

## FINAL REPORT

<b>HCLJ510-000439</b>	<b>Air Traffic Incident (Airprox)</b>	
Date / Time (UTC):	25.9.2007 at 1522 hrs	
Location of occurrence:	Copenhagen Airport, Kastrup (EKCH)	
Airspace class:	Kastrup CTR, airspace class D	
Aircraft:	A	B
Aircraft registration:	N444NL	F-GFKD
Aircraft type:	PA-31T Cheyenne	A320
Flight phase:	Taxi	Landing
Flight rules:	IFR	IFR
Operation type:	General Aviation	Commercial Air Transport
	Business	Scheduled revenue ops
		International Passenger
Weather conditions:	VMC	VMC
Light conditions:	Daylight	Daylight
Air Traffic Services:	Kastrup Tower (118,100 MHz) and Tower/marshaller (FM Channel 15)	
Classification::	A) Risk of collision	

All times in this report is UTC.

On September 25, 2007, at 1648 hrs, the Area Control Centre (ACC) at Copenhagen Airport, Kastrup (EKCH) notified the Danish Accident Investigation Board (AIB) of the incident.

The French Bureau Enquetes-Accidents (BEA) was notified on October 1, 2007, at 0833 hrs.

### History of the flight

The flight (aircraft A), during which the incident occurred, was a private flight from Sion Airport (LSGS) to Copenhagen Airport, Kastrup (EKCH). Aircraft A was certified to be operated by one pilot. However, this flight was operated by two pilots in a two-pilot concept. The pilot taxiing the aircraft on the ground was sitting in the right-hand pilot seat and aerodrome charts were only available to that pilot. None of the pilots had experience of operating at EKCH.

The flight (aircraft B), during which the incident occurred, was a commercial international passenger flight from Paris Charles-De-Gaulle Airport (LFPG) to EKCH.

At 1518:07 hrs and in order to pick up aircraft A, a "FOLLOW ME" vehicle (front facing runway 22L) was in position on runway 30. See enclosure 2 and 5.

After landing on runway 22L, the pilots in aircraft A were instructed to taxi via taxiway B and runway 12 to hold short of runway 22L. See enclosure 1, 4 and 6.

The Tower Air Traffic Controller (ATCO) noticed an overall pilot hesitation (aircraft A) (the radio communication and the taxi movement). For that reason, the ATCO from 1520:54 hrs used progressive taxi instructions and furthermore, the ATCO decided to turn on the red stop bar lights on runway 12 (active at 1521:12 hrs). See enclosure 1, 2 and 4.

At 1521:53 hrs, the pilots in aircraft B were cleared to land on runway 22L. See enclosure 4.

At 1522:23 hrs, the “FOLLOW ME” vehicle on runway 30 initiated a 180° turn. The pilots in aircraft A got visual contact with the “FOLLOW ME” vehicle and it was their opinion at that time that the green lights of the luminous bridge, on the top of the “FOLLOW ME” vehicle, had been turned on. See enclosure 2. The taxi speed of aircraft A was increased.

While aircraft A was approaching the stop bar on runway 12, the ATCO observed the increasing taxi speed and at 1522:32 hrs, the ATCO instructed the pilots to confirm the previous instructions of holding short of runway 22L and finally instructed the pilots to hold short. See enclosure 2 and 4. The pilots in aircraft A did not read back.

The pilots in aircraft A did not observe the red stop bar lights and the yellow flashing runway guard lights (runway 12) and continued taxiing towards the waiting “FOLLOW ME” vehicle on the other side of runway 22L. At that point, it was the opinion of the pilots that a combination of a glaring sun and a wet runway made the lights invisible.

The pilots in aircraft B experienced a high workload during the approach to runway 22L (VOR/DME approach, reduced separation between aircraft and turbulence on short final) and they did not observe aircraft A (abnormally high taxi speed) until the landing roll at an indicated airspeed of approximately 100 knots.

Shortly before crossing runway 22L, the pilot (aircraft A) in the left-hand pilot seat suddenly saw the landing aircraft B. Aircraft A made an abrupt stop and full reverse was used.

It was not necessary for the pilots in aircraft B to deviate from the runway centreline in order to avoid a collision.

