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## INCIDENT

**Aircraft Type and Registration:** DC-9-32, S5-ABF

**No & Type of Engines:** 2 Pratt & Whitney JT8D-9A turbofan engines

**Year of Manufacture:** 1969

**Date & Time (UTC):** 31 July 1994 at 0652 hrs

**Location:** London Gatwick Airport

**Type of Flight:** Public Transport

**Persons on Board:** Crew - 5                      Passengers - 105

**Injuries:** Crew - None                      Passengers - None

**Nature of Damage:** Two right-hand MLG tyres destroyed, damage to right-hand MLG, minor foreign object damage to right-hand engine

**Commander's Licence:** Airline Transport Pilot's Licence (Slovenian)

**Commander's Age:** 32 years

**Commander's Flying Experience:** 5,000 hours (of which 4,000 were on type)  
Last 90 days - 150 hours  
Last 28 days - 75 hours

**Information Source:** AAIB Field Investigation

The incident was an abandoned takeoff due to both right main landing gear (MLG) tyres bursting.

The flight was scheduled to return to Lubiana, in Slovenia, from where it had arrived at Gatwick at 0545 hrs that morning. The operating company had no engineering agent at Gatwick but the commander and first officer each carried out a thorough external inspection of the aircraft prior to start-up. Specifically, the tyres on the right MLG of the aircraft were reported to have shown no sign of excessive wear or any other abnormality and the condition of the tyres remaining after the incident, on the left side of the aircraft were also in good condition.

The planned departure time was 0615 hrs, but a slightly late arrival and a minor technical problem at Gatwick delayed the departure to 0630 hrs, at which time the aircraft taxied out to the threshold of Runway 08R. The flight deck crew recalls that the start of the take-off roll was normal but, upon

reaching 130 kt, 13 kt below  $V_1$ , the aircraft began to vibrate severely. The commander decided to abandon the takeoff and the retardation process began as the aircraft reached 133 kt. He brought the aircraft to rest on the Rapid Exit Turn-off at holding point 'C', 20 metres on the runway side of the CAT II and III ILS yellow stop lines.

During the deceleration, the first officer had informed ATC of the situation and the crew 'listened out' on the Airport Fire Service (AFS) RT frequency, on which, less than one minute after stopping the aircraft, they were informed by the AFS that there was no fire and no danger of one developing. The commander therefore decided to disembark the passengers through the front door, only when the buses had arrived to take them to the terminal building.

The buses arrived at the normal rendezvous point, 140R, four minutes after they had been called out and were expecting to take the passengers off the aircraft when it had been towed clear of the runway. However, the aircraft brakes on the left side had seized 'ON' and had, until that time, prevented it from being moved clear of the runway. Only after further unsuccessful attempts had been made to move the aircraft was it decided to unload the passengers where the aircraft stood. It was therefore some 20 minutes after the aircraft had been shut down that the buses arrived alongside and it was another two and a half hours before the aircraft could be moved to a position clear of the runway.

When the passengers had disembarked, the No 1 stewardess informed the commander that she had heard a 'bang' very early in the take-off roll but had not come to the cockpit because she considered that it would not be constructive to do so at that stage in the take-off roll. It was later discovered that one of the two right tyres had burst at about that time and that the other had burst a few seconds later.

### **Technical examination**

After the incident it was found that both tyres on the right-hand MLG had been shredded down to the tyre beads and this material had been spread along the take-off run. The position of the rubber fragments confirmed that one tyre failure had occurred close to the start of the take-off run and the other tyre had failed close to the point at which the take-off was rejected. The rims of the wheels had also been damaged by contact with the runway surface; this damage was heaviest on the No 4 (outboard) wheel, which would have seen the greater loads as the aircraft listed to the right. The damage to the wheel rims was evenly distributed around the circumference of the wheels, with the rims deflected and, in some places, broken. There was thus no evidence from either the Nos 3 and 4 wheel rims or the Nos 1 and 2 tyres that the wheelbrakes had locked before the aircraft came to rest.

As well as the damage to the landing gear legs, the disintegration of the tyres had also damaged the underside of the trailing edge flaps on the right-hand side of the aircraft. There was damage to the adjacent skin panels: This appeared to have been caused by pieces of the tyres rather than by fragments of the wheel rims. There had also been damage to three fan blades on the right-hand engine, due to tyre debris.

The fragments of both tyres were submitted to the laboratories of the tyre manufacturer for examination. Their inspection of the tyre fragments did not reveal any specific cause for the initial tyre failure although their report indicated that the most likely cause of a total tyre burst during takeoff would be foreign object damage. Retracing of the aircraft's taxiing track did not show any visible source of foreign objects. In contrast, the aircraft manufacturer reports that, of double tyre failures reported, some have been attributed to taxiing with one tyre underinflated, thus overloading the properly inflated tyre. Failure of the properly inflated tyre then results in the failure, later in the take-off run, of the underinflated tyre. In the case of S5-ADF it was not possible to determine the inflation state of the tyres but it was noted that the aircraft was heavily laden, had taxied between 4 and 5 km prior to the take-off run and that the operator was operating without a technical crew for the turnaround.

A major difficulty in the technical examination was that, although the airport authorities had recovered the items of tyre from the runway and these were passed on to AAIB, there was no indication as to the position of the items along the runway. AAIB guidance and recommendation is that, both for reportable accidents and for incidents, initial clearance of items should be to the edge of the runway so that the distribution of the items may be recorded. This procedure still allows the runway to be re-opened in a timely manner and greatly increases the likelihood of the sequence and cause of the tyre failure being determined.