Safety Links

CAD Safety Promotion Newsletter

October 2017 Issue 3

In This Issue

BFU Interim Report

https://www.bfu-web.de/EN/Publications/Interim_Reports/IR2017/I1-Report_17-0024_CL600A380_ArabiaSea.pdf

A Newsletter for Aviation Safety Professionals

Welcome to the third issue of Safety Links.

As safety management practice matures, industry and regulators across sectors and borders are more active in sharing information and lessons learnt. Safety Links provides a platform for you to share good safety management practices and actionable insights for enhancing safety.

Manage the Weather

In this issue, we looked at two types of turbulence, which could be precursors to loss of control of aircraft.

On wake turbulence, a business jet encountered wake vortices generated by A380 at the cruising altitude. While there may be separation minima at certain un-surveillance en-route airspace aiming at reducing such encounter, pilots and air operators must stay vigilant as these provisions will not completely prevent such occurrence, and wake turbulence encounters can occur during any phase of flight, and at high altitude.

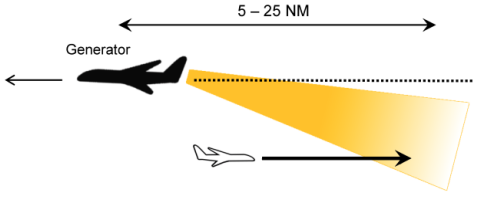
On windshear and turbulence, we have invited the Hong Kong Observatory (HKO) to share their work on providing a timely and accurate weather forecast to help pilots and airlines manage their weather risks.

En-route Wake Turbulence Encounters

In January 2017, while cruising above the Arabian Sea, a Challenger 604 (CL604) had been passed by an Airbus A380 1,000 ft above in opposite course.

Approximately **1 minute** later and **15 Nm** away, the CL604 encountered the wake vortex of A380. The CL604 shook briefly, then rolled heavily and completed several rotations. The aircraft lost approximately **9,000 ft** of altitude before the pilots regained control of the aircraft. Two passengers were severely injured, and three persons suffered minor injuries. The damaged aircraft could not be restored to an airworthy state, according to the **interim report** published by the **BFU**, the accident investigation authority in Germany.

In June 2017, the European Aviation Safety Agency (EASA) issued a **Safety Information Bulletin** (SIB) **2017-10** to remind pilots, air operators and ATC controllers about the risks associated with wake turbulence at high altitude and applicable precautionary measures.



With the increase of air traffic volume and enhanced navigation precision, wake turbulence in the en-route flight phase are becoming more frequent. Wake vortices generated by aircraft could last for some minutes and moved downward with the wind. This poses a potential hazard to other aircraft crossing or operating below.

EASA SIB 2017-10


EASA SIB No.: 2017-10

EASA Safety Information Bulletin
Operations
SIB No.: 2017-10
Issued: 22 June 2017

Subject: En-route Wake Turbulence Encounters

Ref. Publications:
- ICAO PANS-ATM Doc 4444
- ICAO Doc 8643 Aircraft Type Designators and Doc 7030 Air Traffic Services Planning Manual
- Commission Regulations (EU) 965/2012 and (EU) 923/2012
- ICAO Airplane Upset Prevention and Recovery Training Aid – Revision 3
- Report 'An Improved Understanding of En-route wake vortex encounters', by EUROCONTROL and TU Delft

Applicability:
National Aviation Authorities (NAA), Air Traffic Services (ATS) providers, operators, pilots and air traffic controllers

Description:
With the increase of the overall volume of air traffic and enhanced navigation precision, wake turbulence encounters in the en-route phase of flight above 10 000 feet (ft) mean sea level (MSL) have progressively become more frequent in the last few years.

The aim of this SIB is to enhance the awareness of pilots and air traffic controllers of the risks associated with wake turbulence encounters in the en-route phase of flight and provide recommendations and advisories with the purpose of mitigating the associated risks.

Every flying aircraft generates turbulence in its wake. For a fixed-wing aeroplane, this wake turbulence rolls up into a pair of coherent, counter-rotating vortices that can persist for some minutes in the vicinity of the generating aeroplane flight path, moving generally downward and laterally with the wind. This poses a potential hazard to the safe flight of another aeroplane crossing or operating below the trajectory of the generating aeroplane, and encountering these vortices. The 'trailing vortices' intensity and time to dissipate depends upon factors as the weight, size and speed of the aeroplane, as well as prevailing atmospheric conditions. The relative size and weight of the generating aircraft in comparison to the affected aircraft is also a risk factor.