At 1522:45 hrs, the minimum separation (approximately 25 metres) between aircraft A and aircraft B was recorded. See enclosure 2 and 3.

### **Meteorological information**

Automatic terminal information service (ATIS)

*“arr atis 1450:*

*this is copenhagen airport arrival information lima one four five zero expect v.o.r. d.m.e. approach runway in use for landing two two left runway two two left wet transition level five five reduced separation procedures applied on final after landing expedite vacating runway after landing squawk ground mode*

*sierra wind for landing two zero zero degrees eight knots visibility three zero kilometers few two thousand three hundred feet temperature one four dew point one one q.n.h. one zero zero niner nosig this was copenhagen airport arrival information lima*

*arr atis 1520*

*this is copenhagen airport arrival information november one five two zero expect i.l.s. approach runway in use for landing two two left runway two two left wet transition level five five reduced separation procedures applied on final after landing expedite vacating runway after landing squawk ground mode sierra wind for landing two zero zero degrees six knots visibility three zero kilometers few two thousand three hundred feet temperature one four dew point one two q.n.h. one zero zero niner nosig this was copenhagen airport arrival information november".*

### **Aerodrome information**

General

Copenhagen Airport, Kastrup (EKCH)

Position (ARP): 55 37 04.50N 012 39 21.50Ø

Elevation: 17 feet

See enclosure 6.

"FOLLOW ME" vehicle.



Stop bar and runway guard lights on runway 12



### **AIP Denmark (31 AUG 07) (extract)**

*“AD 2 6. Taxiing, parking, start up and deicing*

#### *6.1 Marshaller assistance*

*For ALL Aircraft taxiing to/from stands R1A/B, R2A/B, R3A/B, W1A/B/C/D, E60, A50, G15, G16, G17, G18 and G19 as well as S1/S2(In Areasouth), Marshaller assistance is compulsory within the entire movement area of the Aerodrome.”*

### **Local ATS instruction valid for Kastrup Tower (extract) (version 024/02.07.2007)**

The instruction was written in Danish. The translation of the instruction was made by the Danish AIB.

#### *“5.1.1 Marshaller guidance*

*Aircraft taxiing by own power to/from the below stands shall receive marshaller guidance:*

- *Apron West (incl. R and W1 stands)*
- *G15-G19 on Apron East*
- *S1 and S2 (in area East)*
- *E60*
- *A50”*

### **European action plan for the prevention of runway incursions (release 1.2) (extract)**

The action plan was the result of the combined efforts of organisations representing all areas of aerodrome operations. Represented organisations were:

Eurocontrol, Group of aerodrome Safety Regulators, IATA, ACI Europe, BAA, Intl Federation of Air Traffic Controller’s Association, ENEV S.p.a., JAA, ECA/IFALPA, UK CAA Safety Regulation Group, Bundesministerium für Verkehr, Direction de la Navigation Aérienne, International Council of Aircraft Owner and Pilot Association, National Air Traffic Services Ltd, DFS Deutsche Flugsicherung GmbH and Belgocontrol.

#### Recommendation

*“4.3 - Communications (Language, Radiotelephony, Phraseologies and Procedures)*

- *4.3.2 Verify the use of standard ICAO RT phraseologies.*
- *4.3.3 Use the ICAO read-back procedure (including Drivers and other personnel who operate on the manoeuvring area).*
- *4.3.4 Improve situational awareness, when practicable, by conducting all communications associated with runway operations using aviation English.*
- *4.3.5 Improve situational awareness, when practicable, by conducting all communications associated with runway operations on a common frequency. (note - aerodromes with multiple runways may use a different frequency for each runway.)”*

## **Preventive actions**

Due to this incident, the Air Traffic Management at EKCH revised the ATS instruction for marshaller guidance. The headlines below are relevant extracts from the revised ATS instruction. The instruction was written in Danish. The translation from Danish into English was made by the Danish AIB.

