

Waste Collection, Sorting and Storage and Food Waste Management on Disney Cruise Line Ships

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Abstract

This paper presents the waste collection, sorting and storage on Disney Cruise Line (DCL) company ships, as well as in-house food waste management procedures. In a previous paper, we singled out the DCL company's environmental policies, as well as the cruise itinerary waste management plans for the enterprise's ships.

The paper analyses the in-house environmental personnel's activity, the company's internal regulations, and relevant data and field observations collected by the environmental protection staff, and presents data on the collection, sorting and storage of the waste generated by DCL cruise ships, and details food waste processing and discharge methods.

The paper confirms the DCL company's intention to minimize its fleet's environmental impact by implementing the appropriate waste collection, sorting and storage methods, as well as by reducing food waste amounts and ensuring an efficient food waste management. In 2013, DCL was declared the most environmentally-responsible cruise line, according to the Cruise Industry Environmental Report Card. All crew members are charged with complying with environmental requirements and DCL's environmental policy. Both crew members and customers must pay attention to practices that can accidentally result in food waste pollution. Food waste collection and the prevention of improper overboard spillage of waste are carefully supervised by everyone on board. The DCL company makes constant efforts to reduce food waste amounts and associated risks to a minimum across its commercial fleet. This entails using proper waste storage and disposal procedures, as well as planning the supply of raw materials and food ingredients.

Keywords: Disney Cruise Line, environmental policy, food waste management, on board

Introduction

Over recent years, environmental challenges have been getting more and more attention from governments, companies and the general public, which resulted in a concerted worldwide effort to change the status quo. Developing a prevention strategy for ecological degradation entails implementing the right mechanisms and policies that favour a sustainable approach to economic growth, i.e.increasing both environmental responsibility and economic efficiency.

The present paper presents in a clear-cut manner the waste collection, sorting and storage on board Disney Cruise Line (DCL) ships, as well as their food waste management plan. In a previous paper, we singled out the environmental policies of the DCL company, as well as the cruise itinerary waste management plans for the enterprise's ships.

The purpose of this paper is to look into DCL's environmental impact prevention strategy to ensure a proper food waste management on board, by analyzing (a.) the collection, sorting and transportation of the waste generated by its fleet to the dedicated treatment area, (b.) the waste storage in the treatment area, and (c.) food waste processing and disposal methods.

Disney Cruise Line is an enterprise affiliated with the Walt Disney Company (Manoiu and Antonescu, 2017). It was founded in 1996, initially under the name Magical Cruise Company Limited, based in London, UK, with its operational headquarters in Celebration, Florida (Manoiu and Antonescu, 2017). The DCL's fleet consists of four cruise ships: Disney Magic, Disney Wonder, Disney Dream, Disney Fantasy.

Environmental responsibilities on board DCL ships are held by the captain, environmental officer, chief engineer, B mechanic, and finally by all crew members (Manoiu and Antonescu, 2017).

The article, through its originality, will add to the findings of previous studies on this still insufficiently explored topic (Letson, Suman and Shivlani, 1998; Johnson, 2002; Burgin, Hardiman, 2011; Ulnikovic et al., 2012; Kizielewicz, Lukovic, 2015; Lasserre, Tetu, 2015, Wilewska-Bien, Granhag and Andersson, 2016).

The paper aims to analyze the in-house environmental personnel's activity, the company's internal regulations, and relevant data and on-site observations recorded by environmental protection team members.

Collection, sorting and transportation of waste to the treatment area on board DCL cruise ships

This chapter analyses the collection, sorting and transportation of waste from various ship sections to the designated treatment area.

Collection and sorting of waste

Each department has a designated area where waste is collected before it is transferred to the treatment area (Disney Cruise Line, 2016). These locations are fitted with multiple metal containers, one for each type of waste (Table 1):

Table 1. Types of waste (Source: Disney Cruise Line, 2016)

Category	Examples	Color of container
Burnable materials	Paper, plastic, rags	Blue/Aluminum
Glass	Bottles, glasses, mugs, plates	Gray
Cans and metal	Aluminum and metal cans	Green
Food	Cooked or raw food	Yellow
Medical	Blood-contaminated bandages	Red
Cooking oils	Used cooking oil	Black

When a waste item does not fit any of the categories, or there is no appropriate container in a given location, it must be transferred directly to the waste treatment area and handed over to the officer on duty.

All crew members are responsible for sorting the waste at source (Disney Cruise Line, 2016). This includes waste generated at their work area, in the cabins, eating area/restaurants and pubs, and recreational facilities (crew members must sort their personal waste in the treatment area, not at the source), waste generated by guests in the crew's work area. All crew members are responsible for transferring personal waste to the special collection point or to the waste treatment area.

