

Engineering Innovations in Smart and Green Cities

綠色及智慧城市的創新工程



Build  Asia
2020

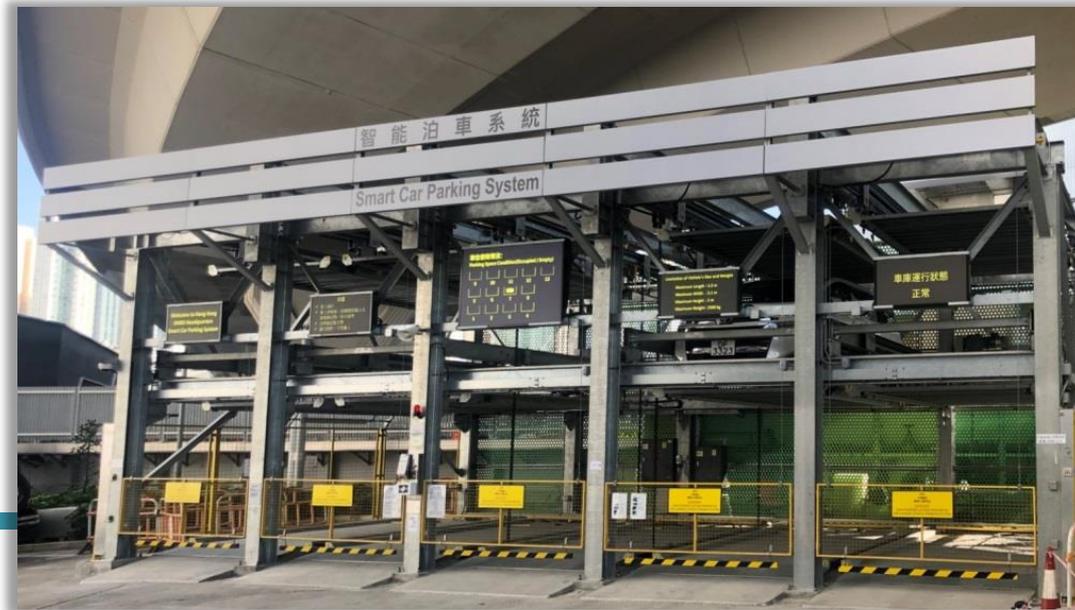


Automatic Parking System in Hong Kong

Ir Antonio CHAN

Deputy Managing Director
REC Engineering Company Limited

Director (2013-2019)
Hong Kong Green Building
Council



Yau Ma Tei Multi-storey Car Park to close by phases

GO



Yau Ma Tei Multi-storey Car Park to close by phases from November 1

The Transport Department (TD) today (October 29) reminded members of the public that the first phase of the closure of the Yau Ma Tei Multi-storey Car Park will be implemented from November 1 (Sunday) in order to facilitate the construction of the Central Kowloon Route by the Highways Department.

Starting from 12.01am on November 1, the 6th, 7th and 8th floors of the Car Park will cease operation and be closed permanently. Before closure of the concerned floors, users who have parked their vehicles on these floors should remove their vehicles or park them on the 5th floor of the Car Park or other floors beneath, which are still open for use. Otherwise, these vehicles will be towed away. Owners or drivers of the vehicles concerned should pay the appropriate parking and towing fees.

Closure of Yau Ma Tei Multi-storey Carpark – further reduction of 770 parking spaces from 1/1/2021

ENRUS/mhursuay, October 29, 2020



表 4.1(a) (續)
 Table 4.1(a) (cont'd)

2020/09

年 / 月 Year/Month	私家車 Private Cars		
	首次登記 First Registration	登記總數 Total Registration	領牌總數 Total Licensed
2015	50 322	567 886	521 852
2016	41 182	583 037	536 025
2017	43 642	600 443	552 710
2018	42 287	617 683	565 213
2019	38 309	628 230	573 932
2019 / 04	2 967	621 648	568 689
05	3 568	622 840	570 142
06	3 392	623 908	570 239
07	3 403	624 869	571 006
08	3 257	625 658	570 919
09	3 116	626 037	571 065
10	2 893	626 405	572 019
11	3 100	627 183	572 187
12	3 292	628 230	573 932
2020 / 01	2 323	628 633	573 571
02	1 930	629 909	565 103
03	2 884	631 808	564 391
04	2 293	633 312	565 764
05	2 840	635 237	569 987
06	2 715	636 832	572 211
07	3 086	638 452	572 615
08	3 550	640 758	570 579
09	3 839	643 422	574 045

Transport Department data (9/2020) :

No. of private car registered in Hong Kong : 643,000 ↑ 13%

Ratio of private car parking spaces against private cars : -
 reducing from 1.46 to 1.09 from Year 2008 ~ 2020 ↓ 25%

Background

Government's Policy

19 Jan 2018

交通事務委員會

在2017年5月19日會議上提出，
並在2018年1月19日會議上通過有關
"泊車位政策"的議案

結合嶄新科技和向高空發展引入新穎泊車系統，使有限的空間可同時容納更多車輛。

鑒於政府未能回應駕駛者對增設泊車位供應的訴求，本會促請政府：

- (一) 充分使用政府多層停車場，包括採取彈性泊車收費，於日間的非繁忙時段提供折扣收費，以及將現行政府多層停車場部份樓層改為營業車位專用區；
- (二) 善用政府建築物空地，於非辦公時間開放為公眾停車場；
- (三) 提供更多短期租約停車場，並加入必須停泊指定百分比的大型或中型營業車作為條款；
- (四) 訂立替代停車場設施原則，規定當局在拆卸或收回停車場設施前，必須在受影響停車場附近設立足夠的臨時泊車措施；
- (五) 引入簡易及方便的智能泊車信息系統，為市民提供全港政府及商廈停車場泊位的實時資訊；
- (六) 善用公共空間發展另類停車場，例如天橋底或附近空地等發展停車場；
- (七) 就各類車位的泊車位供求情況作定期調查，並分區檢視，以便更有效地完善各區的泊車位供求情況；
- (八) 檢討《香港規劃標準與準則》內有關泊車位的供應標準，研究將新界區新建屋苑的車位比例放寬；及
- (九) 結合嶄新科技和向高空發展引入新穎泊車系統，使有限的空間可同時容納更多車輛。

動議人： 劉國勳議員
和議人： 柯創盛議員

Background

Government's Policy

29 May 2018

荃灣區議會第十六次（一／一八至一九）會議記錄

日期：二零一八年五月二十九日

時間：下午二時三十分

地點：荃灣民政事務處會議廳

- (10) 特首於去年就“智慧出行”及“智慧城市”推出藍圖，而有關交通方面的“智慧出行”屬重中之重。在這大前提下，該署認為利用科技可多管齊下解決泊車問題。目前，該署已選取荃灣永順街及德士古道交界一個泊車位置納入今年已展開的智慧泊車系統研究。該署會加快在三個月內盡量壓縮研究的成本。該署亦已敲定六個選址，嘗試為每個選址提供不同的智能泊車系統。荃灣永順街及德士古道交界為全港六個選址之一，由於該選址的面積不小，旁邊設有天橋，該署會在該處選用平面移動式系統，透過支架把車輛疊高，並採用智能系統及利用類似升降機的機件把車輛移入車位。該署已與機電工程署（下稱“機電署”）舉行數次會議，以討論有關細節；
- (11) 由於透過短期租約聘請私人承辦商擬備智慧泊車系統計劃需時，因此該署決定自行管理有關計劃及進行招標。該署會透過有關研究了解該智能泊車系統的實際操作、財政安排及相關條款，希望在今年稍後時間爭取內部人力資源，以便在兩至三年間動工興建有關系統；

2 Apr 2019

SHAM SHUI PO DISTRICT COUNCIL

4/F Cheung Sha Wan Government Offices,
303 Cheung Sha Wan Road, Kowloon
E-mail: sspdcadm@sspd.c.had.gov.hk
Fax: 2785 4218



深水埗區議會

九龍長沙灣道 303 號
長沙灣政府合署 4 字樓
電郵：sspdadm@sspd.c.had.gov.hk
傳真：2785 4218

2019 年 4 月 2 日
交通事務委員會
第 20 次會議議程

- 通過會議記錄
2019年2月19日第19次會議記錄
- 續議事項
 - 關注深水埗違例泊車問題(交通事務委員會文件 9/19)
 - 跟進區內大型車輛晚間停泊位不足問題(交通事務委員會文件 10/19)
 - 關注大坑東道與業蔭街交界交通安全(交通事務委員會文件 12/19)
 - 盡快啟用西九龍法院外新建巴士站(交通事務委員會文件 13/19)
 - 道路標示不清 出入海盈困難(修訂, 加入附件)(交通事務委員會文件 14/19)
- 討論事項
 - 在深水埗欽州街及通州街交界設立智能停車場及休憩用地(交通事務委員會文件 22/19)
 - 關注深水埗車位不足 促建智能停車場紓困(交通事務委員會文件 23/19)

Background

Government's Policy

3 Apr 2019



news.gov.hk
政府新聞網

2019年3月30日

相信不少曾於港外自駕遊的朋友都有使用智能泊車系統的經驗。當你將汽車停於停車場入口內，並按綠下按鈕，汽車便會自動駛入停車場。取車時，你亦不必親自進入停車場，車輛會自動駛出，車程只需大約數分鐘，大大提升泊車體驗。

如果你有機會深入停車場內部參觀，你會發現智能停車場與傳統停車場有重大分別。智能化電腦系統控制的機械式裝置移動汽車至空位，並將汽車停泊得更緊密，更能容納更多車輛。

香港的車輛數量在過去十年增長迅速，平均每年增長率為3%。由於泊車位的平均每位位址也是隨車主的需求。香港土地資源有限，我們須廣泛應用科技，善用智能空位，有效增加泊車位數量，以應付社會需求。

