

# Neighbourhood-friendly Solutions in Waste Recycling

CONSTANTIN FILOTE, CĂLIN CIUFUDEAN  
 Computer Science and Electrical Engineering Faculty  
 “Ștefan cel Mare” University of Suceava  
 9 University str., RO 720225, Suceava  
 ROMANIA

<http://www.eed.usv.ro>

*Abstract:* - The paper presents issues related to inconveniences caused to the environment and presents “neighbourliness practices” elaborated to improve the public image of the composting stations.

*Key-Words:* - Environment, industrial urban areas, waste management stations.

## 1 Introduction

The good functioning of a waste management station implies both the assurance of a superior efficiency with minimum conventional energy consumption and the reducing of the impact that the installation can have upon the environment.

Specialists [4], [5] must find the best technical and economical solutions to the following issues:

- Proper work and maintenance plans;
- Working program of the installation;
- Protection of labour and fire prevention;
- Environmental issues;
- Emergency situations;
- Record keeping;

## 2 Proper work and maintenance plans

These plans must be elaborated especially for each operation apart and must include the following elements:

- Working programme of the installation specifying working days, working hours for each day and legal holidays;
- Personnel chart, which describes the tasks allotted to each function, the minimum staff number and the working plan.
- Acceptable and unacceptable waste description and the procedures for removing unacceptable waste before and after discharge;
- Operational methods for each installation component, including waste sorting-composting methods, waste weighing procedures, operations executed on the composting platform, charging of the vehicles that leave the station, cleaning the inside and outside area of the station and the operations specific to the waste water collection system;
- Maintenance procedures description for each component, including buildings, mobile equipments, utilities and landscape arrangement;

- Training courses for the employees;
- Rules and insurance policy;
- Accountancy procedures;
- Action plans for emergency cases as vehicles or equipment breakdowns or cases where the evacuation place is not usable;
- Emergency procedures.

## 3 Working programme of the installation

The working program of a composting station must take into account the operation chart of the vehicles which deliver the waste to the station, the composting equipment running capacity and the finishing and composting periods. The working program must take into account the station’s location, the adjacent fields destination, as well as the operation schedule of the recycling societies which receive recycled materials from the station and of the societies which take over the composting.

The operation program varies from case to case, according to the placement circumstances. Most such installations situated in the industrial urban areas work in 24 hours shifts, 7 days per week.

## 4 Labour protection and fire prevention

All the activities inside a composting station are being executed according to legal regulations regarding both labour protection and fire prevention [1], [2], [3].

Every person who runs an activity inside the composting station must be well trained regarding the above mentioned issues.

The buildings and the equipment, especially the ones for waste, recyclable materials, composting and fuels storage are being designed, arranged and tested according to the legal norms and technical standards in

the field of fire prevention.

## 5 Environmental issues

The development of a composting station which reduces the impact on the environment, implies an increased attention to scheduling, projecting and functionality of the station. The current section presents issues related to inconveniences caused to the environment and presents "neighbourliness practices" elaborated to improve the public image of the composting stations.

There will be presented designing and functioning characteristics regarding the traffic, noise, odour, air pollution, germs carriers and cleanliness keeping.

The placement, the designing and the proper functioning of the transfer station may solve or fix the impact of these factors upon the environment and the community.

The composting stations may represent a permanent source of noise because heavy vehicles traffic and the industrial equipment's running are noise sources. The noise produced by station adjacent roadways would be perceived as coming from the composting station. The machines noise is due to engines, warning signals, hydraulic units and pistons or blades that work on concrete or steel surfaces. The stations which use compact fixed systems or compressing equipment powered by engines produce extra mechanical noise, due to these machines.

The projecting and proper functioning of the station may reduce the noise of the installations. This problem includes the following aspects:

- The maximisation of the utility in buffer zones which surround the area, especially along the areas where there are adjacent fields. The increasing of the distance between the source of noise and the receiver, or the existence of natural or artificial barriers are the most efficient ways of reducing noise, when this cannot be reduced or eliminated from the source;
- The position of the buildings so that the placement topography and the walls from installation buffer zones protect the vicinities from direct exposure to noise source;
- Equipping the walls and the construction roofs with dampers;
- Stopping the machines which don't work and turning off the vehicles' engines that are waiting access into station;
  - Avoiding traffic flux from the inhabited areas;
  - Placement of the buildings entrances so that they avoid the direction of the neighbours that may be disturbed by the noise;
  - Equipping the alarms that make intermittent noises with intermittent lamps or other ways of warning;

- Restriction to producing noisy activities in certain buildings or enclosures. For example, the execution elements of the compactors could be placed in special areas together with other equipment that doesn't produce noise;

- Maintenance of dumpers and engine rooms of the mobile machines which work inside the station;
- Keeping the doors closed during work time;
- Activities that produce the strongest noises at certain hours, like in the morning or in the afternoon, when the workers are leaving to and from work, during the time when workers are not home or when the noise level outside the station is maximum.

Odour becomes stronger during hot or rainy weather.

