

ADVISORY CIRCULAR

Subject	Issuance Date	AC Number	Version
Guidance Material on Waste Management	1-September-2024	156-06	1.0

Note: This Advisory Circular is published to provide additional information and recommended actions that further elaborate on provisions or concepts prescribed in the GACAR-156.

1. Introduction

1.1 Purpose

The purpose of this advisory circular is to introduce waste management principles and approach as well as an overview on circular economy concept.

1.2 Applicability

This advisory circular is applicable to all aerodrome operators.

1.3 Cancellation

This is the first official version of this advisory circular, and it cancels no other advisory circular on the subject matter.

1.4 Related regulatory references

- a) GACAR Part-156.

1.5 Related reading materials and references

- a) Waste Management at Airports, ICAO Eco Airport Toolkit, available at: <https://www.icao.int/environmental-protection/Pages/Ecoairports.aspx>

1.6 Approval

This advisory circular has been approved for publication by the Executive Vice President for Safety and Environmental Sustainability of the General Authority of Civil Aviation.

2. Introduction

The successful implementation of waste management can have a positive impact on the environment, customers, and the surrounding community. In general, waste management is governed by national regulations (i.e., MEWA and MWAN) and driven by local municipal level targets.

Implementing waste management practices can be challenging. For example, stakeholder agreements with airport operators vary from one location to another (e.g., commercial contract structures, service agreements) and may affect the airport operator's ability to influence its stakeholders. Airports are also restricted by the capabilities of the national waste management services available to it. Nevertheless, there is a wide range of sustainable practices that can enable airports to take a leading role in promoting and encouraging effective waste management.

The purpose of this document is to prescribe such general principles and approaches. It will cover the basics of waste management at site, including environmentally friendly practices and the concept of circular economy, which is also capable of minimizing waste.

3. Waste management

As defined by the Saudi Civil Aviation Environmental Sustainability Program (CAESP), waste is considered as “unwanted or unused” products/materials/substances that happen to be produced and/or arrive at the airport site and that needs to be given a proper treatment. Waste management is the process of handling the waste, as well as dealing with the different requirements of these different types of waste.

3.1 Types of waste

Waste encountered by airport operators includes Municipal Solid Waste (MSW), Construction and Demolition Debris (CDD), deplaned waste from aircraft, compostable waste, hazardous and industrial waste, and lavatory waste. MSW and CDD can be collected, treated, stored, and disposed of in a variety of ways by airports. When considered and implemented in a beneficial manner, these choices can improve airport operations.

a) Municipal Solid Waste (MSW)

Airports have a wide range of choices when it comes to managing this type of waste. MSW consists of daily used items such as aluminum and steel cans, glass bottles, plastic bottles, packaging bags, paper products, and cardboard. The airport's MSW is primarily generated in public areas and airport administration offices, terminal retail and concessions, airplanes and airline offices, and cargo operations.

b) Construction and Demolition Debris (CDD)

Airports also generate Construction and Demolition Debris (CDD). Land clearing, excavation, and construction and demolition at airports can produce CDD.

c) Waste from Aircraft Flights (Deplaned Waste)

A specific type of MSW is waste from airplanes (deplaned waste). In the de-catering process, airline caterers typically collect galley waste as part of deplaned waste.

d) International Waste

International waste should receive special attention. This is usually waste from international flights but can also come from airport terminals that serve international flights. Plant pests, diseases, and other contaminants can be introduced from countries with different policies and regulations. As a result, it's

sometimes called quarantined waste (QW). Despite similarities in material type, international waste is generally handled and processed differently from MSW at airports.

e) Compostable and Biodegradable Waste

Airports generate biodegradable waste. Terminal food waste includes unconsumed food and food waste generated during food preparation. As part of landscape maintenance, airports typically produce green waste such as leaves, grass clippings, and other vegetation.

f) Hazardous and Industrial Waste

Oils, solvents, and other chemical waste are produced when aircraft and ground vehicles are washed and cleaned, fueled, maintained, repaired, painted, metalwork, engine test cells, deicing operations, maintenance of ground vehicles, and abandoned aircraft are among these waste products. Waste of this type are closely regulated by state law and require special treatment, storage, and disposal.

g) Lavatory Waste

As a special type of waste, lavatory waste contains chemicals and potential pathogens, which can pose risks to the environment and human health. Taking precautions should be taken to prevent the release of lavatory waste.

3.2 Waste hierarchy

Airport Council International (ACI)'s Policy and Recommended Practices Handbook provides guidelines for waste management; “Airports should promote the culture of avoiding solid waste generation and, where possible, extracting value from remaining waste in order to achieve a zero-waste landfill goal”.

a) Waste Prevention

According to ACI and EC waste management policies, waste prevention, as shown in figure 1, should be at the top of the hierarchy of waste management. The concept of waste prevention refers to measures taken before a substance becomes a waste.

b) Waste Reduction

The purpose of waste reduction is to reduce the amount of waste that is generated through a variety of processes and practices. Reducing waste contributes to airport sustainability and cost savings. It requires redesigning products, processes, and societal patterns.

