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Aircraft ground handling — Checked baggage —

Part 3: Workstation ergonomics

Traitement au sol des aéronefs — Bagages enregistrés —

Partie 3: Ergonomie des postes de travail

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 9, *Air cargo and ground equipment*.

A list of all parts in the ISO 12604 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

According to ISO 11228-1:

"Disorders of the musculoskeletal system are common worldwide and one of the most frequent disorders in occupational health. Factors such as the size and mass of the object being handled, working posture, and the frequency and duration of manual handling can, alone or in combination, lead to a hazardous handling activity and generate the risk of musculoskeletal disorders."

This document specifies the workstation ergonomic design requirements of handling personnel for baggage checked-in by airline passengers to be carried into aircraft cargo holds, in order to:

— contribute to improving work conditions for baggage handling agents and reducing the incidence of musculo-skeletal disorders (MSD) in this population;

— facilitate enhancing the overall efficiency of baggage handling.

Throughout this document, the minimum essential requirements are identified by use of the keyword "shall". Recommendations are identified by use of the keyword "should" and, while not mandatory, are considered to be of primary importance in providing safe and efficient baggage handling. Any deviation from the recommendations should only occur after careful consideration and thorough service assessment have shown alternate methods provide an equivalent level of work safety.

ISO 12604-1 specifies standard mass and dimensions requirements for baggage checked-in by airline passengers to be carried into aircraft cargo holds. ISO 12604-2[1)] provides requirements and guidelines for baggage handling.

The carrier and handling services provider are responsible for identifying and complying with legal requirements that are locally applicable, such as Health and Safety government legislations and regulations applicable to machinery or manual handling of loads.

1) Under preparation.

Aircraft ground handling — Checked baggage —

Part 3:
Workstation ergonomics

1 Scope

This document specifies the requirements for workstation ergonomic design of baggage handling agents for individual pieces of baggage checked-in by airline passengers at airports to be carried into aircraft cargo holds.

This document applies to all manual handling workplaces in the processing chain for sorting, safe handling and routing of the baggage (containers and bulk baggage, departure and arrival circuits, at terminal and at aircraft, excluding passenger check-in process and loading into aircraft cargo holds). This document doesn't apply to manual handling of odd-sized baggage.

This document does not specify the baggage handling systems in and out of airport terminals, except the baggage weights and dimensions to be handled and the critical characteristics of manual workstations.

This document does not specify the baggage handling systems in the aircraft.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 12604-1, *Aircraft ground handling — Checked baggage — Part 1: Mass and dimensions*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
individual piece of baggage
bag, suitcase, trunk or similar article travelling with a passenger and containing those items necessary for the passenger's journey, such as clothing and personal articles within certain limitations in accordance with the applicable carrier conditions of carriage, that is accepted and checked-in for loading and carriage aboard the same aircraft

Note 1 to entry: An individual piece of baggage does not include freight, express cargo, courier mail, or unaccompanied baggage travelling as freight.

3.2
baggage handling agent
operator in charge of *individual piece of baggage* (3.1) handling

3.3
spout down
inclined plane receptacle intended for *individual piece of baggage* (3.1) retrieval

3.4
carousel
flat and circular crescent chain

Note 1 to entry: *Individual pieces of baggage* (3.1) circulates in a closed circuit.

3.5
pier
linear conveying system (belt or rollers) for accumulating *individual pieces of baggage* (3.1) for purposes of retrieval

3.6
cart/container
bulk load trolley or container (unit load device) mounted on a container trailer

Note 1 to entry: Both devices are used for *individual piece of baggage* (3.1) conveyance.

3.7
security inspection
check of *individual pieces of baggage* (3.1) using X-ray, manual or other equipment, in order to move away any item or individual piece of baggage which is prohibited for transport

3.8
manual indexing station
barcode reading through handheld scanner or manual keyboard entry

3.9
temporary storage area
drop area
storage area for *individual pieces of baggage* (3.1) waiting to be processed

4 Requirements and recommendations

4.1 General considerations for airport baggage areas

4.1.1 Physical surroundings in workspaces

As temperatures that are too low or too high can have an impact on physical consequences of baggage handling agents, thermal environment should be considered. Depending on the local climatic conditions, a temperature and hygrometry control system should be provided to ensure safe conditions. In case of cold conditions, draughtiness shall be limited as far as possible.

