

INSTITUTION OF MECHANICAL ENGINEERS HONG KONG BRANCH
TECHNICAL VISIT TO KMB OVERHAUL CENTRE ON 10/5/2014



IMechE-HKB delegation visited KMB Overhaul Centre

Since 1933 franchised by the government, Kowloon Motor Bus (KMB) operates bus services in Hong Kong carrying millions of passengers daily with its fleet of over 3,800 buses. Safety and efficiency are essential to the business of KMB and the interest of the public, and hence every of KMB passenger-carry vehicle is maintained at the top condition across its service life. This is achieved by the execution of the continuous and stringent overhaul and maintenance (O&M) regime established by KMB, which is carried out in KMB's dedicated O&M facility, KMB Overhaul Centre (KOC). The sheer scale of KOC in terms of facility footprint and O&M of buses is unique in Hong Kong and the technical visit to KOC, organised by Institution of Mechanical Engineers Hong Kong Branch (IMechE-HKB) for the first time ever, in the morning of 10th May, 2014, had given 20 privileged members to appreciate the excellence of KOC in ensuring the high standard of ever serving KMB bus on the streets of Hong Kong.

General

KOC is a multi-storey purpose-built centre for catering the O&M of double-deck buses and remains the world record of the largest single garage for repairing double-deck buses, in where each KMB bus is subject to annual O&M and statutory examination conducted by Transport Department of the government (TD).

Ground floor finds 54 pits for the inspection and reparation of vehicle underside as well as TD examination. The first and second floors are bays for repairing buses, with jacks which lift the vehicles for component removal and installation. The first floor also sees parts repair facilities and store rooms, whereas the second floor the spraying room for painting the buses. The roof provides parking lots for vehicles and houses dedicated equipments for the cleaning of vehicle underside and the performance of water leak test for bus body.

On average, 76 buses receive O&M in KOC at any time and 340 buses undergo TD examination per month. TD's Motor Vehicle Examiners inspect 16 to 27 buses every working day (normally from Monday to Friday). Major components (if overhaul required), such as gearbox, fuel injector and differential assembly, will be taken down from the buses in KOC and sent to the dedicated workshop in KMB's Unit Overhaul Depot at Lai Chi Kok for repair and re-condition.

KOC is staffed by approximately 450 workers. Contractors are engaged to provide technical services in all areas of activities on demand.

KOC Process

Upon arrival at KOC, a bus first receives base-line condition examination on emission and engine power. Then it is driven to the roof to have its underside washed on the roof and body cleaned. After, it is tested for braking and steering performances, followed by inspection in a repair bay on either first or second floor, where the components of the bus are removed and taken out for condition checking according to the prescribed inspection regime classified into chassis, body and electrical system. Faulty components are sent for reparation and re-condition while the consumables, like the rubber-made water tubing in engines subject to ageing, are replaced new based upon the original equipment manufacturer guidelines, TD requirements or KMB rules. Prior to re-installation, each repaired component is bench-tested to warrant full functionality. Once the components are re-assembled on the bus, a thorough quality check is conducted to ensure full work completion and quality. Then the bus is tested for brake, emission and engine power so to achieve the base-line performances are exceeded. Finally, the repaired is test-driven and ready for TD examination.



A Volvo Super Olympian 12 metre bus (3ASV) under overhaul in KOC

From the admission in KOC, a bus typically stays seven (7) days for being ready for TD examination. Once passes the examination, the bus is transferred to the KMB Operations for passenger service.

KOC Excellences

Subject to the satisfaction of the TD examination, a bus is issued Certificate of Roadworthiness valid for one (1) year. In fact, KOC enjoys extraordinarily high rate of first time passing of TD examination. The in-house KMB requirements are more stringent than the statutory ones because, in doing so the buses are maintained and operate at their top efficiency.

KOC has taken proactive measures in environment protection. All liquid disposals is processed and treated prior to discharge to the public main, while the water for leak test is recovered and reuse, with the recovery rate of 60 %. Moderate and neutral-based detergents instead of strong ones are used in underside washing.

Across the 30 years of operation, KOC has shortened the turn-around time from over ten (10) days to the current seven (7) on average. The work quality also sees significant improvement. In the early days when the systems had not be in place, rules and regulations were vague and loose and practices were often subject to individuals' interpretation at the frontline and time. Nowadays the procedures and the acceptance criteria are clearly prescribed, clearing ambiguity at work and hence improving safety and work efficiency. The staff are better trained and skilled, and are more receptive to the computer-based fault diagnosis. Before, brake testing was conducted on public streets; now the specialised testing rig which renders safe, controlled, objective and reliable tests on brakes.

Electronic systems are extensively used in the control of buses and KOC has the computer infrastructure to fully diagnose and rectify faults, enabling O&M to be performed effectively and efficiently.