運輸署已於2016年對委託顧問為香港落實智能泊車系統進行先導研究，研究包括興建多個不同種類的智能停車場，並遵守相關的技術規程可行性評估。為推行以圖入手。首先，我們會探討在「政府、機構或社區設施，以及公共休憩用地」引入智能泊車系統。其次，我們會探討在短期內的用地要求私人發展商安裝，營運以及管理智能泊車系統。最後，我們將把短期內就實施進行相關的地區諮詢工作。

智能泊車系統可分為以下五種類型。因應其自身特性，設計要求及環境限制等，由地方安裝等因素，而決定採納那種設計。



港都未來新發展停車場 (圓輪式升降式) 外觀



圓輪式升降式內部



新加坡智能停車場 (圓輪式升降式) 外觀



垂直升降式內部



基建與物流

主頁 > 基建與物流 > 物色地點推廣智能泊車系統

物色地點推廣智能泊車系統

2019年4月3日

Like 0



下載影片 | 檢視旁白

7 Apr 2019



返回

2019年4月7日

攜手推廣智能泊車科技 探索善用地下空間方案

自政府在2017年年底公布《香港智慧城市藍圖》(《藍圖》)後，過去一年政府部門積極落實《藍圖》措施。最近，運輸署建議以深水埗一幅土地作試驗，發展地下智能停車場先導項目，利用機械裝置移動汽車至地下停車場內的空位，取代人手泊車，從而更有效利用地下空間，增加可建泊車位數目，同時釋放地面空間，規劃作休憩空間，為社區帶來更多福利裨益。

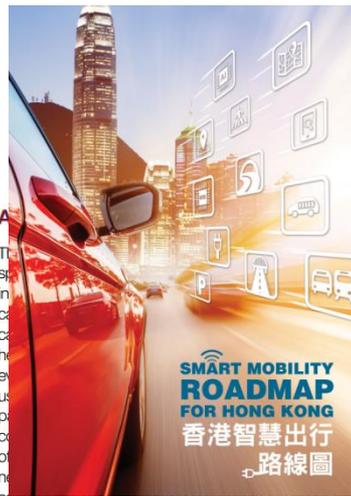


(網上圖片)

Background

Government's Policy

July 2019



SMART MOBILITY
ROADMAP
FOR HONG KONG
香港智慧出行
路線圖



自動泊車系統 (APS)

香港的土地短缺及泊車位不足的問題，促使我們考慮如何善用停車場的空間效率，即藉著增加泊車密度及減少淨空高度來騰出更多空間。由傳統停車場演化出**自動泊車系統**的概念由此而來。自動泊車系統使用機械設備自動泊車，因此省卻建造車道和坡道，也不需要提供乘客升降機。駕駛人士也不必在自動泊車場內駕駛和行走。為了推廣自動泊車系統，運輸署正研究於「政府、機構或社區用地」和「公眾休憩用地」引入自動泊車系統，以及要求短期租約停車場的營運商安裝、營運及管理自動泊車系統。運輸署現正視察於數個合適地點建造不同類型的自動泊車系統的技術及業務可行性，以期在2021年開始分批推行自動泊車系統。

以期在2021年開始分批推行自動泊車系統。

view to taking forward the implementation of APS projects in batches starting from 2021.

Jan 2020

運輸署擬2021年啟用智能停車場 2020年逐步換新咪錶



臺灣2021年初率先啟用拼圖型智慧泊車系統

社會新聞

原文 張偉傑 2020-01-01 00:00 最後更新日期 2020-01-01 12:44

政府近年推展智慧出行，希望以科技解決交通問題，運輸署今日（一）表示，包括新式咪錶、自動泊車系統、不停車繳費系統等。

運輸署指，將於臺灣海盛路以先導計劃形式，試用拼圖型智慧泊車系統，將汽車移至空位泊位，期望2021年初啟用。

另外，新式咪錶將提供更多繳費方法，包括安裝信用卡及二維碼。取代原有咪錶。至於原訂2020年第三季應用的不停車繳費系統，目前資料暫無，亦未透露開關試點。

運輸署高級工程師楊樂祺表示，政府期望2021年初，正式於臺灣海盛路啟用拼圖型智慧泊車系統。她指，停車場採用機械式裝置、自動裝置等，駕駛者將車輛駛進泊車系統後，就可離開汽車，然後裝置會自動將車輛停泊在空位泊位，預料過程需時2至3分鐘完成。

楊樂祺指，每組系統有三層，頂層5個泊位，其餘各4個，即合共13個泊位，暫料屆時一共設8組，連同傳統泊車位，整個停車場會有約270個車位。她又指，泊位主要供私家車使用。

深水埗擬採用圓筒型泊車系統

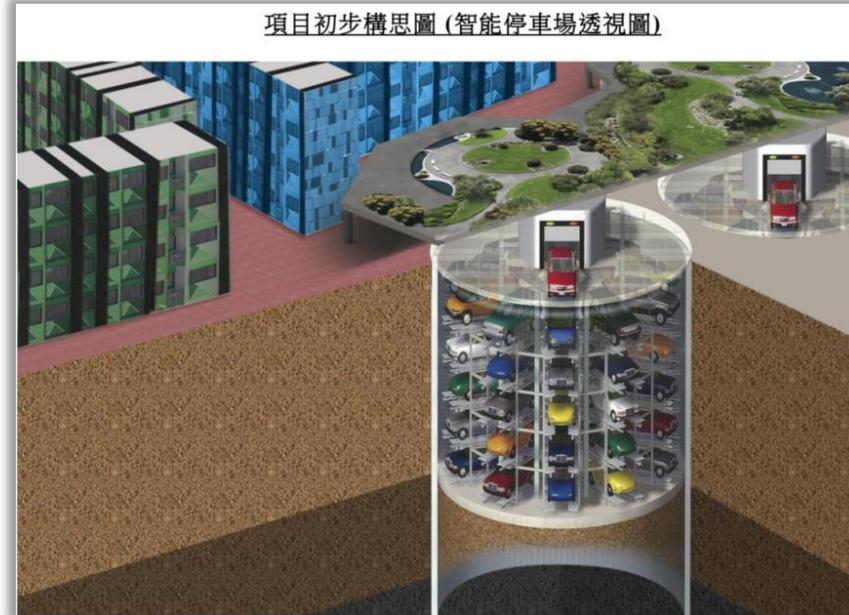
除了臺灣，楊樂祺指，深水埗欽州街亦會推智能停車場，並採用圓筒型泊車系統。她續指，停車場為圓筒型，預料建6層，每層10個泊位，當汽車駛進後，駕駛者就可下車，由裝置將汽車移至空位。她表示，預料屆時建三個圓筒，即提供180個泊車位，不過仍於初步設計階段，未有具體時間表。

政府期望2021年初，正式於臺灣海盛路啟用拼圖型智慧泊車系統。

Automated Parking System

Cope with the concern about the **supply** of and **demand** of parking space

- **Increase** the supply of carpark spaces in limited land resource
- Capable for **all types** of mechanical parking system
- Fit for multi-purpose public facility buildings under **“single site, multiple use”** model



Government's Pilot Project in 2018

EMSD HQ

- Puzzle Type
- Increased parking lot from 5 to 13.
- 3 layers x 5 rows
- **The only one APS** obtained EMSD's "Type Approval" and "Use Permit" as per Cap.618
- In operation

Our Job Reference | 我們的工程案例 (Quotation No.: 1557M18M)

適用於 短期租約泊車用地
SUITABLE FOR
SHORT TERM TENANCY PARKING SITE

CONTACT US FOR MORE
聯絡我們以了解更多
TEL: (852) 2619 8964

盈電工程有限公司 REC Engineering Company Limited

- 提供一站式方案 (設計、供應、安裝、調試、及維護泊車系統，及其相關地基和消防工程)
- 智能自動泊車系統可於**12個月內完工**
- 已為**3層**的拼圖式泊車系統取得《升降機及自動梯條例》之「種類許可」
- 已替機電工程署總部先導項目提供**3層**拼圖式智能泊車系統 (見上圖) 並已取得「准用證」
- Turn-key service provider (design, supply, installation, T&C, maintenance of APS, and its associated footing and fire services installation)
- APS can be completed **within 12 months**
- Already be granted the "Type Approval" as per "Lifts and Escalators Ordinance" for **3-layer puzzle type APS**
- Provided a **3-layer puzzle type APS** for Pilot Project in EMSD HQ (see above photo) and has be granted the "Use Permit"

REC's APS Solution

Build Asia
2020

盈電工程有限公司
REC Engineering Company Limited
(A wholly-owned subsidiary of Yau Lee Holdings Limited)

盈電工程有限公司
REC Engineering Company Limited
(A wholly-owned subsidiary of Yau Lee Holdings Limited)

XIZI
iParking
西子智能停车

REC Engineering is the strategic partner
of XIZI iParking for Hong Kong & Macau.



