

2019 IATA Ground Handling Conference Innovator Competition

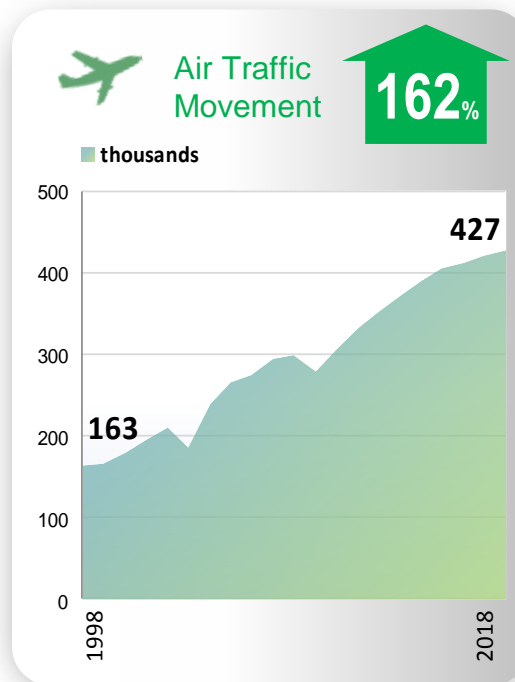
Submission Title: On-stand Ground Services Equipment Pooling Scheme at the Hong Kong International Airport – An Important Step to Ramp Handling Process Transformation

Company: Airport Authority Hong Kong

Background

Under the current two-runway operation from 1998 to 2018, Hong Kong International Airport (HKIA) has recorded air traffic movement growth by 162% from 163 to 427 thousand per annum making it one of the busiest international airports (see Exhibit 1).

Exhibit 1



However, on ramp handling services provision, it has essentially remained the same since the commencement of HKIA in 1998. The provision of ramp handling services is licensed to 3 professional ramp handling operators (RHOs) to offer a competitive choice of service providers to airlines. RHOs are responsible for arranging their own resources including manpower and ground services equipment (GSE).

Business Needs

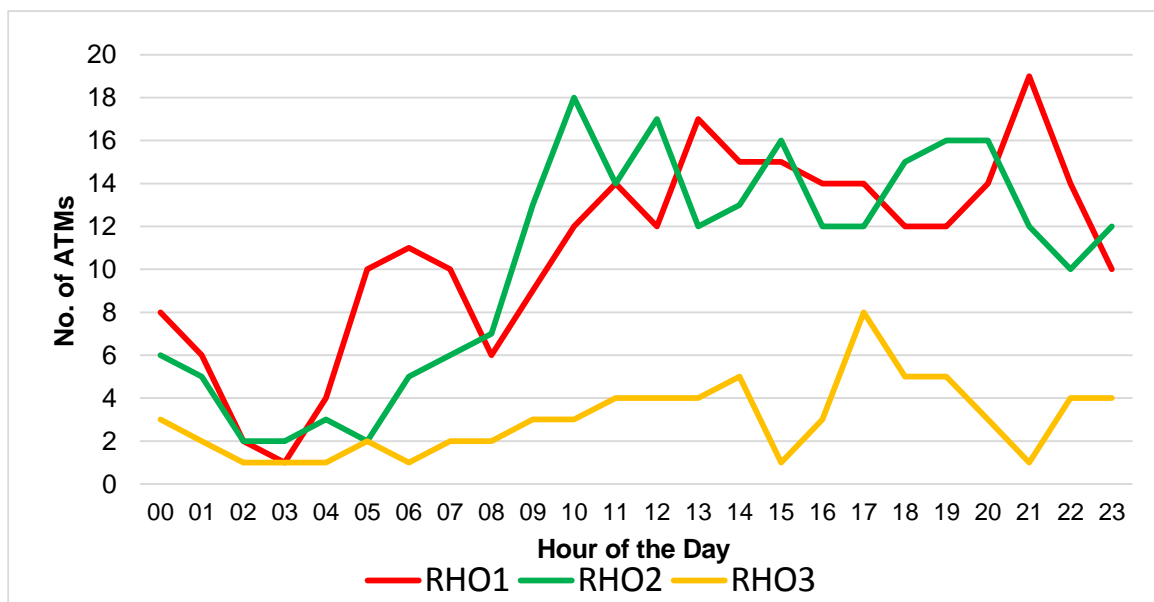
Given that HKIA is approaching its design capacity, bottlenecks in various operational areas are expected to emerge. In 2012, HKIA made the aspirational pledge to become the world's greenest airport and strived to be a leader in environmental management. This means that environmental best practices are embedded throughout HKIA operations, including ramp handling operations, where

possible. To improve competitiveness, enhance passenger experience and achieve sustainable growth, HKIA commenced a ramp handling process transformation to unleash existing untapped capacity and to create new capacity through the implementation of digital ramp applications and a review of the physical ramp handling process. Improvements were identified and evaluated using operational efficiency as well as environmental criteria.

