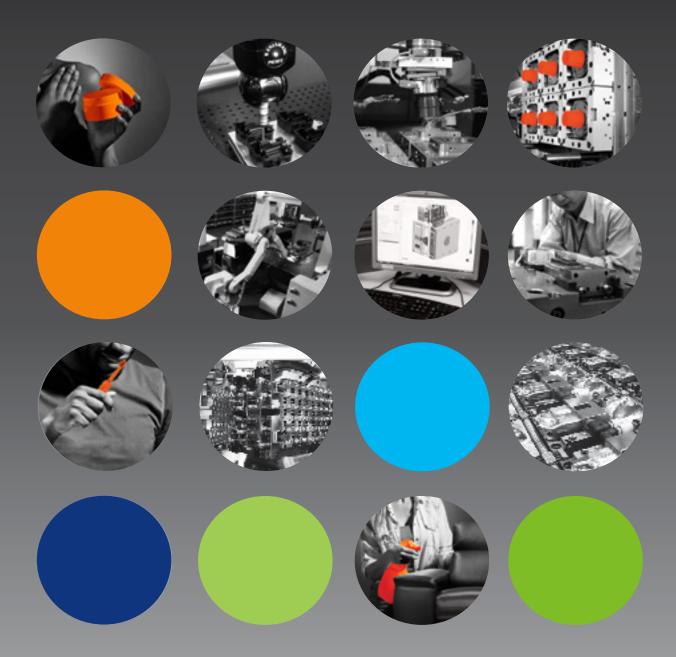




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## 香港模具協會簡介 INTRODUCTION TO HONG KONG MOULD AND DIE COUNCIL

香港模具協會於1989年成立,並隸屬於香港工業總會轄下的第14分組。從成立至今,香港模具協會已經服務本港模具業界逾28年,期間一直致力促進本港模具業界的交流,並向政府反映行業的需要。時至今日,香港模具協會已經發展成為本港模具業界當中,最具代表性的工商業組織之一。

香港模具協會的宗旨如下:

- 促進本港模具業利益
- 提高模具業技術水平,加強在海外的競爭能力
- 組織與模具業利益相關的重要活動
- 向協會會員發佈有關資料
- 向有關政府部門反映模具業的意見

香港模具協會現時有超過100名會員,並由2017-19年度的主席楊悰傑博士及副主席蔡俊杰先生的率領之下,籌組了由29位執行委員所組成的執行委員會;而執行委員會則按所需,再細分為5個小組委員會,來分別進行不同的活動,包括了:內地及海外事務委員會、傳訊及社交媒體委員會、會員關係委員會、跨行業網絡委員會及教育及技術發展委員會。

為了進一步促進會務及會員之間的溝通,香港模具協會已重新整合其官方網站,並會定期透過該網站與會員分享最新的行業資訊。如欲了解更多關於香港模具協會或模具業界的資訊,歡迎瀏覽www.hkmdc.org.hk。

## 香港模具協會 Hong Kong Mould & Die Council

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網頁 Website: www.hkmdc.org.hk



Hong Kong Mould and Die Council, established in 1989 as Group 14 under the auspices of the Federation of Hong Kong Industries, aims at serving the industry's needs for more than 28 years. It facilitates the interaction between members within the industry, and also acts as a channel to voice up industry's need to the Government. Nowadays, the Council has become one of the major associations to represent the common interests of the mould and die industry in Hong Kong.

The objectives of Hong Kong Mould and Die Council are listed as follows:

- To promote the interests of the Hong Kong mould and die industry
- To upgrade the technological level of the mould and die industry and to strengthen its competitiveness overseas
- To organize activities of interest and importance to the mould and die industry
- To disseminate relevant information to fellow members
- To represent the best interests of the mould and die industry and to advise the Government on matters related to the industry

Currently the Council has more than 100 company members led by Dr Jack Yeung, the Chairman, and Mr Felix Choi, the Vice-chairman, for the year 2017-19. An executive council with 29 executive members is established to organize various events and activities, and it is further split into 5 sub-committees based on the nature of events and activities, namely, Mainland & Overseas Affairs Committee, Public Communication & Social Media Committee, Membership Relations Committee, Cross Network Committee and Education & Technological Development Committee.

To further facilitate the Council's execution and the communication among members, the Council has enhanced the contents of its official website, in order to provide members a full grasp of industry updates. For more information about the Council and the news updates of the mould and die industry, please visit: www.hkmdc.org.hk.



