

Performance Optimisation of the Municipal Solid Waste Processing Plant (MSWPP) for Municipal Corporation, Nashik

Background:

Nashik Municipal Corporation is currently processing about 330MT of mixed Municipal Solid waste at MSWPP, Khat Prkalp, Mumbai Road, Nashik.

The following technologies have been adopted for the MSW management and disposal

1. Aerobic Windrow composting
2. Inert Processing
3. Refuse derived fuel manufacturing
4. Biomethanation for Organic waste
5. Sanitary Landfill

Observations:

Currently, of the 330 MT of wet mixed waste received daily at the facility, only 13 MTD of compost is manufactured which is about 4% by weight of the input waste. The Inert processing and RDF is still not functional. The sanctioned power is about 600KVA while the total demand applied by NMC is 1100KVA. The biogas generated at the biomethanation facility is used to generate electricity, which in turn is used for powering the captive pumps used for the biomethanation plant. Thus the net electrical balance from the Biomethanation plant is zero. The partially treated water is being discharged into the nallah outside the plant.

Partially treated water discharge



The windrow composting is not practised systematically and the entire yard is randomly filled with garbage of varying age. About 7000 MT is estimated to be accumulated in the windrow platform. Most of the equipments are idle since the existing staff is not properly deployed/ managed. Since the yard is not available for receiving fresh garbage, the fresh garbage is being diverted to the existing dump yard after a day. With the onset of monsoon, the leachate generation from the dump site is also more.

The administration/ office building is not properly maintained and shows accumulation of scarp and dirt in nooks and corners. The Toilets and urinals are very dirty and unhygienic. The toilets doors and flush tanks need replacement.

Unclean Urinals



Dirty Toilet



Broken Toilet door



Interventions required:

The following sections highlights the immediate interventions needed for improving the functioning of the plant. NMC has to facilitate the same ASAP

General:

1. Landscaping- Primarily lawn, flowering plants and aromatic plants to be grown.
2. All metal scrap, pipes, truss materials, excess liner materials, engine blocks, cans etc to be shifted to a designated place and not littered within the premise

Metal scrap lying at present



Scrap littered in the premises at present



Excess liner material lying in the premises



3. All the open drains, pipe culverts should be cleared of garbage, so that water may drain freely and should be cleared after every shift
4. All access roads to be swept after every shift
5. External vehicles including garbage carrying trucks should not enter the waste processing area like windrow yard, trommel etc. This will reduce the need for frequent road sweeping
6. Ragpickers should not be allowed inside the processing plant
Ragpicker picking up the waste at present



7. Cattle trap to be introduced at the main gate and breaches in compound wall/ fencing to be plugged to restrict entry of cows and other animals

Personnel Safety and Welfare:

1. Cleaning of overhead water tank,
2. Cleaning Toilets and bathrooms, defective toilet door replacement
3. Installation of Reverse Osmosis Water supply

Existing drinking water supply



4. Providing a dedicated clean and well ventilated lunch and rest room for workers
5. It should be made mandatory for each worker to wear personal protective equipments like mask, gloves, gum boots and Uniforms

Person working without using PPEs at present



Electrical infrastructure

It has been observed that all the panels are covered with dust which can cause electrical hazard. All the light fittings are also covered with dust. Live electrical starters were found lying on ground. The lubricant and hydraulic oil were also noticed on cables and panels. The following actions are required

1. Panel rooms to be cleaned and glass barrier to be provided to prevent dust entry
Broken and dusty electrical panel and switch



2. Individual panel boards, starters to be checked and securely fixed. Leaking hoses to be tightened, replaced
3. Wirings and terminations to be checked and secured
4. Emergency stops should be provided for all equipments
5. Electrical and Fire safety equipments to be provided in the plant.
6. Hooter system to be provided for alerting personnel

Immediate Strategy for the month:

The following are the broad activities proposed to be undertaken at the plant under the guidance of Paradigm's team for this month.

Windrow platform:

1. Schedule the daily screening of accumulated waste in order to vacate the windrow platform. It is recognised that since the composting process is not complete in some heap, the quality of product would be affected. The clearing is being commenced from the south western corner. (adjacent to RDF building)
2. The fresh waste would be received at this South west corner. No outside vehicles would be allowed to ply in or across the facility.
3. The first windrow has been constructed close to the reception area. The existing 100mm screen and the pillar loader is a hurdle but the planning has accounted for this.
4. The clearing and processing of heaps is being made simultaneously in order to make way for the next days waste. The process would continue until all the windrow is ordered logically.
5. NMC does not have temperature probes currently. It is proposed to turn the windrow once a week for the start. The temperature would be monitored daily as soon as the probes are received at site.
6. The process water which is currently flowing would be absorbed with the rejects from the 16mm screen. Excess water would be diverted to the existing circular sump, once it is made functional appropriately. This water would be used for sprinkling the windrow and maintaining the moisture

Trommel Screens and conveyors

1. The electrical contractor engaged by NMC has been requested to furnish the "As built drawing" for the electrical works such as equipment cabling, machinery wiring etc. He has been asked to make appropriate modification so that "Electrical Interlocks" are provided. The interlock would ensure that in case of shutdown of any particular equipment, all equipments before it would stop automatically. At present, this is not the case.
2. Side guards with flexible materials should be fitted to prevent dust exposure to the chain drives.

Dust accumulation on the existing equipments



3. Required lubricants to be used as per schedule to be intimated by the Operation manager
4. Equipment supplier “Monica” or any other may be called to offer quote for refurbishing of the old equipments. This will ensure that we have redundancy to take up peak loads

General Action Plan for following months:

Leachate management:

The open drain from dump site is discharging leachate into open nallah which is currently being pumped to the biomethanation plant. Leachate is mixing with surface water and the hydraulic load on the Biomethanation has increased, resulting in lower HRT.

Discharge of untreated leachate



Therefore the treatment of water is also affected and thereby contaminating the nearby ground. The process water from windrow platform is flowing all over the yard as the drain is choked. The actions required are

1. Diverting the dump site leachate into the biomethanation plant
2. Constructing a sump near the windrow yard for collecting process water for reuse in the windrow composting

Systems and Procedure:

It is noticed that several vehicles and material handling equipments are under repair (both major and minor) and hence the productivity has been severely impacted. This requires urgent action. In addition, the following actions are to be taken;

In the following months, systems and procedures have to be developed to maximise the productivity and minimize the equipment down time. This requires a thorough study of current procedures and improving the same.