Odour can be controlled due to some designing and operating characteristics, as shown below:

- Analogue to the case of the reduction of noise, the increasing distance between the source of the odor and the receiver, reduces the impact.
- Observing the usual wind direction for setting the position of the building and its location compared to the neighboring areas.
- Carefully determine the position of the building and its access doors because they shouldn't affect neighbors and close the doors during work time;
- Building easy cleaning platforms, including a battered concrete surface for easy wastage of residual waters. The removal of corners and perfect flat surfaces for preventing the compost deposits which can be difficult to clean;
- Sealing of the concrete surface or other semi-spongy materials to prevent the odor absorption;
- The minimization of the time for the waste storage into the station;
- The incorporation of a smell-neutralizing system;
- Removing all the wastes from the discharging platform, from the traveling hoppers, from the receiving bin at the end of every working day and then cleaning of the areas;
- Including tanks, quick releases holes in the floors and exhaust systems, so that smelling wastes would not accumulate;
- Treating the evacuation systems periodically with disinfecting and odor neutralizing substances.

The waste recirculation station should satisfy the environment requests, irrespective of the station location or the destination of the adjacent fields. The environment emissions from the stations are caused by the dust from discharging the wastes, deposited and sorted in installations, exhaust gases of mobile units as well as trucks or loaders, heating station etc. As in the case of the smell, features of projection and operations can minimize the environment emissions:

- Plating all the traffic surfaces;
- Keeping the paved surfaces and the charging/discharging platforms clean and making sure that enough water is used while cleaning the surfaces to keep the dust from rising;
- Restraining the access of vehicles on the streets of the residential quarter;
- Choosing less polluting equipments;
- Keeping the engines in good function by making the routine checks;
- Cleaning the carriages and the tires to avoid spreading the dirt on the streets;
- Introducing an air filtering system in the composting rooms.

The stations from the industrial parks should satisfy the same environment requests like those stations from the less populated areas. The decrease of the negative aspects connected to these installations could be done by choosing the adequate designing features.

## 6 Emergency Situations

The composting units usually carry routine activities. Although, the operators of the composting units need to be prepared for emergency situations and to include emergency procedures in the activity plan. They must anticipate at least the following emergency situations:

- *Electrical breakdown.* The plan must deal with the problem of keeping the client records, tax collecting and loading the conveyer trucks in case of an electrical breakdown;
- *Fault or breakdown of the weigh.* The plan should describe how to keep the records and on which bases to establish the taxes, in case that the scales are damaged. In installations that have scales at the entrance and exit of the station, if one of those weighing units should breakdown, only one of the access ways will be used in both ways (in-out);
- *Fire.* The defense against fire and the procedure of extinguishing or limiting the fire is applied in case of fire to all the rooms on which composting is achieved. Normally, the defense against fire focuses on the protection of the employees' safety and on the gathering of the fire brigade;
- *Leaking control.* Leaks could be generated by the unloaded material or by the vehicles that are feeding the station. For example, the hoses from the compaction hydraulic systems or those on the garbage trucks could break. The plan for controlling the leaking provides the identification and tracking down the leak, using absorbing materials and cleaning methods. In case of big leaks, the plan must include the prevention of their infiltration in the evacuating systems of the residual and pluvial water;

- *Discovery of some dangerous materials.* The plan must contain methods of identification and isolating methods, the temporary storage places and emergency phone numbers;

- *Accidents of clients and employers.* The plan must specify first-aid procedures, emergency phone numbers and route maps to the closest hospital;

- *The plans for emergency situations* must include a list with phone numbers where we can find the managers, the faithful clients and specialized institutions 24h a day.

## 7 The records keeping

The detailed records keeping allow the station operator and local administration to be sure that the composting station works properly and legally. The medium and large dimension composting stations must keep the record of the following information:

- The loads that enter the station: date, hour, company, driver's name, weight (full vehicle), weight (empty vehicle), the source of the load, the fee;
- The loads that exit the station: date, hour, driver's name, weight (full vehicle), weight (empty vehicle), the type of transferred materials (e. g. waste products, retraining materials), the destination of the load;
- The operational registry of the installation: all the events must be recorded;
- The complaining registry: the date, hour, claimant's name, the nature of the complaint and it's solution. must be noticed;
- The accidental pollution of the environment: there are written details about the accidental pollution of the environment with liquid wastes, solid, odors, aerosols;
- The result of monitoring the environment, the surface waters contamination, the discharging into sewage, the air and water pollution or noise analysis;
- Maintenance registry: for fix or mobile equipment;
- Report regarding the health and security of the employees;
- Documents attesting the ability as an operator of the employees.

During the exploitation the monitoring indicators for each waste recirculation station must be specified (e.g.: oxygen concentration, the maximum value of sulphuretted hydrogen which doesn't allow the transformation into anaerobic digestion) to ensure some high quality compost.

### References:

- [1] O.M. nr. 757/2004 pentru aprobarea „Normativului

- tehnic privind depozitarea deșeurilor” (in Romanian);*
- [2] O.M. nr. 756/2004 *pentru aprobarea „Normativului tehnic privind incinerarea deșeurilor” (in Romanian);*
- [3] O.M. nr. 462/1993 *pentru aprobarea „Condițiilor tehnice privind protecția atmosferei (in Romanian);*
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- [5] F.McDougall, P.White, M.Franke, P.Hundle – *Integrated Solid Waste Management: A Life Cycle Inventory*, Blackwell Science Edition, 2005;
- [6] INCDPM-ICM București – *Studiu privind metodele și tehnicile de gestionare a deșeurilor*, INCDPM-ICM București, 2005 *(in Romanian);*