No.1 APS
manufacturer
in China

20 years
experience

100 patented
technologies

66,700m² production
base

500,000 total parking
spaces around
the world

Pilot Project in EMSD HQ

Automated Parking System

Case Sharing



Type	PSH (升降橫移)
Model	5 x 3
Car Park Space	13
Contract Commencement Date	2018 Q3
LE5 Permit Date	14 October 2019
Car Size / Weight	5200L x 2100W x 2000H, 2500kg
Power Requirement	3 Phase / 20A

Pilot Project in EMSD HQ

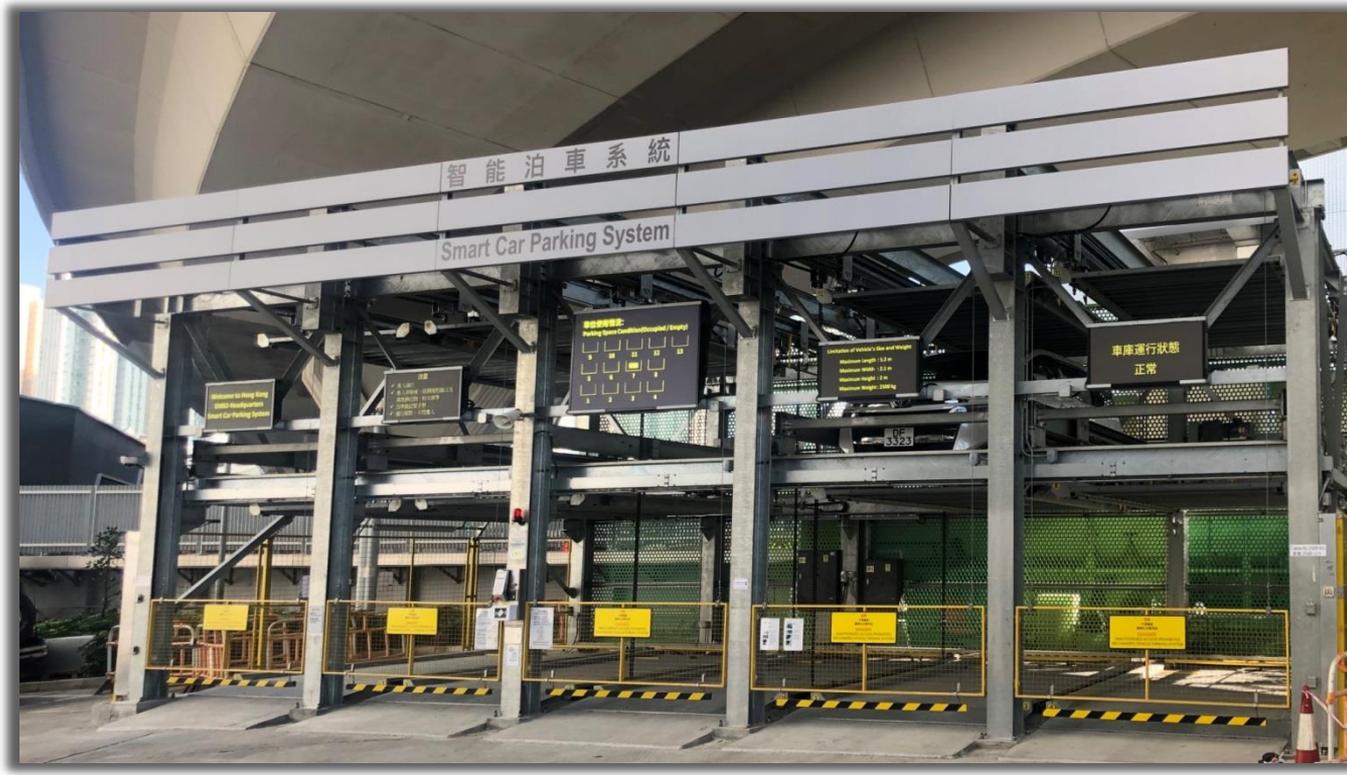
Supply and Installation of Automated Car Parking System at EMSD Headquarters



Original :
5 car park spaces

Pilot Project in EMSD HQ

Supply and Installation of Automated Car Parking System at EMSD Headquarters



Original :
5 car park spaces

Now :
13 car park spaces

Pilot Project in EMSD HQ

Supply and Installation of Automated Car Parking System at EMSD Headquarters

機電工程署 EMSD

香港特別行政區政府 機電工程署
香港九龍德輔道中2號
Director and Director General's Department
Secretary of the Hong Kong Special Administrative Region
230 King Street, Kowloon, Hong Kong
www.emsd.gov.hk

Telephone: 電話號碼 28083861
Facsimile: 傳真號碼 25045970

Dr reference: 來電編號
(6) in: 8M00004931

Tel reference: 來電編號
VEL061/19EMSD

18 February, 2019

VERTEX ENGINEERING LIMITED
FLAT B, 6/F, CHINA FEN HIN BUILDING,
5 CHEUNG YUE STREET,
CHEUNG SHA WAN, KOWLOON

Dear Sir/Madam,

Application for Approval-in-Principle of Xizi PSHLT-3-XI Car Parking System

I refer to your application for type approval of the following mechanized vehicle parking system brand and model :-

Xizi PSHLT-3-XI Car Parking System

After assessing the information submitted by you, I have no objection in principle to the installation of the Xizi PSHLT-3-XI Car Parking System and associated safety components provided that they are in compliance with TSG Q7013-2006 and minimal safety requirements of EN14010 and EN 60204-1, its application is in line with the specifications shown in Appendix I (attached), and its operation are demonstrated to be satisfactory.

You are reminded that the issue of Use Permit / Form LEB to a mechanized vehicle parking system installation fitted with the safety components may be refused if the reliability and performance of such mechanized vehicle parking system fitted with such devices is found not up to standard and detrimental to safety.

Yours faithfully,


(CHEUNG Kim Ching)
for Director of Electrical and Mechanical Services

機電工程署 EMSD

准用證(升降機)
Use Permit (Lift)

升降機及自動梯條例(第618章)
THE LIFTS AND ESCALATORS ORDINANCE (CHAPTER 618)

地點編號 0713437 - 018 升降機編號 CP1
Location ID Lift No.

地址 九龍 九龍灣 啓成街3號 機電工程署總部大樓訪客車場
Address VISITOR CAR PARK AT EMSD HQS, 3 KAI SHING STREET, KOWLOON BAY, KOWLOON

屆滿日期 14 / 10 / 2020
Date of Expiry 日Day 月Month 年Year

發出日期 11 / 11 / 2019
Date of Issue 日Day 月Month 年Year

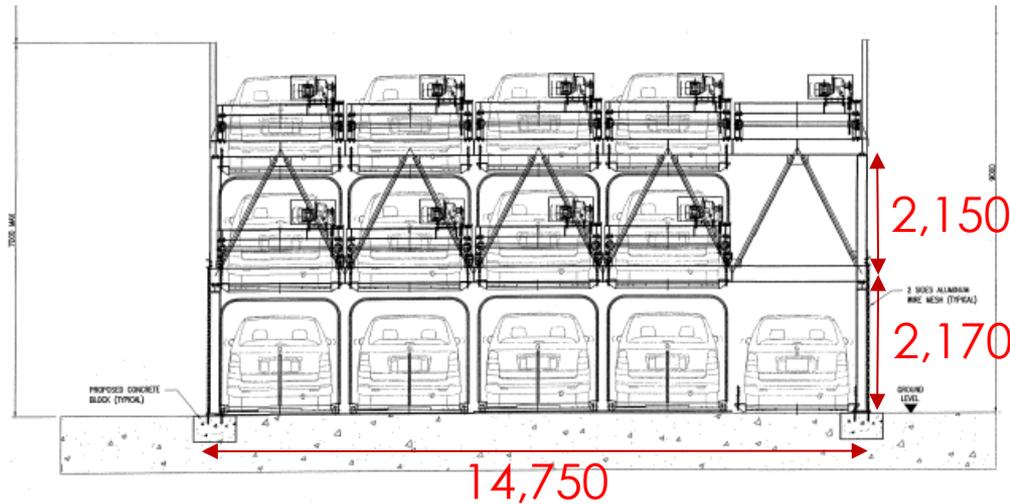
500073976

**Original :
5 car park spaces**

**Now :
13 car park spaces**

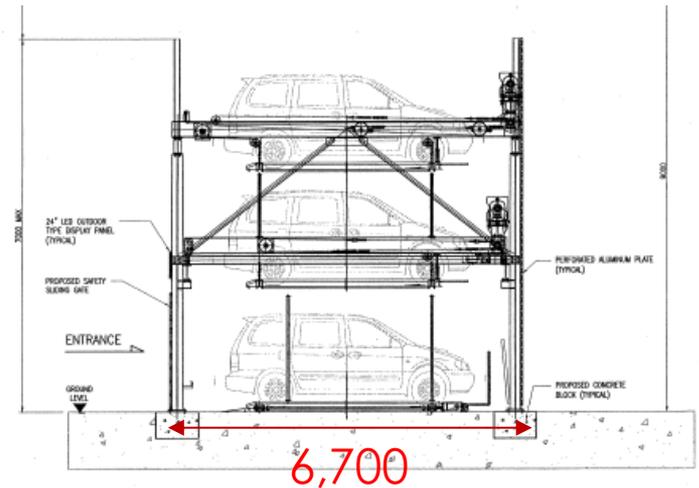
機電工程署 EMSD

Pilot Project in EMSD HQ



SECTION X-X

(PERFORATED ALUMINUM PLATE AND ALUMINUM WIRE MESH NOT SHOWN FOR CLARITY)



