



whitepaper

Waste compactors vehicles for domestic waste collection

The safety light curtains are placed on board of the compactor vehicles to prevent accidents during the compaction of waste phase.

Request

The "INAIL: Italian Workers' Compensation Authority"¹ statistics show that the industry of solid urban waste produced in the period 2004 ÷ 2008, about 55 thousand accidents. In particular, the mechanized harvesting, handling bins and the ascent/descent from vehicles (compactor) represent specific operations which is associated with the highest number of accidents.

The on board vehicle accidents or those that occurred for manual handling and transport of waste are about 12% and are divided into two categories: crushing and jamming.

The following table summarizes the principal risk factors relating to the critical stages of waste collection and suggests prevention systems:

Critical phases	Risk factors	Prevention Systems
Maneuvers of vehicle	<ul style="list-style-type: none"> • bad orientation of vision systems for the side and rear of the vehicle; • malfunction of the braking system of the vehicle; • misunderstanding of the communication between operators and drivers. 	<ul style="list-style-type: none"> • increase in the level of automation in order to avoid the presence of the operators on the ground and on a platform, where it is expected to be used bins; • Bleepers monitor and rear cameras; • lighting systems during night work; • Training and information to the communication mode.
Use of compaction equipment and compactor vehicles	<ul style="list-style-type: none"> • Wrong position of the operator on the ground during the handling of containers; • attempt of removal of obstructions in the containers and unexpected movement of the container. 	<ul style="list-style-type: none"> • systems for controlling the position of the container and stop in case of non-correct positioning or the presence of people in the area of handling; • systems to prevent accidental starting of the machine; • protection of the equipment through: fixed devices, interlocked shields, photoelectric or pressure-sensitive devices; • systems to stop machines in case of incorrect loading of materials.
Emptying bins	<ul style="list-style-type: none"> • Position of the command for the compactor not clear. Possible error between automatic and manual mode; • accidental activation of commands. 	<ul style="list-style-type: none"> • actuation of garbage compactor should not be possible if: the engine of vehicle is not running; the transmission is not in neutral position; the PTO and the parking brake are not inserted; • the changeover from manual to automatic system is only possible if the lifter is in the lowest position and is not moving; • two blocking systems for the immediate stop of the lift, accessible from both sides of vehicle,

We highlight in bold the preventive measures that can be achieved through safety light curtains installed on board of garbage compactor.

¹ Source: the safety for the operators of waste collection and urban hygiene - 2009 Edition

The safety light curtain must prevent accidental access of people or objects in the loading area of garbage compactor during the waste compaction phase. On the other hand, it doesn't interfere during the loading phase of the waste (manual or automatic) and during the unloading phase of the vehicle.

Achievement for satellite/rear loader compactor

The light curtain is positioned in the rear area of the waste loader to protect the operator during the compaction phase in which the compacting mechanism (shovel and sled) is active.

The characteristics of the vehicle allow to load the waste in an automatic way through the bin lift device **1** or manually lowering the door indicated by the arrow **2**. This door is controlled by safety magnetic sensors to determine if it is open or closed.

The next step is the compaction. It is realized through a sled and shovel device which compresses the waste inside the load compartment of the vehicle.

During the loading phase of the waste the safety light curtains, obviously, are not active.

This phase is actually not dangerous to the operator: the compacting mechanism is disabled and in case of automated loading of waste (bin lift device) the operator acts from the control panel **3** placed in a safe area.

The compacting phase is potentially dangerous for the operator.

Incidentally, the operator could be in the action area of the shovel and slide of the compactor. In this phase the safety light curtain is active and immediately stops the compaction equipment in case of accidental access to the load area of the waste.

The light curtain protects only the lower part of the loading area.

With the door closed, the height of the vehicle does not allow the operator to reach accidentally the danger area.

For this reason the protection of the upper part of the load compartment is not necessary.



Achievement for roll on and off compactor

This model of compactor does not present technical and operating characteristics in order to be protected by optoelectronics safety light curtains installed directly on board.

In these waste compaction systems, the operator normally can not directly access to the load compartment that is protected by physical barriers or placed in high position.

There are however different automation and safety systems: start buttons, emergency stop buttons, magnetic sensors, etc.. that could allow interesting developments with the safety controller Mosaic.



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