechanical structure calculated for 2 million cycles. The spreaders can adjust their length to lift 20', 40' and 45´containers using ISO floating twistlocks.

The spreader is designed in accordance with EN13001. As all Bromma spreaders it is made from European high quality steel, which ensures a light and robust design. The spreader has a user friendly design and all components are easily accessible for inspection and maintenance.

Material class	% of share
Core structure	92,4
Power drive	4,05
Flipper or guide	0,90
Hydraulic oil	1,77
Electronics	0,87

Table 1. Percentage share of material.



Life cycle assessment methodology

This carbon footprint declaration is a summary of the results of a thorough life cycle assessment (LCA), which is based on the internationally recognised ISO 14067 standard. The LCA study has been critically reviewed by a third party to ensure it meets the requirements of the ISO standard.

LCA information	
Scope	Cradle-to-grave, with options.
Functional unit/ declared unit	1 unit of YSX45 spreader (Total weight: 8,5 tons)
Reference service life	80 000 hrs
Cut-off rules	A cut-off of 3% is applied
Allocation	Mass balance and time-based allocation
Geographical coverage & time period	Europe Year 2023
Background data source	“LCA for experts” and ecoinvent LCA databases
Software	GABI v10
Critical reviewer	Vladimir Koci, LCA STUDIO

Table 2. LCA information

Description of life cycle and system boundaries

The LCA includes raw material extraction, manufacturing of components by suppliers, in-house assembly, use phase and maintenance of the Hydraulic yard spreader.

The **product manufacturing** phase includes raw material extraction, manufacturing of components, and assembly of the hydraulic yard spreader.

The **use phase** consists of the operation of the hydraulic spreader. The yard spreader operates on a hydraulic mechanism using electrical energy from the machine to which it is attached to so it does not have its own power source. The use phase covers the electricity usage in 80 000 operating hours which is the designed operating hours. EU average electric grid mix is used with a GWP100 of 0,324 kgCO2eq./kWh.

The **maintenance phase** includes production of all components and oils that are typically replaced during the lifetime of the product.

The **transportation phase** includes transport from Kalmar site in Bromma, Malaysia to the customers site. Transport during the manufacturing and other life cycle phases are taken into account based on estimates and averages due to unavailability of primary data.

The **end-of-life phase** is modeled according to the cut-off method. Therefore, it is excluded from the main results as it was modeled using generic data and no primary data was available on how the equipment is treated at the End-of-life

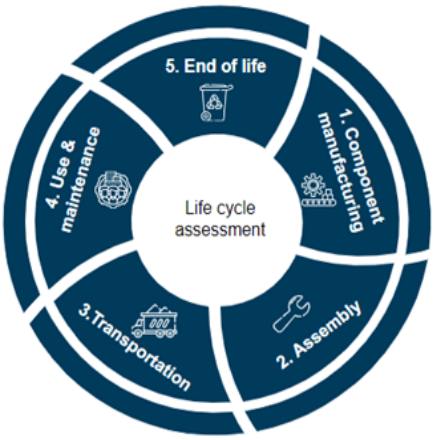


Figure 1. Life cycle phases.