Remarks

Hong Kong's world-class land transport infrastructure is contributed by the safe, reliable and efficient bus services which KMB has rendered for decades. Each KMB bus passes through KOC every year to be maintained to its top condition and granted statutory consent to operate on public roads. In other words, KOC plays a role in the excellence of the land transportation in the territory, and IMechE-HKB was privileged to glance and appreciate how it is achieved.

IMechE-HKB thanks KMB and Mr. Chu and Mr. Tsang of KOC for their generous support and hospitality.

[Post-visit note: this report was referenced by KMB and published in its communication publication "KMB Today" issue 241 of June 2014 in translated Chinese.]

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英國機械工程師學會香港分部參觀總修中心

行內簡稱「KOC」、「82廠」、位於屯門建榮街與河田街之間的九巴總修中心，曾被《健力士世界紀錄大全》列為全球規模最大的多層維修中心。今年5月10日，英國機械工程師學會香港分部（IMechE-HKB）的會員參觀了總修中心。以下內容節錄自該學會的會員通訊，原文為英文。

九巴一向著重安全和效率，總是將公眾利益放在首位。因此，九巴確保巴士時刻保持最佳狀態，背後的功勞有賴九巴的檢修制度，而九巴總修中心也扮演了重要的角色。

通過運輸署測試 轉彎無難度

總修中心規模很大，具備全港獨有的巴士總修工序。2014年5月10日上午，英國機械工程師學會香

港分部的20名會員首次參觀了九巴總修中心。

總修中心的地下，共有54個供巴士進行底部檢查和維修的泊位，同時亦供運輸署作檢測之用。而總修中心的一樓和二樓則用作巴士維修，並備有大型起重機器，以拆卸和安裝巴士部件。而位於二樓的塗噴車間則專門用來為巴士噴上車身顏色，天台可供停泊車輛，亦可供巴士進行車身漏水測試。

總修中心平均每日為76輛巴士進行維修，以及每月讓運輸署檢測340輛巴士，運輸署的汽車檢測員每天（星期一至五）檢驗16至27輛巴士。若需要大修，巴士上包括變速箱、燃油噴射裝置和差速器等的主要部件，會從巴士上拆下來，運到專責部門維修。

總修中心共有約450名工作人員。在有需要時，會



1. 九巴總修中心為香港的陸路運輸提供了卓越的服務。
2. 九巴內部對巴士的要求比法定標準更為嚴格，因而可以讓巴士保持在最佳效率下運作。
3. 英國機械工程師學會香港分部一行20名成員參觀了九巴總修中心。

要求承包商在不同範圍內提供技術支援服務。

服務卓越

運輸署檢測一部巴士後，會發出汽車性能證書（Certificate of Roadworthiness），有效期一年。事實上，巴士經過九巴總修中心的維修，成功通過運輸署首次檢查的比率特別高。九巴內部對巴士的要求比法定標準更為嚴格，正因如此，九巴可以讓巴士保持在最佳效率下運作。

另一方面，總修中心採取了嚴謹的環保措施，所有污水均會經過處理，然後才排出。而進行漏水測試

的用水也會回收和再用，回收率高達60%。即使清潔車底，也只會使用較為溫和的洗滌劑。

行內好評

一直以來，香港提供世界一流的陸路運輸服務，幾十年來，九巴安全、可靠及有效率的巴士服務在當中貢獻良多。每輛經過總修中心維修的九巴巴士，都通過法定檢測，以最佳狀態在道路上行駛。英國機械工程師學會香港分部對部份學員有機會參觀交流而感到榮幸，認為九巴維修中心為香港的陸路運輸提供了卓越的服務。



By courtesy of KMB with compliment

IMechE Hong Kong Branch
Activity Sub-Committee
Technical Visit Group

TECHNICAL VISIT KOWLOON MOTOR BUS OVERHAUL CENTRE

**Institution of
MECHANICAL
ENGINEERS**

Successful applicants will be notified detail

Date: 10 May, 2014

Time: 1030 hrs. to 1130 hrs.

Kowloon Motor Bus, with over 3,000 passenger-carry vehicles in Hong Kong, performs the major overhaul and maintenance and statutory examination of its vast fleet in its dedicated facility, KMB Overhaul Centre (KOC). KOC has long been the world record of the largest multi-storey overhaul and reparation building, equipped with numerous sophisticated devices for vehicle reparation and testing to maintain the conditions of the buses to the highest standard.

For the first time ever, IMechE Hong Kong Branch is privileged to visit KOC and learn the process of bus overhaul, maintenance, inspection and testing. IMechE members who are interested in vehicle engineering and transport industry should not miss this exclusively member-only event.

Venue

KMB Overhaul Centre, 2 Kin Tai Street, New Territories, Hong Kong

Registration and Enquiries

For registration, please visit IMechE webpage:
<http://nearyou.imeche.org/near-you/north-east-asia/hong-kong/events>

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