

**INCIDENT**

<b>Aircraft Type and Registration:</b>	Airbus A321-231, G-WUKG	
<b>No &amp; Type of Engines:</b>	2 International Aero Engine V2533-A5 turbofan engines	
<b>Year of Manufacture:</b>	2018 (Serial no: 8236)	
<b>Date &amp; Time (UTC):</b>	16 January 2020 at 1925 hrs	
<b>Location:</b>	London Luton Airport, Bedfordshire	
<b>Type of Flight:</b>	Commercial Air Transport (Passenger)	
<b>Persons on Board:</b>	Crew - 7	Passengers - 157
<b>Injuries:</b>	Crew - None	Passengers - None
<b>Nature of Damage:</b>	None	
<b>Commander's Licence:</b>	Airline Transport Pilot's Licence	
<b>Commander's Age:</b>	32 years	
<b>Commander's Flying Experience:</b>	8,305 hours (of which 5,175 were on type) Last 90 days - 97 hours Last 28 days - 42 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot	

**Synopsis**

The aircraft was departing from Runway 26 at London Luton Airport, but when the PF made a normal aft movement of the side stick control at rotation airspeed, the aircraft did not pitch up. The PF increased the side stick input close to the maximum deflection. When the aircraft still did not pitch up, the PM selected TOGA thrust. The aircraft responded and a climb was commenced with the flight continuing to the planned destination of Prague Airport, Czech Republic.

An aircraft change had been made for operational reasons from an Airbus A320 aircraft (A320) to an Airbus A321 aircraft (A321), but no adjustment had been made to the passenger distribution. This led to the passengers being seated towards the front of the aircraft, placing the CG outside the forward limit of the permitted operating envelope.

Following this event, the operator took action to: highlight this event to its staff and improve their understanding of the issues raised; and improve the flow of information between operational departments when there is a change of aircraft type to reduce the risk that a similar event would occur in the future.

## History of the flight

The scheduled flight from Luton Airport to Prague Airport was to be flown using an A320 aircraft, but earlier in the day there had been a change and an A321 was to be used. Due to a technical issue, an automated message from the Operational Control Centre (OCC) in Budapest, Hungary, was prevented from reaching the Operational Handling Department (OHD) and Passenger Services Department (PSD) at Luton, who were responsible for the redistribution of passengers following a variant change.

Passengers were boarded with their seat allocation for the A320 and therefore were seated within cabin Zones A, B and C. This left the seats at the rear of the A321 aircraft, which has a fourth zone, Zone D, unoccupied. The unusual passenger distribution was not noticed by the cabin crew or dispatcher. The aircraft commander was unaware of the passenger distribution in the cabin but was passed a Load and Trim Sheet for his A321 aircraft, G-WUKG.

The Luton ATIS information X-RAY at 1820 hrs was: surface wind 180° at 13 kt gusting 24 kt, visibility 10 km in light rain with an OAT of 10°C, dew point 8°C and QNH 1008 hPa. The aircraft taxied to Runway 26, lined up at Intersection A and was cleared to takeoff. The co-pilot was the PF and the commander was the PM. The takeoff speeds  $V_1$  and  $V_R$  were 112 KIAS and 123 KIAS respectively. At  $V_R$ , the PF applied aft side stick in the correct sense and at the normal rate. Due to a lack of aircraft response the PF called that the aircraft was not rotating, and the PF significantly increased the aft side stick movement, which reached almost full aft deflection. The PM selected TOGA thrust, at which point the aircraft rotated.

Due to the standard 'POSITIVE RATE OF CLIMB' call being missed, the landing gear was not retracted until approximately 5,000 feet amsl. The flight was continued to Prague during which the crew analysed the problem and were informed by the Senior Cabin Attendant (SCA) that there were no passengers at the rear of the cabin. The actual passenger distribution did not match the load sheet distribution, which distributed passengers equally throughout the cabin. Close to the top of descent, the conclusion was made that the take-off stabiliser setting on the load sheet was incorrect and this had caused the delayed rotation. It was not realised at that time that the CG was out of limits. It was assumed that the CG was within limits and that the aircraft's auto-trim system had compensated for the different distribution once the aircraft had become airborne. A normal descent, approach and landing was carried out at the destination with no pitch control abnormalities experienced. Subsequently, it was discovered that the aircraft loading had placed it outside the permitted CG envelope.

