Disposal and recycling of wastes in industrial production

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ABSTRACT

In this topic, I will explain various wastes generated in industrial production and their corresponding treatment methods and recycling methods. (All waste included in this paper is from the injection molding process)
Plastic waste:
This is plastic that is not used in the production process and may be waste from cutting, extrusion, or injection molding.
Solvent waste: In some plastic processing processes, it may be necessary to use organic solvents, which become toxic and difficult to degrade after use, requiring special handling.
Wastewater:
During some plastic processing, waste water may contain toxic substances and chemicals that need to be treated to prevent impacts on the environment and human health.
Exhaust gas:
During some plastic processing, toxic gases and odors may be produced, which need to be disposed of to protect workers and the environment.

CONTENTS

1 INTRODUCTION

1.1 Introduction of background

Currently, the injection molding industry has become an indispensable part of the world's manufacturing industry, and with the continuous development of injection molding enterprises, they generate more and more waste. These wastes not only cause serious pollution to the environment, but also waste a large amount of resources. Therefore, how to effectively treat waste from injection molding enterprises has become an urgent problem to be solved.

At present, there have been many studies on the treatment methods of waste from injection molding enterprises, such as incineration, landfill, recycling, and so on. However, these methods have some problems, such as incineration producing a large amount of harmful gases, landfill occupying a large amount of land resources, and the recycling technology is not yet mature enough. Therefore, it is necessary to explore more suitable methods for waste treatment in injection molding enterprises and solve the problems existing in existing methods.

To address this issue, this paper will use experimental research methods to treat waste from injection molding enterprises. Specifically, a suitable method for treating waste from injection molding enterprises will be selected, and its treatment effect, and environmental impact will be evaluated through experimental analysis.

The research significance lies in providing a more effective and feasible method for the treatment of waste in injection molding enterprises through the research of this paper, and making contributions to environmental protection and resource utilization.

(1.1.1) The plastic injection moulding shop

1.2 Waste from injection molding

The waste from injection molding enterprises mainly consists of solid waste, wastewater, waste oil, exhaust gas, etc., among which plastic particles are The main component of solid waste. Plastic particles are usually divided into several types, such as high-density polyethylene, polypropylene, polyvinyl chloride, polystyrene, and polycarbonate. These plastic particles may have different shapes and colors due to different production processes. Solid waste also includes waste plastic residue, which is mainly composed of waste materials and products generated during the production process.

In addition to solid waste, wastewater is also an important component of waste in injection molding enterprises. Injection molding enterprises need to use a large amount of water for cooling, cleaning, and flushing processes during the production process, thus generating a large amount of wastewater. These wastewater contain a large amount of organic matter and heavy metals, and if discharged directly into the environment without treatment, it will cause serious pollution and harm to the environment.

Waste oil in the injection molding industry refers to the treatment of used or contaminated oils resulting from mechanical operations, such as hydraulic systems using oil as a lubricant or coolant.
Injection molding involves high-pressure injection of molten plastic material into a model to form a specific shape or product. Hydraulic systems are commonly used to power clamping and injection units of moulding machines. These systems rely on oil for efficient operation, but over time it can be contaminated by dirt, debris and other contaminants, which can reduce its effectiveness.

In addition to wastewater, injection molding enterprises also generate a large amount of exhaust gas. Waste gas is mainly composed of gases and volatile organic compounds generated during the production process. Exhaust gas contains a large amount of harmful substances and difficult to degrade organic matter. If not properly treated, it can also cause serious harm to the environment.

In summary, the waste from injection molding enterprises is composed of various different substances, among which solid waste, wastewater, and exhaust gas are the main components. In order to protect the environment and human health, it is necessary to effectively treat and utilize these wastes to reduce environmental hazards and resource waste.

1.3 Relevant regulations and standards for waste disposal and environmental protection

Waste Framework Directive (2008/98/EC):
This directive sets out the legal framework for waste management in the European Union (EU). Injection molding companies must comply with the requirements of the directive, including the waste hierarchy, which prioritizes waste prevention, reuse, and recycling over disposal.

Industrial Emissions Directive (2010/75/EU):
This directive regulates emissions to air, water, and soil from industrial activities, including injection molding. Injection molding companies must obtain permits and comply with emission limits and other requirements to minimize their impact on the environment.

