AVIATION OCCURRENCE REPORT

LOSSES OF SEPARATION

BETWEEN AIR ONTARIO
DE HAVILLAND DHC-8-301 C-GUON AND
CANADIAN AIRLINES INTERNATIONAL
DOUGLAS DC-10-30 C-GCPI

AND BETWEEN AIR CANADA
AIRBUS A320-211 C-FDSN AND
CANADIAN AIRLINES INTERNATIONAL
AIRBUS A320-211 C-FLSI

TORONTO/LESTER B. PEARSON INTERNATIONAL AIRPORT,
ONTARIO

24 SEPTEMBER 1996

REPORT NUMBER A96Ø0196

The Transportation Safety Board of Canada (TSB) investigated this occurrence for the purpose of advancing transportation safety. It is not the function of the Board to assign fault or determine civil or criminal liability.

Aviation Occurrence Report

Losses of Separation

between Air Ontario de Havilland DHC-8-301 C-GUON and Canadian Airlines International Douglas DC-10-30 C-GCPI

and between Air Canada Airbus A320-211 C-FDSN and Canadian Airlines International Airbus A320-211 C-FLSI

Toronto/Lester B. Pearson International Airport, Ontario 24 September 1996

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Summary

At approximately 1309 eastern daylight saving time (EDT), an Air Ontario de Havilland DHC-8 (ONT331) was cleared to position on runway 24 right (24R). A loss of separation occurred approximately one minute later when a Canadian Airlines Douglas DC-10 (CDN02) was cleared to land on the same runway. At approximately 1334, a second loss of separation occurred when the same controller cleared an Air Canada

Airbus A320 (ACA127) to position on runway 24R and subsequently cleared a Canadian Airlines Airbus A320 (CDN962) to land on runway 24R. In both instances the landing aircraft were instructed to overshoot, and both did so safely.

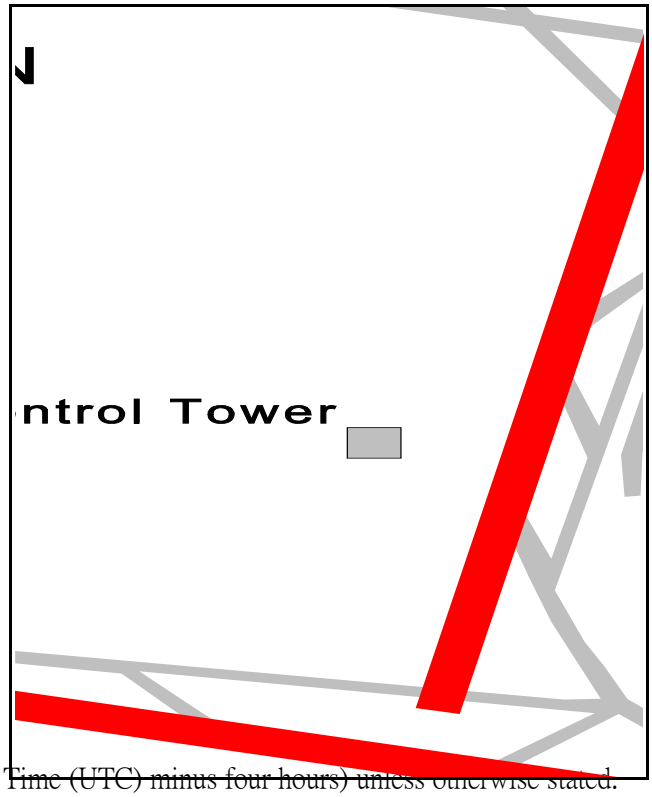
Ce rapport est également disponible en français.

Other Factual Information

The tower controller was working the combined controller positions of north tower and south tower. At 1308:51, the controller cleared ONT331 to position on runway 24R, and, at 1309:37, he transmitted control instructions to the crew. He did not include take-off clearance in this transmission. The flight crew of ONT331 apparently attempted to contact the controller to ask if they had been cleared for take-off, but at the same time, the controller was communicating with the crew of an aircraft landing on runway 24 left (24L), and the transmission from ONT331 was not heard by the controller. The transmission was not recorded. When the controller cleared CDN02 to land, he noticed that ONT331 was not departing and told the flight crew that their "take-off clearance was for now." As CDN02 approached the threshold of 24R, the controller cancelled ONT331's take-off clearance and issued overshoot instructions to CDN02.

At 1332, the controller cleared ACA127 to position and hold on runway 24R. About a minute later, while ACA127 was still holding, the controller cleared CDN962 to land on 24R. During the approach, the crew of CDN962 transmitted to the tower that "there's an aircraft on the runway." The controller immediately issued instructions to CDN962 to pull up and go around.

During the first occurrence, the shift supervisor was on his lunch break; however, there was an acting supervisor, and he noticed that ONT331 was not departing and that CDN02 was instructed to overshoot. Both the controller and the acting supervisor thought that a take-off clearance had been issued to ONT331 before CDN02 was cleared to land and that ONT331 was slow to depart. At the time of the second occurrence, the tower controller was working only the north tower position, and the supervisor was working the clearance delivery position. Staffing at the time of both occurrences was in accordance with unit policies.