Particular attention shall be paid to noises in the working environment (equipment, coatings, impact noises, etc.). Noise should be reduced to the lowest levels feasible, taking into account technical progress, production processes, tasks and noise control measures. Commonly considered A-weighted values that should not be exceeded for noise emission and/or noise exposure in industrial workplaces are 75 dB to 80 dB. Recommended background noise levels in industrial workplaces are 65 dB to 70 dB. Background noise is noise arising from indoor technical equipment (e.g. ventilation systems) or noise coming from the outside, with production machines off in the case of a workplace in industry.

NOTE Details are given in EN ISO 11690-1.

Illuminance shall be sufficient. Incoming natural light should be favoured.

To avoid fumes, only electric vehicles and equipment should be used to work in closed areas, where baggage sorting is frequent.

These work areas should be provided with general ventilation to ensure sufficient fresh air to limit workers' exposure to pollutants from outdoor activities and to maintain sanitation, taking into account local regulations.

4.1.2 Working postures

Stressless standing posture shall be possible at the workplace. Distance between the baggage handling agent's feet ground contact and the ceiling (or equivalent) shall be at least 2,1 m and should be at least up to 2,5 m. This height allows the agent to handle baggage while avoiding leaning.

4.1.3 Workstation equipment

Physical recovery of the baggage handling agents should be favoured by:

— placing some seats close to the baggage loading points; the number of seats shall be related to the maximum number of baggage handling agents potentially assigned to the area; those seats can be jump seats in order to restrict cluttering up; ensure that the seat location should not interfere with operation, and that it is permanently available and accessible;

— making available rest areas for the recovery; rest areas shall be located near the workstation but outside of the baggage area which is constantly noisy.

The information media, screens and consoles shall facilitate clear readability of data and shall not lead to demanding postures.

During handling operations, the agent shall benefit from a good feet ground contact. Floors shall be flat, stable, seamless, not slippery and clear of objects (obstacles, garbage, electrical cables, etc.).

4.1.4 Workstation spatial organization

Spatial organization of the baggage processing area shall allow:

— easy traffic of vehicles and pedestrians (bounded and wide traffic areas, relevant flow directions, no pillars in all vehicle lanes, etc.);

— easy traffic of the baggage handling agent in the working area; placement of additional equipment (screens, actuators, emergency stop, etc.) shall not constrain the baggage handling agent's movements in his/her working area;

— traffic speed limitation of vehicles and machinery in the galleries;

— the approach manoeuvre of convoys, helping position the carts/containers on contact with the working area; carts/containers shall be positioned and evacuated with a tractor independently from each other, and their feeding along the working area shall be facilitated (docking with minimum manoeuvres, etc.)
therefore :

  — tractor lanes should have a minimal width of 3 m;

  — parking lanes for baggage loading/unloading activities should have a minimal width of 2,5 m;

— ensuring that it is possible to perform the following manoeuvres safely: entrance, crossing and exit of a vehicle towing carts/containers in a gallery;

— fitting out parking areas near the workstation for the vehicles; provide secure and accessible areas for storing of empty or full carts/containers, in order to avoid cluttering up working areas;

— limitation of travel between working areas for an individual baggage handling agent, particularly during handling operations; providing traffic corridors and protected access for pedestrians between the different workstations (decks, entrance, exit, dispatch room, living spaces, etc.);

— temporary storage areas for baggage that cannot be loaded immediately;

— mitigating risks of falling or tripping (fall from height or fall on one-level).