## 主席的話

模具是工業領域最重要的基石之一,是一個靠著技術和品質存在的行業,即使是高度工業化的已開發國家,同樣離不開模具發展。模具製造經過多年來的發展,香港及內地的模具生產水平已接近或達到國際先進水平,經營不善或競爭力弱的企業已淘汰出局,生存下來的企業都有一定的技術、客源等優勢。

中國2016年的模具出口總值較2015年錄得5.08%的跌幅,但自2016年下半年起,內地及香港的出口總值均有回穩的趨勢。據中國海關總署統計,中國2017年上半年模具出口為207,094.52萬美元,當中包括塑膠及金屬用的注塑及壓鑄模具及配件,總值較2016年同期上升11.13%。雖然未及2015年水平但數字顯示出口情況已有改善。同時,模具強內,與內方面,自2015年起呈現緩慢下跌趨勢,反映內模具生產技術水平和質量正逐漸提高,從而減少進地模具生產技術水平和質量正逐漸提高,從而減少進地模具行業市場供需前景預測深度研究報告》顯示,模具行業經過長遠的發展,目前處於上升時期,未來五年產值有望突破4.000億。

近兩年來,模具行業的技術創新走在前列,主要表現為:3D打印在模具製造中的廣泛應用、模具的智能 化與大型塑膠模具的優化、大型級進沖模技術的成熟 及具標準件精細化等。

未來兩年,我將繼續帶領會員邁步向前,提升業界的 生產技術水平及效能,以及透過跨行業合作發掘新的 商機。

現階段的挑戰,是模具原材料價格和工資不斷上漲的同時,模具價格卻在回落,增大了模具企業的壓力。因此,模具行業要繼續向高端市場發展,制造高精度、高質量、高增值的產品,如汽車、智能家市場以及電子消費行業發展。此外,還要加大力度投入新型模具的研發及工藝,掌握新型模具設計與製造技術、智能管理及自動化控制系統,才能在日益激烈的競爭中打開市場,佔據一席之地。

模具製造是現代製造技術的重要組成部分,也是工業 生產和日用生活品的重要工藝裝備,因為製模技術 愈先進,愈能帶動其他行業。而且模具涉及金屬、 機械、化工、塑膠、汽車及電子等精密製品等及 基礎工業,無論在市場或技術層面上都是環環相扣工 互相帶動的。因此,香港模具應該與其他基礎與 聯合起來,共享資源,加強科技資訊、技術及經驗的 交流,實現技術與能力的雙重提升與飛躍,與時 強。例如,物聯網科技、智能管理系統、自動化物 配備等,均可應用在模具製造業上。因此,我們深信 透過相互激盪與啟發,可以令整個基礎工業加快「走 因出去」的步伐,在國際市場中脱穎而出。

未來一年,協會除了一如以往拜訪會員內地廠房, 瞭解他們的營運狀況及真正需要,以及舉辦大大小小 的跨行業交流活動,讓會員可以與其他行業的會員 交流技術、營商環境及未來行業趨勢的看法。

最後,承蒙各位會員的支持及厚愛,讓我可與副主席 蔡俊杰先生,於2017-19年度繼續為模協會員及業界 服務。過去兩年的活動得以成功推行,全賴一眾執 委攜手參與及支持,我深信只要我們團結一致,抱着 一份堅毅不屈、積極向上和勇敢面對挑戰的精神, 必然能夠在危機之中找到發展的機遇,願與所有香港 模具業界同仁共勉之!

邁向2018年,我謹代表香港模具協會,祝願業界能夠並肩努力,抓緊機遇,邁步向前,揭開新的一頁。



楊悰傑博士 香港模具協會主席 2017-19

### Chairman's Statement

The mould and die sector is one of the cornerstones of industry, and good technology and good quality are crucial to it. Even highly industrialised developed countries rely on the mould and die sector for development. After many years of production, the standards of mould and die products in Hong Kong and on the Mainland are now approaching or have reached advanced international levels, and badly run or uncompetitive companies have failed and disappeared, leaving only companies which have a clear advantage in technology or customer base.

In 2016 the aggregate value of mould and die exports from China was 5.08% less than in 2015, but since the second half of 2016 exports from the Mainland and Hong Kong have stabilised. According to statistics from China Customs, mould and die exports from China in the first half of 2017 were worth USD \$2,070,945,200, including injection moulds and stamping die moulds (along with parts) for use with plastics and metals. This was 11.13% above the same period in 2016. Although we have not yet returned to 2015 levels, the statistics show that the export situation has improved. As for imports of moulds and dies, there has been a slow decline since 2015, reflecting the gradual improvement in technology and quality in Mainland production, with less reliance on imports in consequence. The Chinabgao. com publication "The Mould and Die Industry in China 2016-2021: an Analytical Report on the Prospects for Market Supply and Demand" indicates that after a long period of development the mould and die industry is in a take-off period, and there is a good chance that the 400 billion barrier will be breached in the next 5 years.

In the last two years the mould and die industry has been in the front ranks for technological innovation. The main expressions of this include the wide-spread use of 3D printing in the manufacture of moulds, the introduction of smart features in moulds and the optimisation of large-scale plastic moulds, the maturing of large scale injection mould technology, and the refinement of standard components.

In the coming two years I shall continue to lead the members on our forward journey, improving the standard and efficiency of production technology and seeking new business opportunities through cross-industry co-operation.