Wake turbulence encounters can occur during any phase of flight. Separation minima aim at preventing such encounters from inducing risk, but it must be noted that these provisions will not completely prevent wake encounters from occurring.

This is information only. Recommendations are not mandatory.

© European Aviation Safety Agency. All rights reserved. ©EASA Certified. Proprietary document. Copies are not controlled. Confirm revision status through the EASA Internet/Intranet.

Page 1 of 7

https://www.easa.europa.eu/newsroom-and-events/press-releases/easa-publishes-safety-information-wake-vortex

The trailing vortices' intensity and time to dissipate often depend upon factors such as the weight, size and speed of aircraft, and prevailing atmospheric conditions. The relative size and weight of generating aircraft in comparison to the affected aircraft is also a risk factor.

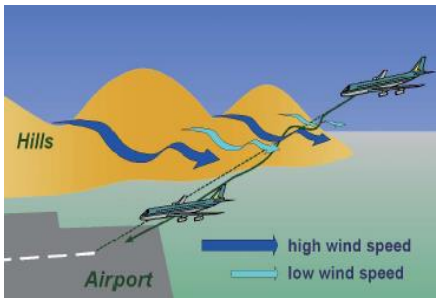
The SIB also included advice for pilots and air operators, for example, in the core of the vortex, if the pilot reacts at the first roll motion, the roll motion could be potentially amplified by such pilot action.

Safety Promotion in Hong Kong ATC

Taking into account the potential safety impact caused by wake turbulence and the operating capability of 'Very Light Jet' and 'Super Heavy' aircraft in Reduced Vertical Separation Minimum (RVSM) airspace whereby application of vertical minima of 1000 feet is permitted, the CAD promulgated relevant information from the above EASA SIB to ATC controllers, which aimed at preventing similar incidents in Hong Kong FIR through enhancing awareness of potential wake turbulence hazards for en-route phase of flights.

Prolonged Low Level Windshear

*By **Ms Chan Man-yee, Eliza**, Aviation Forecaster, Airport Meteorological Office, Hong Kong Observatory*



At the Hong Kong International Airport (HKIA), about **one in 500 aircraft** experienced significant low level windshear. Majority of those occur in March and April due to flow disturbance caused by the terrain of the Lantau Island next to the airport.

The Hong Kong Observatory (HKO) operates an automatic Windshear and Turbulence Warning System (WTWS) based on data from a Terminal Doppler Weather Radar (TDWR), two LIDARs and many anemometers to provide automatic alerts of significant low level windshear and turbulence over HKIA. These alerts are relayed to pilots via ATC. The duty aviation forecaster may also issue subjective windshear warnings based on pilot reports of windshear and turbulence and by assessing the latest meteorological conditions. The windshear and turbulence warnings are then broadcasted on ATIS.

Unlike microburst caused by thunderstorms which tends to be short-lived, terrain-induced windshear can last much longer. An example of prolonged windshear case which brought significant impact to airport operations in recent years occurred on 5 March 2015. A narrow ridge of high pressure over the south China coast brought strong and gusty easterlies to the runways on that day. Winds near the hilltop over Lantau Island on the other hand were strong to gale south to south-easterlies.

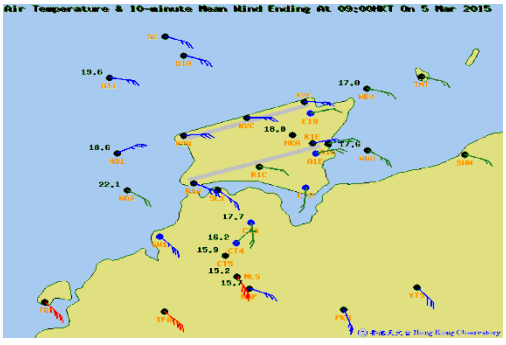


Figure 1:
Strong and gusty easterlies on surface of the airport with strong to gale south to south-easterlies over the hilltops over Lantau Island in the morning of 5 March 2015