Unlike most other airports, all parking stand resources at HKIA are available for common use. While aircraft of any airline may be assigned to park at any parking stand, each parking stand on average has to serve around seven turnaround flights each day which means that the time interval between two turnaround flights is extremely tight. In terms of the physical ramp handling process, RHOs move manpower and GSE all over the apron frequently and promptly to serve their airline customers, causing occasional delays in aircraft servicing (and hence on-time performance failure). These delays may be due to late resource deployment, apron road traffic jams, and/or parking stand congestion as a result of RHOs occupying the parking stand staging area for the previous flight for too long. The idling use of GSEs in parking stands conflicts with HKIA’s Greenest Airport Pledge as the GSE servicing parking stands are aged diesel-powered vehicles which emit carbon and other emissions during the idling period.

In addition, due to the short term nature of service level agreements with airlines, RHOs are only willing to invest in resources to cater for the average peak instead of the peak-of-the-peak demand (see Exhibit 2 for the peak demands of the 3 RHOs for arrival flights handling at HKIA), which adds to the difficulties of achieving timely service during the busiest periods.

Exhibit 2



A review on the GSE fleet was conducted, and aging equipment was found to be an issue as reflected in their serviceability and breakdown rates.

The Opportunity

In 2016, HKIA commenced its decennial RHO Licence renewal exercise, which presented an excellent opportunity to institute new terms and conditions to enable the ramp handling process transformation, as well as measures to assist HKIA to achieve its Greenest Airport Pledge. To prepare for the negotiation with RHOs, HKIA reviewed historical ramp handling performance and conducted a

comprehensive analysis on the causes of failures to achieve its prescribed performance level. Specifically on arrival baggage delivery, the study indicated that one-third of those failures were GSE related, due to either lateness or insufficient GSE provided for aircraft turnaround handling. Furthermore, a review on the then GSE pool also revealed that the fleet was aged and required high maintenance. HKIA has also set an airport-wide carbon target to reduce carbon intensity by 10% by 2020 compared with 2015 levels. Given the majority of GSE was diesel powered, further consideration on environmentally-friendly (zero-emission or low-emission market proven models) GSE was considered a priority.

Risks and Drawbacks Identified and Addressed

In developing the On-stand GSE Pooling Scheme, various risks and drawbacks were identified and addressed:

Procurement Decision

The 3 RHOs at HKIA have different preferences on GSE specifications. Multiple steps were taken to ensure suitable GSE for HKIA operations:

- Reference was made to the latest IATA Airport Handling Manual's recommendations on GSE.
- RHOs were invited to provide inputs for standardization.
- Conformance demonstration tests were conducted to validate the specifications conformity with the RHOs and final inputs on specifications were collect before factory production.

Industry knowledge & Technical Expertise

To offset the lack of GSE industry knowledge and technical expertise as a result of being the only aerodrome operator for 20 years, a professional contractor with relevant industry knowledge and technical experience was appointed. In addition, support from OEMs has also been solicited on the warranty of the GSE and knowledge transfer.

Supporting Infrastructure

The quick provision of electric GSE from charging and repair was considered essential for the Scheme to be successful. HKIA funded the upfront capital investment for the supporting charging infrastructure and RHOs were able to enjoy a fixed rental rate per usage. Two dedicated GSE maintenance workshops, with a total of 18 maintenance bays located in close proximity to the parking stands. The first workshop with 6 maintenance bays has already been commissioned. In addition, upgrading of the charging facilities at HKIA has continued, increasing from 82 electric GSE charger sets in place when the Scheme commenced in July 2018 to ultimately over 400 when the Three-Runway System is commissioned.

A significantly higher availability of GSE is guaranteed with this extensive charging infrastructure.

Transition Planning

Similar to the introduction of other new operational procedures, systems and facilities, the transition in itself could create operational risks. To control these risks, the transition process was carefully planned to take into account the following:

- Implementation has been planned in three phases, allowing the Scheme to evolve and be adjusted if necessary. Phase 1 involves only one quarter of the parking stands. This includes a one-month gear-up period for rolling out the Scheme stand-by-stand to ensure risks were contained.

- To ensure operators are trained well on the new GSE, HKIA provided GSE to RHOs 3 months before the Scheme’s commencement as a way to build capability and familiarization in using the GSE. In addition, RHOs were engaged early in the transition planning and arranged dedicated operators to be trained and assigned to work in the Phase 1 area.