One of the challenges we face at present is that, while raw material prices and the wage bill rise relentlessly, the prices of moulds and dies are falling, putting the industry under increased pressure. For this reason, our industry must continue to aim for high-end markets, creating high-precision and high-quality products with high added value. We should aim for the automobile, smart living and health-care markets, for example, and for the electronic consumer goods sector. At the same time, we must redouble our efforts to invest in new-style mould R&D and technology, and master the technology of new-style mould design and manufacture, along with smart management and automated control systems. This is the only way of opening up new markets and securing our position in the face of ever fiercer competition.

Mould and die manufacture is an important component of modern manufacturing, and also an important technological tool for industrial production and everyday goods, since advanced mould and die manufacturing technology provides a stimulus to other sectors. Moulds and dies also impinge on precision products and foundation industries in fields which include metals, machinery, chemicals, plastics, automobiles and electronics, where in terms of both the market and technology they are closely integrated components, so that progress on one side drives the other side forward. For this reason the mould and die companies in Hong Kong must get together with other foundation industries, to share resources, improve the exchange of technical information, technology and experience, and bring about joint advances in technology and capability, moving forward in step. For example, IOT technology, management technology and logistic technology can all be applied to mould and die manufacture. We are confident that by stimulating and inspiring each other, we can get the whole of foundation industry to "Go Global" at a faster pace and achieve prominence in the international market.

In the coming year the Council will continue its past practice of factory visit on the Mainland, to learn about their operating situation and real needs. We will also run cross-industry communication activities large and small, giving members the opportunity to exchange ideas about technology, the business environment and future industry trends with other sectors.

Last but not least, I would like to extend my heartfelt gratitude to fellow members for their unfailing support. It is an honour for me to serve the Council with Vice Chairman M. Felix Choi and the new Executive Committee in the 2017-19 term. During this term, the Hong Kong Mould & Die Council will ride the new wave to open up more opportunities for members. Although we may come up against new challenges, we believe we can definitely overcome them with our wealth of experience and that we can grasp opportunities with the unwavering support of the stalwarts in the industry.

Moving forward to 2018, on behalf of the Council, I wish all the friends and supporters in the industry will step forward to grasp every splendid opportunity and start a new chapter together.



Dr Jack Yeung HKMDC Chairman 2017-19



## 副主席的話

#### 「跨越界眼・創新領域・開拓商機」

衷心感謝各執委及會員對我的信任,我十分榮幸能夠連任模協副主席一職。我定當與主席楊博士鼎力合作,竭盡所能,為會員服務,也為提升香港模具業的競爭力及持續發展力而貢獻。

模協從成立至今已經有逾28年歷史,多年來雲集業界精英,現已發展為香港模具業中具代表性的工商業組織。協會自2015年度起,以「跨越界限・創新領域・開拓商機」為發展方向,致力協助會員拓展嶄新的產品市場、發展先進技術科技,並透過跨行業活動加強會員與不同行業及初創企業的商務聯繫。

回顧過去兩年,模協成功舉辦了近20項精彩的活動,當中包括定期舉行的跨行業廠房參觀活動、籃球錦標賽、Chinaplas國際橡塑展、上海及寧波暨DMC展覽會考察團及模協的年度盛事「香港模具協會及香港塑膠業協會周年聯合晚宴」及當中的「產品展示暨原型

設計分享酒會」等,並獲得參加者的正面評價。模協 更於2016年重新整合網頁www.hkmdc.org.hk及建立 微信群組,為不同業界專業人士提供交流平台, 以發掘更多商機。

展望未來,我們將承接過往的經驗,為模協會員安排 更多不同類型的交流活動。2017-19的新一屆執行 委員會亦於楊主席的帶領下,繼續秉承「跨越界限、 創新領域・開拓商機」的發展方向,加強與金屬、 塑膠、自動化科技、各類精密部件及科技產品作跨 行業合作。透過融合各種尖端技術及智能設備,促進 科技發展、人才培訓及技術提升,讓業界於龐大的 中國內地及海外市場保持競爭勢頭。同時,我們會 積極與更多國際組織合作,以及參與展覽活動及研討 會,讓會員利用各地區的營商條件,取長補短,提升 港資企業的獨特優勢。以下為5個專項委員會,分別 由2位正、副召集人帶領,其成員及負責職務如下:

#### 內地及海外事務委員會

召集人	正: 何柏堅	副: 洪俊里
成員	梁廣泉、陳志強、蔡芷珊、黃達仁、邵旭村	同
主要職務	<ul><li>為香港模具業界提供有關政策的最新資訊</li><li>收集、整理及發放國內政府所訂立及修正</li><li>與內地及海外模具協會、相關的政府及相關的政府及相關的國內及海外拓展對外事務及認如國內及海外展覽、考察團等</li></ul>	改與業界有關的新政策及訊息 幾構單位保持聯繫

