TULIPS

Test protocol Waste Safari

Are you ready to spot the big five on your airport Waste Safari?

What is a Waste Safari?

A Waste Safari, also known as a waste audit, is a process of systematically evaluating and analysing the waste generated within the airport. It involves collecting, sorting, and measuring the different types of waste produced, as well as identifying the sources and causes of waste.

Why perform a Waste Safari?

- Gaining insights into the airports' waste streams.
- Identifying areas where waste reduction or diversion efforts can be implemented, potentially leading to cost savings and environmental benefits.
- Raising awareness about the impact of waste on the environment and promote sustainable practices among airport employees, stakeholders, and passengers.

What is important prior starting a Waste Safari?

- Aligning with key stakeholders such as waste management partners and cleaning companies.

Two types of Waste Safari

Weight based detail analysis
where waste bags are opened, the content is separated into fractions and weighed.

Pro
- ✓ Gives an in-depth overview with fine details.
- ✓ One can assess as many fractions as one is interested in.

Con
- ✓ Resource intensive, requires setup that might not be possible nearby the collection point.
- ✓ Extensive list of equipment's are needed.
- ✓ Time consuming.

Volume based visual analysis
Bags are not opened, the content is assessed visually and fractions are assigned a percentage value.

Pro
- ✓ Resource effective, needs minimal equipment (baggage weight, laptop, gloves).
- ✓ Can be carried out at or nearby the waste station.
- ✓ High amounts can be assessed in short time.
- ✓ It gives a good overview of waste streams and faulty source separation despite lacking the fine details.

Con
- ✓ Only works if waste is disposed in see-through bags.
- ✓ It does not provide fine details.
- ✓ There is a limitation on how many fractions one can assess visually.
- ✓ Difficult to calculate weight of fractions. Plastic for example is big in volume but very low weight while food waste is heavy while low in volume etc.

Weight based detail analysis

The equipment needed:
- ✔ Approx 4 long tables
- ✔ Small buckets for fine sorted waste (such as 40x20 Liter)
- ✔ Large container for analyzed waste
- ✔ Etiquette stickers and markers
- ✔ Personal protection gear (such as long gloves and masks)
- ✔ Cleaning materials (such as towels, cloths, all-purpose cleaner, hand soap, paper towels)
- ✔ Protective tablecloths
- ✔ Scale(s) with gram precision
- ✔ Large and small tongs (optionally)
- ✔ If possible, a material scanner
- ✔ Laptop(s)
- ✔ Photo camera

The equipment needed to collect and transport the samples includes a
- ✔ Warehouse trolley
- ✔ Pre-printed information signs to notify the collector crew of the sample bin and ongoing work
- ✔ Tape to fix information signs
- ✔ Protective gloves
- ✔ Blank etiquettes and a pen for marking the location and collection time of the sample bags

Sample selection requirements

The requirements for sample selection depend on choosing passenger or commercial waste:
- ✔ **Passengers**: Samples' locations of bin bags were selected based on various criteria, including the activities near the collection bins, observation time within a 24-hour interval, the nearest gate and flight destinations, the number of passengers at the nearby gate, and the season. Additionally, locations close to restaurants or retailers were given priority. These criteria were used to ensure that the sample size would be representative and could be generalized.

- ✔ **Commercial**: Samples' locations of bin bags were selected based on different shops and restaurants and various key business partners. This allowed for a comprehensive analysis of waste generated by commercial entities within the airport environment.

Picking up bins

To ensure the picking up of bins flows smoothly, follow these steps:

✔ **Collaborate with the waste handler and cleaning facilities:** Work together with the responsible waste handler and cleaning facilities to ensure proper coordination and execution of the waste sampling process.

✔ **Collect and label bags:** The waste handler, in collaboration with cleaning facilities, should collect bags from designated areas. Each bag should be labeled with relevant information, such as the time of collection and the location (e.g., hall number). This information can be recorded on a template specifically designed for this purpose.