REACH Regulation (EC 1907/2006):
The Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) regulation applies to chemicals used in the EU. Injection molding companies must comply with the requirements of REACH, including registering chemicals and providing safety data sheets to customers.

Waste Electrical and Electronic Equipment Directive (2012/19/EU):
This directive sets out requirements for the disposal of electrical and electronic equipment, including equipment used in the injection molding process. Injection molding companies must comply with the directive's requirements for the proper disposal of this equipment.

ISO 14001:
As mentioned above, the ISO 14001 standard is an internationally recognized environmental management system. Injection molding companies can adopt ISO 14001 to demonstrate their commitment to environmental protection and sustainability.

1.4 Goals and research questions

Goal:
Reduce the amount of waste generated during the injection process.

Optimizing material use in injection process.

Improving efficiency and profitability of injection moulding operations.

Minimize the environmental impact of injection waste.

Research questions:
What is the main source of waste during the injection process?

How to optimize the injection process to reduce waste generation?

What is the most effective way to recycle or reuse injection waste?

What are the costs and benefits of implementing waste reduction strategies in injection operations?

How to minimize the environmental impact of injection waste?

How to maintain or improve the quality of injection products while reducing waste generation?

What is the most promising new technology or material for reducing injection waste?

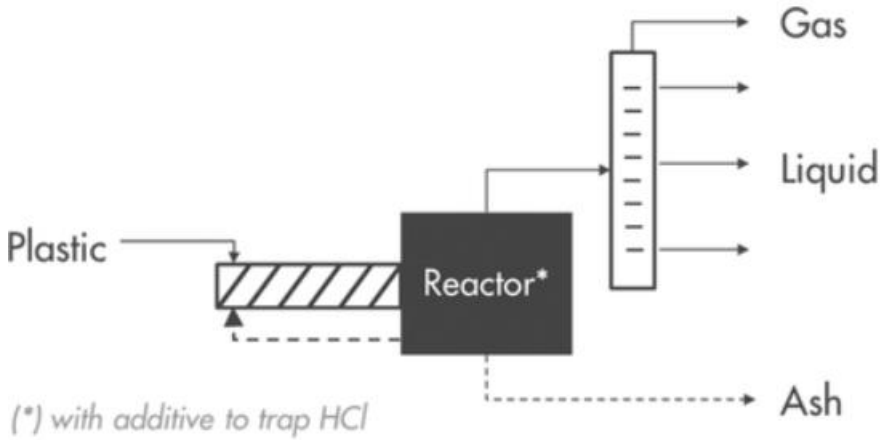
2 SOLUTION

2.1 Disposal of solid waste

Solid waste is mainly divided into plastic particles and plastic waste residue. Plastic particles are generated from residual raw materials during injection molding and have recycling value.Of course, unqualified injection molding products can also be recycled. While plastic residue is generated from processing waste. These plastic waste residues, due to being melted at high temperatures and being contaminated, do not have recycling value, so another treatment method is needed.

Unrecyclable waste plastics are typically pyrolysis through so-called melting pyrolysis. Figure (2.1.1) provides a conceptual process solution. Therefore, the plastic is added to the extruder and allowed to melt, optionally adding recycled liquid, which is then added to a large container heated to 450-1000 ° C and mechanically stirred. Cracked steam is removed at the top of the container and then condensed into liquid pyrolysis oil. Non condensable gases can be used to heat the reactor. The char is removed at the bottom of the vessel and disposed of. The pyrolysis of polyolefine produces waxy liquid products with a yield of 70-80 wt%. Each ton of liquid product consumes approximately 1.5-2 GJ of energy, which is less than half of the available energy in the 10-15 wt% gas generated during the pyrolysis process. Therefore, the pyrolysis process can automatically and efficiently run on its own by-products.Strict temperature control and ordinary stirring are crucial for minimizing coke deposition and achieving high oil yield.The obtained pyrolysis oil and wax can be further cracked into olefins and aromatics (so-called high-value chemicals) at a yield of about 60wt%.（Shen, 2022, p.21 ; Wang & Han, 1984, p.41)

This is the treatment method used by the company I am interning with. The exhaust gas from the incinerator is sucked in through pipes installed on the incinerator and processed in the exhaust gas storage tank on the roof of the building.



