

INSTITUTION OF MECHANICAL ENGINEERS HONG KONG BRANCH  
TECHNICAL VISIT TO HAECO HONG KONG HANGERS ON 29/6/2019



Members of Institution of Mechanical Engineers Hong Kong Branch visited HAECO Hong Kong

Members of Institution of Mechanical Engineers (IMechE) in Hong Kong enjoys convenient air connections to the world via Hong Kong International Airport (HKG or VHHH). Ensuring the integrity and functional soundness of the aircrafts to and from HKG is paramount to the safety of the millions of lives in the 111,000 flight movements in HKG every year. Since 1950, Hong Kong Aircraft Engineering Company Limited (HAECO), has shouldered the maintenance, repair and overhaul (MRO) of the civil aircrafts for over 100 airlines in HKG. HAECO three (3) massive airframe maintenance hangers at the west end of HKG is the base of the HAECO Hong Kong operations and much mechanical engineering works take place.

### **MRO Supports**

HAECO Hong Kong has total 22 maintenance positions. Eight (8) of them are full indoor bays and three (3) are nose-in bays allocated in the Maintenance Hanger nos. 1, 2, 3A and 3B which widths 500 m, while the rests are outdoor bays on the apron. Unlike the nos. 1, 2 and 3A enclosed cousins, Maintenance Hanger 3B is an open hanger in adapting the wind effect of the surrounding landscape. Workshops, warehouses, laboratories and offices locate at the back of the Maintenance Hangers.

1,700 out of 7,000 of HAECO employees of various grades work in the Maintenance Hanger compounds in HKG, which accommodate a series of workshops including:-

- Sheet Metal Shop
- Machine Shop
- Cleaning Shop
- Disinfection Shop
- Composite Repair Shop
- Paint Shop
- Tool Room

#### *Sheet Metal Shop*

Sheet Metal Shop prepares metal sheets for fuselage skid replacements and provides support to riveting and double sealing in fuselage reparations. Sheet metalwork is a dedicated craftsmanship in which HAECO Hong Kong is endowed with its over 50 years of experience. The quality workmanship delivered by the highly skilled and experienced sheet metal workers is reputable in the aircraft MRO industry. Other aircraft MRO companies, especially those in the U.S., are keen to recruit these specialised workers upon their retirement in Hong Kong for their sheet metal expertise.

Sheet Metal Shop frequently provides metal sheets for repairing the airframes which principally serve the routes within Asia. These routes are often in high temperature and humidity and rusting on the fuselage skins is commonplace.

#### *Cleaning and Disinfection Shop*

Each civil aircraft is equipped water and waste tanks for containing potable water and effluent respectively. Upon maintenance, they are taken from the fuselage for thorough cleaning and disinfection.

#### *Composite Shop (Aircraft Interior Maintenance Department)*

More and more airframes are made of composite components, very often carbon fibre honeycomb structures. Composite Shop specialises in preparing and applying composite materials for the damaged composite airframe structures.

#### *Tool Room (Material Management)*

Tool Room is where the tools for MRO are stored and managed. To avoid foreign object damage to the aircrafts under MRO, 48 hours before the departure of an aircraft, Tool Room shall verify all tools used on that aircraft have returned to it. Unless the tool return is all complete, the aircraft shall not be released.

Whenever HKG is to receive a new aircraft type, Tool Room requests the tool list for the new type for scrutiny, in deciding whether the new tools are of value of acquisition. Should there be operational and commercial justification, the new tools are purchased and added to the Tool Room inventory.

#### *Paint Shop*

Surface blasting, prima coating and top-coat application are carried out at Bays 1 and 2 in

Maintenance Hanger no. 1 and Bay 8 in Maintenance Hanger no. 3A, which are equipped with drainage installations to collect waste fluids generated during airframe external painting. The drainage is channelled to the in-house wastewater treatment facilities for process before disposal of.

HAECO Hong Kong provides maintenance-type, standard airlines livery airframe external painting. Special painting schemes are executed by the HAECO operations in Xiamen, Fujian Province of the mainland China, Taikoo (Xiamen) Aircraft Engineering Company Limited.

**MRO in Good Hands**

*Aero-engine Trail*

The aero engines, after MRO, must pass the Engine High Power Run in order to be declared airworthy and released to the customer. The engine ground



Engine Run-Up Facility at Docking lot M23 in VHHH

running takes place in the Engine Run-Up Facility at the Docking lot M23, where the pressure ratio of the air inflow and outflow of an engine is examined across the entire operating regime of the engine. The pressure ratio readings must be stable from idle to full power, or the dangerous engine surge will occur.