Waste Safari <airportname>				
Location				
Date				
Time				
Waste stream	<general>	<paper>	<plastic>	Waste handler logo
KG				

✔ **Use pre-printed signs:** To avoid empty or nearly empty bags being collected, consider placing pre-printed signs inside the bins. These signs should describe the Waste Safari process and instruct the collection crew not to empty or remove the marked bags.

Bag opening - pre-sorting

✔ All collected bags are weighed and recorded.
✔ Bags are opened.
✔ The location and time of the bag are labeled in Excel.
✔ The big buckets are moved to sorting tables.
✔ Pre-sorting is performed on the materials.

Sorting and weighting

- ✔ **Sort into specific buckets:** Begin by sorting large buckets into more specific categories. For example, separate metals into smaller buckets based on the type of metal, such as ferro or non-ferrous metals. If there is a bucket containing "other" materials or unknown materials, visually determine the rough classification. If available, use a scanner for detailed material determination.
- ✔ **Label the buckets:** Label each bucket with specific information, including the category (e.g., Metals, non-ferrous), location (e.g., Hall 2), and time (e.g., 3 pm). This ensures proper identification and tracking during the sorting process.
- ✔ **Carry out the sorting:** Sort the bags within each bucket according to their respective categories. Ensure that the sorting is thorough and complete.
- ✔ **Weigh the sorted materials:** Use a scale to weigh each fully sorted bucket and record the weight in grams on an Excel sheet. This helps track the quantity of materials in each
- ✔ category.
  Document findings: Take photos and notes of significant findings during the sorting process. Each photo should be assigned a number that matches the corresponding data in the Excel sheet. When documenting photos, include the time, location, and material category of the bucket's content in the title.

	Material/product	Waste bag — Hall 2 ----------- 3 PM	Notable item	Weight (grams)	Remarks	Waste bag — Hall 2 ----------- 3 PM	Notable item	Weight (grams)	Remarks	Waste bag — Hall 2 ----------- 5 PM	Notable item	Weight (grams)	Remarks	Total commercial area
1							Commercial area (FF3)							
3	Plastics													0
4	- PET bottles													0
5	- EPS packaging													0
6	- Plastic cups													
7	- Plastic cup lids													0
8	- Plastic bags (PE/PP/Flexibles)													0
9	- Plastic packaging													0
10	- Multilayer bags (Chips)													0
11	- Cup,cup holders and lids													0
12	- Unspecified plastics													0
13														0

Assessment and reporting

Reporting is recommended and could contain the following information:
- ✔ Introduction and problem description
- ✔ Research questions
- ✔ Procedure and test methodology
- ✔ Context description
  - ✔ Time, location, flight schedule, sample etc.
- ✔ Results
  - ✔ A complete description of the sorted materials
  - ✔ Any specific comments (remarkable finds, deviations from the test method, etc)
- ✔ Interpretation and discussion
- ✔ Conclusion and recommendations

Volume based detail analysis

The Equipment needed:
- ✔ Approx 1 long tables
- ✔ Large container for analyzed waste
- ✔ Personal protection gear (such as long gloves and masks)
- ✔ Cleaning materials (such as towels, cloths, all-purpose cleaner, hand soap, paper towels)
- ✔ Protective tablecloths
- ✔ Large and small tongs (optionally)
- ✔ Laptop(s)
- ✔ Photo camera

The equipment needed to collect and transport the samples similar as described in weight based detail analyses.

Sample selection requirements

Similar as described in weight based detail analyses.

Picking up bins

Similar as described in weight based detail analyses.

Assessing

✓ **Weighing of bags:** Determine the weight of each bin bag using a scale. This provides a general understanding of the amount of waste in each bag.
Lay out and photograph the bags: Lay the bin bags on the floor or a designated area and take photographs. Observe the bags carefully and document their visual appearance.

✓ **Recognition and documentation:** Based on observations and the pictures taken, recognize and document the materials present in the bin bags. Look for any obvious non-conforming or misplaced items.

✓ **Document findings:** Take photos and notes of significant findings during the assessment process. Assign a number to each photo that corresponds to the relevant data in an Excel sheet. Ensure that the photos include the time, location, and material category of the bin bag's content in the title.

Assessment and reporting

Similar as described in weight based detail analyses.

WP6: Circular Airports