

Hong Kong International Airport

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Embracing the need for an expansive approach

The growth of the aviation industry in Asia has been truly phenomenal over the past quarter of a century, none more so than in Hong Kong.





Cargo handling continues to grow significantly at HKIA

In the 1990s, the single-runway Kai Tak Airport was approaching capacity, while the terminal building was crowded and many flights were delayed or rerouted. The turn into Kai Tak airport in the old days was so tight that only specially-trained pilots were allowed to do it.

At the end of the 1980s the then-Governor of Hong Kong, Sir David Wilson, announced the plan to construct a new airport at Chek Lap Kok, as a part of an overall port and airport development strategy. In 1991, the UK and the mainland governments signed the memorandum of understanding giving their firm support to the airport project.

Hong Kong International Airport (HKIA) commenced operation in July 1998, and last year marked the 15th anniversary of HKIA. There has been enormous growth in traffic since the end of Kai Tak days. Since 1998, passenger volume and flight movements have doubled, and cargo throughput has increased by 150 per cent.

In point of fact, HKIA has been one of the largest engineering and architectural projects in the world. Norman Foster was the architect responsible for the grey and glass HKIA on the large outlying island of Lantau – which has seen the city's aviation industry rise far above predictions.



Our people, working with HKIA across three decades



Aurecon knows what it takes to create international airports that are safe, profitable, passenger friendly and agile enough to meet future needs.

Since 1992, our people have been involved in the majority of major building capital works completed at Hong Kong International Airport (HKIA) including Terminal 1, North Satellite Concourse and Terminal 2, in addition to term consultancies.

Aurecon are proud to have been working with HKIA across three decades.

Contact us about Aurecon and HKIA

Kenneth Sin

Buildings Leader, Hong Kong

M +852 6621 5873

E kenneth.sin@aurecongroup.com

Contact us about Aurecon in Asia

John Webb

Buildings Leader, Asia

M +852 5362 3551

E john.webb@aurecongroup.com

Airport terminals Designing for profit

Aurecon's Buildings Leader in Hong Kong Kenneth Sin and Buildings Associate Andy Pang explore how innovative engineering can ensure greater returns on capital expenditure (CAPEX) and simultaneously save on operational expenditure (OPEX) in today's airport environments.

Very few businesses require the astonishingly large amount of CAPEX that airports do. As total infrastructure solution provider for airports around the world, we have seen that if CAPEX is not carefully controlled, especially the initial expenditure, it could take a long time to recoup this outlay from future revenue. Great design can significantly alter the profit equation of an airport and should be a key consideration from the earliest planning stages.

There is therefore a huge business interest in optimising spend while maximising their revenue-earning potential and minimising operating cost. The only way to achieve this is by designing for profit.

Approach

Designing for profit is best approached by thinking about: Client, Environment and Design. This entails thinking about a client's business needs, including their customer's wants and needs. It also encompasses the climactic and physical environment of a project. Only once you've understood these complex factors should you start thinking about design.

Designing for profit requires clever thinking around why we design airports the way we do. Those designing airports should ensure the following three elements remain top of mind:

Maximising revenue

Typically, retail fees form a significant portion of an airport's revenue stream. Hence, the maxim of "location, location, location" applies. Passengers won't consider retail until their check-in is complete, passed through security and immigration or even until their gate is safely in sight.

There have been instances of airports whose designs have been hugely successful from a passenger's perspective but are commercially disastrous – that is, where it is possible for passengers depart overseas without being enticed to spend any money on parking or at the food and retail outlets. The airport owners of one such airport were forced to retrofit retail spaces into the departures hall, after the facility opened, with the inevitable disruption and inefficiency.

Minimising capital expenditure by:

Minimising the size of your building

A quick, but often overlooked, design principle is to consider extending the aerobridge. Once passengers are on the bridge, they are unlikely to notice if these are 10m or 15m longer. Pulling the building façade back by 10-15m can decrease building area substantially.

Ensuring optimal spatial efficiency

Today, it is possible to simulate the spatial performance of a building before construction. To achieve this, Aurecon currently uses two pedestrian circulation modelling tools. Aurealis, a visualisation tool that answers 'How will this facility look and feel once built?' This software provides very realistic 4D renderings of airport spaces, including the movement of people. To compliment this, STEPS is used to provide more explicit engineering outputs such as travel time and speed.

Used together, these tools enable designers to experiment with different scenarios until the correct balance between aesthetic and commercial performance is achieved.

Containing operating costs

Clever consideration of natural light

Designs that carefully consider natural light or take advantage of the typical large glass facades can have significant impact on running cost.

For instance, in designing the Hong Kong Terminal 1's processing hall atrium, the design team chose to suffuse it in natural light through the roof and facade, which allowed daylight to filter through but reflected solar heat. Energy expenditure on lighting was greatly reduced, without significant air conditioning penalty. Thus, on-going OPEX was reduced.