- A marshaller shall never be brought into a position on the opposite side of an active runway for aircraft picking up.
- Marshaller guidance is compulsory to/from the below stands while aircraft are taxiing by own power:
  - Apron West (incl. R and W1 stands)
  - G15-G19 on Apron East
  - S1 and S2 (in area East)
  - E60
  - A50
- TWR decides how far the marshaller should guide the aircraft to/from the abovementioned stands with the following restrictions:
- An aircraft to/from the abovementioned stands shall never cross an active runway without marshaller guidance.

Remark: As soon as possible after landing, an aircraft to the abovementioned stands should receive marshaller guidance.

## **Enclosures**

1. Surface Movement Radar (SMR) presentation made by the Danish AIB.
2. SMR presentation made by the Danish AIB.
3. The minimum horizontal separation presented by the Danish AIB.
4. Transcript of radio communication – Kastrup Tower (118,100 MHz).
5. Transcript of radio communication – marshaller (FM channel 15).
6. Aerodrome chart – Copenhagen Airport, Kastrup (EKCH) (extract from the Danish AIP).

## **AIB discussion**

### **Marshaller guidance**

The Danish AIB identified some communication issues in the radio communication between Kastrup Tower and the marshaller (“FOLLOW ME” vehicle driver):

- Use of non-standard phraseology (no use of ICAO RT phraseology)
- Communication conducted in Danish (no use of aviation English)
- No use of ICAO read-back procedure
- Communication associated with runway operations on runway 22L (landing, departing, crossing aircraft, vehicles crossing and runway inspections etc.) was conducted on different frequencies. In this incident, communication was conducted on frequency 118,100 MHz and FM channel 15 (no fully frequency coupling), which in the opinion of the Danish AIB reduced high levels of situational awareness.

The Danish AIB finds that these communications issues were not causal factors to this incident. However, they might have weakened the general situational awareness (ATC, pilots and vehicle driver) to such degree that they contributed to the sequence of events. Furthermore, the Danish AIB believes that the lack of a communication standard (Tower/marshaller) resulted in a second runway incursion, because the “FOLLOW ME” vehicle entered runway 30 without an ATC clearance.

As regards this matter, the Danish AIB strongly encourages the Danish Civil Aviation Authority to assess the recommendations presented in the European action plan for the prevention of runway incursions.

Positioning of a “FOLLOW ME” vehicle on one side of an active runway while waiting for an aircraft arriving from the other side of the active runway implied a latent risk, which in this incident influenced the sequence of events.

Regarding marshaller guidance, the ATCO did not fully act in accordance with the valid local ATS instruction and the requirements of the Danish AIP. Taxiing to stand G16 required marshaller guidance within the entire movement area of the aerodrome. The Danish AIB believes that compliance with the local ATS instruction and the Danish AIP would have significantly reduced the likelihood of this incident to occur.

### **Runway incursion (aircraft A)**

The Danish AIB finds that contributory factors to loss of situational awareness and pilot confusion were:

- No airport experience of EKCH
- No marshaller guidance immediately after landing
- No airport diagram readily available to both pilots, which made the task of monitoring and assistance (pilot not in control) less constructive
- Uncertainties about ATC instructions and aircraft position were not clarified

- The positioning of the “FOLLOW ME” vehicle on runway 30 (the other side of an active runway). (As regards this matter, the Danish AIB has not been able to determine whether or not the green lights of the luminous bridge on top of the “FOLLOW ME” vehicle had been turned on. But an increasing taxi speed succeeded the 180° turn of the vehicle, which means that the “FOLLOW ME” vehicle was in position for picking up aircraft A before an ATC crossing clearance had been issued).
- Glaring sun combined with a wet runway

The combination of loss of situational awareness and pilot confusion probably increased the workload in the cockpit to such degree that the pilots did not follow the actually received ATC instruction but the one they expected to receive. The pilots were most likely exposed to pilot “target fascination/tunnel vision” by positioning the “FOLLOW ME” vehicle on the other side of runway 22L. For that reason, neither red stop bar lights nor yellow runway guard lights nor ATC instructions were perceived.

The Danish AIB believes that the positioning of the “FOLLOW ME” vehicle on runway 30 leading to pilot “target fascination/tunnel vision” in combination with the loss of situational awareness were the causal factors to this incident.