Transportation to the waste treatment space

For sanitary and safety reasons, any collected waste must be transferred to the waste treatment area as directly and often as possible. All heads of departments train their teams on the procedures and routes to use for waste transportation (Disney Cruise Line, 2016). Upon entry into the waste treatment area, crew members are instructed on how and where to discharge/store the waste. When the waste management officer is handed over a load, the crew members who brought it in must wash the containers and return them to their areas. They must also carefully wash their hands after having handled waste. All departments are responsible for emptying, cleaning and returning their allocated waste containers.

Departmental responsibilities

On board waste management is an explicit requirement for all crew members and departments. Failure to comply with the regulation and to meet responsibilities may result in disciplinary reprimands and even termination of employment (Disney Cruise Line, 2016).

Department heads must ensure that all departmental collection points are fitted with the appropriate containers based on the type of activity; the right procedures are applied for sorting and transferring waste to the treatment area; all crew members are trained on the correct waste management methods, and waste sorting and handling operations are carefully monitored. Department heads are also responsible for ensuring full compliance with waste management regulations in their respective areas.

Waste storage on board the ships

Waste treatment area

The waste treatment area features a) an incinerator sector; b) a waste sorting and storage area, and c) waste cold storage room.

The waste treatment area must be kept clean, supervised closely, and used only for waste treatment operation materials.

Types of processed waste

Burnable waste

Once the waste reaches the treatment area, the personnel must identify the nature of the materials and the most appropriate processing methods. Burnable waste is shredded before being incinerated. The incineration of the following substances is not allowed on board the ships (United Nations-International Maritime Organization, 2011): polychlorinated biphenyls (PCBs); waste containing traces of heavy metals; refined petroleum-based products containing halogen compounds.

Non-burnable waste

Non-dangerous waste that cannot be burned is stored temporarily on board until it can be recycled or discharged in accordance with the relevant regulations.

Recyclable waste

It must be sorted before reaching the waste treatment area, where it is collected and processed before being discharged on land. Recyclable materials must not be mixed before disposal, as this can disrupt the recycling process.

Food waste

It is processed on board using grinders, in accordance with regulation. Items that cannot be grinded must be brought to the waste treatment area for storage and subsequent disposal.

Special waste

This type of waste cannot be processed on board the ships. It must be brought to the waste treatment area or to a location designated by the environmental officer for packing and storage until it is discharged.

Waste storage on board DCL ships

The main waste storage areas are the cold storage room and the waste sorting and storage area (Fig. 1).

The environmental officer is responsible for all waste sorting and labeling operations in the treatment area (Disney Cruise Line, 2016). The waste processing personnel must follow the environmental officer's instructions on waste handling and storage.

Waste cold storage room

This is the main location used for storing waste that, if stored at room temperature, can undergo biodegradation (food waste), as well as for other types of waste (e.g. dangerous non-flammable waste). Waste that is not affected by temperature can be stored in the cold room only if there is enough space available.



Fig. 1 Waste sorting unit

Unless stated otherwise by the environmental officer, the cold storage room is the designated area for storing dangerous non-flammable waste before it is discharged on land. Dangerous waste must not be kept longer than ninety days in this facility. Before the dangerous waste reaches the storage area, the environmental officer must make sure all labelling was done correctly, the appropriate containers are used and that they are in good condition, material safety data sheets (MSDS) are available and that incompatible materials are sorted out, in order to reduce associated risks (Disney Cruise Line, 2016). Before stored in the cold room, the waste must be labelled with the date of

storage, in order to help with the final disposal timing. The cold storage room is a safe location and must be kept closed at all times.

It is necessary to take the appropriate safety measures for risks associated to all cold storage waste types. The equipment that must be made available consists of: a fire extinguisher, personal protective equipment (PPE), and MSDS to indicate any hazardous elements (Disney Cruise Line, 2016). The environmental officer must inspect the cold storage room regularly and ensure compliance with the aforementioned rules.

Food waste processing and disposal procedures

Food waste processing

Waiters and personnel charged with dishwashing must carefully separate food waste from other types of waste in order to reduce the risk of plastic materials contaminating the organic waste mixture that is discharged in marine waters. In special marine areas, food waste must be grinded to less than 1 inch (25 mm) before it is discharged. The company's ecological objective is to follow the same standards for all marine areas. The primary processing method for food waste is via pulpers/grinders (Fig. 2). When waste cannot be grinded, it is discharged on land as regulated waste (Disney Cruise Line, 2016).