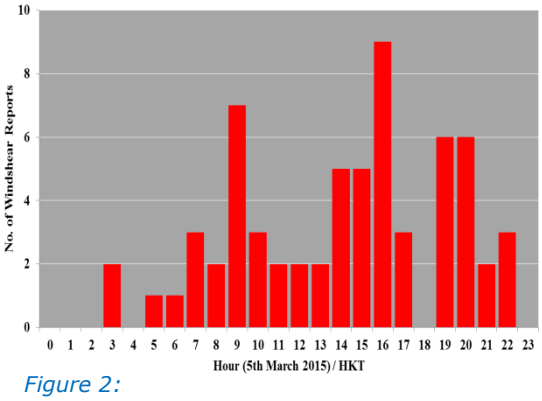


Figure 2:
On 5 March 2015, windshear reports were received from pilots for 18 hours.

Runway 07 was in use at the time. Owing to the temperature inversion layer at altitude of 1,500 to 3,500 feet, vertical flow was inhibited, forcing the strong southerly winds to pass through the mountain gaps of Lantau Island and brought rather frequent windshear and turbulence over the airport (Figure 1). Windshear reports were received starting from 3 am in the morning and lasted for **18** hours until the evening, which means **1** to **9** reports per hour (Figure 2). Among the reports, some pilots reported windshear loss of more than **30 kt**, comparable to the headwind loss brought by a microburst. A few pilots also reported moderate to severe turbulence encounters during the period.

Apart from the windshear and turbulence over the airport, the strong southerly airstream also brought significant tailwinds to the aircrafts which were making turns over the base leg of Runway 07 together with some significant cross winds to the aircrafts on final leg. The combined effects of the hill-top level tail winds, cross winds followed by fluctuating gap flows caused several aircrafts to drift away from the intended approach glide-path, leading to a number of missed-approaches.

As the windshear and turbulent conditions persisted during the day, more than **10** arrival flights were diverted and more than **20** aircrafts had to go around. In total, **64** arrival and **10** departure aircrafts reported significant windshear and turbulence on that particular day. Among them, **3** aircrafts reported windshear loss of 30 kt. The WTWS successfully detected windshear and made timely alerts over HKIA on that day (Figure 3). All arrival pilot reports received were covered either by the WTWS alerts or windshear warnings.

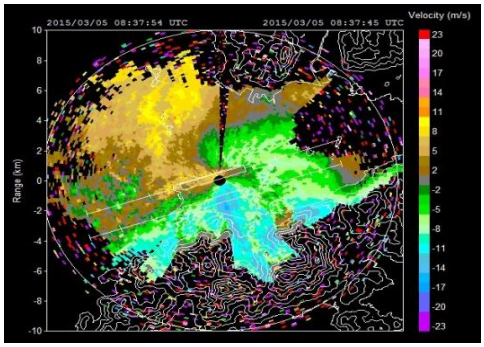


Figure 3:
Green inbound flow in the midst of yellow and brown outbound flow was detected by LIDAR

To continuously review and enhance the performance of the windshear and turbulence alerting and warning services, HKO keeps a close liaison with the aviation community through different forums such as the "Windshear and High Impact Weather (WHIX) Panel" and the "Liaison Group on Aviation Weather Services". Pilots are encouraged to report windshear and turbulence encounters to ATC for continual review and improvement of the windshear and turbulence warning / alerting services.

Closing by CAD: Meteorological information is essential to the safety, regularity and efficiency of air navigation. While the HKO has robust systems to provide timely windshear alerts to pilots and continual safety review with the aviation community, airlines must also maintain an effective weather risk management system and ensure your crew are conversant with the procedures.

Windshear Poster

http://www.hko.gov.hk/aviat/ws_poster/ws_poster.htm

New Accident Investigation Authority

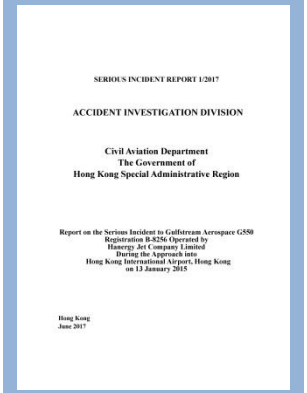
Since 2016, CAD has been working closely with the Transport and Housing Bureau (THB) to implement a new ICAO Standard, which required each State to establish an independent accident investigation authority (AIA).