#### 傳訊及社交媒體委員會

召集人	正: 黎潘成	副: 吳家仁
成員	洪俊里、王耀強	
主要職務	- 促進會員溝通,發展更有效的商貿的平台 - 編輯協會的年度刊物 - 利用最新的社交媒體加強協會與會員間之	

#### 副主席的話

#### 會員關係委員會

召集人	正: 蔡芷珊	副: 丁錫華
成員	黄嘉文、馮志明、林志榮	
主要職務	以不同的活動加強協會及會員之間的溝通 - 會員探訪活動 - 協會周年晚宴 - 內地新春晚會 - 香港模具協會籃球錦標賽	,所舉辦的活動包括:

#### 跨行業網絡委員會

召集人	正: 黃文信	副: 邵旭桐		
成員	梁廣泉 、歐傑豪、江漢波 、冼慧妍、孫暉	、江漢波 、冼慧妍、孫暉銓、徐詠琳		
主要職務	<ul><li>聯繫不同行業,定期舉辦跨行業活動,</li><li>迎合現時市場發展概況,與創新設計及</li><li>定期舉辦成功案例分享會等活動,讓業</li></ul>			

#### 教育及技術發展委員會

召集人	正: 孫國偉	副: 王耀強	
成員	楊啟泰、歐傑豪、李煜培、江漢波		
主要職務	- 促進協會與不同的大專院校合作,為業身 - 引入先進製造技術及現代化管理系統	界培育人才	

面對瞬息萬變的環球經濟環境,本港模具企業必須繼續並肩前行,勇於創新,才可發掘更多機遇。我熱切期 望與楊主席及新一屆的執委,繼續攜手合作,團結一致地為協會出謀獻策,組織更多既能惠及業界,又富啟 發性的活動。務求凝聚模具同業,共同提升行內技術管理水平,從而增強市場競爭力。同時,激發業界創新 思維及培育行業之新力軍,令業界得以持續發展。

最後,祝願模協百尺竿頭,更進一步,香港模具業界再創高峰。



蔡俊杰先生 香港模具協會副主席 2017-19

### Vice Chairman's Statement

#### "Collaborating Across Industries $\cdot$ Exploring Creative Synergies $\cdot$ Capturing New Opportunities"

Thank you for the trust and support from the Executive Committee and the members, I feel extremely honoured to serve as Vice-Chairman of HKMDC for a further period. I am resolved to co-operate closely with Chairman Yeung to serve the members with all my strength. I am determined to make my contribution towards enhancing the competitiveness and sustainable development of the mould and die industry in Hong Kong.

More than 28 years have now passed since HKMDC was founded. Over the years it has been joined by the foremost companies in our industry, and it is now the representative commercial and industrial organisation of the mould and die industry in Hong Kong. In 2015 the Council summarised its direction of development as "Collaborating Across Industries · Exploring Creative Synergies · Capturing New Opportunities". Since then it has been striving to help its members to open new markets for their products, and to develop cutting-edge technology. It has also been using cross-industry activities to strengthen members' business links with other industries and startups.

Over the past two years HKMDC has run nearly 20 first-rate activities, including regular cross-industry factory visits, basketball championships, CHINAPLAS, mission to Shanghai & Ningpo, and last but not least, our annual crowning event, HKMDC & HKPIC Joint Dinner, with its Product Showcase & Prototype Sharing Cocktail Party. All these events were much appreciated

by the participants. In 2016 the Council also reorganised its website at www.hkmdc.org.hk , and set up a WeChat group, providing platforms for communication between specialists in different sectors, so that new business opportunities could come to light.

Turning towards the future, we plan to build on our past experience and set up a greater variety of activities for communication our members. Under the leadership of Chairman Yeung, the new Executive Committee will continue to be guided by the development policy of "Collaborating Across Industries · Exploring Creative Synergies · Capturing New Opportunities", and will strengthen cross-industry co-operation with metals, plastics, automation, advance components and electronic products. By incorporating state of the art technology and smart equipment, and by promoting technological development, talent training and technical upgrading, we can ensure that the industry maintains its competitive momentum in the enormous markets of the Mainland China and overseas. At the same time we will work actively with still more international organisations and take part in exhibitions and seminars, enabling members to adapt to local business conditions and take advantage of them, increasing the distinctive advantages of Hong Kong companies. There are 5 special sub-committees, each led by a Convener and Vice Convener, with major duties as follows:

#### Mainland & Overseas Affairs Committee

Convener	Patrick Ho	Vice Convener	Thomas Hung
Members	KC Leung, Calvin CK Tan, Maggie Ts	oi, T Y Wong, Ivan Siu	
Major Duties	<ul> <li>To provide the most updated inform mould and die industry</li> <li>To compile, consolidate and dissemi the industries</li> <li>To maintain a closed connection wit corresponding units and institutions</li> <li>Assist members in developing mainl and organizing activities aboard, suc</li> </ul>	nate the latest policies f h mainland and oversea i and and overseas affair.	from the PRC government related to as mould and die councils, and any s, planning co-operation proposals,

