

Mechanical-biological treatment as a strategically project for the social and environmental development

Christiane Dias Pereira – *Civil Engineer with MBA in Environmental and Enterprise Management. Technical Director of Faber Serviço Ltda*

Wolfgang Tonges – *Administrator. General Director of the Faber Gruppe*

Leticia Tavares Theotônio – *Specialized in History and Environmental Consulting. Directory Technical Assistant for Faber Serviço Ltda.*

Abstract

Through the experiences of different countries, notably Chile, Haiti and Brazil, the using of the Mechanical Biological Treatment of residues was projected involving a series of components directed to the development and improvement of the life quality for the populations. The application of the MBT, as a solution for a parcel of the urban residues, is carried through by technical and holistic elements, where the economic, social and environmental aspects are equated in an integrated proposal of handling and treatment. The concept of valuation of residues is extended to beyond the productive activities, including pedagogical activities, territorial organization, environmental protection and social inclusion.

Keywords

Waste treatment, social and environmental development, emissions reduction, environmental education

1 Summary

The MBT combined with the recycling improvement was developed from the concept of the valuation of the residues, which results in the improvement of the garbage transforming it into a raw substance for the recyclable market. Thus, after the application of treatment technologies such as the mechanical and biological treatment there is a reduction of the environment risks due to the controlled degradation of the organic masses.

Through experiences in different countries, especially in focus Chile and Haiti, the implementation of the mechanical-biological waste treatment was projected combining some factors seeking to provide development and a better way of life to the surrounding community.

The application of the MBT as a solution for the household waste is executed based on technical and integrated elements, so that the economic, social and environmental aspects are solved as a proposal for integrated handling and treatment.

2 Technical introduction of MBT

The MBT aim is the biological stabilization of organic fractions found in household waste up to reaching the characterization as an inert mass. It means that after the MBT the organic fractions will be microbiological inactive having as consequence gas emissions reduction and also reduction of the organic load at the leachate.