4.1.5 Work rate set by an automated system

If the baggage handling agent's workstation is fed by an automated system, this system shall enable the agent to implement his/her occupational gesture, i.e.:

— for baggage on departure: anticipate the incoming individual piece of baggage, being able to estimate its size, the best gripping zone, the trajectory to be carried out for a safe positioning in the cart/container;

— for baggage on arrival: anticipate the putting down of the baggage onto the conveyor belt (available zone, belt speed), not hold back or put back the individual piece of baggage in hand, control the putting down rate of baggage.

In order to enable the agent to implement occupational gestures, speed and free flow of the technical system should help the agent stick with a pace as steady as possible, anticipate his/her gesture, and not restrain it. The belt capacity shall thus be adapted to the number of pieces of baggage to be processed in order to avoid:

— transhipments causing additional manual handling to extract and store part of the baggage temporarily;

— complete breaks of the technical system causing manual handling of all the baggage.

4.2 Workstations in airport baggage areas

4.2.1 General

Workstation layout shall help reduce manual handling. Assistance should be given to the baggage handling agents by providing dedicated loading or unloading equipment in order to reduce repetitive bodily strain.

Workstation layout shall also help ensure baggage handling agent's protection against impact and crushing hazards while positioning and evacuating carts/containers.

Traffic corridors painting and protected access for pedestrians between the different workstations should be provided and regularly renewed.

Carts/containers should be moved mechanically to prevent:

— impact and crushing hazards;

— carts/containers manual handling.

For handling of heavy baggage, i.e. whose mass is greater than the maximum mass of standard baggage as defined in ISO 12604-1, or baggage whose handling is demanding, assistance shall be given to the baggage handling agent (2 workers, handling aid tools, etc.) (see ISO 12604-2).

Walking distance with a carried individual piece of baggage shall be limited as far as possible. If the agent has to walk with baggage in hand, the cumulative mass of baggage processed shall be adjusted (see ISO 12604-2).

4.2.2 Departure workstations

4.2.2.1 Requirements and recommendations for all workstations dedicated to baggage on departure

The working area should provide:

— "buffer" spaces that help manage loading (leave some baggage on hold to optimize load arrangement);

— drop locations for some types of baggage waiting to be processed, easily accessible to baggage handling agents;

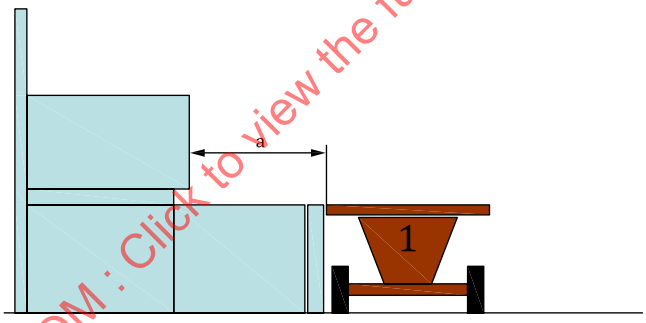
— storage areas for empty carts/containers, which favour rapid provisioning of workstations (see 4.1.4).

A deck should be provided (see Figures 1 and 2).

The deck width should allow the worker to take a step and align the feet with the loading direction. In order to reduce the carrying distances, this width should be between 1 m and 1,2 m.

The deck height should match the floor height of the cart/container, and a continuity of level between the different decks should be ensured. For that purpose, it is necessary that the carts/containers from a same gallery have the same floor height.

NOTE the continuity of level between the different decks enables cooperation between baggage handling agents.



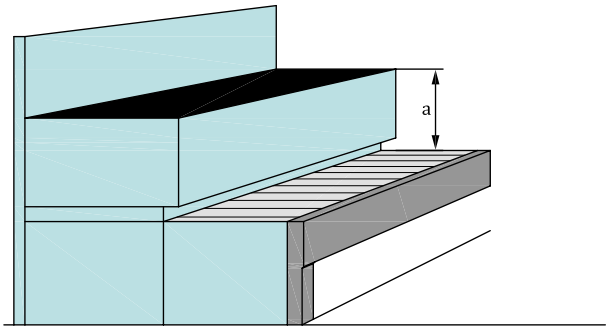
Key

1 trolley

[a] From 1 m to 1,2 m.