#### Public Communications and Social Media Committee

Convener	Daniel Lai	Vice Convener	Ben Ng			
Members	Thomas Hung, Eddie Wong	Hung, Eddie Wong				
Major Duties	<ul> <li>To facilitate communication with me</li> <li>To compose the Hong Kong Mould &amp;</li> <li>To make good use of new social med</li> </ul>	& Die Council Annual Pu	3 1			

#### Membership Relations Committee

Convener	Maggie Tsoi	Vice Convener	Thomas Ting			
Members	Colman Wong, Martin Fung, Leslie Lam					
Major Duties	Maintain close relationships with mem - Timely Member visits - The Annual Dinner for the Council - The Spring Dinner in the Mainland - Hong Kong Mould & Die Council Bask		ities:			

#### Cross-Industry Networking Committee

Convener	Michael Wong	Vice Convener	Ivan Siu		
Members	KC Leung, Alfred Au, Kong Hon Po,	Leung, Alfred Au, Kong Hon Po, Ami Sin, Alan Suen, Jennifer Tsui			
Major Duties	- Liaise with different industries and organize cross network activities, such as cross industry gatherings				
	- Develop and maintain close relationships with creative and innovative production industries				
	- Regularly organize seminars, and sharing success stories; enable the industries to gain useful				
	information; and explore business co	operation and developm	nent opportunities		

#### Education & Technological Development Committee

Convener	Samson Suen	Vice Convener	Eddie Wong			
Members	KT Yeung, Alfred Au, Leton YP Lee,	e, Kong Hon Po				
Major Duties	- To Collaborate with Vocational Training Council to design series of "Industrial Forum" and other					
	technology seminars, to promote the latest market intelligence to members for technological advancement					
	- To introduce advanced manufacturing technology and modern management system to the industry					

In the face of the fast-changing global economic environment, our mould and die companies must continue to march ahead shoulder to shoulder, innovating boldly. This is the only way of discovering new opportunities. It is my earnest wish to continue to work closely with Chairman Yeung and the new Executive Committee, so that our united teamwork can provide good advice to the members, and so that we can run still more activities which are both beneficial to the industry and a source of inspiration. I shall endeavour to bring the industry together to improve the standard of technology management in our field, in this way reinforcing our competitiveness in the market. At the same time a creative mindset must be encouraged in the industry, and new industry teams must be fostered and developed if the sector's development is to be sustained.

I would like to end by wishing the Council continuing success and further progress in the future, so that the mould and die industry in Hong Kong can scale new heights.











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Mr. Samson Suen 香港生產力促進局塑膠科技中心 Plastics Technology Centre, Hong Kong Productivity Council

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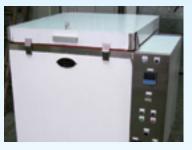
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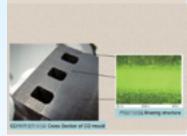
















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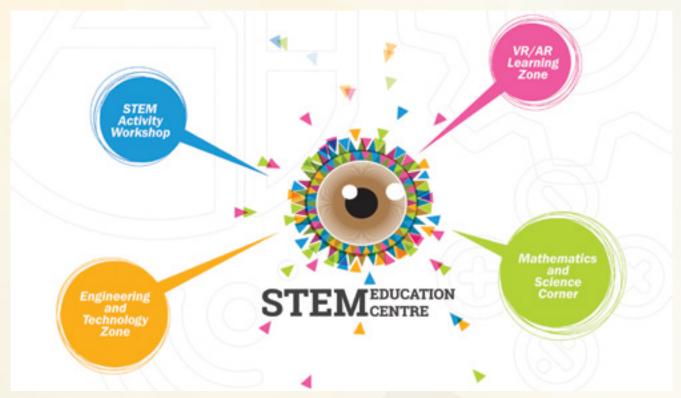
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## 善用先進科技 推動STEM教與學 Leveraging advanced technologies to drive STEM teaching and learning continuous

資料提供: 職業訓練局 Contributed by Vocational Training Council (VTC)



為維持香港的國際競爭力,滿足經濟、社會、科學和科技發展上的需要,以及培養創新思維和開拓與創新精神,香港特別行政區政府在2016年的《施政報告》中提出要積極推動科技教育,鼓勵更多年青人修讀簡稱 STEM 的科學、科技、工程和數學學科,為創科行業注入新動力,促進經濟與社會可持續發展。

