

Building Waste Sorting Stations for Sustainable Environment

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Abstract: - Building a sorting station that minimizes the impact on the environment implies increased attention in planning, designing and functioning of the installation. This paper presents the issues caused by the sorting stations upon the environment, as well as the good neighborliness practices developed with the purpose of improving the public image of the sorting stations.

We shall introduce operating notions concerning traffic, noises, odors, air pollution, water quality, germ carriers and cleanliness keeping.

Key-Words: - Sorting stations, friendly environment conditions, sustainable development.

1 Introduction

Building a sorting station that minimizes the impact on the environment implies increased attention in planning, designing and functioning of the installation. This paper presents the issues caused by the sorting stations upon the environment, as well as the good neighborliness practices developed with the purpose of improving the public image of the sorting stations.

We shall introduce operating notions concerning traffic, noises, odors, air pollution, water quality, germ carriers and cleanliness keeping.

2 Traffic

Heavy traffic has the greatest impact on the environment outside the installation perimeter and it is specific for the large-sized sorting stations. This happens especially in the case of urban and suburban stations, where heavy traffic is already an important problem of the community. Transportation routes should be carefully analyzed from the developing and placing stage, in order to minimize the traffic impact on the environment outside the sorting station. Moreover, a correctly designed access that does not disturb the traffic is essential for clients' serving and for the functional efficiency of the installation.

Usually, sorting stations have an indirect control upon traffic, by scheduling the functioning program (the time when the trucks deliver the waste). Few sorting stations can program the entering traffic (the arrivals of the collector trucks), because they unload immediately after they get filled, so that the collecting staff can begin or finish the workday.

However, there is a possibility that the sorting stations

can program the traffic. They schedule their vehicles to avoid the rush hour traffic. If there are vehicle queues at the entrance of the transfer station, they should not affect public traffic. The queues can cause traffic security issues, can block the access to neighborhood properties and in some cases they can cause damage to the roads that were not designed for heavy traffic.

Some of the designing and functioning characteristics that could reduce the impact of the traffic at the sorting stations upon the environment are described in this paper:

- designating a route that avoids the crowded places, the residential areas and other problematic areas;
- adding pointers and route markings, and signaling the crossroads;
- building accelerating or slowing traffic lanes that allow the vehicles smooth traffic-ins and traffic-outs, reducing crowding and accident danger in the vicinity of the station;
- using the right-turning at the entrance and at the exit from the station and minimizing the left-turnings, to reduce crowding and accident danger;
- waiting space for the clients and for the collecting trucks in order to form queues within the station area, without disturbing public traffic;
- installing and utilizing the compacting machines for maximizing the amount of waste per vehicle and, thus, reducing the number of necessary vehicles;
- scheduling and even restricting the functioning time of the station, in order to encourage the usage of the station outside the rush hours;
- programming the commercial deliveries so that they avoid the rush hours.

3 Noise

The sorting stations can be a permanent source of noise, and that could disturb the neighbors. The heavy traffic and the functioning of the industrial equipment are the main sources of noise at the sorting stations. The noise coming from the roads next to the station will be perceived as noise produced by the station. The noise is made by the engine, the warning signals, the hydraulic units, pistons or the equipment razors that come up against or scratch concrete surfaces or steel. The stations that use fixed compacting systems or mechanical compressing equipment produce additional noises.

The optimized designing and functioning of the station can reduce the noise. This issue includes the following aspects:

- maximizing the usefulness of the pad areas surrounding the station, especially along the neighboring areas; increasing the distance between the source of the noise and the receiver or the existence of natural or artificial barriers are the most effective ways of reducing noises, when it cannot be reduced from the source;
- orientating the buildings so that the characteristics of the place and the walls within the pad area can protect the surroundings from direct exposure to the course of the noise;
- equipping the walls and ceilings with noise-absorbing materials;
- closing down the non-working equipment and stopping the engines of the vehicles waiting to enter the station;
- avoiding the flow of traffic surrounding the residential areas;
- placing the building entrances so that they are not facing the surroundings that could be disturbed by the noise;
- replacing the strident sounding alarms with luminous alarms or other warning signs;
- restricting the noise-producing activities in some buildings or facilities; for instance, the hydraulic power units of the compressors could be placed in special areas, along with silent equipment; in the designing stage, one could opt for using more silent equipment;
- the appropriate maintenance of the noise absorbers and of the engine compartment of the mobile equipment;
- keeping as many closed doors as possible during the functioning hours;
- performing the most noise-producing activities at a time when the surrounding inhabitants are not at home or when the outside noise level is at its highest.

4 Odors

Odors become pungent on hot or rainy weather. They

can be controlled with the following designing and functioning characteristics:

- increasing the distance between the source of the odor and the receptor will reduce the impact;
- considering the dominant wind direction, in order to orientate the building correctly towards the neighboring areas;
- carefully orientating the building and the access doors in such a manner as not to disturb the neighbors and closing as many doors as possible when in function;
- designing easy-to-clean platforms, including an inclined concrete surface, in order to facilitate the draining of residual waters; eliminating edges, cracks and passages that are hard to clean;
- sealing concrete surfaces or other semi porous materials in order to prevent odor absorption;
- minimizing waste storage in the sorting station area;
- implementing odor neutralizing systems;
- removing all the waste from the unloading platform, conveyer belts, stocking bunkers for compost-rejected waste at the end of each workday, and then cleaning these areas;
- building pools, draining holes in the pavements and drainage systems, so that the stench waste is removed;
- periodical treatment of the drainage systems with disinfectants and odor neutralizers;
- refusing stinky waste;
- other household measures such as: the regular cleaning and disinfecting of containers, machines and other surfaces that come into contact with the waste.