Figure 1

The baggage delivery support (belt, spout down) should be positioned at a height between 0,75 m and 0,85 m from the workstation ground.



a From 0,75 m to 0,85 m.

Figure 2

When handling an individual piece of baggage, the agent shall be able to stand in contact with the system that delivers the individual piece of baggage. A space for her/his feet should be provided (minimal depth: 210 mm, minimal height: 226 mm). An open space of at least 0,8 m around her/him shall be provided to make movements easy.

Assistance should be given to the baggage handling agents by providing dedicated loading equipment in order to reduce repetitive bodily strain.

Display of information necessary to take care of the flight (flights being handled, completed flights, upcoming flights, number of passengers, assignment) shall be readable from the loading locations and vehicle traffic areas.

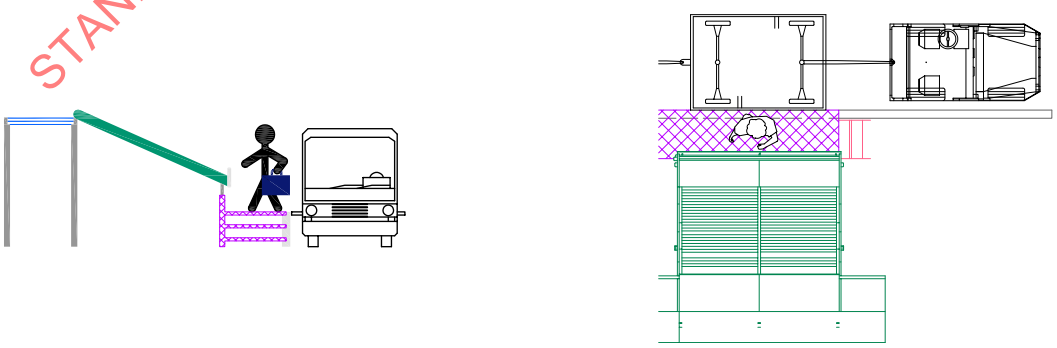
When a baggage tracking device is used by the agent, it should be possible to handle baggage with two hands (cuff or belt-type portable system, etc.) without disturbance.

4.2.2.2 Spout down-type departure workstations, carts/containers placed parallel to deck

System configuration shall allow baggage delivery at a speed preventing the risk of hand impact or crushing, or baggage ejection (see Figure 3).

Spout down should end with a stop whose height shall not constrain baggage gripping. That can be achieved by an assistance device for baggage extraction (roller, pushing or lifting the baggage), retraction, etc.

The amount of baggage accumulated at the spout down end should be limited to avoid extraction problems; and the spout down width should be adjusted to a cart/container's pitch.



a) Sectional view b) Top view

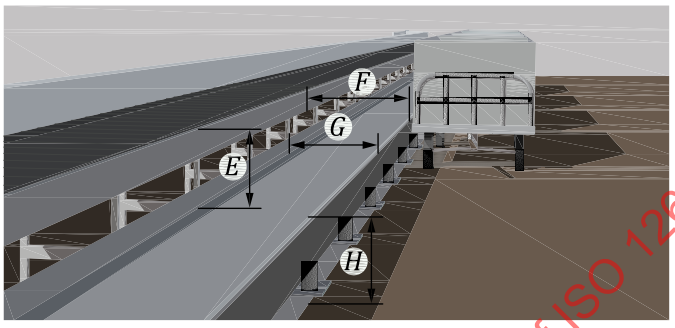
Figure 3

4.2.2.3 Carousel-type departure workstations, carts/containers placed parallel to deck (see Figure 4)

The baggage scroll rate should be between 20 m/min and 30 m/min (i.e. between 0,33 m/s and 0,5 m/s).

The belt length and number of workstations shall be adapted to the flow of baggage to be processed.

Every baggage handling agent should always be in direct contact with the belt stop and start function from his/her workplace in order to control the belt and so to reduce the stress during the baggage handling.