Re-thinking circulation spaces

Airports don't have to be entirely enclosed and there is a huge opportunity, particularly outside of the tropics, to take advantage of this cost-saving measure. Passengers are often subject to an artificially controlled environment from kerb to kerb. In the right season, the use of external circulation spaces not only saves on lighting and cooling costs, but provides a welcome break.

The quality of an airport's design has a significant bearing on both its initial capital cost and its long term profitability. Overall, profitability should be a key metric in the evaluation of the design.

The pace of growth has been so marked that in 2011, it was reported that Hong Kong was considering building a third runway.

Stanley Hui Hon-chung was appointed as Chief Executive Officer of Airport Authority Hong Kong (AA) in February 2007 and describes the current scale and status of the airport:

“Since HKIA commenced operations, we have adhered to 4 principles: Safety, Operational Efficiency, Customer Convenience and Environment. This commitment has earned HKIA the world’s best airport for over 50 times. It has become the world’s busiest cargo airport for 3 consecutive years since 2010 and is also one of the world’s busiest passenger airports.

“Hong Kong International Airport (HKIA) is located less than 5 flying hours from half of the world’s population. We are connected to about 180 destinations, including 44 in mainland China, through about 1,000 daily flights by more than 100 airlines.

“In 2012, 56.5 million passengers used HKIA and 4.03 million tonnes of air cargo passed through Hong Kong. During the fiscal year ended 31 March 2013, AA reported a profit attributable to the equity shareholder of HK\$5,624 million and revenue of HK\$13,134 million.”

For the time being anyway, HKIA remains a two-terminal and two-runway facility generating enormous social and economic value for Hong Kong. The 65,000-strong airport community serves as the key contributor to Hong Kong’s position as a leading international and regional aviation centre. It is also a gateway of China. It has built an integrated, multi-modal transport network with the Chinese mainland; especially the Pearl River Delta (PRD) and passengers can travel between HKIA and the PRD by cross-boundary coaches, limousines, and ferries.

The AA, established in 1995, is a statutory body wholly owned by the Hong Kong SAR Government and is responsible for running operations and the development at HKIA.

Further evidence of the airport’s importance was reflected in figures for the financial year ended 31 March 2013, which showed that HKIA

handled a total of 57.2 million passengers. HKIA indicates that South East Asia, Mainland, and Taiwan are the 3 largest passenger markets, accounting for 27 per cent, 22 per cent and 14 per cent respectively.

Of course airlines play a vital role in driving passengers to HKIA, as Hon-chung outlines:

“We always welcome new airlines to operate at and existing airlines to add new routes to and from HKIA. To support the addition of new destinations, we have in place a New Destination Incentive Arrangement scheme, which offers 75 per cent rebate on the landing charges for flights to a new destination for the first 6 months of operation and a 25 per cent during the subsequent 6 months.”