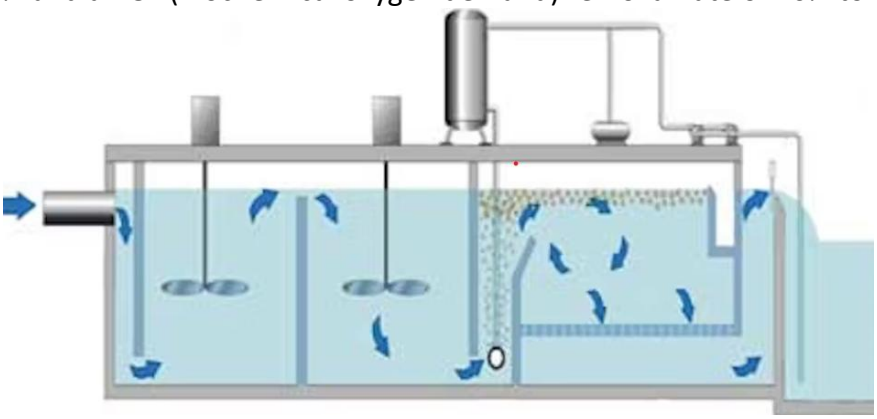
(2.1.1)Processes in the thermal degradation of organic matter at atmospheric pressure

2.2 Disposal of liquid waste

Liquid waste is divided into wastewater and waste oil.

Disposal of wastewater

There are high requirements for the suspended solids content in the wastewater from cleaning and cooling injection molding machines. Therefore, Dissovled Air Floatation(DAF) can be used to remove most of the suspended solids in the wastewater, and then the wastewater can be reused in the production process to reduce wastewater discharge. After removing large particles of debris and settling sand from the wastewater through grids and settling tanks, it stays in the regulating tank for a certain period of time to ensure uniform water quality.(Joe, 2013) Then, the wastewater is lifted into the pipeline mixer and reactor using a pump as the power, and flocculants are added to improve the water quality characteristics. The mixed wastewater flows into the air flotation tank by gravity. The air flotation tank mainly uses the microbubbles generated by the air dissolution system as carriers to adhere to the suspended solids flocs in the water. The suspended solids rise to the water surface together with the microbubbles, forming scum, and removing the suspended solids in the water. Especially for the removal of plastic suspended particles with a specific gravity close to water, dissovled air floatation technology is an effective method. During the treatment process, ferric chloride and aluminum sulfate can also be added to promote protein aggregation and precipitation, as well as oil floating. In addition, using the DAF process can achieve a COD(Chemical oxygen demand) removal rate of 30% to 90% and a BOD(Biochemical oxygen demand) removal rate of 70% to 80%.



(2.2.1)Dissolved Air Flotation Process (Lawrence et al., 2009)

In addition to Dissovled Air Floatation, in the wastewater treatment technology of injection molding enterprises, biological treatment technology is another relatively common method.
The main principle is to biodegrade waste through microorganisms, converting organic pollutants into inorganic compounds or degradable substances, while ensuring treatment efficiency, which can significantly reduce environmental pollution. Biological treatment technology has many advantages. Firstly, no new pollutants will be introduced during its treatment process, which has a relatively small impact on the environment and high safety. Secondly, biological treatment technology can utilize natural resources, and its relatively low energy consumption is another major advantage. At the same time, advanced biological treatment systems can also obtain

by-products such as biogas and fertilizers during operation, killing two birds with one stone. It not only achieves the effect of garbage treatment, but also brings economic benefits to the enterprise.
It should be pointed out that biological treatment technology also has some drawbacks. For example, its reaction is easily influenced by various factors such as temperature, pH value, concentration, etc. Therefore, it is particularly important to study the appropriate conditions for microbial growth in biological treatment processes. In addition, the treatment cycle of biological treatment technology is long, and it is difficult to ensure treatment efficiency due to the influence of waste type, microbial strains, and treatment temperature. In response to these shortcomings, further research and exploration are needed on biological treatment technology to improve its efficiency and quality in waste treatment.(Ahmed et al., 2021)
In short, biological treatment technology, as an important technological means for waste treatment in injection molding enterprises, has broad application prospects. Compared with other treatment technologies, biological treatment technology is more environmentally friendly and cost-effective, but it also faces certain technological bottlenecks that require in-depth exploration and research.

Disposal of waste oil

Waste oil is mainly produced from engine oil and hydraulic oil.The solid fragments in the waste oil can be filtered by filtering the waste oil before implementing the following two treatment methods.