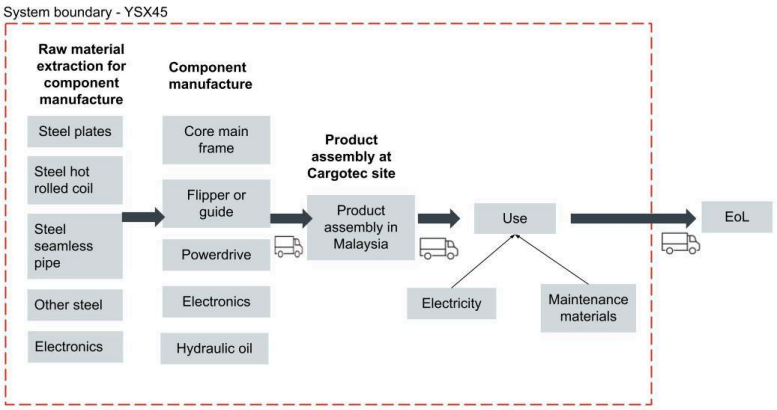
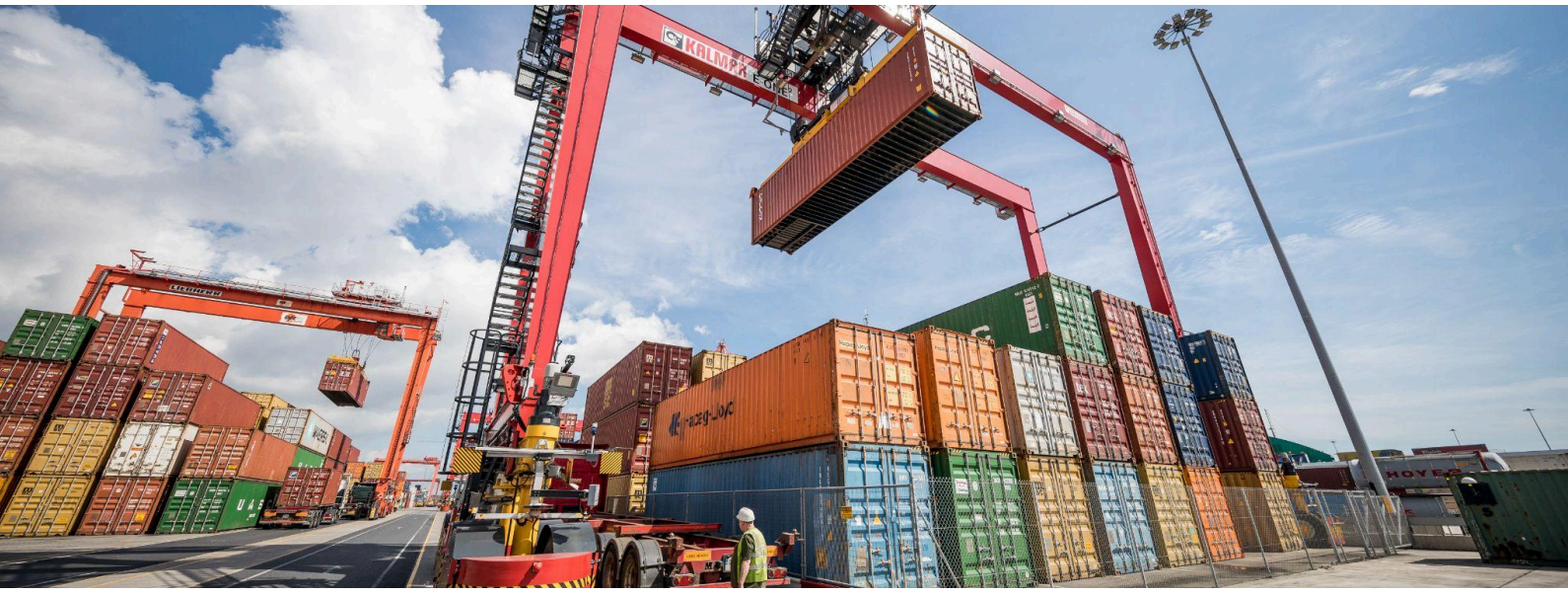