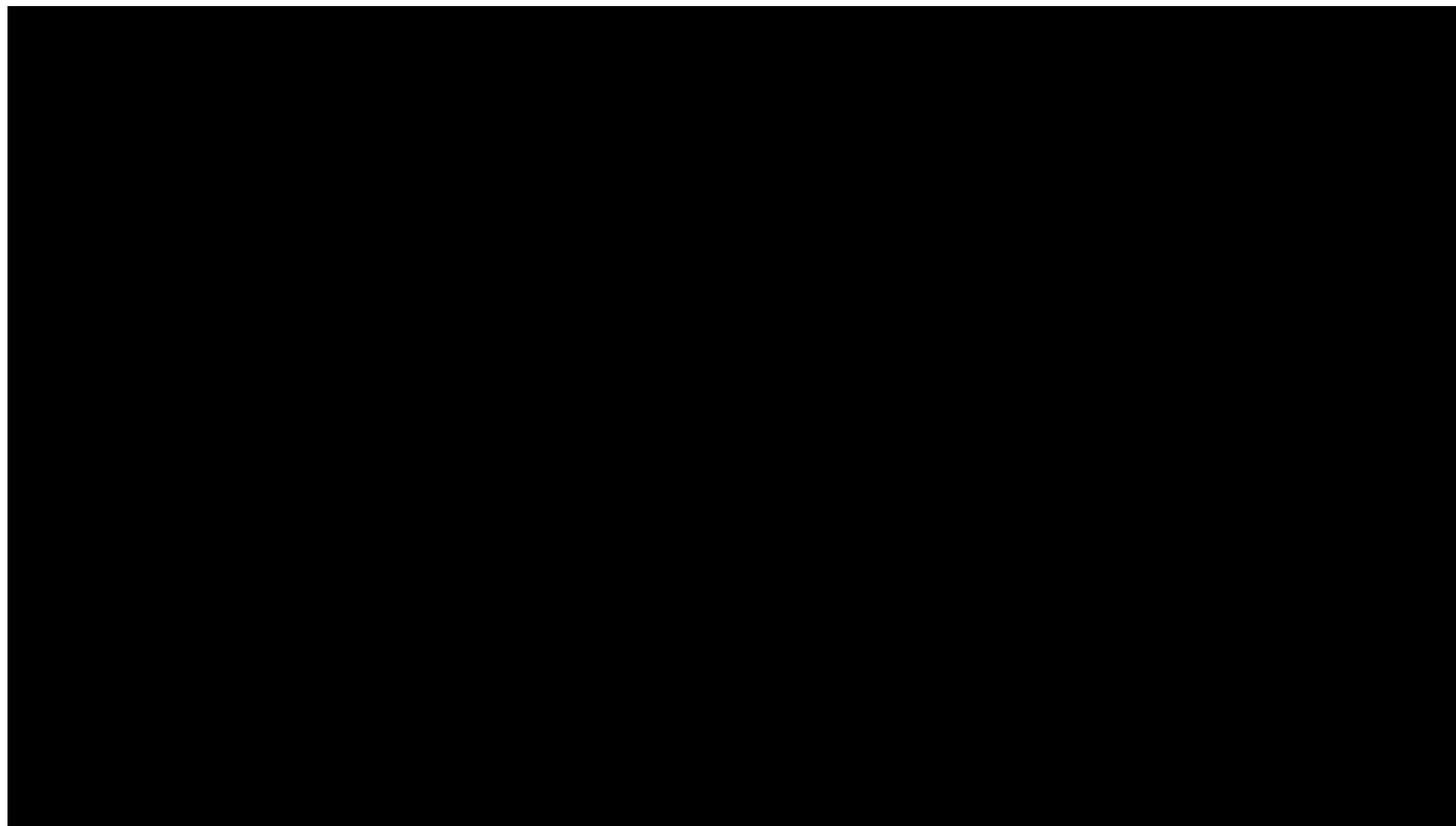
SECTION Y-Y

(PERFORATED ALUMINUM PLATE AND ALUMINUM WIRE MESH NOT SHOWN FOR CLARITY)

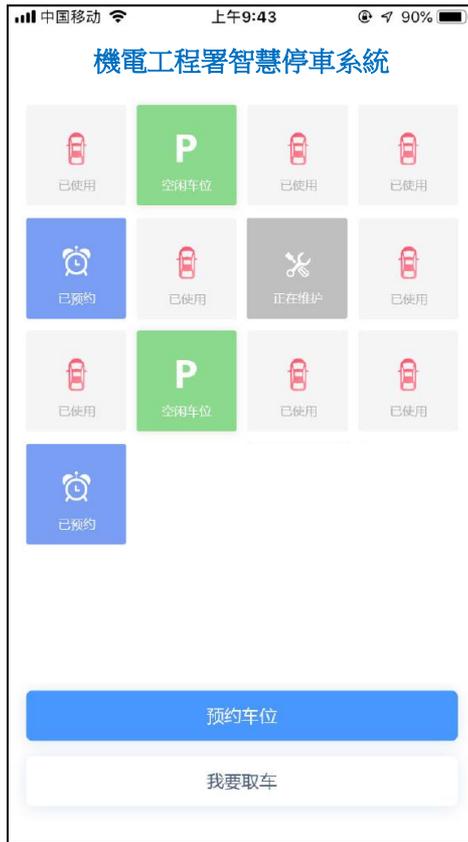
Overall dimensions : 6,700L x 14,750W x 5,625H mm

Car size : 5200L x 2100W x 2000H mm

Pilot Project in EMSD HQ (video demo)



Pilot Project in EMSD HQ



Job Reference

廣州珠江新城希爾頓歡朋酒店



佛山市環球國際廣場



浙江省湖州市紅門館前

5層PPY

提供137個停車位

平均存取車時間:

90秒



Job Reference

深圳南山第二外國語學校 (集團) 海德學校

共4座塔式, 提供104個停車位, 平均存取車時間: 90秒
車牌識別 不用拍卡



深圳市公安局南山分局

共8座塔式, 提供240個停車位
平均存取車時間: 90秒



離開前確認

- 車輛已熄火
- 車門已關閉
- 庫內無人員
- 倒車鏡已折回

Automated Car Parking System

Some standard types:

- PJS (簡易升降)
- PCX (垂直循環)
- PSX (水平循環)
- PSH (升降橫移)
- PCS (垂直升降)
- PPY (平面移動)
- PXD (巷道堆垛)
- AGV (自動導引車)



Automated Car Parking System



Simple raising platform

- Simple design
- Height of travel < 3.5m
- Only double layers
- Must driven away the vehicle at lower level before accessing the upper level (not intelligent!)

PJS (簡易升降)



Automated Car Parking System

PCX (垂直循環) 「摩天輪」



Operates like a Ferris wheel

- Small footprint
- Longer time to retrieve the vehicle when parked at farthest end
- Robust structural design is needed (to cater for unbalanced situation)
- Higher power consumption

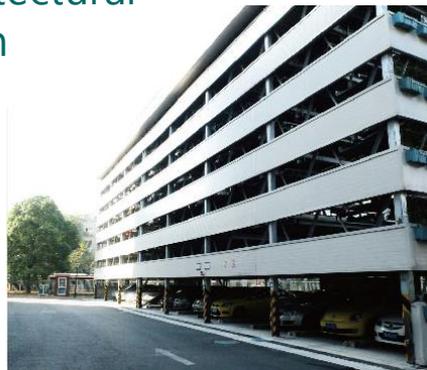


Automated Car Parking System

PSH (升降橫移)「拼圖式」

Vehicles will be maneuvered vertically and horizontally to fill up the system

- Simple design
- For 2 layers, height of travel <3.5m
- More desirable design to suit architectural layout, especially existing car parkin
- Can be built up to 8 layers
- Aesthetic enclosure can be added



PSH (升降橫移) 「砌圖式」



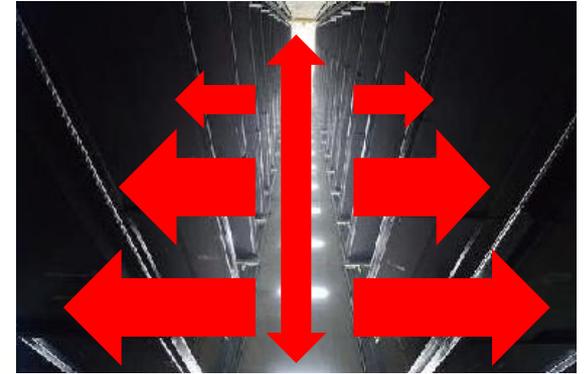
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Automated Car Parking System

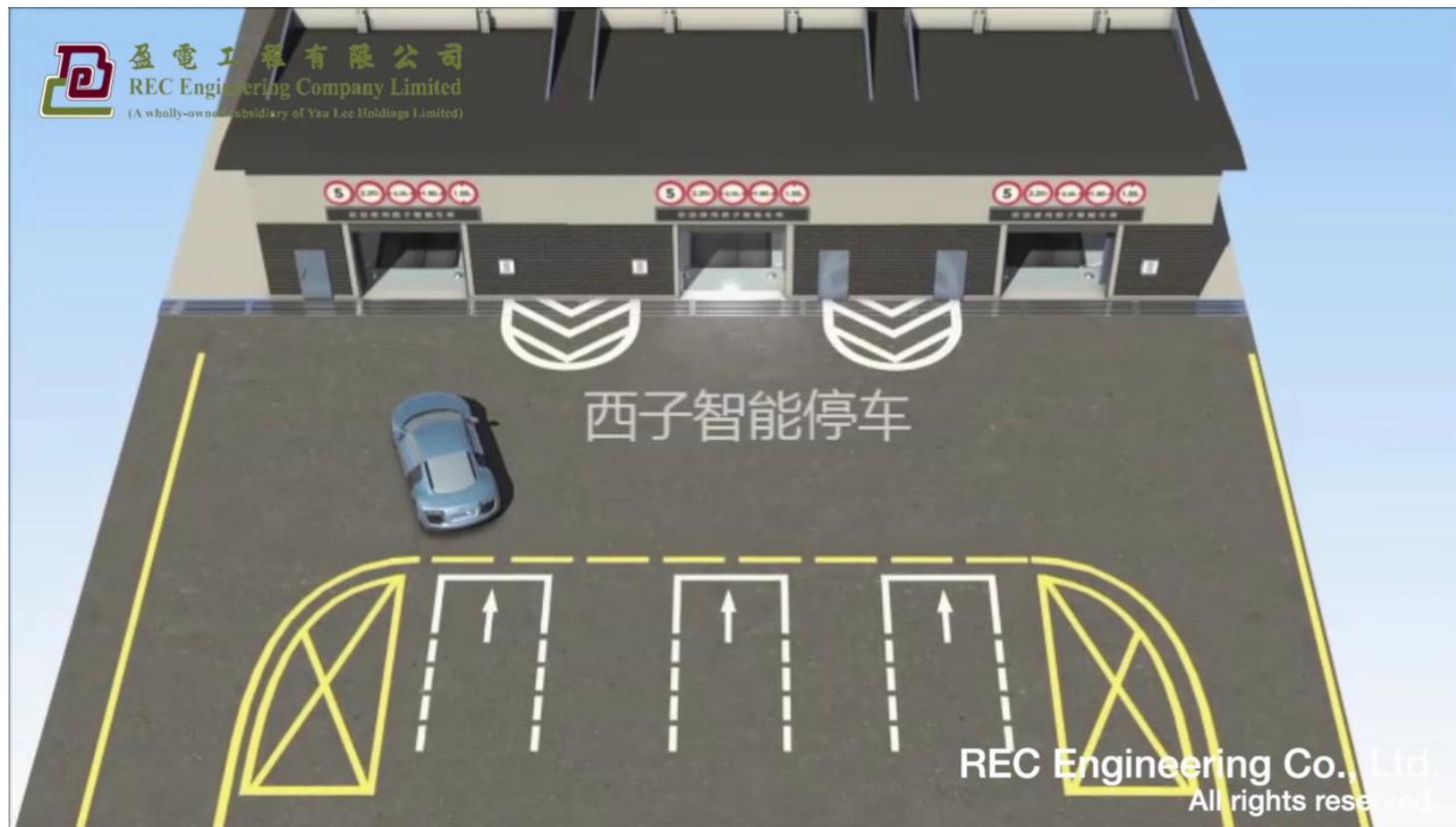
PCS (垂直升降)「圓塔 / 方塔」

The vehicles will be maneuvered via a vertical shaft in the centre and then parked horizontally at different levels