Recycling: Waste oil can be recycled by cleaning and reprocessing into usable products. This is a sustainable and environmentally friendly option that reduces the amount of waste generated. Many injection companies have established partnerships with companies specializing in waste oil recovery.

Reuse: Waste oil can be reused in place during the injection process. This is a cost-effective and sustainable option that reduces demand for new oil and minimizes waste. However, it is important to ensure that the reused oil meets the required specifications and does not affect the quality of the products manufactured.

2.3 Treatment of exhaust gas

In terms of waste gas treatment, the company has installed a denitrification tower, effectively reducing the emission of waste gas and the content of pollutants. Denitration tower, also known as selective catalytic reduction (SCR) system or denitrification tower, is an air pollution control device used in power plants and industrial facilities to remove nitrogen oxides (NOx) from flue gas emissions. Nitrogen oxides are harmful pollutants that can cause air pollution, smoke, and the formation of acid rain.(FLUENCE NEWS TEAM, 2019）

The denitrification tower adopts a process called selective catalytic reduction, which involves injecting a reducing agent, usually ammonia or urea solution, into the flue gas flow. The flue gas containing nitrogen oxides passes through the catalyst bed in the denitrification tower, and the nitrogen oxides react with the reducing agent in the presence of the catalyst. The chemical reaction between nitrogen oxides and reducing agents converts nitrogen oxides into harmless nitrogen (N2) and water vapor (H2O). Catalysts help promote reactions at lower temperatures, typically between 300 and 400 degrees Celsius.

By using denitrification towers, industrial facilities can significantly reduce nitrogen oxide emissions, thereby minimizing their impact on air quality and the environment. These systems play an important role in meeting emission regulations and standards implemented by environmental agencies.

（2.3.1）The denitrifiction tower system

2.4 Does the waste disposal in the factory workshop comply with the standards of environmental protection regulations

Treatment of three main wastes

Name	Disposal location	Component	Excluded quantity	Treatment method
Waste residue	Incinerator	Polymer matrix 80.15% Additive 19.76% Pollutant 0.09% Oxygen 1.33%	200t/year	Convert plastic residue into coke using melting pyrolysis method.
Waste gas	Denitrification tower	Carbon dioxide 32.4% Nitrogen oxide 55.77% Organic compound 10.5%	900m3/month	The chemical reaction waste gas from the desalination tower is converted into harmless nitrogen and water vapor, then discharged into atmosphere.
Wastewater	Dissovled air floatation system	Organic particles 70% Inorganic substance 25% Pollutant 5%	6580t/year	After passing through the dissolved air flotation system, it will discharged through the sewer.

(2.4.1) Company standard emissions form （Shen, 2022, p.4）

According to form (2.4.1), the discharge of main wastes is known. Since the table is jointly prepared by the company and the environmental protection agency of the local government, it proves that the company has passed the environmental protection review.

2.4 Possibility of partial waste recycling

Part of the waste recycling in the injection molding industry is absolutely possible, and it is used in many manufacturing plants. Recycling plastic waste from the injection molding process has many advantages, including reducing the impact on the environment, saving resources and possibly reducing production costs. The following are the six basic steps for recycling plastic materials I have learned from practice.

Step 1: Collect waste plastic
The first step of plastic recycling is to collect waste plastic products. Although this process may seem easy, it is not entirely the case. Firstly, it is necessary to clean the residual plastic particles from the injection molding machine and place them in a dedicated box (a dedicated box refers to separating recyclable plastic waste from non recyclable plastic waste), and then collect unqualified injection molding products.

Step 2: Classify plastics
After collection, we will classify the collected plastic according to its type. Usually, we classify plastics based on their purpose, composition, color, and size.