The new AIA will be in the Facilities Building of CAD, and have a full-time setup of one Chief Inspector (CI) and six Inspectors of Accidents. The AIA will be established upon THB's appointment of a new CI. Please visit http://www.thb.gov.hk/eng/job/index.htm if you are interested. Besides updating the Hong Kong Civil Aviation (Investigation of Accidents) Regulations (Cap 448B), we will maintain close communication with THB and the industry to ensure a smooth transition.

Recruitment Ad

http:www.thb.gov.hk/eng/job/index.htm

Final Report on a Serious Incident


SERIOUS INCIDENT REPORT 1/2017

ACCIDENT INVESTIGATION DIVISION

Civil Aviation Department
The Government of
Hong Kong Special Administrative Region

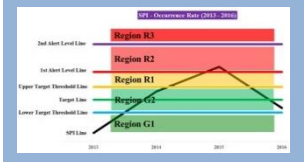
Report on the Serious Incident to Gulfstream Aerospace G550
Registration B-8256 Operated by
Hanergy Jet Company Limited
During the Approach into
Hong Kong International Airport, Hong Kong
on 13 January 2015

Hong Kong
June 2017

http://www.cad.gov.hk/reports/Serious%20Incident%20Final%20Report%20-%20HHG305%20on%2013%20Jan%202015.pdf

Automated FOD Detection System

Risk-based oversight



UAS Safety Talk

Contact Us

Strategic Safety Office

HK Civil Aviation Department

sso@cad.gov.hk

Final Report on a Serious Incident

A Final Report was published by the Accident Investigation Division of CAD on a serious incident. In January 2015, a ferry flight operated by a business jet company had descent below glideslope and lost altitude quickly from around 2,000 ft AMSL to about 500 ft AMSL when it was about 7 nm to Runway 07L. After recovery actions by the flight crew, the aircraft carried out a missed approach and landed uneventfully. Probable causal factors identified include the loss of situational awareness of the flight crew leading to subsequent height loss significantly. Two recommendations were made to the company to strengthen flight crew training on situational awareness, monitoring of aircraft status and CRM training.

Transforming "Data" to "Actionable Insights"

False Aircraft Targets Displayed as Code "2000"

Occasionally, there were reports of false aircraft targets displayed as code "2000" on ATC radar displays. A number of these false targets were generated by aircraft on tow which had used incorrect transponder settings. Sometimes those false targets might trigger "false" TCAS alerts, which could cause distractions. The CAD had collaborated with the Airport Authority Hong Kong (AAHK) and aircraft maintenance organisations to mitigate those issues through measures such as training and campaign to remind maintenance/aircraft towing personnel about transponder setting procedures, on top of the new functions of the new ATM System for filtering out false targets from ATC radar displays.

Automated Foreign Object Debris (FOD) Detection System

To enhance runway safety and foreign object (FO) prevention at the HKIA, an automated FOD detection system is planned for full commissioning in Q4 2017. The System is equipped with 22 electro-optical sensors along the North and South Runways and is capable of providing FO alerts on a real-time basis. Upon detection of FO on runway, the system will issue an alert to the console at the Apron Control Centre (ACC). The operator in the ACC will be able to zoom in the FO image for visual verification and inform the Air Traffic Control Tower and Airfield Officer for ad-hoc runway inspection. The CAD will continue to work in collaboration with AAHK which ensures a smooth commissioning of the System.

Integrated Approach to Continuing Airworthiness Oversight

The CAD Airworthiness Office (AWO) is progressively adopting a risk-based approach to continuing airworthiness oversight by performing safety risk analysis on the safety data generated from the existing performance-based and compliance-based approaches. Through monitoring Safety Performance Indicators, inspections, audits and surveys can be prioritised towards areas of greater safety concerns or needs. The new approach has been presented at international forums and discussed with the industry in Hong Kong.

Unmanned Aircraft System (UAS) Safety Awareness

On 25 October 2017, CAD invited a 3D mapping surveyor to give a talk on "*UAS Safety Awareness - an Operator's Perspective*" and their safety management practice. Over 70 participants attended the event.

What is "Safety Links" and how can I contribute?

Safety Links provides a platform for aviation professionals to share good safety management practices and lessons learnt with other sectors, such that we can all learn from your experience and plan for safety improvement. Please contribute your knowledge and safety suggestions.

The information may be de-identified upon request.

Safety culture
Our business