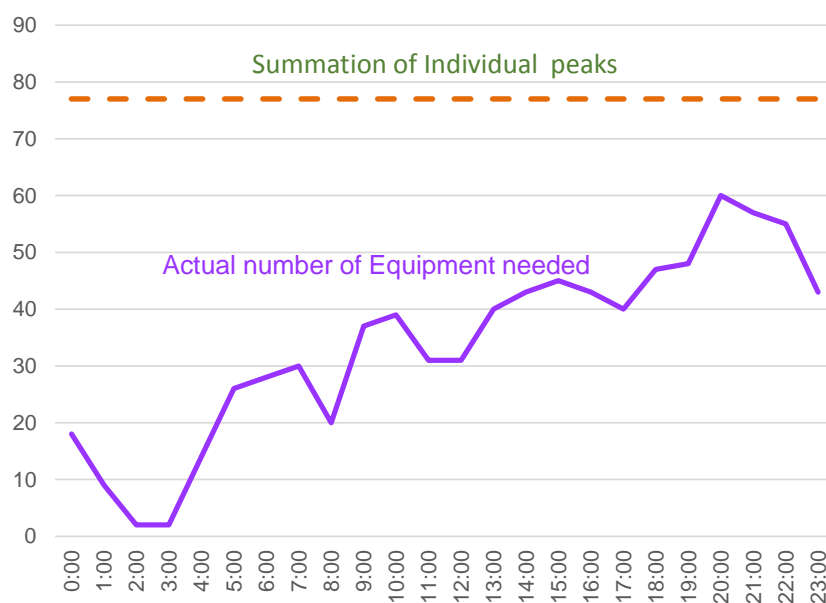
Systemic Failure

To prevent the risk of grounding all GSE of a particular brand and/or model due to various reasons (e.g., design failure found), HKIA procured two different brands and models for each type of the critical GSE provided on-stand.

GSE Quantity & Cost

While reduction in the overall number of GSE is not one of the original objectives (rather the reduction of GSE movements causing apron road traffic jam), the actual number of GSE planned is fewer than the number currently required by the 3 RHOs to cater for the peak-of-the-peak demand (see Exhibit 3 for the comparison of the pooled fleet size against the individual peak’s requirement in Exhibit 2). As a result, the capital investment and on-going maintenance costs are expected to be less. Moreover, as the GSE are located on-stand and would require less movement around the airfield, the useful lives and replacement cycles would be longer.

Exhibit 3



On-stand GSE Pooling Scheme

In July 2018, the HKIA led a roll out of the On-stand GSE Pooling Scheme as a resource-sharing initiative to unleash existing untapped capacity and create new capacity in the ramp handling process, and to lower the emissions generated by the equipment.

This concept revolutionized the bi-decennial practice of RHOs, which originally involved RHOs providing their own GSE and moving them around the apron, to the aerodrome operator providing a set of critical environmentally-friendly GSE on-stand for operation at fixed rental rates. Phase 1 was implemented on 6 July 2018 at the Midfield Concourse (see Exhibit 4 for the implementation phasing).

Exhibit 4



The on-stand GSE provided included electric Lower Deck Loaders, electric Conveyor Belt Loaders, electric Passenger Steps and Main Deck Loaders. Subject to RHOs' request, electric Baggage Tractors, Powerful Tractors and Cool Container Dollies are also available for rental, 95% of which were either electrically-powered or of zero-emission (see Exhibit 5 for the GSE provided).

