香港天文台
HONG KONG OBSERVATORY

Reprint 671

Development of New Wind Shear Posters in Collaboration with IFALPA and ICAO

C.M. Shun

Commission for Aeronautical Meteorology (Thirteenth Session),

Geneva, Switzerland, 23 November - 1 December 2006

World Meteorological Organization **CAeM-XIII/Rep. 7(2)**

COMMISSION FOR AERONAUTICAL METEOROLOGY

Submitted by: Hong Kong, China
Date: 30.X.2006
Original Language: English
Agenda Item: 7

THIRTEENTH SESSION
Geneva, Switzerland
23 November to 1 December 2006

COOPERATION WITH OTHER BODIES AND INTERNATIONAL ORGANIZATIONS

DEVELOPMENT OF NEW WIND SHEAR POSTERS IN COLLABORATION WITH IFALPA AND ICAO

PROGRESS/ACTIVITY REPORT

SUMMARY

Reference: CAeM-XIII/Doc. 7(2)

CONTENT OF DOCUMENT:

Appendix:

- Progress/Activity Report

PROGRESS/ACTIVITY REPORT

1. INTRODUCTION

1.1 Over the years, a number of ICAO publications were developed on wind shear to serve as guidance material for States and/or training and educational material for pilots. These publications include the Wind Shear Circular (186-AN/122) published in 1987 which was replaced by the Manual on Low-level Wind Shear and Turbulence (Doc 9817) in 2005, and three posters related to wind shear published between 1982 and 1990 (see Annex 1).

1.2 This report summarizes an initiative of the Hong Kong Observatory (HKO) to develop new wind shear posters as a joint effort of WMO, IFALPA, ICAO and HKO to enhance aviation safety.

2. NEED FOR NEW WIND SHEAR POSTERS

2.1 Recognizing the importance of gust front and microburst as low-level wind shear hazards to aircraft, ICAO published between 1982-1990 three posters on these phenomena for training and educational purposes. These posters provide very useful information on the characteristics of the gust front and microburst and draw the attention of pilots to their hazards (see Annex 1).

2.2 In Hong Kong, China, in collaboration with IFALPA, HKO published a “Booklet on Windshear and Turbulence in Hong Kong – information for pilots” (see Annex 2) in 2002 to promulgate among pilots the latest understanding of wind shear and turbulence, alerting phraseology and alerting services at the Hong Kong International Airport (HKIA). The Booklet has been widely distributed to airlines operating at HKIA and reproduced by a number of airlines for pilot training.

2.3 In view of the positive feedback from airlines and pilots on the Booklet, HKO has undertaken to produce a set of wind shear posters jointly in collaboration with IFALPA and WMO, with information from the Booklet simplified and tailored for the aviation users in general. The objective of the posters is to promulgate the current knowledge of low-level wind shear/turbulence hazards and their alerting techniques to pilots and meteorologists, for training and educational purposes. It is envisaged that the posters will cover the following subjects:

- Causes of wind shear (thunderstorms, terrain, sea breeze and low-level jet);
- Nature of wind shear;
- Wind shear alerting techniques;
- How pilots prepare for wind shear encounter.

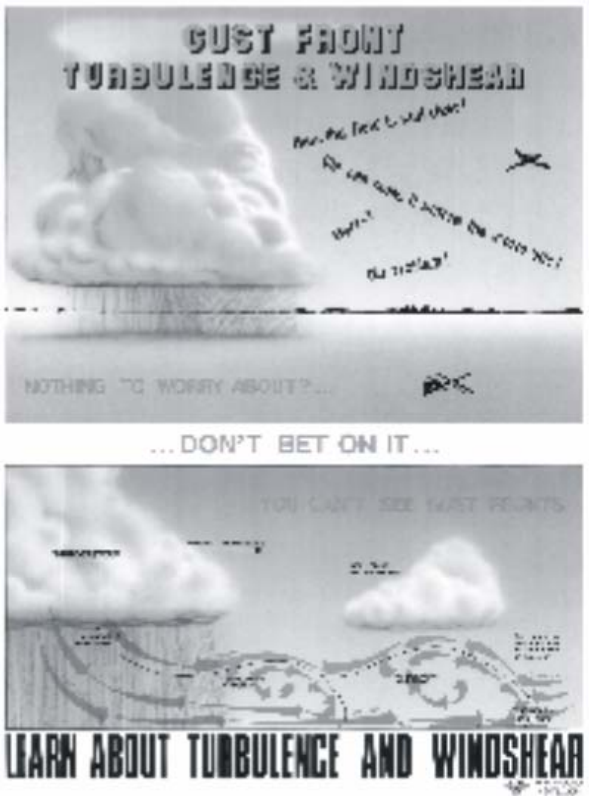
2.4 Initial discussions have been made with the Secretariats of WMO and ICAO, and the IFALPA representative concerned on the technical content of the new posters. It is envisaged that the posters will broadly cover the characteristics of wind shear in the different airport environments around the world while giving clear and concise messages tailored for the end users. Coordination between the organizations will be required on the widest distribution of the new posters to end users and interested recipients.

2.5 In the Tenth Meeting of the Communications/Navigation/Surveillance and Meteorology Sub-Group (CNS/MET SG/10) of ICAO held in Bangkok, 17-21 July 2006, the initiative was presented and a draft conclusion was formulated to invite ICAO to consider updating the ICAO wind shear posters for training and educational purposes, based on the new posters being developed by HKO in collaboration with WMO and IFALPA. This conclusion has been adopted by the Seventeenth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/17) in August 2006.