## Weight and balance

The operator allocates specific aircraft to the scheduled flights for the day. This information is passed by email from the OCC in Budapest to the operating bases. At the outstation, the message is received by the OHD and PSD.

The OHD enters the aircraft registration into software, which generates the Load and Trim Sheet from the weight and balance data for the specific aircraft stored in the system. The PSD, knowing the specific aircraft, checks in the passengers and allocates boarding passes

where the software permits, ensuring the aircraft always remains within its permitted weight and balance envelope. If there is an incorrect allocation of seats and the aircraft would be outside its permitted operating envelope, the software will not generate a Load and Trim Sheet. The operator's fleet comprises Airbus A320 aircraft, with a 180-seat configuration, and the A321 with 230 seats. When all the passengers have boarded, the Load and Trim Sheet is printed, and a copy is passed to the flight crew for them to complete their performance calculations.

On the day of the incident, an A320 was allocated to the flight and this information was passed to OHD and PSD at Luton. Both departments received the information and began their respective activities towards producing a Load and Trim Sheet and checking in the passengers for an A320. Later, the OCC needed to change aircraft from the A320 to G-WUKG, an A321. An email informing OHD and PSD of the change was prepared but, due to a technical problem, was not sent. This was noticed later in the day, at 1405 hrs, and the OCC Duty Manager telephoned the OHD and informed them of the aircraft change. The OHD entered the new aircraft registration into the Load and Trim Sheet software but PSD were not informed and had already allocated passenger seating for the three passenger zones on the original A320. When all the passengers had passed through the boarding gate and taken their allocated seats for the A320, the software produced a Load and Trim Sheet with passenger distribution for the four zones of the A321, maintaining the CG within limits for the flight. This sheet was passed to the flight crew and is shown below at Figure 1.

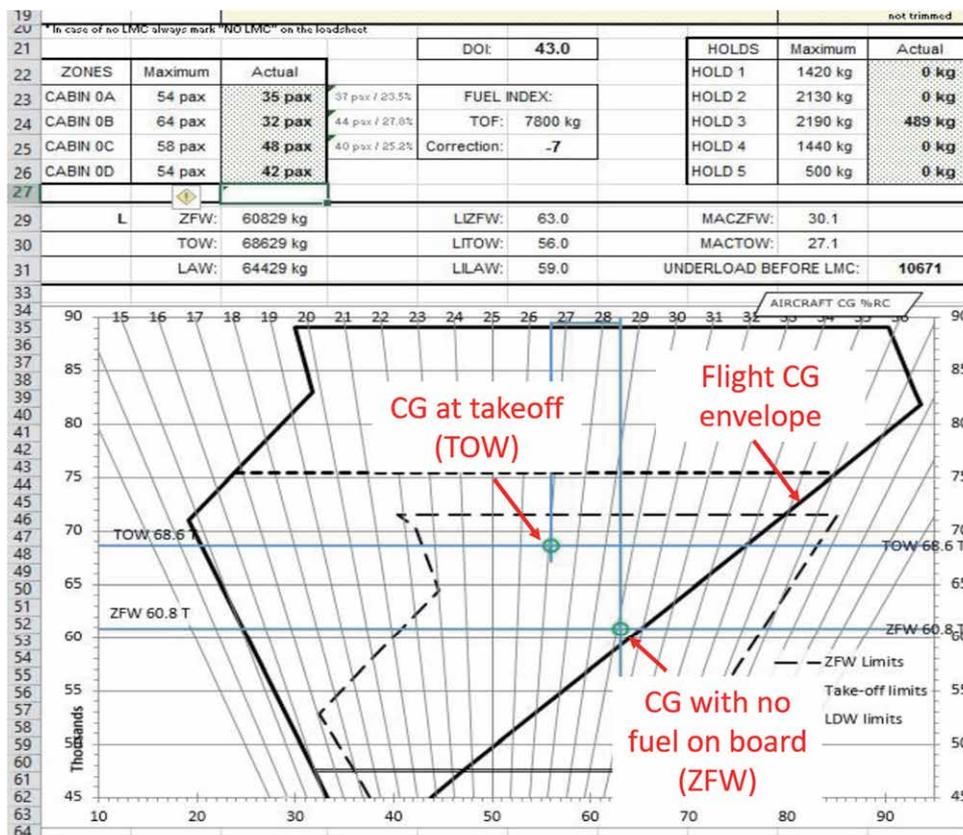


Figure 1

The Load and Trim Sheet as calculated but not as loaded

After the incident, the commander completed a Load and Trim sheet using the passenger seating allocation for the A320, but with the passengers seated in those seating positions in G-WUKG. The result, shown in Figure 2, shows that the total passenger weight was forward in the cabin placing the aircraft CG outside the permitted envelope.