By requiring tenants to use specific materials, cleaners, and paints, airports can reuse and repurpose materials. Reusing or repurposing recovered materials reduces the demand for new materials, for example, reducing the mining of aluminum.

c) Waste Recycling

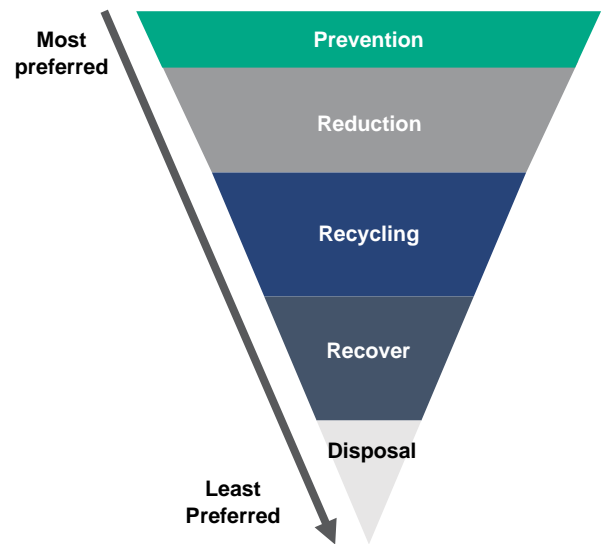


Figure 1: Waste management hierarchy from United Nations Environment Program (UNEP)

Establishing a recycling program is a common method of reducing waste. Most of the airport waste is recyclable or compostable, with paper constituting the largest single category of MSW generated by the airline industry.

There are two types of recycling found at airports, which correspond to the two types of waste MSW and CDD. Airports can save money by recycling MSW but developing and implementing a recycling process will cost money as well. A CDD recycling program can result in significant savings in terms of materials and costs, but it requires careful planning to achieve those savings.

d) Waste Recover

A waste recovery process involves converting nonrecyclable waste materials into energy-producing fuels. The process is known as "waste to energy". Several processes can convert waste to energy, including combustion (incineration), anaerobic digestion, gasification, and landfill gas recovery.

e) Waste Disposal

It is an unsustainable method of managing waste. Treatment of waste prior to disposal can reduce its volume and toxicity. It is possible to treat waste by physical means (e.g., shredding), chemically (e.g., incineration), or biologically (e.g., anaerobic digester). An integrated waste management system relies heavily on landfills for waste disposal.

4. Waste management approach

A key aspect of minimizing waste is not only maximizing the number of materials that can be reused and recycled, but also considering social, economic, environmental, and operational aspects of waste. Airport management must be engaged and committed, roles and responsibilities of stakeholders must be defined, and overall objectives must be shared. Waste management program development should include the following steps:

- 1) **Assess types of waste:** in the assessment, types of waste should be characterized, as well as their origins and destinations. Additionally, the assessment should identify new opportunities for recycling, reuse, and waste reduction, and help evaluate the effectiveness of waste management over time.
- 2) **Plan waste prevention, reduction, recycling and recover:** an airport waste avoidance, reduction, reuse, and recycling plan should be developed based on the previously completed waste assessment, or other information regarding waste patterns within the airport. Top management should establish a clear policy in accordance with national/regional regulatory frameworks
- 3) **Implement the waste management plan:** a waste management plan's success depends on several factors. This should be part of a corporate strategy that includes coordination with all airport stakeholders, as they may be responsible for implementing the strategy in their respective areas. The policy should be reviewed periodically and adapted as necessary. Implementing a cost-effective waste management approach requires identifying economic incentives for reducing, reusing,



Figure 2: Waste management plan cycle

and recycling waste. Employees need to be sufficiently motivated to adopt the waste management procedure in their daily operations through publicizing its benefits.

- 4) **Monitor and evaluate the waste management plan:** an airport operator should implement a comprehensive monitoring and evaluation system to determine whether the targets in the waste management plan are being met.

Effective communication and outreach efforts are essential to the success of all waste reduction efforts at airports. It is possible for the airport to publish highlights, data, and metrics regarding their accomplishments and efforts. This kind of communication activity will foster motivation among relevant stakeholders.

5. Developing a waste management plan

Developing a waste management plan for an airport is crucial to minimize environmental impact, promote sustainability, and ensure compliance with waste management regulations. Below is the suggested structure and key sections to include in the waste management plan:

1. Introduction and Executive Summary:

- a) Provide an overview of the airport's operations and the importance of effective waste management.
- b) Summarize the purpose, objectives, and scope of the waste management plan.