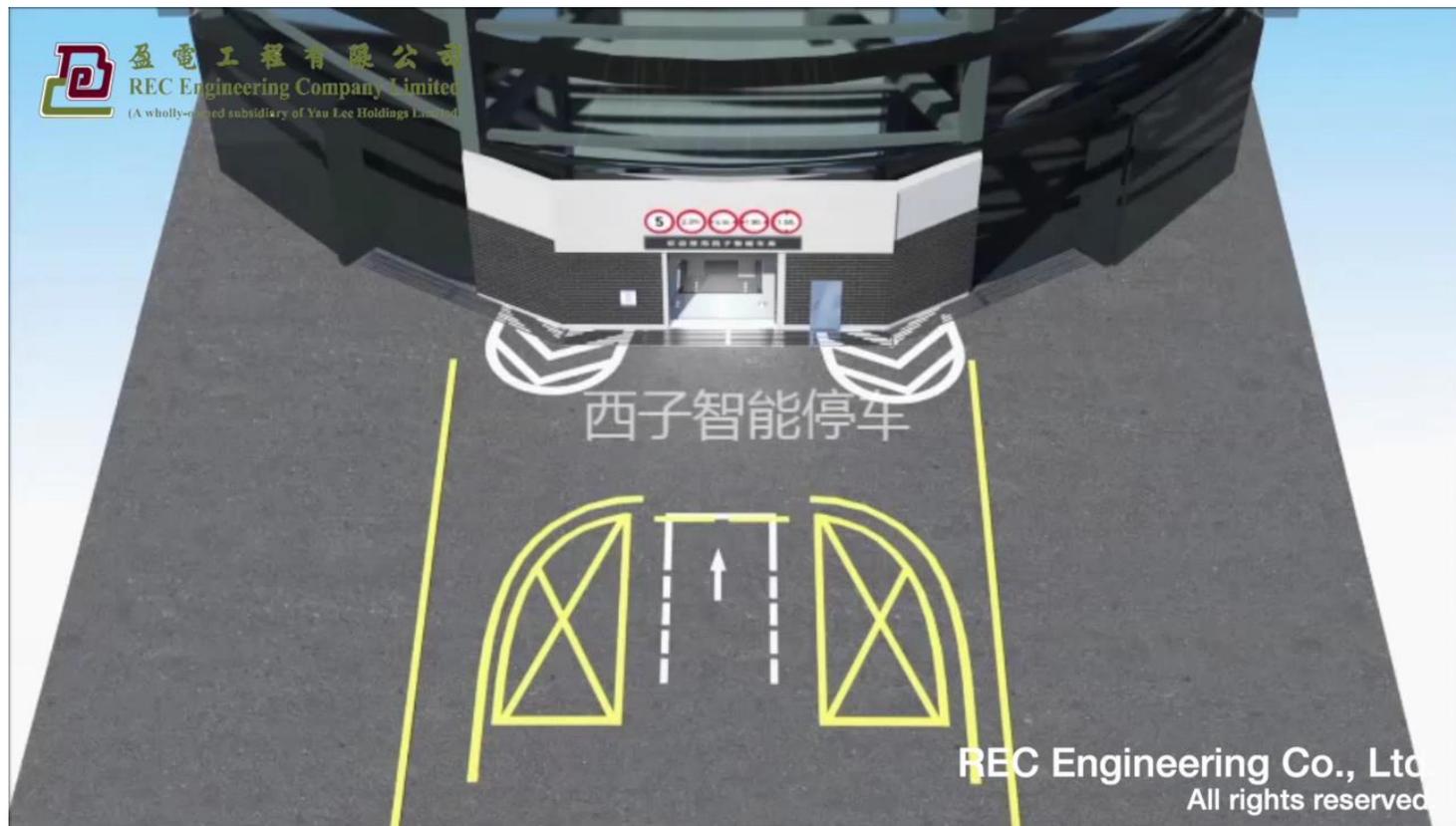
- Small footprint
- Very compact design to save space
- Can be built underground
- Longer time to retrieve the vehicle