製造科技業訓練委員會主席張達材先生指出:「香港特別行政區行政長官發表的2016年《施政報告》,以及政府委任的推廣職業教育專責小組,提出多項加強職業教育的措施和建議,加上配合香港政府資歷架構的發展,教育局成立製造科技業(模具、金屬及塑膠)行業培訓諮詢委員會。」他表示職業訓練局屬下的製造科技業訓練委員會「主要的職權範圍,包括評估本業人力需求和供應、就職訓局工程學科課程和設備提供建議、為職業專才教育活動提供意見。VTC STEM教育中心則旨在作為一平台,支援VTC和中學的老師和學生,推動STEM教育。透過訓練委員會和STEM教育中心的工作,冀望可吸引更多年青人,投身包括模具業的製造科技業,並提升新血和現有從業員整體的專業技術水平。

In view of the need for Hong Kong to maintain its international competitiveness and fulfill the needs of economic, societal, scientific and technological developments and in particular to foster innovation and an entrepreneurial spirit, the 2016 Policy Address of the Hong Kong Special Administrative Region (HKSAR) has shown support for the promotion of Science, Technology, Engineering and Mathematics (STEM) education. It is hoped that this can strengthen support for technology start-ups, giving new impetus to the sustainable development of innovation and technology in Hong Kong.

"With respect to the directions set under the Policy Address delivered by the Chief Executive of the HKSAR in 2016 and the Task Force on Promotion of Vocational Education, a number of measures and proposals have been put forward to strengthen the vocational and professional education and training (VPET). Following the development of Hong Kong Qualifications Framework, Manufacturing Technology (Tooling, Metals and Plastics) Industry Training Advisory Committee was set up accordingly." said Mr Stanley Cheung, Chairman of the Manufacturing Technology Training Board. He stated that the Manufacturing Technology Training Board<sup>1</sup>, which is formed under the Vocational Training Council (VTC), has committed to assessing the manpower demand and supply of the industry, recommending the Engineering Discipline of VTC on its programmes and facilities, and tendering advice to VPET activities. In the meantime, the VTC STEM Education Centre is designed as an educational platform to facilitate STEM education for VTC and secondary school teachers and students. With the support from the Training Board and STEM Education Centre, it is enthusiastically hoped for attracting more young people to plunge into molding and manufacturing industry, thus energising and enhancing the overall professionalism and technical level of practitioners.



職業訓練局(VTC),作為香港最具規模的職業專才教育(VPET)培訓機構,於2017年5月15日正式成立VTC STEM教育中心,以回應政府方向及全球教育趨勢,加強及優化二十一世紀的勞動力以應對目前經濟及科技的高速發展。VTC STEM教育中心設施先進,善用虛擬實境(VR)和擴增實境(AR)技術,為VTC學生提供模擬職場培訓,並陸續應用於屋宇裝備工程、飛機維修、汽車工程、樹藝等不同程度課程的教與學,培育具備高效實操能力的職業專才。

職業訓練局總辦事處(行業合作)高級項目主任林之彪先生稱:「VTC STEM教育中心的未來發展方向,包括為工程、應用科學及資訊科技學科師生提供平台,讓相關學科或行業的專題項目能夠順利完成。同時,我們更鼓勵加強國際伙伴的合作,促進跨學科專題項目的研究。配合擴增實境或虛擬實境主導的教學法,相信能有助中學及高等教育院校提高學與教的成效。成立以來業界包括有關商會、工會、培訓機構和其他持份者,都對中心有著正面的評價,中心亦積極與各方面進行交流合作。」他亦期望香港模具協會可與製造科技業訓練委員會加强合辦技術座談會,並為職訓局學生提供更多工作實習和就業機會。

VTC STEM教育中心透過展示多項VTC學生和業界協作的科研項目,如運用體感技術控制的機械臂、人工智能象棋識別系統等,提升各界對STEM應用的認識,加強學生對科學、科技、工程和數學等科目的興趣。VTC STEM教育中心同時積極與業界拓展夥伴關係,合力推動STEM教育,為VTC學生分享STEM相關行業的最新發展及所需技術,從而培育出新一代科學家、工程師及發明家。



Being the largest provider of VPET of Hong Kong, VTC has established its STEM Education Centres which were officially unveiled on 15 May 2017, in order to echo Government's direction and international education trends. The centres aim to boost the 21st century workforce to cope with the rapid economic, scientific and technological developments. The VTC STEM Education Centres are equipped with advanced facilities leveraging Virtual Reality (VR) and Augmented Reality (AR) technologies to provide VTC students with simulated workplace training. The technologies have been in turn deployed for the teaching and learning of various programmes at different levels including building services, aircraft maintenance, automotive engineering and horticulture, honing the responsiveness of students and training up effective VPET personnel who excel in practical know how.

"The future development direction of the VTC STEM Education Centres includes providing a platform for teachers and students in engineering, applied science and IT disciplines to deliver curriculum related or trade relevant projects. In addition, we have an aim to promote and facilitate cross-disciplinary projects and collaboration with international partners. By developing the Virtual Reality (VR) and Augmented Reality (AR) based pedagogy, we believe the teaching and learning effectiveness of secondary schools and higher education institutions can be enhanced " said Mr Angus Lam, Senior Project Officer, Headquarters (Industry Partnership), Vocational Training Council. VTC STEM Education Centres take initiative to cooperate with multifarious organizations since its establishment. The achievement of which has been well recognized by commercial sectors, trade unions, training institutions and other stakeholders. He hopes that Hong Kong Mould and Die Council can have more collaboration on organising technical seminars with the Manufacturing Technology Training Board and providing industrial attachments and employment opportunities to VTC students.

