

## SIDE LOADED REFUSE COLLECTION VEHICLE

### APPLICATION OBJECTIVE

- to pick up in an optimised manner various kinds of household waste provided in waste containers at the kerbside within a pick-up collection arrangement (see also fact sheet "[Mobile waste container](#)")

### OUTLINE ON APPLICATION FRAMEWORK

#### PARTICULARLY APPLICABLE FOR WASTE TYPES

Glass	X	Light-weight packaging	X	Biowaste	X
Paper / paperboard	X	Mixed household waste	X	Bulky waste	X
Lamps		Textiles		Electrical and electronic waste	
Scrap metal		Waste wood		C&D waste	
Waste oil		Old paint & lacquer		Waste tyres	
Hazardous waste					
Branch specific waste					
Other waste material	X	all kinds of solid waste that arise continuously within a larger area, require a frequent pickup and are collected and forwarded in container of the appropriate standard at locations well accessible to trucks			

#### SPECIAL CHARACTERISTICS AND REQUIREMENTS OF THE APPLICATION

##### **Pre-treatment of the input material:**

not necessary but collection in standardized waste bins

##### **Options for the utilisation of the generated output:**

The compaction of the waste in the truck body results in a mixture and caking of the waste. This makes a separation afterwards difficult.

##### **Potential health risks:**

For Pedestrians: Vehicle drivers do not have a direct view on the loading process! This causes a potential risk for pedestrians passing by during the pickup operations to get hurt but this risk is minimized by additional mirrors and cameras attached to the vehicle.

Driver: The driver takes also responsibility for the loading function. A recreation phase that usually occurs during pickup operations with rear end loading vehicle does no longer exist. Inexperienced drivers try to overview the loading process directly. This might lead to physical distensions.

##### **Other aspects:**

Collection vehicles can be additionally equipped with on-board computers to keep record on the emptying and other relevant data (e.g. weight of the bin) for purposes of service monitoring, tour planning and billing. Meanwhile the combination with bin identification technology is a common solution (see also fact sheet "[Waste bin identification](#)").

#### RESTRICTIONS OR INFLUENCE OF EXTERNALITIES ON THE APPLICATION

##### **Infrastructural conditions:**

To allow an efficient waste collection with this type of vehicle, waste collection containers must be set out at points where they are easily accessible for the vehicle (kerbside) and placed in a way that the lifter mechanism can reach them without that any additional physical manipulation or intervention is needed. There may be a need to ensure these conditions by temporarily closing roads for parking and employing teams that places the waste containers in the right way on the kerbside. This pickup technology is especially suited to areas with a detached building structure (most particularly rural type areas with sufficient space along roads and between houses and at the city outskirts) where such favourable conditions are more easily to attain. In the inner city environment with a high traffic density and limited space availability at the kerbside, the effective application of this technology may face rather high limitations.

##### **Climatic conditions:**

No limitations except of the fact that the vehicle itself must be fit for the road conditions in the collection area.

TECHNICAL DETAILS	
GENERAL OVERVIEW	
ABSTRACT	<p>Side loaded refuse collection vehicles are vehicles with a side lifting mechanism for the pickup of waste provided in waste containers at the kerbside within a pick-up arrangement. This type of vehicle is playing yet an important and still growing role for the pickup of various waste types from households and the commercial sector. Compared to the rear-end-loaded collection vehicle, its advantage consists primarily in the one-man-service for driving and loading, thus rendering the service more economical.</p> <p>Basically, one can distinguish two types of side loaded refuse collection vehicles, the “true” type which is operated entirely from the driver’s cabin and the “pseudo”-type or so called “walk alone”-type, where both, forwarding of the waste containers to the vehicle and the release of the lifting mechanism must be done manually. The “true” type of the side loaded refuse collection vehicle is normally tailored to handle mobile 2-wheel waste containers whereas the “pseudo”-type is often adjusted to empty different mobile waste containers up to a volume of 1,100 liters.</p>
SPECIFIC ADVANTAGES	<ul style="list-style-type: none"> <li>- high loading capacity thru on-board compaction of the waste</li> <li>- can be used for both pickup and short-distance transport at the same time</li> <li>- needs a crew of one person only in comparison to <u>rear-end loader</u></li> </ul>
SPECIFIC DISADVANTAGES	<ul style="list-style-type: none"> <li>- relatively high priced vehicle in comparison to <u>rear-end loader</u> and <u>front loader</u></li> <li>- not all types of waste emerging in households can be picked up</li> <li>- in most cases for 2-wheel mobile waste containers only</li> <li>- waste containers must be placed accessibly at the kerbside</li> </ul>
APPLICATION DETAILS	
TECHNICAL SCHEME	<p>Basic parts of the side loaded refuse collection vehicle are the chassis, the body with a compaction mechanism, the hopper and the lifting device.</p> <p>For the pickup of the waste, the vehicle has to stop beside the waste container. The lifting device, which is attached to the vehicle on the side directed to the waste container, grabs the container and empties it into the feed-hopper. Operation of the lifting device can be manually controlled with a joystick outside the cabin or done in an automatic mode. The lifting device is situated behind the driver’s cabin and consists of a telescope arm covering a distance of more than 2 m with a grabbing mechanism or comb/diamond-system at its end to fix the bin at the lifter. Various degrees of automation are available for the lifter.</p> <p>A compaction mechanism compresses the waste and forwards it from the hopper into the storage body of the vehicle. The compaction is normally done by two hydraulic and counter-driven screws and manually, semi-automatically or automatically controlled.</p> <p>Once the body is completely filled up, the vehicle goes to the disposal facility where it opens its rear to discharge the waste.</p> <p>Figure 1: “True” side load refuse collection vehicles (left &amp; right) (picture source left &amp; right: Intecus GmbH)</p>
	