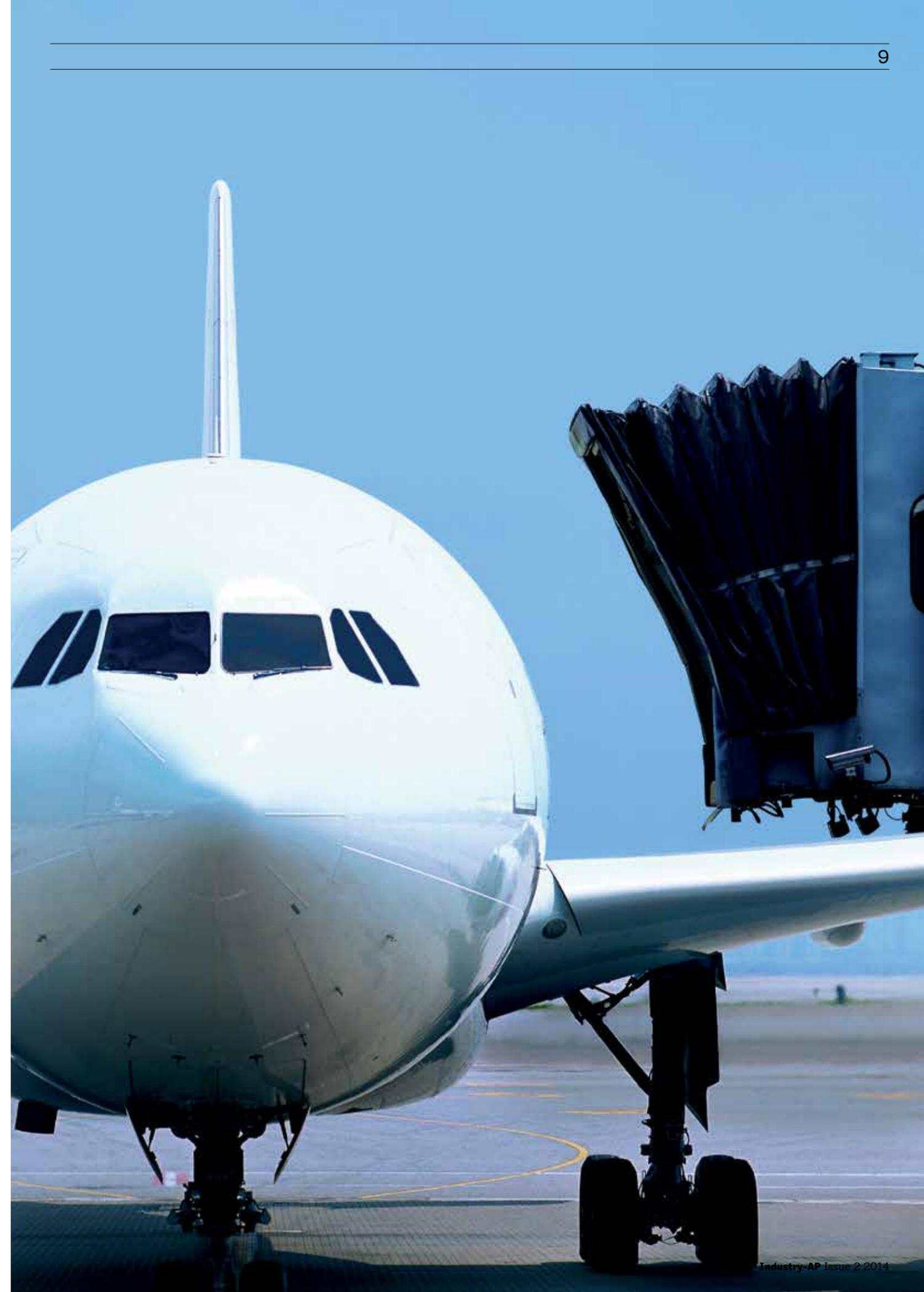
Commercially, HKIA continues to enjoy growth and Hon-chung reports that in the 6 months ended 30 September 2013, AA’s revenue and profit attributable to the equity shareholder increased 14.7 per cent and 17.0 per cent compared to the same period in the previous year, to HK\$7,336 million and HK\$3,215 million.

“Steady growth in air traffic, increasing passenger spending and stringent control over operating expenses contributed to satisfactory half-year financial results. AA forecasts the momentum of traffic growth will continue in the remainder of the financial year and it is cautiously optimistic of its 2013/2014 full-year financial performance,” he states.

This continued success at HKIA is occurring despite global economic uncertainty, as he continues:

“Looking ahead, AA expects the upward momentum of HKIA’s overall traffic growth – especially on the cargo front – to continue as it approaches the end of the year. Cargo throughput is expected to outperform the global average for the year, reinforcing HKIA’s position as the world’s busiest cargo hub.”

That of course will in turn put additional pressure on the existing infrastructure at HKIA and in recent months the organisation has constructed new parking stands to accommodate increasing parking demands;







“Following the commissioning of 6 new parking stands in July 2013, another 6 parking stands were scheduled for completion by the end of 2013. Together with the Midfield development project, which includes a new passenger concourse with 20 parking stands, we will put in place a total of 48 new parking stands by the end of 2015 in phases. The apron expansion also includes a cross-runway vehicular tunnel linking to the cargo area to facilitate efficient vehicular flow at the apron.” Hon-chung affirms.

Embracing change has become something of a necessity at HKIA over the past couple of decades and Hon-chung promises more to come.

“Capacity constraint has become the key challenge at HKIA. The IATA Consulting estimates that, at a base-case level, HKIA will

be receiving 102.3 million passengers and 8.9 million tonnes of cargo per year by 2030 while handling 607,000 flight movements. However, the practical capacity of the two-runway system is only 420,000 flight movements.

“To meet these anticipated unconstrained demands, AA is now planning and implementing a series of capacity enhancement initiatives.

“In order to meet the expected long-term growth in demand for air traffic, the AA is now carrying out a thorough and rigorous statutory Environmental Impact Assessment study for expanding HKIA into a three-runway system. Once the statutory process is complete, we aim to start construction in 2016 and commission the planned three-runway system in 2023,” he concludes.



Project Hong Kong International Airport Skyplaza Year of Completion 2007



俊和發展集團
CHUN WO DEVELOPMENT HOLDINGS LIMITED

5C, Hong Kong Spinners Industrial Building Phase 1, 601-603 Tai Nan West Street, Cheung Sha Wan, Kowloon

Tel: (852) 3758 8711 | Fax: (852) 2307 0090 | Email: info@chunwo.com

www.chunwo.com



Flight path for an ever growing Hong Kong International Airport

Hong Kong International Airport

www.hongkongairport.com

Airport Authority Hong Kong,
HKIA Tower, 1 Sky Plaza Road,
Hong Kong International Airport,
Lantau, Hong Kong

Tel: +852 2181 8888