Exhibit 5

On-stand Provisions-



Additional Provision-



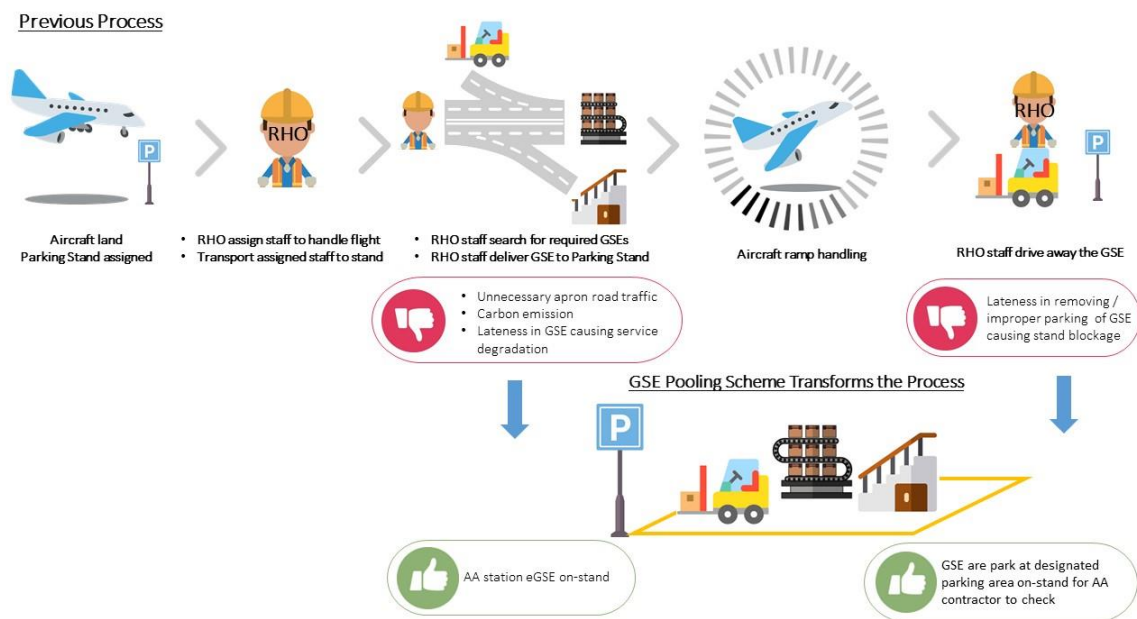
All GSE comply with IATA Airport Handling Manual's recommendations and meet aircraft damage prevention requirements if they dock to aircraft in their normal operations.

A dedicated fleet management system is deployed for GSE management. This enables real-time monitoring, access control, geo-fencing, battery charging alert, maintenance planning, etc., to optimize usage and maximize the asset life. Access control is implemented to ensure that only trained operators are allowed to use the GSE to ensure safety, security and accountability of equipment use. In addition, HKIA has appointed a professional contractor with relevant industry knowledge and technical experience to carry out daily management and maintenance of the GSE, as well as a 24/7 patrol team which can offer timely assistance to RHOs on real-time basis.

The Benefits

The benefits and simplicity of the enhanced ramp handling process with regard to the On-stand GSE Pooling Scheme is depicted Exhibit 6.

Exhibit 6



This simplified process delivers a range of benefits to various stakeholders.

Air Passengers

- Improved on-time-performance of their flights and baggage.

RHOs

- Guaranteed GSE availability on-stand prior to aircraft arrival at a fixed rental rate.
- Manpower savings from non-productive works of searching for and driving GSE from stand to stand.
- Management can concentrate on quality, safety and efficiency improvements.
- No capital investment is required.
- Flexibility in pitching for business from airline customers without the need to concern on availability of and time lag in getting additional GSE.
- Standardization of GSE facilitates staff training.
- Reduced carbon emissions as these are shifted to the aerodrome operator (owner of the rental fleet).
- Better air quality conditions for workers not operating diesel powered equipment.

Airlines

- Eliminated OTP failure caused by insufficient of or lateness of GSE.
- Gain flexibility in choice of RHO as GSE is no longer a concern.

HKIA

- Ensured the peak-of-the-peak demand for GSE is met without increasing the total GSE fleet size.
- Uplifted apron capacity as a result of reduction in apron road traffic, traffic jam caused by slow moving GSE, untidiness of GSE staging area on parking stand, and aircraft ramp handling delays.

- Improved working conditions due to better air quality conditions arising from adoption of state-of-the-art zero-emission or electric GSE.
- HKIA airport-wide carbon emissions are reduced as a result of the reduction in GSE equipment used at the airport and the switch to electric or zero-emission equipment from diesel equipment.
- Faster adoption of latest technology on safety and quality improvements, e.g., aircraft safe docking device.
- Minimized the risk of aircraft damage caused by aging GSE.

Post Implementation Review

The GSE Pooling Scheme has been running smoothly since July 2018 and has achieved its target performance standards. Currently there are about 250 GSE in use which is expected to increase to around 1,000 upon full implementation in 2024.

For the 9 months of operations (July 2018 to March 2019), 64,952 flights were handled by the pooled GSE. All flights had GSE standing-by 1 minute prior to aircraft arrival as per performance standard requirement.

The Scheme has been well received by the RHOs and other ramp operators (see Exhibit 7 for aircraft being served by the pooled GSE). In response to their requests, selected areas in the Phase 2 area have been provided with on-stand GSE since December 2018. Furthermore, to pave way for the Scheme's subsequent developments, a taskforce composed of RHOs and other key stakeholders was formed in Jan 2019. Through the joint efforts of the airside community, it is believed that the complicated issues such as disposal of existing GSE in subsequent phases could be addressed to benefit all.

Exhibit 7