PCS (垂直升降)「方塔」



PCS (垂直升降)「圓塔」

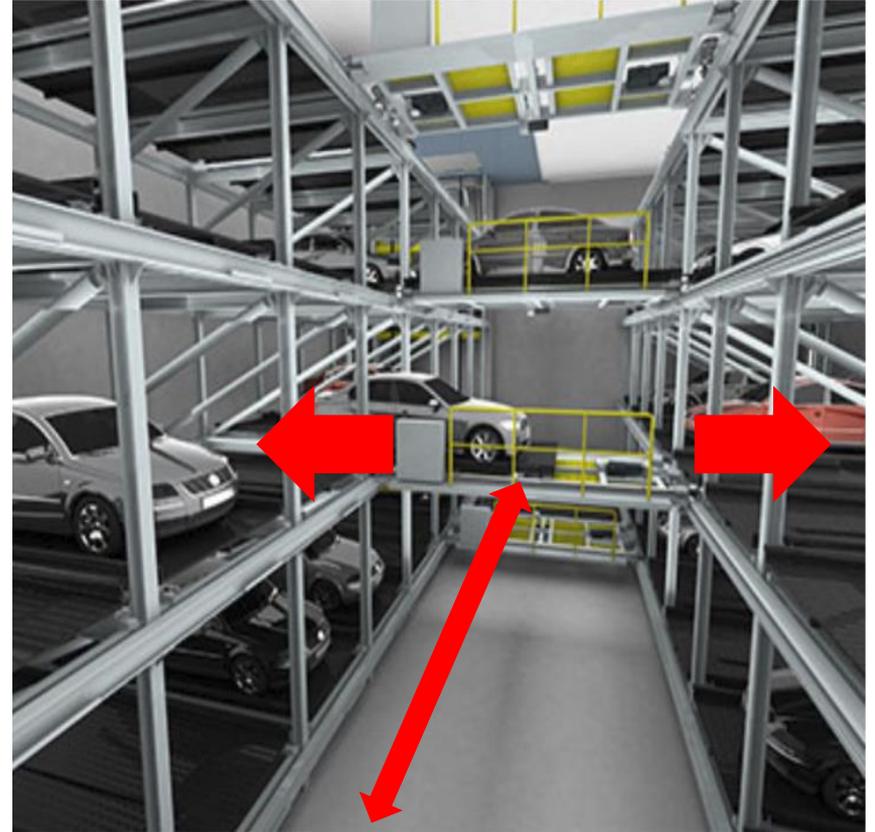


Automated Car Parking System

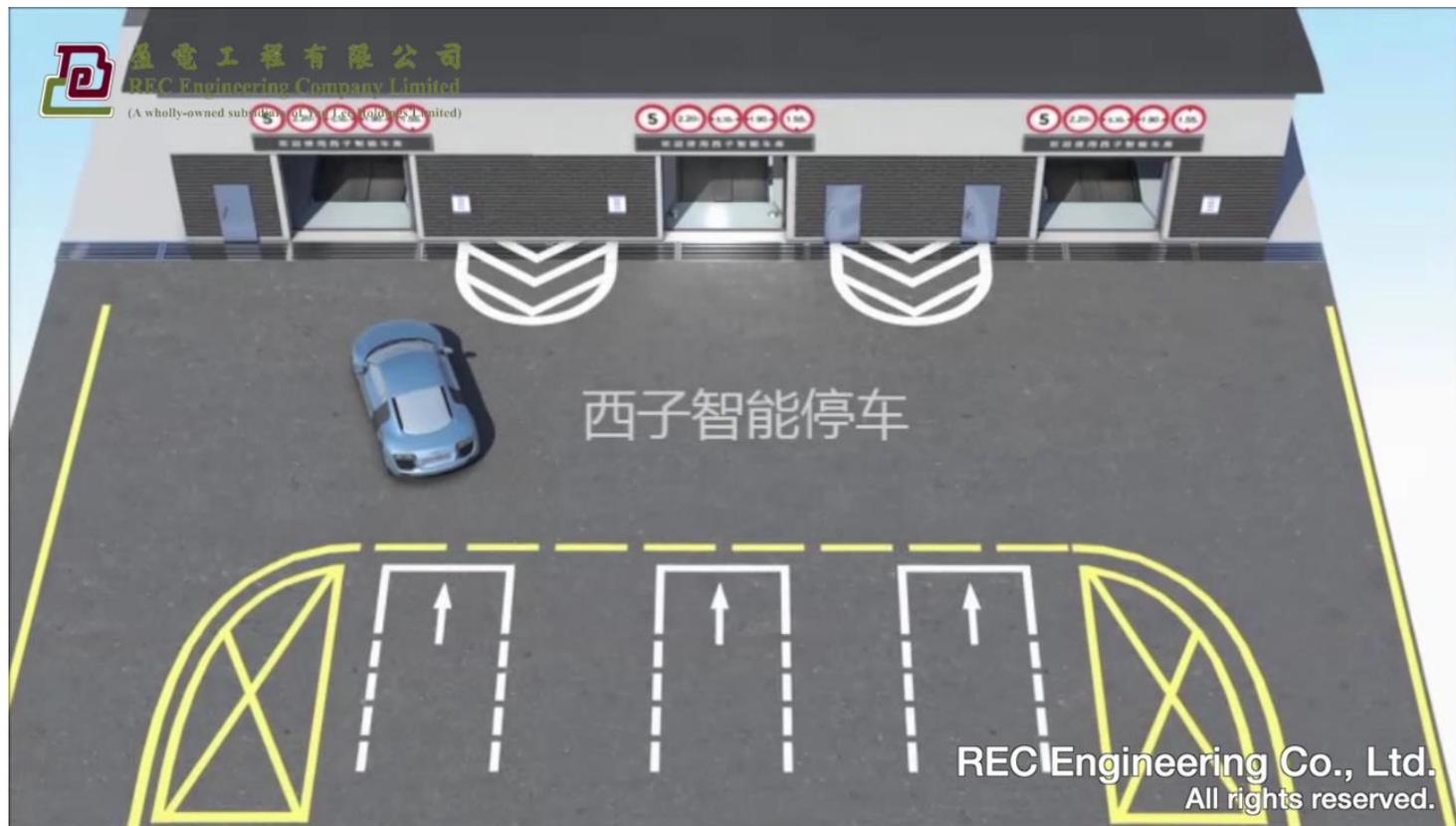
PPY (平面移動)「立體車庫」

The vehicles will be delivered to different levels by vertical lift shaft, then maneuvered horizontally and parked

- Very large capacity
- Very compact design to save space
- Can be built underground
- Support multi-entrances



PPY (平面移動)「立體車庫」

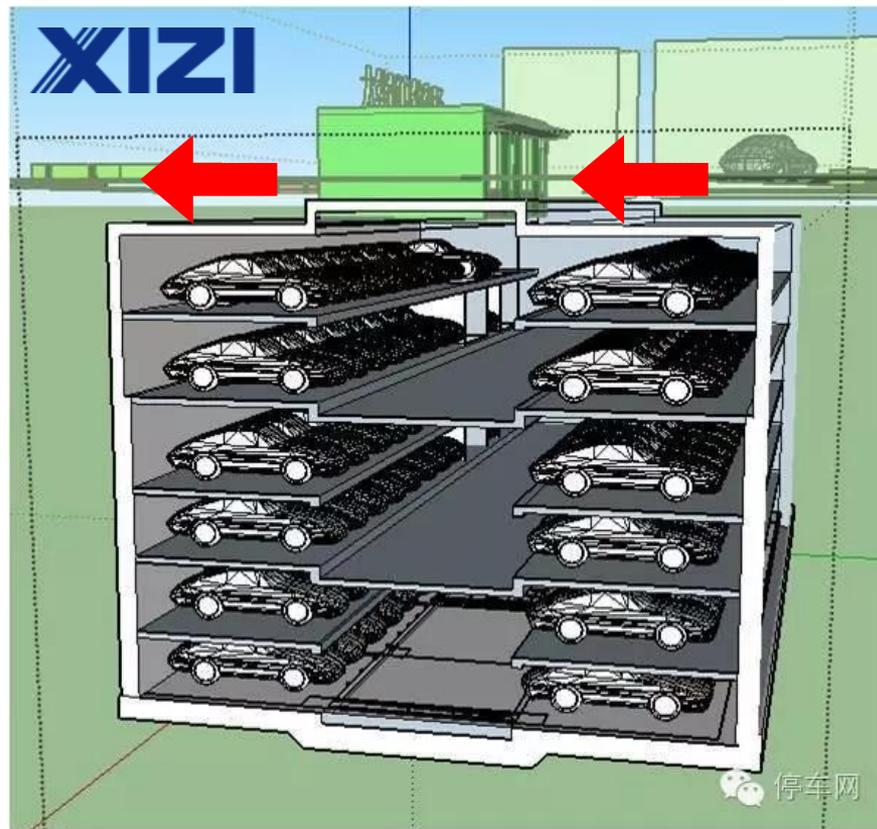


Automated Car Parking System

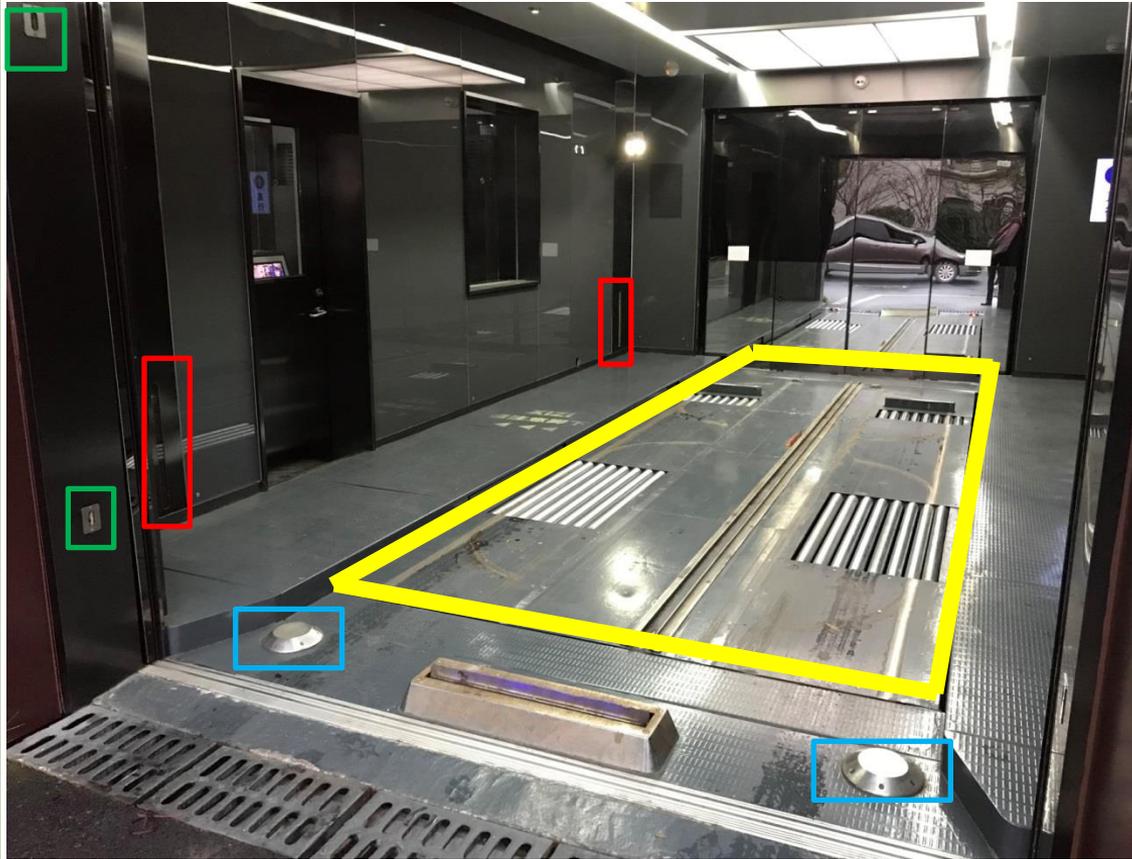
PPY (平面移動)「立體車庫」

西湖大華飯店 | 地下倉儲式立體車庫

Type	PPY (平面移動)
Car Park Space	132
Level	6
No. of Elevator	2



Automated Car Parking System



Frame in Green Red Blue:
Sensor to guide the car park in
the correct position

Frame in Yellow:
Car Pallet for moving up & down

西湖大華飯店地下倉儲式立體車庫

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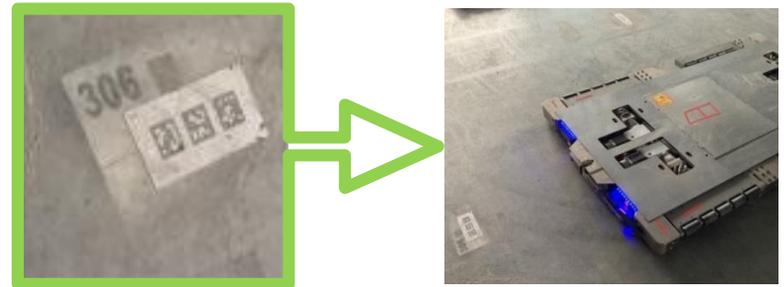
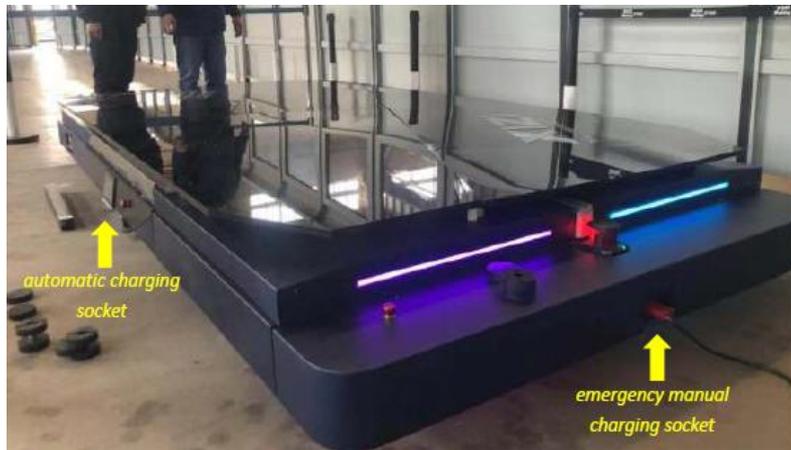
XIZI
iParking