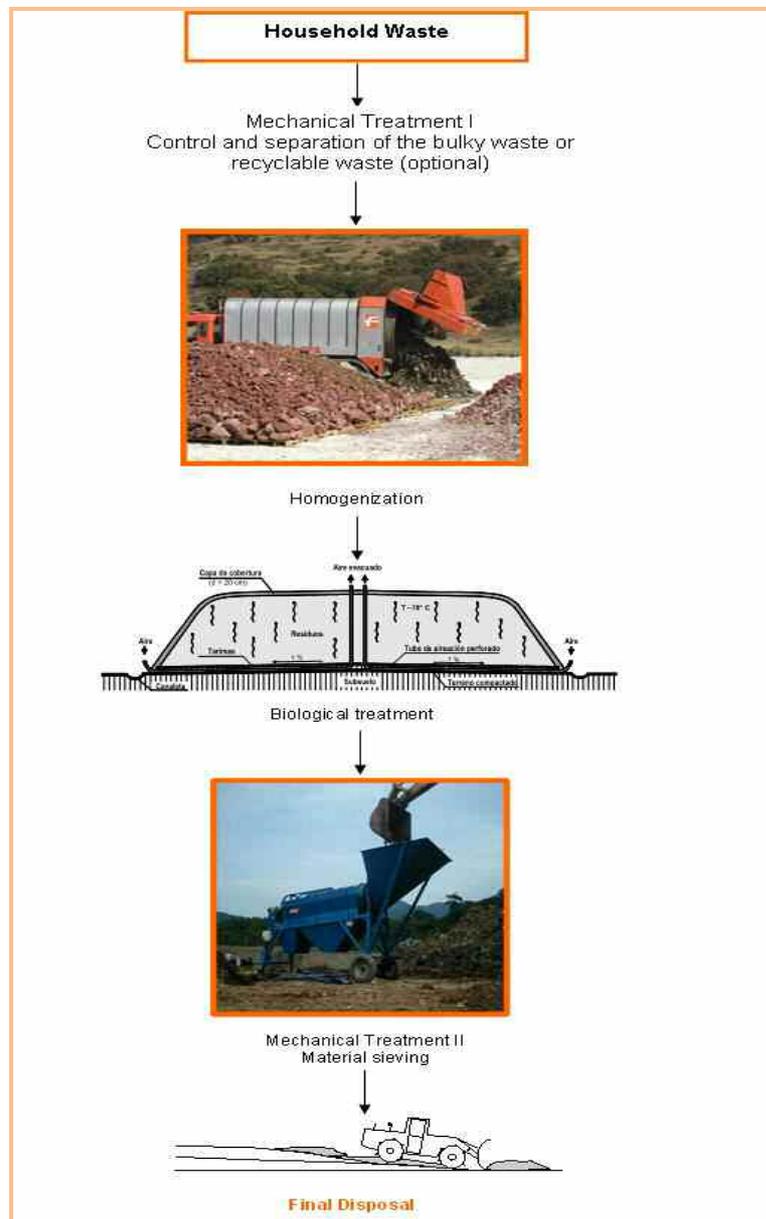
Waste treatment advantages

- Possibility of parallel compost production.
- Duplication of landfills duration – the area for traditional landfills is much larger and consequently the investment for its acquisition will also be so. However the area with application of MBT, besides being smaller (smaller investments), will suffer less impact and will not affect the neighboring owners. Also the utilized area may have multiple uses in the management of waste. Example: Centre of selection and preparation of raw material for recycling, without any contamination risks to workers.
- Reduction in emission potential - 90% reduction of methane production and of organic load present in leachate.
- Improvement of landfill operation by reducing dust emissions, paper flow and odor emission.
- Minor settlements (favorable for the early installation of a surface cap)

Valuable or hazardous materials are separated from the delivered waste before the mechanical treatment is initiated. During this mechanical treatment the waste is crushed and homogenized in a closed drum, with the addition of leachate from any dump (for instance from old waste dumps) without incurring in further treatment costs and maintaining an environmentally friendly disposal of the leachate. The next step is the biological treatment of the waste. During this stage the biologically decomposing organic waste mass is treated as an aerobic-cell (with oxygen) and as a microbiological process to achieve almost entire waste decomposition.

This stage can be reached by a rotting duration of approx. 4-9 months. Complete decomposition of the biological organic mass is the prior aim. (Any remaining biological decomposing organic mass in the waste causes an uncontrollable anaerobic-cell (with-

out oxygen) and microbiological decomposing process as found in traditional waste dumps). The optional stage is the mechanical treatment II and consists of sieving the material prior to final disposal. After the biological stage the treated material will be land-filled with special equipment focusing to increase the emplacement density from 0,8 to 1,4 t/m³.