After clearing an aircraft to position on an active runway, the controller involved in these occurrences generally slid the flight data strip for that aircraft partially out of its flight data strip holder. Lately, however, the flight data strips had not been of a uniform width, and some slid easily in and out of the flight data strip holder, whereas others required considerable force to slide. Because of this, the controller used an alternative reminder method if the flight data strip was

[1] All times are EDT (Coordinated Universal Time (UTC) minus four hours) unless otherwise stated.

difficult to slide, lifting the flight data strip holder part way out of the flight data strip bay. It could not be determined what method was used for the first occurrence. At the time of the second occurrence, the controller was unable to slide the flight data strip for ACA127 because the strip was wide and would not slide easily. The controller did not use any visual cue reminder method during the second occurrence. Although the tower controller scanned the threshold of runway 24R prior to issuing the landing clearance to CDN962, he did not visually acquire ACA127. The weather during both occurrences was reported as wind 360 degrees at 5 knots, visibility 2 statute miles in rain showers and mist, and clouds based at 700 feet above ground level. The threshold of runway 24R is approximately 1.5 miles from the control tower. Factors which can affect the ability of controllers to see aircraft on the threshold include the number and type of aircraft waiting for take-off on taxiways "B", "H", and "A" and the prevailing visibility. An additional factor in this instance was the paint scheme of ACA127, which was predominantly dark. Witnesses who were in the tower during the second occurrence stated that ACA127 was quite difficult to see at the threshold of runway 24R.

The control tower was equipped with monitors to display information from the airport surface detection equipment (ASDE). Controllers in the tower reported that the monitors sometimes displayed returns of non-existent aircraft, or did not display returns for aircraft which were in position on the end of runway 24R. Some of these anomalies were observed by investigators during the field phase of the investigation. Controllers stated that they checked the ASDE monitor after the second loss of separation, and there was no return for ACA127.

The controller involved in the occurrences reported that he had slept only two hours during the night before the occurrences, and that his sleep pattern had been similar during several previous nights. The controller stated that he knew he was tired before he started his shift, but he assessed himself as fit to perform his duties. Significant amounts of sleep loss can have deleterious effects on one's performance, including decrements in vigilance, impairments of working memory, and increased errors in communication. People, especially those who are sleepy, often do not realize their actual level of fatigue, alertness, or performance.

Analysis

In the first occurrence, the controller cleared ONT331 to hold on runway 24R and did not issue a take-off clearance until after CDN02 had been cleared to land. The controller thought that he had issued a take-off clearance to ONT331 and was waiting for the flight crew to begin a take-off roll; the flight crew was waiting for a take-off clearance. Both the airport controller and the acting supervisor thought that a take-off clearance had been issued to ONT331 prior to the first loss of separation and, therefore, did not realize that a significant, abnormal occurrence had taken place. For that reason, the controller was not removed from operational duty.

In the second occurrence, the controller cleared ACA127 to position on the active runway and forgot to issue the take-off clearance. He also forgot to use, or was unable to use, his visual cue, possibly because the flight data strip would not slide easily out of the flight data strip holder. With no visual cue to remind him that the aircraft was in position on the runway, a line of defence was lost. He did not visually acquire the aircraft in position on the runway during his scan of the area. It is possible that a combination of the lack of contrast between the aircraft and the background, traffic on an adjacent taxiway between the tower and the threshold,

and meteorological conditions, in conjunction with the lack of a visual cue, resulted in the controller forgetting that he had placed the aircraft on the active runway. It is also likely that the ASDE did not display a return for ACA127.

The controllers on duty at the time of the occurrence stated that the combination of traffic on the adjacent taxiway, reduced visibility, and the predominant colour of the aircraft blending into the background made ACA127 difficult to see at the threshold of the runway. Although the airport is equipped with ASDE and the tower controllers are able to monitor the returns, the location and idiosyncrasies of the radar make it subject to displaying false or misleading information, or not displaying information at all. The controllers are aware of these characteristics and certainly, in the case of the second occurrence, the lack of information would be a critical lapse. The shift supervisor was working the clearance delivery position at the time of the second occurrence and was unable to perform supervisory duties.

It is very likely that the controller was fatigued as a result of an accumulated sleep debt stemming from several nights of disturbed and shortened sleep cycles. The fact that the controller thought he had cleared ONT331 for take-off when he had not, and forgot he had placed ACA127 on the threshold of runway 24R, appears to be consistent with these potential sleep-loss effects. Further, although the controller felt that he was fatigued prior to starting his shift, he believed that he would be able to perform his duties. This decision by the controller was consistent with the effects of fatigue, in that people often do not realize their actual level of fatigue, alertness, or performance.

Findings

1. The control tower was staffed in accordance with unit policy.

2. The controller had an accumulated sleep debt and was fatigued.

3. In the first occurrence, the tower controller was working the north and south tower positions combined.

4. The tower controller was aware that he had placed ONT331 in position on runway 24R.

5. The tower controller thought that he had cleared ONT331 for take-off on runway 24R when he had not.

6. CDN02 was cleared to land on runway 24R when separation from ONT331 was not assured.

7. The controller forgot about ACA127 after he cleared it to position on runway 24R.

8. There is no uniform method used by controllers as a visual reminder that they have placed an aircraft in position on an active runway.

9. The tower controller did not use any visual cue to remind himself that he had placed ACA127 on the

threshold of runway 24R.

10. The shift supervisor was working the clearance delivery position at the time of the second occurrence.

11. A combination of factors made ACA127 difficult to see at the threshold of runway 24R.

Causes and Contributing Factors

The two losses of separation occurred when, in each instance, the controller instructed the aircraft to position on the active runway and subsequently cleared an aircraft to land on the same runway when separation between the landing aircraft and the aircraft on the runway was not assured. Contributing to the two occurrences was the probable impairment of the controller's performance by sleep debt.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson Benoît Bouchard, and members Maurice Harquail, Charles Simpson and W.A. Tadros, authorized the release of this report on 23 September 1997.