*Combat Leakage and Corrosion*

Full tightness of the fuel tanks inside the wings is paramount to the safety and integrity of an aircraft. Much dedication is paid to the application of sealant on every joint inside the wings in warranting the wings' top tightness.

When a runway is wet, water on the runway carries the dirt on the tarmac and splashes onto the front landing gear wheel-well by the spinning front landing gear wheels. Corrosion is found to be the most severe at the front landing gear wheel-well inner walls among all sections of an airframe. Extra corrosion inhibiting compound is applied to the inner walls to provide additional protection to them.

*Maintenance Regimes*

HAECO Hong Kong implements Approve Maintenance Schedule for its airline customers. It comprises of:-

- 1) 45-minute transit check for identifying and rectifying Classes 1, 2 and 3 failures

Failure Class	Details
1	Failures indicated to the flight crews by means of warnings and flags in the flight

Failure Class	Details
2	Failures indicated to the crews on the ground only whereas have no impact on the current flight
3	Failures not indicated to the crews at all, are available on request only and are checked at the next scheduled maintenance check

- 2) Light Maintenance which duration varies from six (6) hours to two (2) days
- 3) Line Check and Base Check scheduled by HAECO Hong Kong Planning Department

Check	Typical Duration
A	Five (5) hours to overnight
C	Two (2) weeks
D	Two (2) months

### *Engineer the MRO Owner*

The 14 Category C (Base Maintenance Certifying Engineer) licence holders of HKAR-66 Aircraft Maintenance Licence in are the owners of all the aircraft MRO projects in the HAECO Hong Kong facilities. They establish the MRO programme and define the critical paths for each aircraft in their portfolio and determine either an aircraft can be released to service, or the extension of the turn-over time.

They are the gatekeepers of the works quality and qualification, certifying the process of maintenance recorded on the non-routine task cards which record the training levels of the maintenance personnel, tools, procedures, location and the environment. Eventually, they issue Certificate of Airworthiness and Certificate of Maintenance Review for releasing the aircrafts they own.



The technical visit convener, Mr. Chi-Yuen Law, presented a certificate of appreciation to Mr. Vic Chow in recognition of HAECO Hong Kong hospitality to host the activity

### *Health and Safety*

The airframes during MRO are without the cabin air-conditioning system in operation. Even though with external ventilation, working inside the cabin can be very hot and humid. For health and safety consideration, HAECO Hong Kong implements a heat stroke policy, which prohibits human activity in the cabin should the cabin temperature be 28 degree Centigrade or above.

### **Remarks**

The aviation industry is a highly safety, integrity and quality conscious industry, as well as a combination of sophisticated, state-of-the-art engineering and manual, dedicated craftsmanship. Aircraft MRO plays a crucial part of the industry excellence, and HAECO Hong Kong is no doubt the aircraft MRO leader with its professionalism, dedication, diligence and wealth of MRO knowledge and experiences. It is no wonder HKG is the civil aviation hub in Asia Pacific; not only is its network extensive, its top-class aircraft MRO services rendered by HAECO Hong Kong assure the airlines that their fleets are well taken care of in HKG.

The IMechE members in Hong Kong may be rest assured that whenever they travel from Hong Kong by air, their paramount safety and comfort is in good hands.

IMechE Hong Kong Branch thanks Mr. Vic Chow and his colleagues for their kindness and hospitality in receiving the technical visit on 29/6/2019.

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# TECHNICAL VISIT TO HAECO HANGARS

Join IMechE to visit the HAECO Group's hangars at the Hong Kong International Airport and learn more about its world-class aircraft engineering services, including airframe services, line services, cabin solutions, private jet solutions, fleet technical management, inventory technical management, component overhaul, aerostructure repairs, landing gear services, engine services, parts manufacturing and technical training.



**Time:** 09:30 to 11:00 on 29/6/2019 (Saturday)  
**Venue:** 80 South Perimeter Road, Hong Kong International Airport, Lantau, Hong Kong (assembly at Tung Chung MTR Station at 08:30)

For details, please visit IMechE webpage:  
<http://nearyou.imeche.org/near-you/north-east-asia/hong-kong/events>  
20 places available to IMechE members