2. Policy Statement:

- a) Include a clear and concise statement affirming the airport's commitment to sustainable waste management practices.
- b) Outline the guiding principles and goals that underpin the plan.

3. Legal and Regulatory Framework:

- a) Identify relevant local, national, and international waste management regulations, standards, and guidelines that the airport must comply with.
- b) Describe how the airport will adhere to these legal requirements.

4. Waste Audit and Characterization:

- a) Conduct a comprehensive waste audit to identify the types and quantities of waste generated at the airport.
- b) Classify waste streams based on their characteristics, such as hazardous, non-hazardous, recyclable, and organic waste.

5. Waste Reduction and Minimization:

- a) Outline strategies and initiatives to minimize waste generation at the source.
- b) Promote waste reduction practices, including waste prevention, reuse, and recycling.
- c) Encourage staff and passengers to adopt sustainable waste management behaviors, such as proper waste sorting and segregation.

6. Collection and Storage:

- a) Describe procedures and protocols for the proper collection, storage, and handling of different waste streams.
- b) Specify waste storage areas, containers, and labeling requirements.
- c) Ensure compliance with safety regulations and guidelines for the storage of hazardous waste, if applicable.

7. Recycling and Resource Recovery:

- a) Identify opportunities for recycling and resource recovery of specific waste materials, such as paper, plastics, glass, and metals.
- b) Establish partnerships with recycling companies and waste management service providers.
- c) Develop a system for tracking and documenting recycling rates and the quantity of waste diverted from landfill.

8. Hazardous Waste Management:

- a) Provide guidelines for the proper handling, storage, and disposal of hazardous waste, if applicable.
- b) Ensure compliance with regulations for the safe transport and disposal of hazardous materials.
- c) Implement procedures for spill response, emergency preparedness, and worker safety related to hazardous waste management.

9. Composting and Organic Waste Management:

- a) Develop strategies for managing organic waste, such as food waste and landscaping waste.
- b) Implement composting programs and explore opportunities for on-site or off-site organic waste processing.
- c) Encourage the use of compost in landscaping and horticultural practices.

10. Waste Disposal:

- a) Identify approved waste disposal facilities and establish contracts or agreements for proper waste disposal.
- b) Ensure compliance with regulations regarding the transport and disposal of different waste streams.
- c) Develop procedures for the proper documentation and tracking of waste disposal activities.

11. Monitoring and Reporting:

- a) Define key performance indicators (KPIs) to measure the effectiveness of waste management efforts.
- b) Establish a monitoring system to track waste generation, recycling rates, and waste reduction targets.
- c) Set up regular reporting mechanisms to assess progress and communicate waste management performance internally and externally.

12. Training and Education:

- a) Develop training programs to educate staff on proper waste management practices, including waste segregation, recycling, and hazardous waste handling.
- b) Provide educational materials and awareness campaigns for passengers and visitors to encourage responsible waste disposal.

13. Continuous Improvement and Review:

- a) Establish a process for periodic review and evaluation of the waste management plan.
- b) Encourage feedback from stakeholders and engage in continuous improvement initiatives.
- c) Consider emerging technologies and best practices to enhance waste management efforts over time.

6. Circular economy overview

As an alternative to conventional linear economies (make, use, dispose), a circular economy keeps resources in use for as long as possible, extracts maximum value from those resources during their use, then recovers and regenerates products and materials at the end of their useful lives. Airports have been implementing circular economy principles to reduce waste and create a more sustainable operational model. Below are a few examples that airports are encouraged to adopt in their waste management plans

1. Material Reuse and Upcycling:

- a) Airports have implemented programs to reuse or upcycle materials to extend their lifecycle and reduce waste. For example, furniture and equipment that are no longer needed can be repurposed or donated to community organizations or charities.
- b) Some airports have initiated projects to upcycle materials, such as transforming old banners or signage into bags, accessories, or other useful products.

2. Food Waste Reduction and Recovery:

- a) Airports have implemented measures to reduce food waste generated in restaurants, cafeterias, and other food service areas. This includes optimizing food production and inventory management, donating surplus food to local food banks or charities, and implementing composting programs for organic waste.
- b) Some airports have established partnerships with food recovery organizations to collect and redistribute excess food to those in need.

3. Collaborative Partnerships and Resource Sharing:

- a) Airports have fostered collaboration and partnerships with neighboring businesses or organizations to share resources and reduce waste collectively. For example, sharing equipment, facilities, or transportation services can lead to more efficient resource utilization and reduced environmental impact.

These examples highlight the diverse ways airports can incorporate circular economy principles into their operations. By adopting these practices, airports can contribute to waste reduction, resource conservation, and the transition to a more sustainable and resilient aviation industry.

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