SERIOUS INCIDENT

Aircraft Type and Registration:	ATR 72-211, G-CLNK
No & Type of Engines:	2 Pratt & Whitney Canada PW121 turboprop engines
Year of Manufacture:	1989 (Serial no: 147)
Date & Time (UTC):	16 April 2021 at 0630 hrs
Location:	Guernsey Airport
Type of Flight:	Commercial Air Transport (Cargo)
Persons on Board:	Crew - 2 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Damage to cargo rail, rollers and locks.
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	59 years
Commander's Flying Experience:	10,500 hours (of which 155 were on type) Last 90 days - 78 hours Last 28 days - 28 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB

Synopsis

As the cargo aircraft took off, a Unit Load Device (ULD) positioned in the centre of the aircraft slid rearwards into a vacant bay. After landing, as the aircraft braked, the ULD slid forward breaking through the forward locks and coming to rest in a vacant bay forward of its original position. An investigation by the ground handling organisation found that the locks to the rear of the ULD had not been raised and that there were no independent checks during the loading to verify that the locks had been correctly raised.

Safety action has been taken by the ground handling organisation to improve their loading procedures. The operator has also introduced 'void awareness' training on all their fleets during Operator Proficiency Checks to highlight the potential risks in operating with empty 'void' bays.

History of the flight

During the morning the aircraft had flown from East Midlands Airport to Guernsey with a full load of five freight containers (ULDs[1]). The ground handling team met the aircraft and two ULDs were unloaded. The remaining three ULDs were re-positioned within the aircraft in positions C1, C3 and C5 (Figure 1).

Footnote

[1] A ULD is a container or pallet used to load luggage and freight onto an aircraft.

Figure 1

ULD bay locations on G-CLNK

The pilots checked that the load tallied with the loading information report and closed the doors at 0610 hrs. As the aircraft accelerated during the takeoff for a flight to Jersey, the crew heard a 'slight thud', which they attributed to the movement of some water bottles in the cabin. During the 15-minute flight the pilots did not notice any change to the feel or control of the aircraft. The aircraft touched down normally and when the brakes were applied the pilots heard a sliding noise closely followed by a 'loud thud' which was felt through the airframe.

The aircraft cleared the runway and the co-pilot moved to the cabin to assess the load but could only see the ULD in C1[2] which was correctly positioned. Once on stand, the ground handlers inspected the load and discovered that the ULD initially loaded in bay C3 had moved to C2.

ULD loading and locking

ULDs are filled, weighed and their position in the aircraft determined by the loading planners prior to being delivered to the aircraft. They are then individually loaded onto the aircraft at the forward cargo door and pushed into position by hand. The ULD slide along rails that are attached to the cargo bay floor (Figure 2).

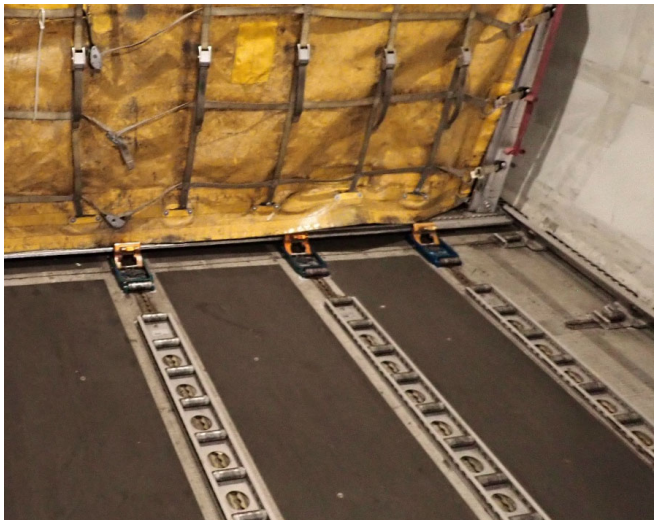

Figure 2

ULD rails and locking mechanisms

Footnote

[2] There is insufficient gap between the ULD and the fuselage to allow the crew to view the load rear of the ULD in position C1.

Locks that secure the ULDs in position are located between the bays and like the rails are attached to the fittings on the floor. The position of each bay is indicated by green markers on the cargo bay walls. The locks can be positioned DOWN to allow ULDs to slide over them and UP to lock ULDs in position (Figure 3).

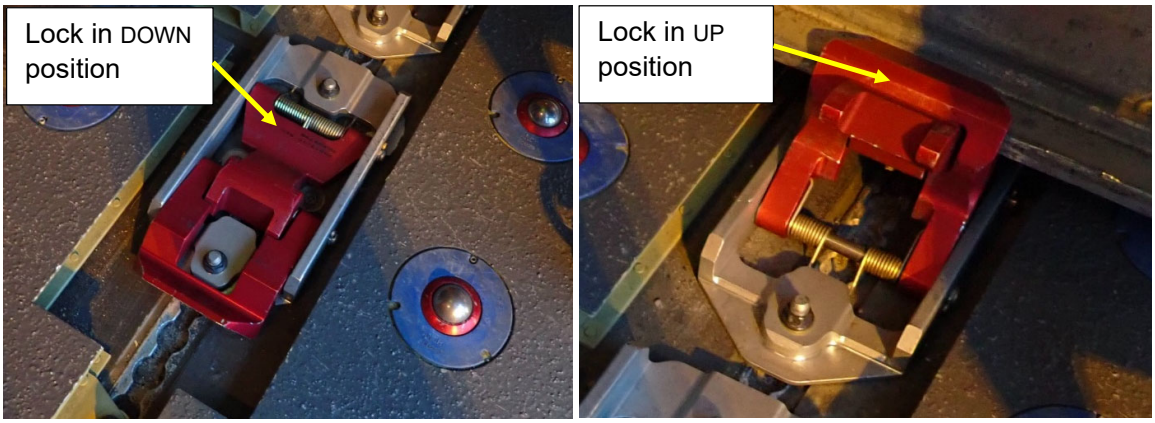

Figure 3
ULD lock positions

The locks can be used as a rear restraint, a forward restraint or when positioned between two ULDs as both a forward and rear restraint. When loading the aircraft, the locks at the rear of the bay in which the ULD is to be positioned should be in the UP position and the ULD is moved rearwards until it engages with these locks. Once in position, the forward locks are raised and engage with the front of the ULD preventing it from moving forward.