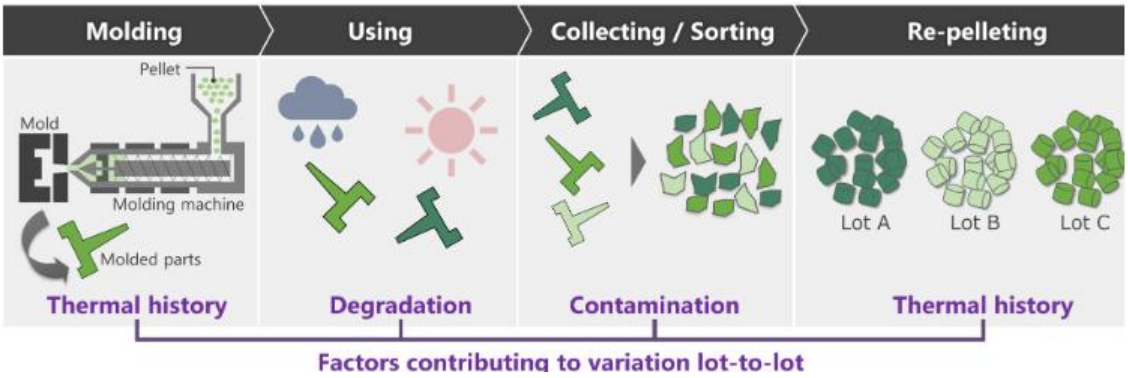
Step 3: Wash to remove impurities
After plastic classification, clean the material to remove impurities. These impurities in plastic include paper labels, dirt, and particles of other components. Washing is essential because failure to remove impurities may damage the new product. Moreover, the contaminants contained in plastic products are not plastic materials and may not be recyclable.

Step 4: Shredding and resizing
This process is carried out immediately after cleaning the plastic. It is impossible to recycle formed plastic. The plastic material needs to be adjusted to a recyclable form. In this fourth process, the material will be placed in a crusher to crush the plastic into fragments.
Compared to the original shape, plastic materials cut into small pieces are more convenient to process. Chopping can also reprocess plastic into materials other than plastic products. Adjusting the size can also make it easier to identify metals and other elements that recyclers did not discover during the cleaning process.

Step 5: Further identification and separation of plastics
After the size adjustment is completed, the next step is to identify and separate the plastic material. In this process, plastic particles need to go through a testing program. The reason for testing plastics is to determine their grade and quality. Then separate the plastic material based on its characteristics for further processing.
For example, one characteristic tested during this process is density. Place these plastic particles in a container filled with water to determine the density of different types of plastic. The density of sinking plastic particles is higher, while the density of floating plastic particles is lower.

Step 6: Reprocessing

After the fifth step, we will package the prepared plastic particles into different categories. Afterwards, the recycling company will be contacted to transport these plastic particles, and the recycling company will reprocess these plastic particles into injection molding raw materials that can be used normally. This type of material will be cheaper than ordinary materials, thereby reducing the procurement costs of injection molding companies.(British Plastics Federation, 2023)



（2.5.1）Example of factors that fluctuate material properties in the recycling process.(Daisuke Yagi, 2022)

2.5 How waste is stored and ransported

Plastic waste (British Plastics Federation, 2023)

Storage:

Waste classification: Plastic waste is divided into different categories according to its type and quality. This includes classifying clean plastic waste, contaminated plastic, and discarded or defective parts. Proper classification is helpful for effective recovery or treatment.

Storage container: Store plastic waste in designated containers or trash cans. These containers are usually labeled and color coded to indicate the type of plastic waste they contain. Different types of plastic or non recyclable waste can use different containers.

Size reduction: Oversized scrap, such as unqualified parts or large models, may be cut or broken into smaller pieces. This reduces the volume of waste and facilitates storage and transportation.

Waste management system: Injection molding equipment usually has a waste management system. The system includes documentation, tracking and processing procedures to ensure compliance with local regulations and environmental standards.

Transportation:

Waste collection: When the waste collection container is full, this can be done using waste collection services or dedicated waste transport vehicles.

Recycling partnerships: Injection molding companies often establish partnerships with recycling companies. These partnerships help deliver plastic waste to recycling centers where it can be treated and recycled into new plastic products.

Disposal facilities: When plastic waste cannot be recycled, it can be transported to waste disposal facilities such as incineration plant or garbage dump. Follow appropriate disposal methods to ensure compliance with environmental laws.

Lipuid waste

Storage:

Sealed containers: Liquid waste is usually stored in sealed containers, such as drums, tanks, or tank trucks. These containers must be able to withstand the chemical properties of liquid waste and have good sealing performance to prevent leakage and environmental pollution.

Safety identification: Liquid waste containers shall be properly identified, including waste type, hazard, etc. This will help staff to properly dispose of waste and take necessary safety measures.