QUANTITY ASPECTS	The carrying capacity is limited by the allowed total load of the vehicle and the body type (permitted load). The loading volume and loading mass of the different vehicles is in the range of 5–29 m <sup>3</sup> or 6–12 Mg.
SCALE OF APPLICATION	Pickup operations of side loaded collection vehicles can be carried out from one side of the collection vehicle only, in most countries this is on the right. In order to limit the pickup operations to one run per road it is advisable that all waste containers belonging to a road are set out along one kerbside only.
INTEROPERABILITY	<p>The vehicle can be used for the pickup of waste and short distance transportation in different collection schemes. The lifter device is usually compatible to mobile waste containers with comb or diamond-adapted fringe. Other mobile container types and collection receptacles of low weight can only be emptied with special equipment.</p> <p>It is possible to equip the vehicles with GPS and on-board computer technique for operations monitoring and recording. This allows their use in combination with bin identification systems (see fact sheet on "<a href="#">Waste bin identification</a>").</p>
OPERATIONAL BENCHMARKS: RESOURCE CONSUMPTION	
AIDS AND ADDITIVES NEEDED	none
HUMAN RESOURCES NEEDED	Normally 1 truck driver, in case of manual forwarding of waste containers one more staff may be necessary.
SPATIAL NEEDS	Normally employed in the pick-up system, the technology does require space for the truck stop at the kerbside only. Moreover parking space at the operating yard (car park) is needed.
OPERATIONAL BENCHMARKS: COST DIMENSIONS	
INVESTMENT COSTS	The capital needs (investment) for side loaded refuse collection vehicles are 160,000–220,000 Euro.
OPERATING COSTS	<p>Running costs accrue for</p> <ul style="list-style-type: none"> <li>- repair and maintenance: ~11 % of the initial investment per annum</li> <li>- personnel: 1-2 persons (most common is a crew of one person depending on the mode of operation)</li> </ul>
OTHER RELEVANT ASPECTS	
LABOUR PROTECTION	<p>For the use of this technology tight labour protection regulations need to be observed in Europe. References for this in Germany are for example:</p> <ul style="list-style-type: none"> <li>- Technical rules for biological working materials – Waste collection, protective measures (TRBA 213),</li> <li>- GUV-Regulations: Safety and health protection during waste management activities, part I: Waste collection and transportation</li> </ul>
MISCELLANEOUS	
MARKET INFORMATION	
REFERENCE FACILITIES	The side loaded refuse collection vehicle is yet a less common (compared to <u>rear-end loaded vehicles</u> ) but already widely used vehicle type for the pickup of various waste types in a number of countries. The number of sales per annum is growing.

<p><b>RECOGNIZED PRODUCER AND PROVIDER FIRMS</b></p> <p><i>(important note: the list of firms does not constitute a complete compilation of companies active in the specified fields)</i></p>	<p>Producer and supplier firms for this technology and its components in Germany are for example:</p> <p>Chassis:</p> <ul style="list-style-type: none"> <li>- Daimler AG, Stuttgart, <a href="http://www.mercedes-benz.de">www.mercedes-benz.de</a></li> <li>- MAN Truck &amp; Bus AG, München, <a href="http://www.truck.man.eu">www.truck.man.eu</a></li> </ul> <p>Aufbau und Lifter:</p> <ul style="list-style-type: none"> <li>- HS Fahrzeugbau GmbH, Emstek <a href="http://www.hs-fahrzeugbau.com">www.hs-fahrzeugbau.com</a></li> <li>- FAUN Umwelttechnik GmbH &amp; Co. KG, Osterholz-Scharmbeck <a href="http://www.faun.com">www.faun.com</a></li> </ul>
<b>REMARKS AND REFERENCE DOCUMENTS</b>	
<p><u>Further information on this vehicle technology and links to firms providing and using it can be obtained from:</u></p> <ul style="list-style-type: none"> <li>- Verband der Arbeitsgeräte- und Kommunalfahrzeug- Industrie e.V., Berlin, <a href="http://www.vak-ev.de">www.vak-ev.de</a></li> <li>- Gemeinsame Arbeitsgruppe von VKU und BDE Fahrzeuge und Behälter - Technische Übersicht und Standards <a href="http://www.vku.de/abfallwirtschaft.html">www.vku.de/abfallwirtschaft.html</a></li> </ul> <p><u>Reference for applicable norms/standards in Germany:</u></p> <ul style="list-style-type: none"> <li>- <b>DIN EN 1501, Part 1, 3 und 5:</b> Refuse collection vehicles and their associated lifting devices</li> </ul>	