Examination of the aircraft

Examination of the aircraft by the operator found that the locks and rails between bays C2 and C3 were damaged and dislodged (Figure 4), and the locks to the rear of bay C3 were DOWN. The locks between bays C2 and C3 had been pulled out of the tracks in the cargo bay floor within which they were attached.

The ULD that moved in flight was found to be undamaged and there was no other damage to the aircraft.

Investigation by ground handling organisation

An investigation by the ground handling organisation identified that when the ULD in bay C3 was moved into location, the locks between bays C3 and C4 were not raised and remained in the DOWN position; however, the forward locks were raised. During the takeoff roll the slight thud heard by the crew was probably the ULD in bay C3 sliding rearwards to bay C4 and stopping against the forward locks which restrained the ULD in C5. During the landing the ULD would have slid forward as the aircraft decelerated, breaking the locks between bays C2 and C3 which were in the UP position. Its movement would then have been arrested when it hit the raised locks to the rear of the ULD in C1.

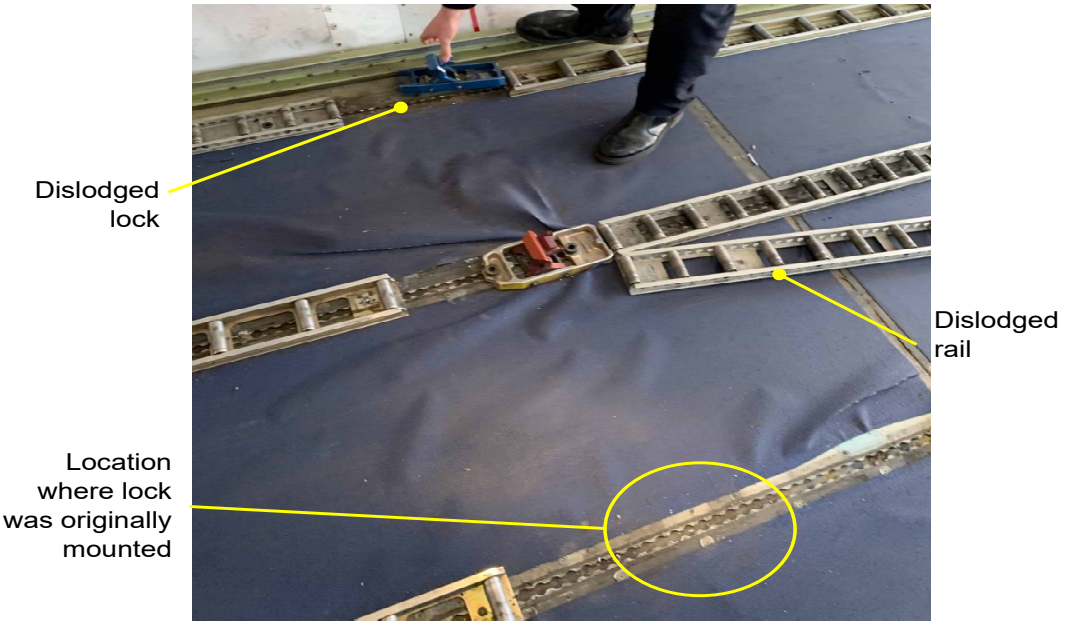

Figure 4

Damage to rails and locks between bays C2 and C3 (reproduced with permission)

Normally when loading ULDs into position, they are pushed until they contact the rear locks and the ULD cannot move any further rearward. The forward locks are then raised. In this event, with the rear locks in the DOWN position, the handling organisation was unable to determine how the ULD stopped in a position that would allow the forward locks to be raised and engage with the front of the ULD. It was considered that a combination of friction of the ULD as it was moved rearward on the rails, the visual cues of the green marker on the fuselage wall, and the forward locks becoming visible on the bay floor as the container moved over them probably resulted in the ULD being positioned so that the forward locks could be engaged without the rear locks being UP (raised).

Weight and balance

An assessment of the weight and balance of the aircraft, following the forward and rearward movement of the ULD loaded in bay C3, established that the aircraft remained within the forward and aft limits throughout the flight.

Safety action

The investigation by the ground handling organisation found that the loader may have been distracted during the loading; moreover, there was no requirement for an independent check of the locks to be carried out as the ULD were loaded. As a result of these findings the handling organisation undertook the following safety action:

> The ground handling organisation has revised their loading procedures to introduce an independent check to verify that all locks are positioned in the correct position when the aircraft is loaded.

To raise awareness of risks associated with void bays, such as the effects on trim if the aircraft is loaded incorrectly or the ULD moves into another bay, the operator has taken the following safety action:

> The operator has introduced ‘void bay awareness’ training as part of their Operator Proficiency Check on all fleets to highlight the risks when operating with void bays.