Storage area: Liquid waste shall be stored in a designated storage area to prevent leakage, diffusion and environmental pollution. Storage areas shall be provided with suitable leak-tight facilities, such as leak-tight floors or collection chutes, to capture any possible leakage.

Safety control: The area where liquid waste is stored shall be provided with appropriate safety control measures, such as fire protection equipment, leakage emergency treatment equipment and appropriate ventilation system. Employees shall receive relevant safety training and understand emergency response measures for handling liquid wastes.

Transport:
Safety containers: Suitable containers, such as sealed tankers, drums or containers, shall be used for the transportation of liquid wastes. These containers must comply with regulatory requirements for the transportation of liquid waste and be capable of preventing spills and contamination.

Leakage protection: Measures must be taken to prevent leakage when transporting liquid wastes. This includes the use of suitable seals and safety devices and periodic checking of the condition of the container to ensure its integrity.

Compliance and Permitting: The transportation of liquid waste must comply with local regulations. This may involve obtaining the necessary permits or licenses and must be carried out in accordance with transportation regulations.

Vehicle Requirements: Vehicles used to transport liquid wastes must meet specific requirements.

Waste gas

The storage and transportation of waste gas is not as complex as plastic waste and liquid waste. Injection molding industry usually installs emission control equipment, such as waste gas collection hood, exhaust system and waste gas treatment equipment, to control the generation and emission of waste gas. These devices help to collect and treat waste gas and reduce its impact on the environment. The waste gas generated in the injection molding process can be directed to the centralized treatment facility or purification system through the pipeline and collection cover. The treated waste gas can be directly discharged into the atmosphere after purification. This requires compliance with environmental regulations to ensure that exhaust emissions comply with appropriate emission standards and limits. It is important to monitor and record the emission and collection of waste gas, which is an important environmental management practice. This helps to ensure that exhaust emissions meet regulatory requirements and provides data for environmental impact assessment.

3 TOPIC ANALYSIS

3.1 The current situation and challenges of industrial waste treatment

Waste treatment technology of plastic enterprises has always been a hot issue of concern. At present, the waste treatment technology of injection molding enterprises in China generally has the following problems: first, the treatment efficiency is low. As the waste of injection molding enterprises is composed of various materials, it is difficult to separate and classify different materials, resulting in low treatment efficiency. Secondly, the treatment cost is high. Injection molding waste treatment requires a lot of material, financial and human costs, but the treatment effect is not satisfactory. Third, waste disposal is single. Now, many injection molding enterprises adopt simple landfill treatment, which causes serious environmental pollution. Finally, there is a lack of technological innovation. The existing injection molding waste treatment technology can no longer meet the development needs, and technical innovation needs to be strengthened.

To solve these problems, injection molding enterprises need to take some measures. First, strengthen the management and monitoring of injection molding enterprises. The advanced information management system shall be adopted to strengthen waste monitoring and timely find and handle wastes. Secondly, there is a need for innovative injection molding waste treatment technologies. Improve treatment efficiency and reduce cost by selecting proper treatment technologies and equipment. At the same time, technical research and development shall be carried out with environmental protection as the main objective. Finally, strengthen the construction of industry norms and standards, encourage injection molding enterprises to self-discipline, regulate waste disposal behaviors, and reduce the impact on the environment.

To sum up, there are many problems in the waste treatment technology of injection molding enterprises, but there are still opportunities for development under the promotion of technological innovation. The key is that enterprises themselves need to pay attention to waste management and actively take measures to solve problems. Meanwhile, the government is also expected to strengthen policy guidance and supervision and jointly promote the development of injection molding waste treatment technology.

4 FUTURE DEVELOPMENT

4.1 How to improve the harmless conversion rate of industrial waste

Use science and technology to improve the efficiency of industrial solid waste disposal: As for the power of science and technology, everyone should understand that science and technology plays a very important role in the process of industrial production, and the state should first increase the investment in science and technology in production to support the recycling of industrial waste, because only when the investment in science and technology becomes larger, the production efficiency will be higher. Then we will produce less industrial waste in the production process, so it will be less difficult for us to deal with industrial waste. Of course, if the government wants to implement this policy, it must increase the protection of the environment, and for enterprises with scientific industrial solid waste disposal, it must increase incentives and support, help these enterprises have more funds to study the relevant solid waste disposal methods, and reuse these industrial wastes into the production industry, so as to realize a recyclable industrial economy.