Key

E height between retrieval belt and deck: from 0,75 m to 0,85 m

F pedestrian traffic width between putting down belt and deck edge: from 1 m to 1,2 m

G pedestrian traffic width at feet level: from 1,21 m to 1,41 m

H deck height: floor of the cart/container height

Figure 4

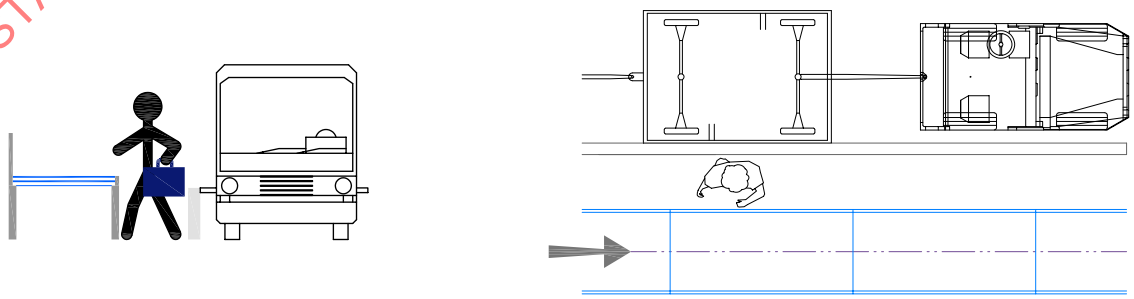
4.2.2.4 Pier-type departure workstations, carts/containers placed parallel to deck

Such a system shall not be favoured because it does not allow the baggage handling agent to monitor his/her activity (see Figure 5). It shall thus be installed only if baggage sorting is carried out beforehand.

The baggage scroll rate should be between 20 m/min and 30 m/min (i.e. between 0,33 m/s and 0,5 m/s).

To enhance flexibility of this system, the agent shall be able to monitor the arrival of baggage in his/her area (manual control, push button, etc.). Every baggage handling agent should always be in direct contact with the belt stop and start function from his/her workplace in order to control the belt and so to reduce the stress during the baggage handling.

Pedestrian area should be protected to avoid entrapment incidents.



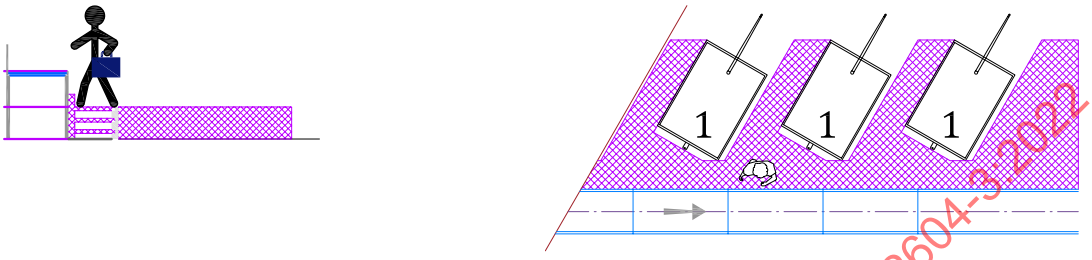
a) Sectional view b) Top view

Figure 5

4.2.2.5 Departure workstations, carts/containers placed at an angle or perpendicular to deck

This type of workstation is the least satisfactory in terms of working conditions because it forces the agent to handle the carts/containers and causes many movements (see Figure 6). It can thus be installed only if the space configuration does not allow alternate ones.

The baggage handling agent's walking distance shall be as short as possible and free from obstacles from the baggage gripping up to putting it down in the cart/container.



a) Sectional view b) Top view

Key

1 trolley

Figure 6

4.2.3 Arrival workstations

4.2.3.1 Requirements regarding baggage handling agent's protection against risks related to traffic

The workstation shall be protected from vehicular traffic. This protection shall not hinder baggage handling agent's movements.

4.2.3.2 Requirements regarding the area of baggage moving and handling along the conveyor line

Arrival workstation layout shall allow the agents to move and handle baggage freely along the conveyor line.

The workstation width (see Figure 7) shall be 70 cm minimum and designed on the basis of other installation requirements.