Outside special marine areas, food items that cannot be grinded (bones, fish, crustaceans, etc) can be discharged overboard using chutes/slides when the ship is over 12 marine miles from shore and advancing at a speed of at least 6 knots. This needs to be approved by the Environmental Safety, Security and Policy Authority (Disney Cruise Line, 2016). If the procedure is not available, the food waste that cannot be grinded must be discharged on land as regulated waste.

All personnel involved in the food waste discharge procedure must carefully monitor the waste flow and make sure no plastic or other types of prohibited materials are discharged. The food waste that is processed using grinders is checked by the grinder operator, who has to examine the waste feeding line. The waste that is discharged using chutes/slides is checked by the environmental officer.

Wet food waste (resulting from grinders) is collected in the wet waste silo. The discharge of wet waste is performed directly from the silo. On the Disney Magic and Disney Wonder ships, the personnel can use the discharge slide located in the waste treatment area. Before the discharge operation begins, the environmental officer checks the ship's location and time, and files the necessary reports in the Garbage Record Book (Disney Cruise Line, 2016).



Fig. 2 Bone, crustacean and large food item grinder

Food waste disposal

The environmental officer is responsible for discharging food waste overboard and recording the discharged amount, time and ship location in the Garbage Record Book. Before discharging the waste, the environmental officer ensures compliance with company policies and MARPOL codes (United Nations-International Maritime Organization, 2011). The Disney Magic and Disney Wonder ships feature a discharge chute that is kept closed when not in use.

On-land discharge of food waste and food-contaminated waste

Food waste and food-contaminated waste must be discharged on US territory, in the harbour, when no processing equipment is available on board.

Waste that cannot be discharged in the water must be transferred to the appropriate waste processing and treatment unit. The specific discharge process is chosen based on the type of waste. All waste must be packed and labeled before reaching the land (Disney Cruise Line, 2016).

It is forbidden by law for any food waste and any food-contaminated material to be discharged in the US, with the exception of direct transfers to specialized sanitation units that are authorized by the United States Department of Agriculture (USDA). Waste can only be discharged in hermetically sealed containers, approved by the USDA, under the supervision of the environmental officer and of a representative of the sanitation company (U.S. Department of Agriculture, 2006).

The environmental officer is responsible for planning the contaminated waste collection process via the Disney Cruise logistics and procurement department (Disney Cruise Line, 2016). The environmental officer will contact the sanitation company the day before the end of a cruise and will indicate the number of required containers. The officer is responsible for planning and supervising the waste discharge process, preparing the necessary

documentation in accordance with local and national regulations. The transfer of unregulated waste to contractors must be undergone as fast as possible.

Regulated waste consists of material leftovers derived from fruit, vegetables, meat or any meat- and plant-derived material (including poultry).

In US harbors, regulated waste must be packed in 3 mm-thick bags and discharged in hermetically sealed containers approved by the USDA (U.S. Department of Agriculture, 2006). Disney uses 4 mm-thick bags.

Any food waste discharge action must be documented in the Garbage Record Book and the reports must be kept on board for 3 years (Disney Cruise Line, 2016). The environmental officer is responsible for keeping a record of all discharged waste.

Customs Service and Customs Protection

The US Customs and Border Protection organization (US CBP) controls the entry of food products on US territory (U.S. Customs and Border Protection site, 2016). Without CBP's permission, it is forbidden to discharge food products or food waste-contaminated materials on land. When it is necessary to discharge such materials in a given harbor, a sanitation company approved by CBP must be contracted, which will process the waste delivered in CBP-approved containers (U.S. Customs and Border Protection site, 2016).

Conclusion

The Disney Cruise Line Company aims to minimize the environmental impact of its cruise ships by implementing the appropriate waste collection, sorting and storage methods, as well as by reducing the amount of generated food waste and by ensuring a proper management of this waste category. To this end, Disney Cruise Line uses the best available technologies and provides dedicated employee training programs. In 2013, Disney Cruise Line was declared the world's most environmentally responsible cruise line, according to the Cruise Industry Environmental Report Card (Elks, 2013). The company fully complies with all relevant national and international conventions, laws and regulations.

All crew members are responsible for complying with the DCL company's environmental requirements and policy. Both crew members and customers must pay attention to practices that can result in accidental food waste pollution. Food waste collection and the prevention of improper overboard spillage of waste are carefully supervised by everyone on board. The DCL company makes constant efforts to reduce food waste amounts and associated risks to a minimum across its commercial fleet. This entails using proper waste storage and disposal procedures, as well as planning the supply of raw materials and food ingredients.

The keywords that define DLC's environmentally conscious approach to its ongoing operations are keeping thorough records, monitoring, oversight, awareness and constant communication.

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