Apart from the AR and VR technologies, the VTC STEM Education Centres also showcase scientific and technological projects undertaken by VTC students in collaboration with industry, such as the kinetic-technology-enabled robotic arm and the Chess Recognition System, with a view to arousing the awareness of secondary school students of STEM applications and raising their interest in science, technology, engineering and mathematics subjects. The VTC STEM Education Centres are actively looking for industry partnership to drive STEM education with them and have initially obtained the support of a number of enterprises who provide updates on the latest industry development and technologies required for VTC students, thus cultivate a new generation of scientists, engineers and inventors.

<sup>&</sup>lt;sup>1</sup> 職業訓練局在2016年進行理順屬下訓練局委員會後,決定在2017年4月1日起,將原有的塑膠業訓練局委員會與金屬業訓練委員會,合併成為製造科技業訓練委員會。

<sup>&</sup>lt;sup>1</sup> The Vocational Training Council (VTC), after rationalisation of its Training Boards in 2016, decided to combine the Plastics Training Board and the Metals Training Board into the Manufacturing Technology Training Board starting from 1 April 2017.



林之彪先生續稱:「在籌備成立VTC STEM教育中心前,職訓局觀察到近年選修STEM學科的中學生人數不斷減少,當非STEM學生日後入讀職業專才教育或其他高等教育院校時,或難以修讀或適應工程及科技課程。」他期望通過推廣STEM教育,令青年人裝備自己,掌握能力緊貼本港及環球經濟、科學及科技日新月異的發展。

為加強學生的創造力,以及啟發他們更主動地學習STEM有關的學科,VTC在工程學科教育上同樣重視3D打印技術的學習。3D打印涉及不同的技術範圍,由熔融沉積成型(FDM)到激光燒結(Laser Sintering),通過材料逐層堆積形成最終的三維產品。3D打印被譽為顛覆性的技術,具有改變傳統生產模式的巨大潛力。與傳統的製造技術相比,例如材料切割或射出成型等,3D打印擁有比這些製造技術較有優勢,它能夠在相對較短的時間內形成形狀複雜並具有功能性的產品,而這些產品不但成本相對較低,其品質亦相當不俗。

3D打印技術進展迅速,世界各地的公司紛紛投資數十億元用於其研發,以改善硬件,軟件和打印塑料及其他材料上。3D打印的使用已經成為主流,目前,3D打印技術在航天、汽車工業、生物醫藥和消費產品領域已經有很多應用。現今在相關的職場上,懂得使用3D打印機已經成為其中一項職業技能的需求。因此,以支持香港相關行業的發展,學生學習3D打印技術對於職業專才教育(VPET)來說是必不可少的。

"Before establishing the VTC STEM Education Centre, we noticed that there is decreasing number of secondary school students choosing STEM studies as their elective. Non-STEM educated students may fail to accommodate the Engineering & Technology subject after entering vocational education or other higher education institutions." added Angus. By promoting STEM education, he hopes young people can equip themselves to keep pace with the ever-changing development of Hong Kong and the global economy, science and technology.

To foster students' creativity and inspire them to be more proactive in learning STEM subjects, VTC has also put emphasis on learning 3D printing technology for engineering education. 3D printing refers to a spectrum of different technologies, from fused deposition modeling (FDM) to laser sintering, to add layer by layer of materials to form 3D objects. 3D printing has been hailed as a disruptive technology with tremendous potential to alter traditional production model. To compare with conventional manufacturing technologies such as material removals or moulding, 3D printing has an advantage over such methods. It enables to create functional products with arbitrarily complex shaped in a comparative short time, and they are high quality products as well as relatively low cost. It has already had many applications in aerospace and automotive industries, biomedical and consumer products.

The technology behind 3D printing is progressing rapidly, with companies around the world investing billions of dollars into research and development to improve hardware, software, and printable plastics and other materials. The use of 3D printing has gone a mainstream. As a result, knowing how to use a 3D printer has become an in-demand job skill. Hence, investment in 3D printing is necessary and critical for the Vocational and Professional Education and Training (VPET) to support development of related industries in Hong Kong.