Automated Car Parking System

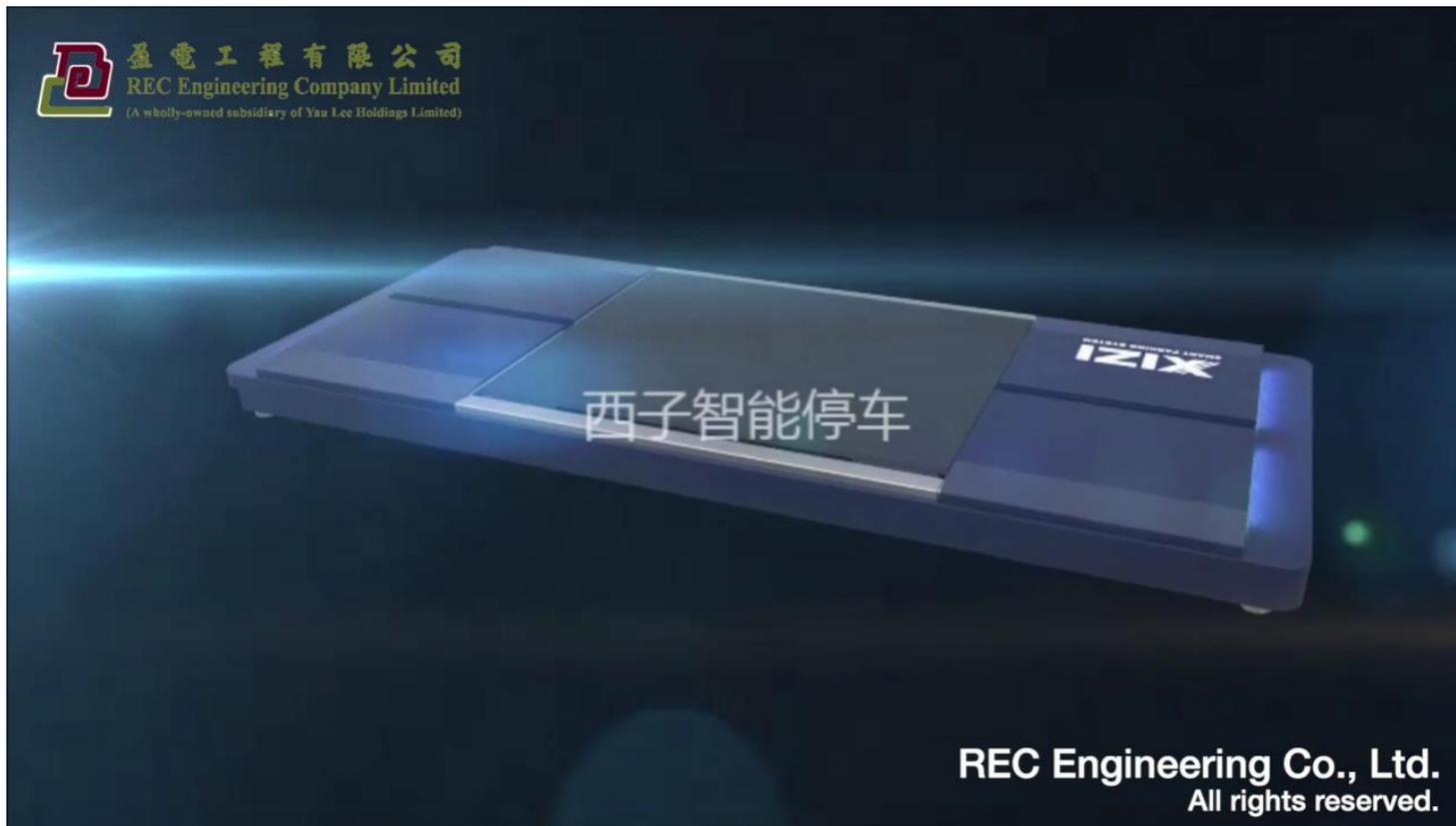
AGV (自動導引車)「電子飛氈」

Navigation:

- Laser Scanner x 4 nos.
(For position & obstacle detection)
- QR Code (For position confirmation)



AGV (自動導引車) 「電子飛氈」

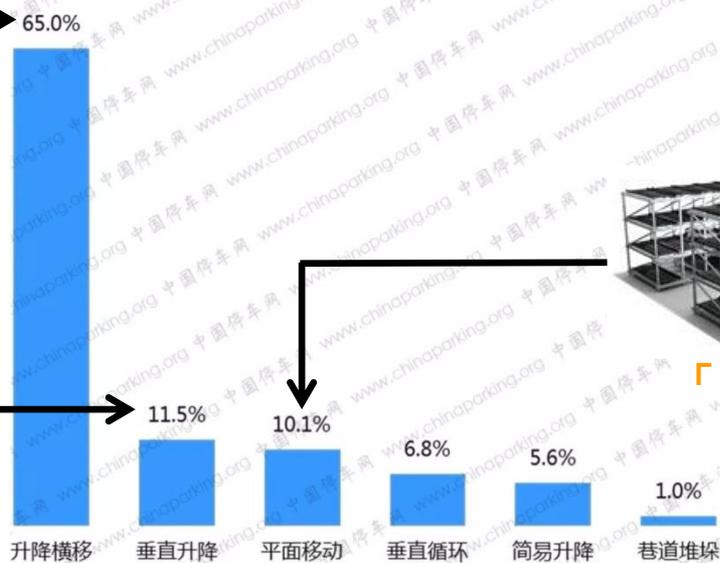


AGV (自動導引車) 「電子飛氈」



Automated Car Parking System

2018年机械式停车设备(含PPPEPC)公开招标项目
设备类型分布



数据来源: www.chinaparking.org 制图: MRCPO 中国停车网市场研究中心

Automated Car Parking System

Type	Pros	Cons	Typical Application	Average Retrieval Time
PJS 簡易升降	<ul style="list-style-type: none"> Simple, cheap 	<ul style="list-style-type: none"> Not "smart", need to move away lower car to retrieve upper car 	Standalone installation	
PCX 垂直循環 摩天輪	<ul style="list-style-type: none"> Small footprint 	<ul style="list-style-type: none"> Mechanically unstable when in operation Higher energy consumption Cannot support EV 	Small scale (<14 spaces)	3mins
PSH 拼圖	<ul style="list-style-type: none"> Simple Suitable for existing carparks Exempted from Cap.618 for under 3.5m (=2 levels) High retrieval efficiency Easy installation / maintenance Low headroom requirement 	<ul style="list-style-type: none"> Smaller parking area (harder to park the car esp. reverse parking) 	All scale, residential / commercial area with peak hour pattern	1min
PCS 圓塔 / 方塔	<ul style="list-style-type: none"> Simple Small footprint High spatial utilization efficiency 	<ul style="list-style-type: none"> For underground design, need to fulfil many statutory requirements 	Medium scale (50 spaces)	2mins
PPY 立體車庫	<ul style="list-style-type: none"> High efficiency and redundancy (especially for multi-entrances design) 	<ul style="list-style-type: none"> For underground design, need to fulfil many statutory requirements 	Large scale (100-500 spaces)	2mins
AGV 電子飛氈	<ul style="list-style-type: none"> Highly convenience 	<ul style="list-style-type: none"> Expensive (initial / maintenance cost) Need special requirements on finished floor surface (hardness, smoothness, inclination) 		2-4mins

Statutory Requirements



Electrical and Mechanical Services Department

- Under the Lifts and Escalators Ordinance (Cap. 618), type approval for three-layer puzzle stacking system is required prior to general applications.
- The design of the puzzle stacking system shall comply with BS EN 14010:2003+A1:2009, or equivalent international safety standard.

《升降機及自動梯條例》

1-3
第 618 章

第 1 部
第 2 條

《已廢除條例》(repealed Ordinance) 指在第 157 條實施前有效的《升降機及自動梯(安全)條例》(第 327 章)；

升降機 (lift) 指 ——

- (a) 備有運載裝置的升降機器或器具，而其運載裝置的移動方向，受一條或多於一條導軌所限制；或
- (b) 機械化泊車系統，但不包括自動梯；

機械化泊車系統 (mechanized vehicle parking system) 指具有動力操作機械裝置的機械設施，而該機械裝置是供運送車輛往該設施內的泊車位的；

(2) 本條例不適用於 ——

- (f) 升降行程高度不超過 3.5 米並符合以下說明的升降機 ——
 - (i) 不穿過任何樓面；及
 - (ii) 純粹用於升起汽車；

表格 LE1
香港特別行政區政府
升降機及自動梯條例(第 618 章)
升降機/自動梯的種類許可申請

機電工程署 

表格 LE1
香港特別行政區政府
升降機及自動梯條例(第 618 章)
升降機/自動梯的種類許可申請

請參閱「表格 LE1 備註」，並在適當方格內加上✓號。

致：機電工程署署長 (*署長*)

第 1 部	申請人資料	(此部分須由申請人填寫)
		只供本署填寫

Statutory Requirements



升降機及自動
梯安全

主頁 > 升降機及自動梯安全 > 刊物 > 指南 / 指引 > 雙層泊車系統

雙層泊車系統安全指引

適用範圍

本指引適用於專為提升車輛而無須穿過任何樓層及升降高度不超過3.5米的雙層泊車系統。

雙層泊車系統通常有兩個泊車位，一個在上，一個在下。降低上層泊車平台時，須先將下層泊車位的車輛移去。其他升降高度超過3.5米或須穿過任何樓層的機械泊車系統，均受升降機及自動梯條例(第618章)所管制。