_____

Annexes: 2

ANNEX 1



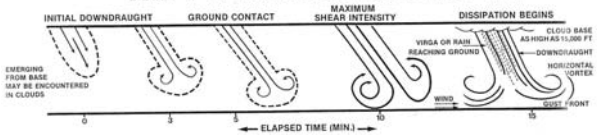
(a)

- Do you know the MET clues to the possibility of wind *shear*?
- Do you know the precautions you should take if there is a risk of an encounter?
- Do you know the initial indications on flight deck instruments of an encounter?
- Do you know and understand the dynamics of wind shear and its effects on aircraft performance?
- Do you know the recommended recovery techniques for your aircraft?

IF YOU DON'T KNOW THESE THINGS...YOU SHOULD!

(b)

THE TYPICAL MICROBURST . . .



- has winds that intensify for about 5 minutes after ground contact
- dissipates from 10 to 20 minutes after ground contact
- spreads in all directions after ground contact in a violent horizontal vortex up to 3 kilometres or more
- can occur in both "wet" and "dry" atmospheric conditions
- can occur in "families" (one microburst indicates possible development of others)
- can have average horizontal wind speed differences (head wind-tail wind) of about 50 knots with extreme values exceeding 100 knots possible
- can have vertical speeds in excess of 3,000 feet per minute

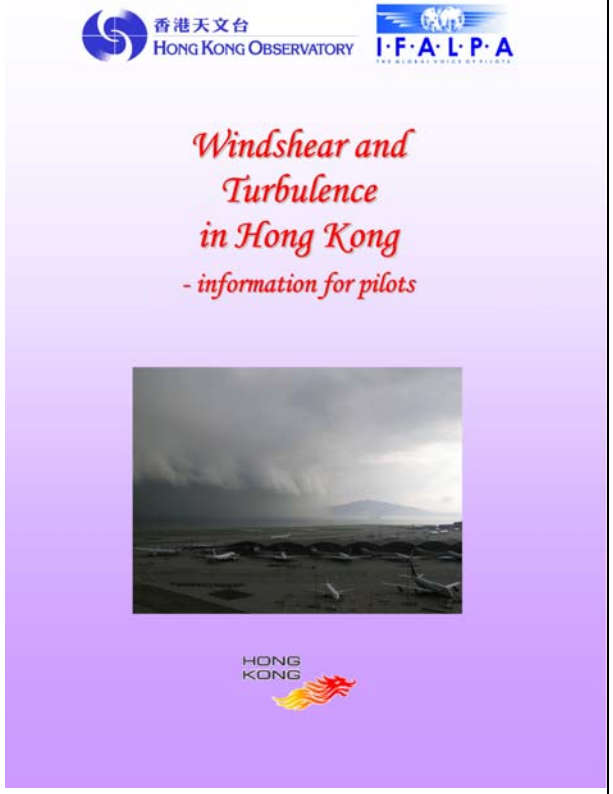
DON'T TAKE A CHANCE - WAIT IT OUT!

(c)

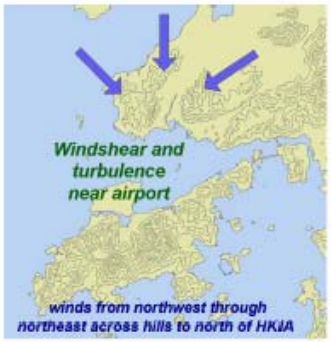
ICAO Wind Shear Related Posters:

(a) Gust Front Turbulence and Windshear (P621) – 1982
(b) Windshear – Microburst (P683) – 1988
(c) Microburst – Wind Shear (P686) – 1990

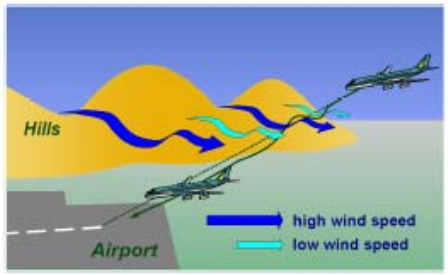
ANNEX 2



(a)



On windy occasions, such as the approach of a tropical cyclone, air streams of high wind speed may emerge from mountain gaps. Lying between these high-speed air streams are air streams of lower wind speed. Aircraft, traversing through alternating high-speed and low-speed air streams, may encounter headwind losses and gains at different locations along the approach and departure corridors (refer to the first example on page 14).

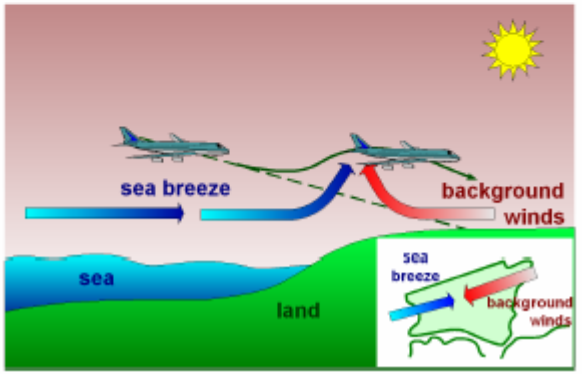


(b)

What is 'sea breeze'?

Sea breeze usually develops under fine weather and light wind conditions. At HKIA, the onset of sea breeze is typically characterized by winds turning westerly over the western part of the airport. With prevailing easterly winds blowing in the background, significant windshear in the form of headwind gain to an aircraft may develop along the runways.

While not frequent, windshear of 20 knots or greater associated with sea breeze may occur under background easterly winds of 10 knots or higher. This weather phenomenon occurs more in winter and spring. Turbulence, in addition to windshear, is known to occur in a sea breeze.



(c)

HKO/IFALPA Booklet on Windshear and Turbulence in Hong Kong – information for pilots:

(a) Cover page of second edition (2005)
(b) Schematic on wind shear induced by terrain
(c) Schematic on wind shear induced by sea breeze