#### Air Traffic Control

At an early stage, the ATCO noticed hesitation and confusion from the pilots in aircraft A. Two reasonable defence barriers were introduced (the use of progressive ATC taxi instructions and the use of red stop bar lights on runway 12).

The ATC instructions were in compliance with standard ICAO phraseologies.

Any ATC clearance/instruction requires a readback. An ATCO is responsible for checking the completeness and accuracy of the readback. In order to complete the communication loop, any readback requires a hear-back.

The readbacks from the pilots in aircraft A were partly incomplete but they were not corrected. However twice, the ATC instruction to hold short of runway 22L had been read back correctly, which supported that the instruction had been received and understood correctly.

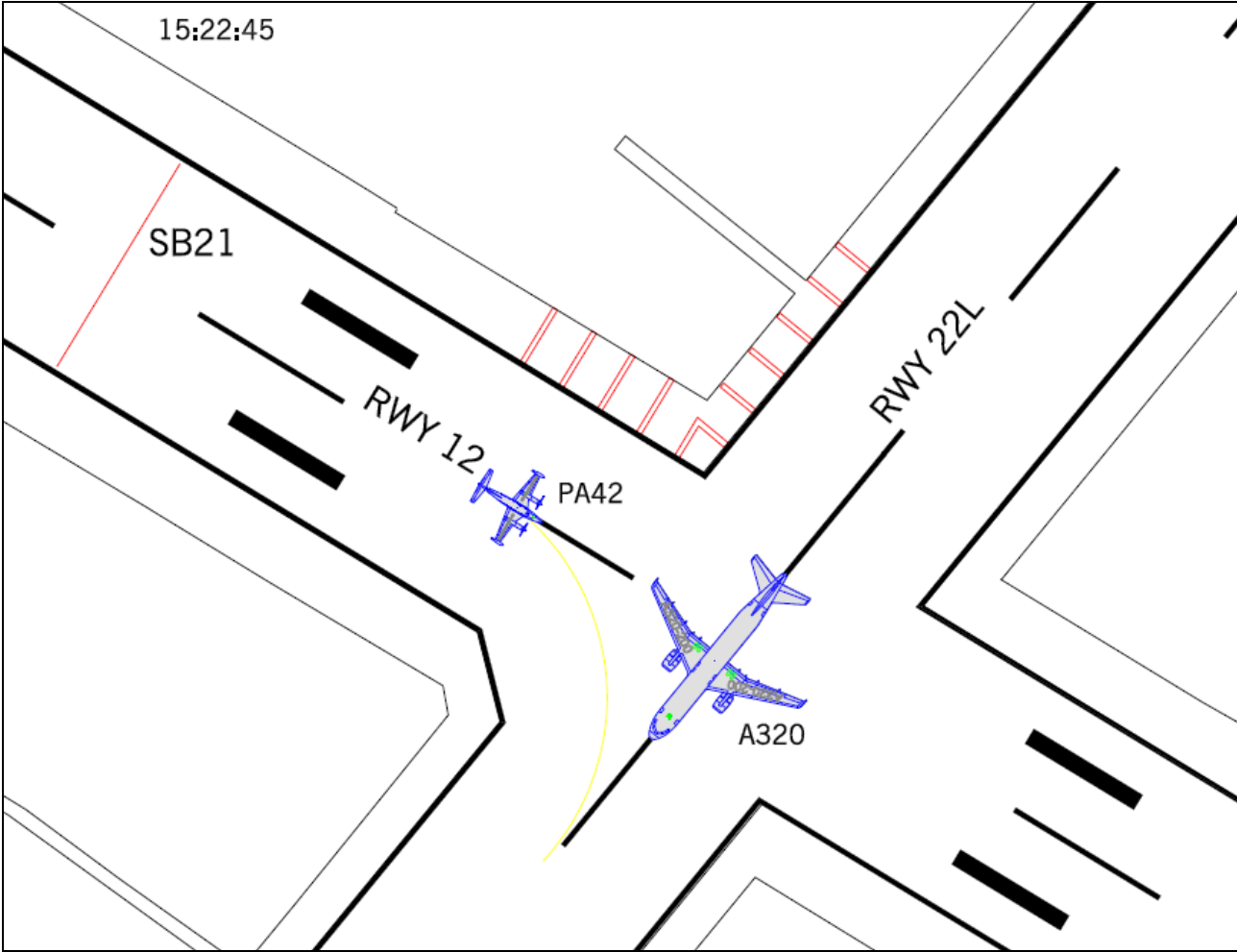
**Enclosure 1**



**Enclosure 2**



Enclosure 3



#### Enclosure 4

The Danish AIB has replaced the call sign of the Airbus 320 with “*aircraft B*”. The radio communication on frequency 118,100 MHz was retransmitted to the marshaller on FM (frequency-modulated) channel 15.