Establish a reasonable management system: Because only when there is a special management system in the enterprise to be responsible for the disposal of industrial solid waste, can we really rectify the whole waste market and improve the rational utilization rate of waste. Only when you really reduce the generation of waste in this way can you establish an industrial chain of renewable resources, help industrial waste form a good recycling structure and achieve a scientific effect of industrial solid waste disposal.

Employee education and training: Educate and train employees on waste management practices, including classification, treatment and disposal methods. Encourage employees to actively participate in waste reduction actions and provide them with the necessary knowledge and tools to implement best practices. In order to realize the comprehensive utilization of industrial waste, it is necessary to fundamentally change the ideological understanding of the comprehensive utilization of industrial waste. While carrying out environmental protection publicity, enterprises must also pay more attention to the publicity of the content of comprehensive utilization and recycling of industrial waste, encourage industrial enterprises to carry out technology research and development, and give some support in policy.

4.2 How to improve the recycling of some high-value industrial waste

Improve waste classification: The factory should establish a complete waste classification system to facilitate the separation and proper treatment of different types of waste. In this way, recyclable waste and non recyclable waste can be separated, so as to improve the recovery rate.

Improve the recycling rate of waste: Factories can use technical means to treat and recycle high-value waste. This may include physical treatment methods (such as separation, filtration, magnetic separation, etc.), chemical treatment methods (such as dissolution, extraction, etc.) or heat treatment methods (such as pyrolysis, smelting, etc.). The selection of appropriate technology and equipment depends on the characteristics of the waste and the required recycling objectives.

Energy conservation and emission reduction: Factories can adopt some energy conservation and emission reduction measures, such as improving production efficiency and reducing energy consumption, so as to reduce the generation of waste and pollutants.

Market development: Explore market channels for recycling high-value waste, establish cooperative relations with relevant industries, and look for new uses and applications of recycled products. This can increase the commercial feasibility of sales and recycling of high-value waste.

Promote new technologies: Factories can actively promote new clean technologies, such as solar energy, wind energy and other clean energy, to reduce environmental pollution. To sum up, improving the waste and recycling of factories needs to start from many aspects, including improving waste classification, improving waste reuse rate, energy conservation and emission reduction, recycling and promoting new technologies.

5 SUMMARY

Based on the practice in the internship, this thesis aims to explore the waste treatment technology of injection molding enterprises, so as to reduce environmental pollution, improve the social image of injection molding enterprises, and ensure the sustainable development of injection molding enterprises.

Sources and composition of waste from injection molding Enterprises:
The waste of injection molding enterprises mainly comes from the waste water, waste gas and solid waste generated in the process of injection molding production. Among them, wastewater is one of the most important wastes of injection molding enterprises. It contains a large number of organic substances, heavy metals and harmful substances, which will cause serious pollution to the environment if discharged at will. The waste gas contains pollutants such as carbon dioxide and sulfur dioxide, and the solid waste mainly includes waste plastics.

Waste treatment technology of injection molding Enterprises:
According to different types of waste from injection molding enterprises, biochemical treatment, physical treatment, chemical treatment and other methods can be used for comprehensive treatment. Biochemical treatment mainly includes microbial degradation treatment and flotation treatment, which can effectively remove organic matter and ammonia nitrogen; Physical treatment mainly includes adsorption, incineration and other methods, which can remove large particles and non recyclable plastic waste; Chemical treatment mainly includes denitration, precipitation and other methods, which can treat organic matter and nitrogen oxides in waste gas.

Current situation and challenges of waste treatment:
This paper analyzes the current situation of waste treatment in accommodation enterprises, including current waste treatment technology, waste classification and recycling, etc. The challenges include capital and cost pressure, waste treatment technology selection, training and educating employees, etc.

Optimization scheme of waste treatment in injection molding Enterprises:
In order to further improve the efficiency and effect of waste treatment in injection molding enterprises, this part describes how to improve the harmless conversion rate of industrial waste and how to improve the recycling of some high-value industrial waste. These suggestions can help accommodation enterprises improve the efficiency of waste treatment and resource regeneration rate.

In short, the waste treatment of injection molding enterprises is a necessary measure for the sustainable development of enterprises, and the waste treatment and management should be strengthened to protect the environment and ensure the sustainability of enterprises.

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