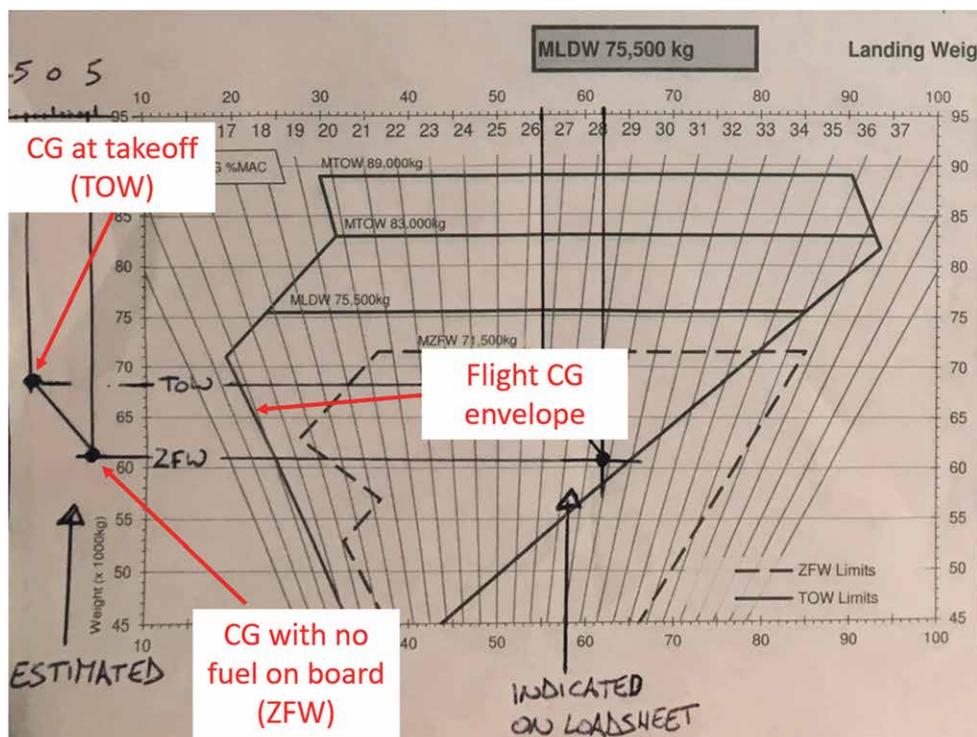


Figure 2

The A321 Load and Trim Sheet that would have resulted on the incident flight

## Analysis

The incident occurred due to the aircraft change from an A320 to an A321 not being notified to both OHD and PSD. As a result, the passengers were seated at the front of the aircraft, placing the CG outside the forward limit of the operating envelope. The effect of this was that, at rotation, the aircraft appeared to the crew not to respond as expected to the normal side stick control inputs due to the forward CG. The PF required almost maximum aft control input and the PM selected TOGA thrust before the aircraft nose lifted. The crew analysed the problem but considered that an incorrect stabiliser setting, taken from the load sheet, had caused the problem. Only at the top of the descent for the destination did it become apparent that the passengers had possibly been incorrectly distributed in the cabin. The crew did not experience any unusual control response during the approach and landing.

## Safety actions

Following the incident, the operator carried out an internal investigation. It identified safety actions it would take to prevent a reoccurrence, which were to:

- Improve the passage of information between the OCC and the flight crew when a change of aircraft variant takes place.
- Improve Ground Handling Agents' awareness of the implications of a change in aircraft variant.
- Distribute and make highly visible to all staff briefing material on this incident.
- Include any variant change at the flight and cabin crew briefing.
- Provide additional training for cabin crew on weight and balance distribution and its affects.
- Produce a Safety Bulletin to provide staff with a more detailed description of the incident.
- Issue a Crew Order (change to Operations Manual Part A) with enhanced awareness and guidance if suspicion is raised onboard.