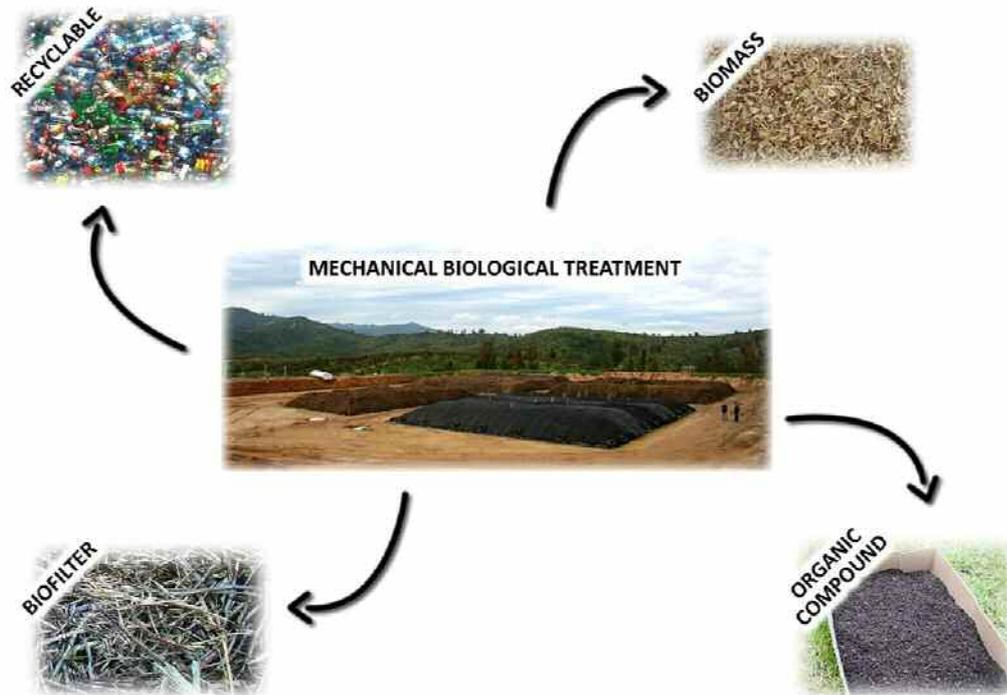


3 Mechanical and biological treatment products

The products obtained from the application of the mechanical-biological treatment have great potential to re-enter the production chain due to application of the concept of waste valorization during the MBT operation. The waste valorization (or waste recovery)

saves resources, reduces pollution, creates jobs and contributes to the sustainable development and to a better environment.

The treated residues have changed their characteristics so that their reuse is possible while safeguarding human health and creating potential for development of communities. So you can get as a product of MBT: high-quality organic compost, reuse of recyclable waste from household collection, cover material (bio-filter) and energetic material (biomass or plastics).



4 MBT: social development and environmental protection

The planned politic and operation implementation of the MBT committed itself to a sort of balanced and healthy environment, coordinating all the transformations of the built environment, aiming the welfare of the community and promoting the full development of the social functions of the city.

The social development is the evolution of the components of the society (human capital), and how they are related (social capital). The MBT projects, "Every and all Development is a Social Development," because we believe that there is no development without changing both social and human capital.

With this in focus and attached to the technical capabilities of the Mechanical Biological Treatment we are trying to establish ties with the community through the provision of "green jobs". These jobs are going to be trained and employed by a marginalized popu-

lation at the economic productive system which now is going to exercise a fundamental role in the development of technologies for treatment and reuse of waste.

5 Individual Projects Overview

5.1 Chile



The project for „The Support of the Administration of Solid Waste for the Community of Vila Alemana“ considered the elaboration of an urban plan for the integrated management of solid waste (PAGRU) and the introduction, monitoring and qualification of a pilot module for the mechanical-biological treatment of waste for the community of Vila Alemana.

During the period in which the project PPP was drawn and developed, different activities were implemented, which have as a goal the introduction of an integrated system and mechanically biological treatment of the urban waste as the first step on the part of the city administration to make possible/reach a lasting development and converge its own interests with the prevention of the environmental pollution and the reduction of the significant impact by the unsuitable handling of the urban solid waste.

The goal was to produce concrete information about the course and the characteristics of the methodology of the mechanical-biological treatment, which on the one hand supplied with concrete technical and economic arguments so that the city of Villa Alemana can opt for a total introduction of the system for its community and thus also on the other hand the country can evaluate better the best form for the introduction of this technological type in its communities.

Starting in a far spectrum from the expected results and from the execution of this PPP project, it is expected in a general form to contribute to the public knowledge in connection with the substantial improvements (social, environmental, operational, economically) which an integrated management plan for solid waste can produce.

The introduced environmental operation to solve the daily urban problems as well as the handling of solid waste form the starting point for the local development and growth under the perspective of the self-preservation.

In particular, this project has gotten straight that the traditional techniques for dump aren't an efficient possibility to solve the environmental problems attached to the operation of the waste. These dumping grounds will be transformed into a world and social passive which is transferred to the future generations and offends the self-preservation development.