5 Air Pollution

The atmospheric emissions of the sorting stations are caused by the dust released by the waste that is disposed, deposited and sorted in the installations, exhaust gases of the mobile machines such as trucks or loaders, central heating, etc.

Just as with the odors, the designing and functioning characteristics can minimize atmospheric emissions, as follows:

- paving all the traffic surfaces;
- keeping all the paved surfaces and the load-unload platforms clean; making sure to use enough water when cleaning the concrete surfaces so as not to arouse the dust;
- restricting the access of vehicles in residential areas;
- choosing less polluting machines (e.g., machines provided with catalysts);
- keeping the engines in good functioning conditions by regular check-ups;
- cleaning the bodies of cars and the tiers in order to avoid spreading dirt on the streets;

- introducing air-filtering systems in the sorting, and depositing halls.

6 Rainwater

Rainfall and the water that flows from rooftops, roads, parking lots and special areas inside the sorting station finally reach the sewage system. These leaks can contaminate the underground water. Avoiding contamination with leaks from waste, mud or fuel is very important in maintaining the quality of both the surface waters and the underground waters.

Building a sorting station creates new waterproof surfaces (e.g., paved surfaces) that increase the total amount of leaks and can contribute to floods.

Most sorting stations evacuate used household and rain waters in the town sewage system.

In order to minimize the impact upon the town sewage system and upon the purifying stations, the sorting stations must take the following measures:

- covering the areas where one unloads and deposits the waste of which water residue is dumped into the sewage system; this measure reduces the amount of rainfall that would contribute to the total volume of residue water evacuated from the station;
- removing as much waste as possible from the unload platform by mechanical means (e.g., scraping or brushing) before hosing it down;
- installing showers, restrooms and low-flow taps;
- making sure to purify the water before it comes into contact with the waste.

The specific purifying demands vary according to the sewage capacity but they can include rules regarding the decantation of solid materials, the use of water/oil separators or of other purifying systems.

Other measures which must be taken in order to control the quality of the surface waters are as follows:

- observing all the rules and regulations for the management of surface waters in the area of the sorting station; where these rules are well-implemented, the designing and functioning characteristics must include surface water retaining installations (large pools, tanks or pipes) that reduce the flow to the desired amount; furthermore, the water quality regulations can demand the building of mud decantation installations and various biological filtering systems for water decontamination; sometimes the correction of the water pH or the use of other purifying technologies may be necessary;
- placing the stations outside the areas with flooding potential;
- minimizing the waterproof areas and extending natural and green areas, in order to reduce the water flow;

- limiting the number of containers deposited in open air or utilizing sealed containers; if the full containers are deposited in open air, they must be provided with drainage pools connected to the inner sewage systems;
- maintaining all the used water purifying installations in good functioning condition; this involves regular cleaning and the removal of mud and other solids from the pools and the drainage holes, as well as the removal of oils from the water/oil separators;
- prompt intervention should an outside leakage occur, to prevent waste from entering the surface water system.

7 Germ Carriers

Germs are the microorganisms that can transmit various diseases. The germ carriers in the sorting stations are the mice, insects and birds that rummage through the waste. Among birds, seagulls pose the biggest problems in some coastal and land areas. The issue of germ carriers falls under the category of nuisances, which must be treated carefully.

In order to reduce the number of germ carriers, one can take the following measures:

- fixing cracks of openings in the buildings, containers and depositing areas in closed transfer stations; these measures reduce the chances of germ carriers getting in, especially rodents;
- measures for removing birds, such as hanging wires that prevent birds from entering the station and eliminating horizontal surfaces where birds can crowd;
- removing all the waste at the end of each workday;
- cleaning the unload-depositing platforms daily;
- routine inspections of the installations, in order to discover possible habitats for germ carriers; taking the necessary measures;
- calling the disinfection-deratization services, if needed.

8 Keeping Clean Inside the Sorting Stations

Under normal working conditions of the installations, waste is expected to arise inside and around the installations. In the areas where the transport of waste in closed vehicles is not necessary, the issue of garbage arises most often on the way to the transfer station. Dry and light materials such as plastic bags can come off the trucks or off the unload-depositing platforms and wind up outside the station. The measures to be taken are as follows:

- all operations must take place in closed areas, as much as possible;

- orienting the main transfer building according to the main direction of the wind, in order to prevent garbage from winding up outside the station; generally, the windowless side of the building must face the wind direction;
- applying strict rules concerning the covering of the trucks will reduce the amount of waste falling off the trucks; some sorting station operators have the right to refuse uncovered loads and to charge extra taxes, in order to discourage them;
- installing devices that deviate the wind to another direction than that of the unload-depositing area;
- placing the doors on the sides that are not exposed to waste, regardless of the building orientation;
- minimizing horizontal curbstones, where waste can accumulate;
- providing the stations that use slides with wide rubber sleeves that enclose the bottom of the slide and the upper part of the container; providing these stations with loading bars that keep the waste inside the trucks and the containers;
- installing fences and wire nets in order to stop the waste from spreading outside the station;
- regularly cleaning the exterior and interior of unload-depositing platforms and taking efficient household measures; these will minimize the amount of waste that could wind up outside the station.

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