Figure.2 System boundary



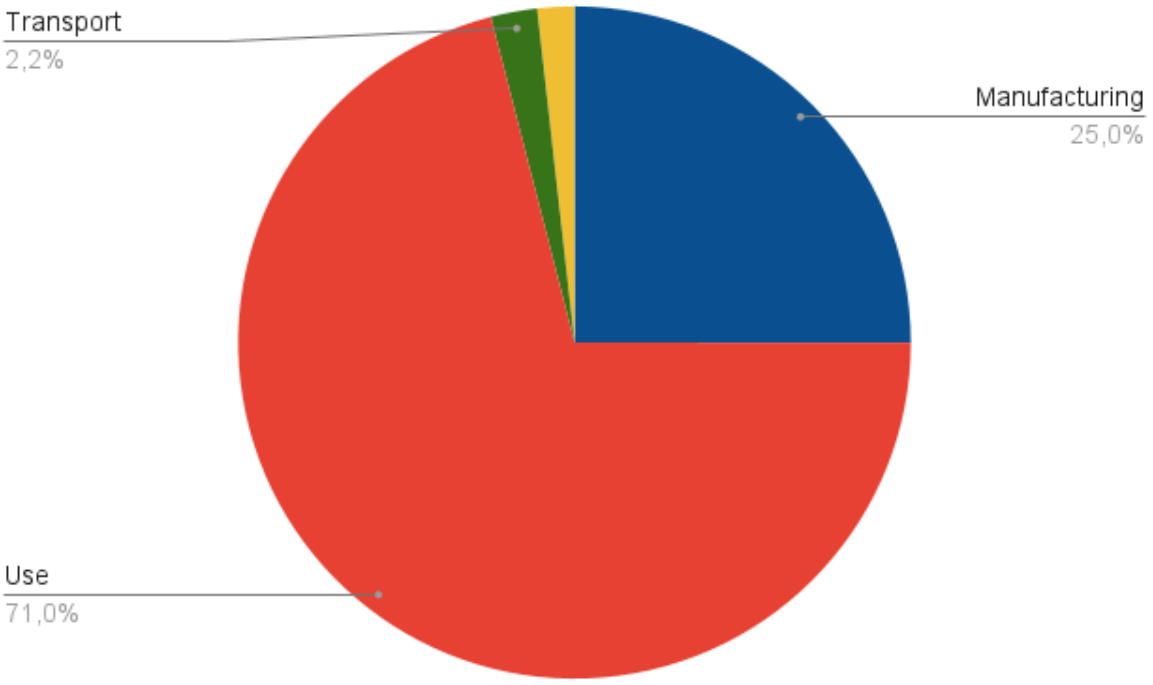
Results - Carbon footprint

Table 3 lists the Greenhouse Gas emissions results for each greenhouse gas emission type and life cycle phase, according to ISO 14067. The contribution of each life cycle phase on the total carbon footprint is further examined in Figure 3.

kg CO_2 eq.	Production	Transport	Use	Maintenance	Total
ISO14067 GWP100, Aircraft emissions	0,003	0,00	0,080	0,002	0,085
ISO14067 GWP100, Net Biogenic GHG emissions	-15,6	-96,3	500,0	15,7	403,8
ISO14067 GWP100, Emissions from land use change (dLUC)	17,3	18,8	7,0	0,4	43,5
ISO14067 GWP100, Fossil GHG emissions	22732,0	2100,0	64000,0	1600,0	90432,0
Total GWP100	**22733,7**	**2022,5**	**64507,0**	**1616,1**	**90879,3**

Table 3. Carbon footprint results

Figure.3 Total carbon footprint share of different lifecycle phases



Use phase is the hotspot of the life cycle of the Hydraulic yard spreader

The life cycle assessment showed that the use phase is the hotspot for the GHG emission contributing to 71% of the life cycle emission in the YSX45.

In addition to the carbon footprint, the LCA study also evaluates other environmental impacts according to the PEF method.

We continue to develop these data points and will update this statement when we receive new information.

* Calculated with an average EU electricity mix.
Assuming that these products have longer lifetime than the warranteed time, the spreaders are expected to have a second life and therefore are used somewhere else due to which the end-of-life has been excluded from the system boundaries.

Manufacturing and assembly

The manufacturing phase has the second largest contribution (25%) to the life cycle emissions of the product compared to other phases.The *Core structure* is the biggest contributor in this phase to the carbon footprint of the product. It is also the component that makes up the most weight in the product.

Use phase

The use phase is the largest contributor (71%) in the life cycle of the product. The emissions originate from electricity generation required during the lifetime of the product. An EU-average grid mix from GaBi was used at this stage.

Transport

The emissions from the transportation required for the manufacturing and distribution of the product has a low contribution (2,2%) when compared to the other life cycle phases.

Maintenance

This phase has a low contribution (1,8%) to the carbon footprint of the product. Emissions in this phase are associated with the replacement of components and oils.

End-of-life and circularity

The end of life phase is calculated according to the cut-off approach as Cargotec does not own live data on how the equipment is treated after the first life. It is assumed, even if the product does not have a second life after usage, the majority of it would likely be recycled as recycled steel is a valuable material.

References

1.	ISO 14040:2006: Environmental Management-Life Cycle Assessment-Principles and framework.
2.	ISO 14044:2006: Environmental Management-Life Cycle Assessment-Requirements and guidelines.
3.	ISO 14067:2018: Greenhouse gasses — Carbon footprint of products — Requirements and guidelines for quantification.
4.	LCA report: “Bromma YSX45/YSX45E LCA report”

BROMMA

A Tradition of Innovation

Bromma is the industry market leader in ship-to-shore spreaders, mobile harbor crane spreaders, and yard crane spreaders. A pioneer in the container handling industry, Bromma is focused on lifting the productivity of its customers through more reliable spreaders, and Bromma's industry-leading all-electric spreaders and recent Spreader Monitoring System application are part of this continuing effort.
www.bromma.com

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