Kastrup Tower (frequency 118,100 MHz) (extract):

1515:18      n444ln            tower good afternoon november triple four lima november with you in final establishing in v.o.r. d.m.e. two two left

                 twr                good morning november triple four lima november continue approach runway two two left previous is a seven five seven so caution wake turbulence surface wind two zero zero at eight knots

                 n444ln            ..... we are get one eight zero for final lima november

1516:17      twr                november triple four lima november surface wind two zero zero eight knots two two left cleared to land

                 n444ln            two two left cleared to land lima november

1519:01      twr                november lima echo turn right off via bravo four

                 n444ln?            say again

                 twr                first yes vacate right off via the high speed

                 n444ln            The progressive taxiing for november four four four lima november is this the high speed

                 twr                affirm sir

                 n444ln            okay thank you

1519:35      twr                and november four four four lima november continue via taxiway bravo and turn right via runway one two to hold short of two two left

                 n444ln            will continue right to bravo and hold short two two left lima november

1519:54      aircraft B            tower good afternoon “*aircraft B*” established four d.m.e. runway two two left

**Enclosure 4 (continued)**

twr "aircraft B" continue approach runway two two left

aircraft B continue the approach runway two two left "aircraft B"

1520:54 twr november triple four lima echo just continue straight ahead via bravo

1521:32 twr and november triple four lima november then first right via runway one two to hold short of two two left

n444ln we cross runway one two and hold short runway two two left lima november

twr please ..... turn right via runway one two

n444ln right in runway one two

twr affirm

n444ln thank you right in runway one two and hold short runway three zero lima november

1521:53 twr "aircraft B" stand by for landing clearance surface wind two zero zero at seven knots

aircraft B cleared to land eh runway two two left "aircraft B"

twr and "aircraft B" now you are cleared to land two two left

aircraft B copied cleared to land two two left "aircraft B"

1522:32 twr november triple four lima nov please confirm to hold short of runway two two left hold short

1522:49 aircraft B eh did you see the aircraft from "aircraft B" on eh our right side

## Enclosure 5

The radio communication between Kastrup Tower and the marshaller took place on FM channel 15. The instructions from Kastrup Tower to the marshaller were retransmitted on frequency 118,100 MHz. However the replies from the marshaller were not retransmitted on frequency 118,100 MHz.

The radio communication between Kastrup Tower and the marshaller took place in Danish. The below translation from Danish into English was made by the Danish AIB (extract):

1510:01	marsh	and tower marshaller
	twr	marshaller go ahead
	marsh	I am parked on V2 and would like to cross 22L for india
	twr	marshaller on V2 you may cross 22L
	marsh	and marshaller crossing. Is he going to be picked up somewhere, the one for the golf area?
	twr	well, cheking – call you back
1510:45	marsh	marshaller clear of 22L
	twr	marshaller, thank you
1516:45	twr	marshaller from tower
	marsh	yeah, go ahead
	twr	the little one coming, I intend to let him taxi on 30 and then you can pick him up on the other side of 22L
	marsh	I'll pick him up on the other side of 22L and we can use golf, right?
	twr	yes
1517:33	marsh	and marshaller on runway 30
	twr	okay, marshaller

**Enclosure 5 (continued)**

1523:32 marsh and tower marshaller I got him, marshaller cortège and golf one and it was golf eighteen, okay?

twr and marshaller it was golf sixteen down to the end and vacate via golf one

marsh and it was golf sixteen marshaller cortège

1525:17 marsh and tower marshaller

1525:43 twr tower marshaller

marsh I was not yet in position and I had not turned on the luminous bridge

