

The Vertical Waste Transferring Principle – Efficient, Simple and Cost Saving

Nobody would consider not to have a kitchen garbage bin, but instead go to the larger bin in their courtyard every time a small amount of waste must be disposed of. That would take time and time is valuable for most people.

No, everybody would dump their waste in the kitchen garbage bin in small amounts until it is filled up and then “transfer” the content of this bin to the larger bin in their courtyard.

Think of the kitchen garbage bin being a Waste Transfer Station and the larger bin in the courtyard being a waste disposal site – a landfill or an incineration plant. Think of this when deciding whether to implement a Waste Transfer Station or none at all. Waste Transfer Stations in general are time- and money savers.

Nobody would consider either throwing waste in their kitchen garbage bin horizontally. No, everybody dumps it straight down and pack it with their hands to avoid going too often to the larger bin in the courtyard. Easy and convenient. Think of this when you will have to decide whether to construct a Waste Transfer Station using the Horizontal OR the Vertical principle.

The Horizontal principle uses steel beam reinforced square containers. Why reinforced ? Because when the waste is packed – or compressed - into a square container, the compressing forces impacts all parts of the inside of the container and these forces will tend to make the square container round. Reinforcements are expensive and they are heavy. Why not avoid them and replace their weight with content – with waste in the container?

By making the container round in the first place, these reinforcements are not needed.

The Horizontal principle also uses a waste-chamber from where the waste dumped by the collection trucks is pushed and compacted into the square container. Both the waste-chamber and the pusher are costly and they take up quite a bit of space. Furthermore the waste can only be pushed into the square container by using “artificial” power – by using electricity. If the electricity fails: Problems – the waste cannot be pushed into the container and cannot be transferred to the disposal site. Why not replace the waste-chamber and the pusher with other means ?

By dumping the waste directly into an upright standing round container ”natural” power – gravity can be used instead of electricity. Electricity will be needed for compacting the waste, but if the electricity fails: No problem. The non-compacted waste can still be transferred to the disposal site.

The Vertical Waste Transferring principle uses such an upright standing round container – a silo. Reinforcements, waste-chamber, pusher and the 100% dependency of electricity are avoided. Huge amounts of equipment costs can be saved. Less space is required¹ and costly interruptions of operations are avoided. All in all, Vertical operating Waste Transfer Stations (WTS) are proved to be less costly in operation (incl. capital expenditures for land, infrastructure and constructions etc. and maintenance) per ton of waste compared to Horizontal operating Waste Transfer Stations. Furthermore they are far more easy to maintain and to keep clean.

¹ In its total layout, the Vertical Waste Transferring principle saves at least 30% of space compared to the conventional Horizontal Waste Transferring principle.

The compaction of the waste at the Vertical operating WTS is performed by a mobile compactor which operates sideways and down-upwards. One compactor can handle the compaction operations at 6 silo-positions (see below). For comparison, compaction at the Horizontal operating WTS is done by means of stationary compactors, one at each dumping position. It is evident that costs can be saved by introducing the Vertical instead of the Horizontal principle.

At the Vertical operating WTS, the silos are placed side by side in so called silo-positions or – bays. There are normally between 4 to 12 silo-positions at a Vertical WTS, the number of positions depending on the amount of waste needed to be transferred every day.

The Vertical Waste Transferring principle is **highly efficient and reliable**. For the collection trucks to fill one silo with 18-22 tons of waste takes maximum 30 minutes including compaction. At one silo-position 2 silos containing say 40 tons in all can therefore be filled in 1 hour. By having 4 silo-positions operating 8 hours per day, the WTS can transfer $(40 * 4 * 8)$ 1.280 tons per day (tpd). Operating a WTS with 12 silo-positions 24 hours per day (in 3 shifts) enables transfer of $(40 * 12 * 24)$ 11.520 tpd ! This is actually the case with the Vertical operating WTS in Santiago de Chile (completed 1996) – approximately 10.000 tpd transferred using railway to a landfill 75 km from waste collection areas in Santiago.

For enabling the collection trucks to be correctly dispatched to the right silo-position, CNNL has introduced a Control and Monitoring System (C&M) on each WTS, thereby controlling the traffic of the collection trucks from arrival to (weighing system) and departure from (weighing system) the WTS. The C&M is necessary in order to distribute the incoming amounts of waste evenly to each silo-position.

When silos have been filled and compacted transfer trucks on which are mounted special systems (tipping frame and cable system) tip the silos down from the silo-positions on to their chassis and transport them to a disposal site. After emptying the silos by very simple operations at the disposal site, the transfer trucks bring back these empty silos to the WTS where they are repositioned at the silo-positions ready for being filled again. The above mentioned C&M also monitors and controls the transfer trucks operations.

At each silo-position a system is introduced for avoiding waste spill at the positions – the so called Funnel / Rearplate systems. In “co-operation” with the doors mounted on the top of the silos these systems form a perfect funnel ensuring that the waste is dumped fully into the silo and not next to it.

In order for all Vertical operating WTS to live up to environmental friendliness, all are equipped with a Dust- and Odour Control System (D&O). Implementing these systems enables CNNL’s WTS to be located in dense populated urban areas without affecting the environment in their neighbourhoods. In fact, CNNL’s WTS located in Jing’an District, Shanghai has contributed to improve the environment in the neighbourhood.