

GH_{OST}

GROUND HANDLING OPERATIONS SAFETY TEAM

ULD Pull Straps

Introduction

Dating back as far as the first dedicated cargo aircraft, ULD (Unit Load Devices) have become essential equipment for the aviation industry.



In January 1970, a B747 flying between New York and London, marked the first ever commercial flight of an aircraft carrying passengers and ULD. As the number of wide-bodied aircraft operations increased, so did the need for ULD. Early lower deck ULD were typically heavy, rather clumsy devices, requiring a great deal of maintenance to keep them operational. Tare weights were around 120 kg and many airlines preferred them to be equipped with forkliftable bases, to facilitate handling in very basic cargo warehouses.

1988 saw the entry into service of the A320, which was the first single aisle passenger aircraft designed to use ULD, thus introducing the 45-inch high AKH.

This era also saw the rapid growth of the courier express industry, which resulted in the introduction of various new shapes and sizes of ULD, specifically produced for these operations.



In recent years, [ULD CARE](#) have worked tirelessly to influence the way in which the aviation industry views and values Unit Load Devices. Their purpose and maintenance are often forgotten, as they silently do what they do, on a daily basis.

What is a ULD?

A ULD is either an aircraft pallet and pallet net combination, or an aircraft container. ULDs are removable aircraft parts subject to strict civil aviation authorities' requirements from design, testing, production, and operations, to repair and maintenance. An airworthy ULD must be structurally capable of restraining the loads and providing adequate protection to the aircraft systems and structure during flight.

Safety Concern

Both ULD Care and GHOST, who have jointly written this article, want to raise awareness of a related topic that may have been a factor in several accidents, resulting in serious injuries to ground staff.



Most baggage/cargo containers are fitted with straps, defined as "door handles, straps or hand holds" in the IATA ULDR manual. As their name suggests, they are provided so that ground staff can manoeuvre the ULD on and off dollies and/or storage systems during the build, breakdown and loading processes. ULD are designed to be supported and to move around on roller systems or ball mat systems, and so even when fully loaded they should not require a great deal of force to overcome any kind of rolling resistance.

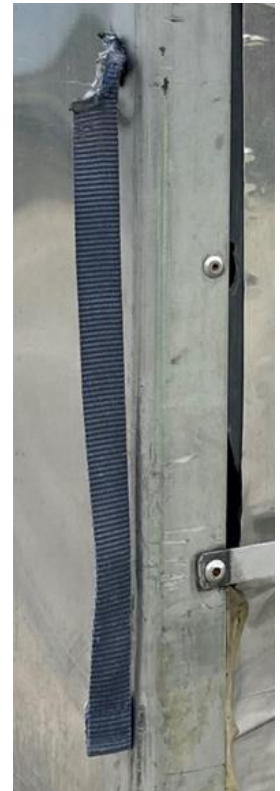
Whilst they are seemingly minor components of the ULD, there are some very important aspects to consider.

The industry standard for any type of container, found in the IATA ULDR ed.11, states that "two flush handles or straps shall be located on each side panel for manual movement of the container. Each handle shall provide space suitable for gripping with a gloved hand and shall have a capacity of 445 daN (1,000 lb) pull in any direction. They shall provide an area equivalent to 150 mm (6 in) wide by 75 mm (3 in) deep for gripping with a gloved hand. They shall be designed so they can cause no damage to adjacent units."

This requirement places the responsibility on the ULD manufacturer to ensure that a suitable number of straps of a suitable strength are attached using an attachment system, capable of meeting the strength requirements.

Whilst the ULD manufacturers comply with these build standards, there are two common ways in which problems can arise:

1. The first is when some kind of non-manual force is applied to the hand strap, perhaps through the use of an additional piece of rope or other mechanism that is used to connect the container to a mechanical force such as a tractor. This is the sort of process that can occur when ground staff try to pull a loaded container across a concrete floor. Such an activity will far exceed the capacity of human manpower and will require that a force greatly in excess of 1000lb be exerted on the strap. The best outcome in such a case is that the strap or its attachment simply breaks but quite often what may occur is that they do not fail completely but are simply damaged, setting the scene for failure at a future time and at a lower load.
2. The second failing is where straps are simply damaged through normal operational wear and tear, banging up against other containers or other airport infrastructure. In such cases the webbing and/or the attachment hardware can be degraded to the point that their capacity is far below the 1000lb requirement.



The probability of a serious fall should one of these straps fail during use, is extremely high. Over the years, there have been more than one fatal accident involving ground staff falling backwards off high loaders, when a pull strap fails suddenly during use.

Serviceability And Inspection



As previously mentioned, all components of a ULD must meet specific airworthiness criteria, defined in the Component Maintenance Manual (CMM) and inspections must identify and remove unserviceable units for repair. As it would not be practical for ground staff to carry a copy of the CMM, each ULD has an Operational Damage Limits Notice (ODLN).

This decal provides detailed information on what damage is acceptable. If the damage is greater than the limits provided, the unit must not be used. The ODLN which has for some years now been fitted to all new ULDs, clearly states that there should be “no damaged worn out or missing pull straps”.

Others	Webbing	WP	No damaged, worn-out or missing pull-straps
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As it is a requirement that every container is to be inspected before use and the condition of the pull strap is not difficult to determine, there should be absolutely no excuse for any ULD to be in operation with a strap that is not 100% serviceable.

Once the first bag or piece of cargo has been loaded into a ULD, there is a strong likelihood it will travel, even if a defective strap is found afterwards. Because of the potential consequence, the absolute importance of inspecting not only the pull straps but the entire container before even the first step of the loading process takes place, can never be underestimated. The bag room or cargo shed will be the best opportunity to inspect, in terms of conditions (lighting etc.) and time available.

Design

By far the safest design of hand strap has no kind of loop provision; in other words, it is impossible for personnel to place their entire hand through a loop in the strap. This is because such an action can trap the staff member in a situation where they could be dragged along, should the ULD be moved.

Ground staff may feel that they can exert more force on the container if the strap is in the form of a loop but the reality is that as long as the ULD is supported on the proper ground support equipment, there is no need to ever provide additional force. It should be perfectly easy to move the ULD by simply holding the strap with one hand and pulling with normal force.

Recommended Actions

ULD pull straps are a potential source of extreme risk. They may appear insignificant but this should never be an excuse for them to be used improperly or used in anything other than a fully serviceable condition.

The following recommend actions are proposed:

- Airlines and other owners of containers should implement a program of strap replacement every 2 years. Some airlines already do this, using straps of different colour to indicate the year of installation.
- Repair providers should be instructed to specifically check straps and attaching points on each shop visit. On average, an AKE container visits the repair shop 1.5 times a year, so there is ample opportunity to do so.
- All personnel with related responsibilities should be trained to never start building up a container when the straps are not in good condition. Staff in the cargo shed may not be at risk from a weak strap, but those on the ULD loader or in the aircraft hold, most certainly are.

For any related comments, feedback or information please contact GHOST@caa.co.uk