In this same logic, the PPP project has made possible to spread and communicate publicly in the national level the technical, social and environmental conditions of a MBA before the landfilling as well as to justify the position that each operational activity must be planned in an integral context for an economy plan and not as an isolated measure with less self-preservation projection.

In order to introduce the knowledge of the MBA and the concept of „only deposit such solid waste that has exhausted its possibility of reusing, recycling or being used in any other form, for example energetically. Under this perspective it is successful to save means, to diminish the pollution and decrease the necessary space requirement for the final deposition of solid waste, to create new jobs around the new technology and to educate the population so that it finally can contribute to the self-preserving development and improvement of the quality of life.

As a conclusion the PPP project has shown that the mechanically biological treatment (MBA) of a management plan accompanies an effective solution (with operational, environmental and economic positive results) and has been tried out in the Chilean context and therefore are applicable to other municipalities with similar characteristics in Chile and Latin America.

The implementing of the project will be a concrete alternative solution to be introduced in the municipality of Villa Alemana and Marga Marga community, V region-Valparaiso-Chile and will transform into a reference project for the country.



Source: Faber Recycling GmbH – October 2008

5.2 Haiti



An economical activity that doesn't depend on draining resources, doesn't pollute the environment and uses as the basic input the creation, the innovation and the garbage. An economical activity that develops products with high value, highly labor concentration, generating occupation in all of the professional levels, with wages above the average of the country. An activity that links the economical to the social development, being it for the inclusive potential that it embraces, as well as for the human performing inherent to the production and the educational guides. These are the ECOPARC'S projects main characteristics.

The Project ECOPARC, whose purpose is the application of technologies for treatment and final disposition of residues, involves in its presuppositions a differentiated range of performance. This time the intention is to cross the border of the technical actions involving the society and the public power in a process of operational and normative adaptation concerning the management of residues.

The Project ECOPARC appears founded on the pillars of a new time, ruled from now on no more in the exhaustion of the nature nor in the exacerbated conservation movement, but we mention here a sustainable alternative that involves technology, economy, environment and social improvements.

We intended to build a calendar of development for the environmental economy, with the establishment of indicators and statistics, diagnoses, training and promotion of businesses. The "waste economy" has potential to be a vector of development for the Country and it should be understood as a strategic sector.

Truitier landfill – October 2008



Source: MBS Consulting

ECOPARC Plan



Source: MBS Consulting

The ECOPARC is so called sustainable applied, materializing itself in the creation of the infrastructure adjusted to the involvement of the society in an enterprise whose intention is the environment preservation and to improve the dynamics of the local economy.

6 Conclusion

The enormous volume of waste generated daily in the urban centers has brought a series of environment, social, economic and administrative problems, all of them linked to the increasing difficulty in implementing and maintaining adequate waste disposal areas.

Therefore it is necessary to contain the generation and to give an adequate treatment to the waste. For this, it's necessary to invest in technologies that allow to reuse and to recycle the materials in disuse. We can't face the waste as an "useless remaining portion" anymore, but as something to be transformed into a new substance to return to the productive cycle in a healthy way.

The differentiated impacts generated by the solid urban waste justify the necessity of concrete interventions, possible by the planning of adequate management programs. The use of management tools in the solution of the problem comes from the ample variety of waste generated daily in the cities, demanding different technical actions as a solution. The treatment of waste materials that can be inserted in the economic activity again becomes then necessary, maximizing the consequent environment profit of minimizing and reusing the "waste" through its valuation.

Proposals of integrated management centers are ruled not only in the capacity of accomplishment of productive activities, but in the bond of these activities with the program of environment education objectifying permanent and accessible actions to the sensitization of the whole population for the responsible consumption and desirable practices for the participation in the collection program.

The Project impersonates a conjugation of strategies put in movement, which have as unfolding the leverage of the process of accumulation of capitals and consolidation in the domestic and external market of the raw material commerce coming from processes that value materials. Therefore, it handles about an intrinsic relation between strategies and enterprise dynamic in set with a genesis based in the socio-environmental formation.