建築結構規定

任何人如擬安裝雙層泊車系統，在開展工程前，須委任一名認可人士或註冊結構工程師進行有關工程。獲委任人須向建築事務監督提交建議書及有關的結構數據，證明該機械泊車系統的穩固性，以及安裝該系統的樓宇在結構上足以承受此系統的運作。

一般規定

1. 必須為操作人員/使用者提供安全及足夠的通道，以便通往平台控制器。
2. 必須提供充足的電力供應，以便操作雙層泊車系統。
3. 如在露天地方安裝雙層泊車系統，其設計包括電氣組件等的設備必須適合在戶外環境使用。
4. 不得使用雙層泊車系統運載人或運載有人的車輛。



Guideline for Implementing Mechanized Vehicle Parking Systems

Statutory Requirements



Fire Services Department

- Sprinkler system shall be provided to every vehicle parking deck (Parking space)
- Fire hydrant/hose reel system should be provided on each level to ensure that every part of the puzzle stacking system can be reached by a length of not more than 30m of hose reel tubing.
- Fire hydrant & Sprinkler system would be exempted, provided that:
 - Total Deck Area: Less than 230m²
 - Clearance: Distance from other system / structure not less than 4.5m
 - Structure Height: Less than 15m
 - Openness: At least one side of the System shall be fully open and facing the access road
- Access for firefighting and rescue operations (external access staircase or walkway with metal railing against falling hazard) of clear width not less than 800 mm should be provided to every vehicle parking deck (parking space).
- Emergency vehicle access should be provided to the system in accordance with the Buildings Department's Code of Practice for Fire Safety in Buildings 2011

Statutory Requirements

自動泊車系統消防系統要求

Viewing TD WKGO Rm1... 's application

Fire Service Installation Requirement for Automated Parking System

- 應為每個停車位安裝花灑系統
- Sprinkler system shall be provided to every vehicle parking deck (parking space)
- 應於每層提供消防栓/喉轆系統，而滅火喉和喉轆膠喉的長度不超過30米
- Fire hydrant/hose reel system should be provided on each level to ensure that every part of the puzzle stacking system can be reached by a length of not more than 30m of hose reel tubing.



花灑系統
Sprinkler system



消防栓
Fire hydrant

喉轆系統
Hose reel system

自動泊車系統消防系統要求

Viewing TD WKGO Rm1... 's application

Fire Service Installation Requirement for Automated Parking System

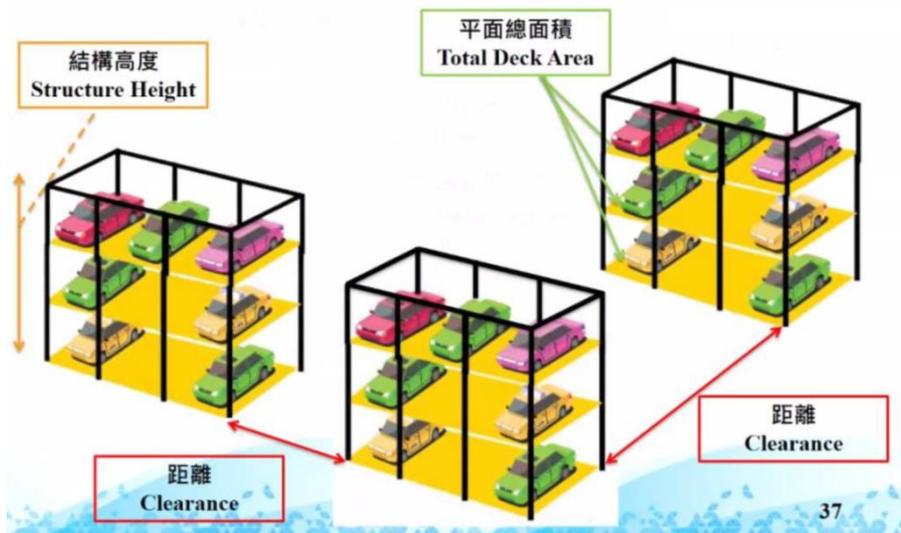
- 如符合以下要求，可豁免安裝消防栓及花灑系統 –
- Fire hydrant and Sprinkler system would be exempted, provided that –

- 1) 平面總面積
Total Deck Area - 少於230平方米
- Less than 230m²
- 2) 距離
Clearance - 與其他系統/結構的距離不少於4.5米
- Distance from other system / structure not less than 4.5m
- 3) 結構高度
Structure Height - 少於15米
- Less than 15m
- 4) 開放度
Openness - 至少系統的一面應完全開放及面向通道
- At least one side of the System shall be fully open and facing the access road

Statutory Requirements

自動泊車系統消防系統要求

Fire Service Installation Requirement for Automated Parking System



自動泊車系統消防系統要求

Fire Service Installation Requirement for Automated Parking System

- Viewing TD WKGO Rm1... 's application
- 應為每個停車位提供淨寬度不少於800mm的消防和救援通道(室外通道樓梯或有金屬欄杆的通道)
 - Access for firefighting and rescue operations (external access staircase or walkway with metal railing against falling hazard) of clear width not less than 800 mm should be provided to every vehicle parking deck (parking space).
 - 應按照屋宇署“2011年建築物消防安全守則”為拼圖型泊車系統提供緊急車輛通道
 - Emergency vehicle access should be provided to the puzzle stacking system in accordance with the Buildings Department's Code of Practice for Fire Safety in Buildings 2011

Statutory Requirements



Building Department

- Any building or structure (e.g. the shallow or pile foundation of the puzzle stacking system) to be erected on the Premises shall comply with the Buildings Ordinance (Cap. 123) and its subsidiary regulations.
- Accountable GFA
 - Calculation of Gross Floor Area and Non-accountable Gross Floor Area Building (B(P)R23(3)(a)&(b), PNAP APP-2)
 - Carparking and Loading / Unloading Areas (and associated ramps and facilities) (B(P)R23(3)(b), PNAP APP-2)
 - Horizontal Area of Staircases, Lift Shafts and Vertical Ducts Passing through GFA Non-accountable Floor (PNAP APP-2)
 - Larger Lift Shaft Areas (PNAP APP-89)
- Code of Practice(?)
 - CoP for Building Works for Lifts and Escalators
 - CoP for the Structural Use of Steel
 - CoP for the Provision of Means of Access for Firefighting and Rescue Purposes

Statutory Requirements



Planning Department

- **Hong Kong Planning Standard & Guidelines (HKPSG)** – Chapter 8 Internal Transport Facilities
 - Provision of No. of Parking Space in Parking Standards
 - Standard Parking Space: 5m x 2.5m (x 2.4m headroom)



Lands Department

- **Lease Conditions**
 - Practice Note – Car Parking Requirement, Mechanical Parking System
- **Accountable GFA**
- **Carpark Layout Plan Approval**
 - Sales of Parking Space



Architectural Services Department

- **Code of Practice**
 - General Specification for Lift, Escalator and Passenger Conveyor Installation in Government Buildings of HKSAR

Design Considerations

General

- Car size and load
 - SWL 2500kg x 150% = 3750kg?
 - SUV? EV?
- Traffic concern
 - Car circulation / car gate arrangement?
 - Car park management system / payment system / booking system

EMSD

- Cap618 “Lifts and Escalators Ordinance”
 - Lifting platform mechanism? Restricted transfer area?
 - EV charger power connector

FSD

- Means of access
 - 800mm width at car front side
- Sprinkler / hose reel
- Smoke extraction system
- Fire compartment? Metal structure? Concrete structure?

Engineering Innovations in Smart and Green Cities

綠色及智慧城市的創新工程



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Automatic Parking System in Hong Kong

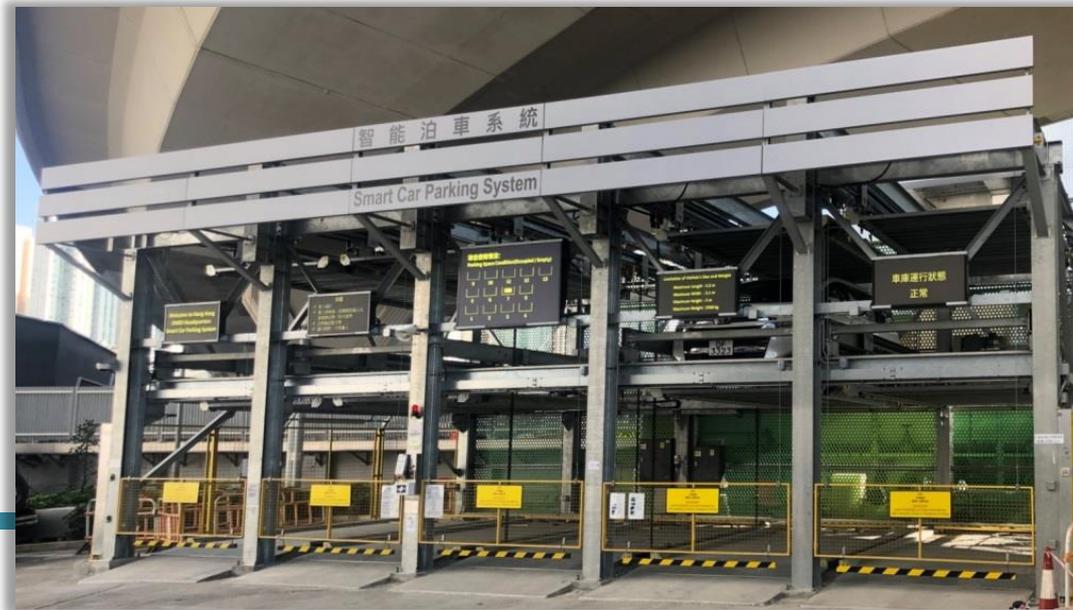
Ir Antonio CHAN

Deputy Managing Director
REC Engineering Company Limited

Director (2013-2019)
Hong Kong Green Building
Council

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