港科院院長徐立之教授於VTC STEM教育中心開幕典禮上致辭時表示:「香港需要投資創新與科技產業,促進多元發展,建立知識型經濟,故此STEM教育也成為重要議題。」徐教授認為VTC舉辦的活動有助推廣創科文化,為香港培育創科人才,讓年輕人日後能在創科路上一展所長。

VTC主席陳鎮仁博士説:「面對瞬息萬變的世界,要取得成功並不能單憑知識,而是要懂得將知識融會貫通。因此,年輕人懂得跨學科的知識和技能,且具備實踐的能力至為重要。」他指VTC增設的STEM教育中心,除配備先進的設施,中心亦會舉辦一系列推廣STEM教育的工作坊、比賽及講座,以促進學術與業界知識和技術的交流,藉此在中學推廣STEM教育及支援VTC、中學教師及學生相關學科的教學。

VTC現時共設立三個STEM教育中心,為全港提供多元的 STEM教育服務以及策略性的地點覆蓋:包括香港專業 教育學院(青衣),香港專業教育學院(柴灣)及青年學院 (九龍灣)。歡迎有興趣的團體及人士通過預約前往參觀。 更多有關資料可在以下網站查詢。http://stem.vtc.edu.hk Professor TSUI Lap-chee, the president of the Academy of Sciences of Hong Kong, officiated at the VTC STEM Education Centre Grand Opening Ceremony said, "Hong Kong needs to invest in the innovation and technology industries to move towards a knowledge-based economy and so STEM education is an issue high on the agenda." He further remarked that VTC would play host to activities to nurture the pioneering and innovative spirit of young people as well as their abilities to innovate, collaborate and problem-solve in furtherance of technological entrepreneurship. In so doing, the young people would be trained up to make their mark in their future road of innovation.

VTC Chairman Dr Clement said, "In today's rapidly changing globalised world, success is driven not only by what we know, but by what we can do with what you know. It is therefore more important than ever for our youth to be equipped with cross-disciplinary knowledge and skills, and the abilities to apply them in the real-world contexts." To achieve this, VTC has established the STEM Education Centre, which is well-equipped with state-of-the-art facilities, varied including STEM-subjects-specific activities will be organised in order to provide a platform for exchanging knowledge and expertise between academics and industry practitioners.

Three STEM Education Centres are set up currently to provide strategic coverage across the territory: IVE (Tsing Yi), IVE (Chai Wan) and Youth College (Kowloon Bay). Interested parties are welcome to visit the Centres via appointments. More information could be found at VTC website. http://stem.vtc.edu.hk

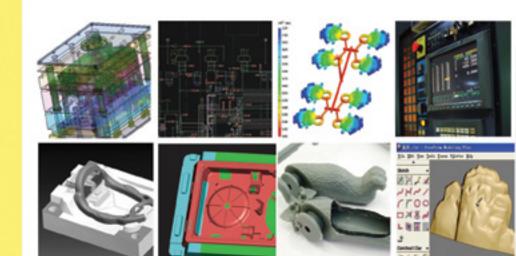




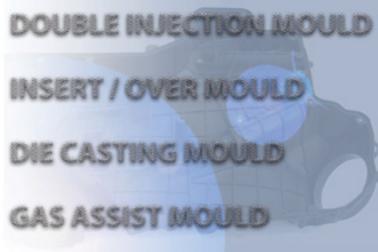


立志模具有限公司 LAP CHI MOULDING CO. LTD. 質穩定











## LAP CHI MOULDING CO. LTD.

HONG KONG Lap Chi Moulding Company Limited

CHINA- DONGGUAN Dongguan Chi Shing Plastic Products Company Limited Dongguan Lap Shing Products Company Limited











### 製造科技業(模具、金屬及塑膠)資歷架構 及從業員「過往資歷認可」

Qualification Framework of Manufacturing Technology (Tooling, Metals & Plastics) Industry and "Recognition of Prior Learning (RPL)" for practitioners

資料提供: 香港生產力促進局 Contributed by Hong Kong Productivity Council



資歷架構是一個七級的資歷級別制度,涵蓋學術、職業及持續教育界別的資歷。資歷架構認可的資歷是經過質素保證以及按照客觀和明確的標準釐定級別。而製造科技業(模具、金屬及塑膠)亦於2011年成立「行業培訓諮詢委員會」,發展各項資歷架構的基建工作,到目前為止,製造科技業(模具、金屬及塑膠)《能力標準説明》及「過往資歷認可」機制已相繼制定及推行。

The Hong Kong Qualifications Framework (HKQF) is a seven-level hierarchy covering qualifications in the academic, vocational and continuing education sectors. Qualifications recognised under the HKQF are quality assured and level-rated in accordance with objective and well-defined standards. Manufacturing Technology (Tooling, Metals & Plastics) Industry Training Advisory Committee was established in 2011 to develop various infrastructures under Qualifications Framework. Currently, the Specification of Competency Standards and Recognition of Prior Learning (RPL) Mechanism of Manufacturing Technology (Tooling, Metals & Plastics) Industry are formulated and implemented respectively.



#### 設立資歷架構之目的 **Objectives of HKQF**

設立資歷架構之主要目的是提供一個鼓勵及促進終身 學習的平台,以提升香港工作人口的技能及競爭力。 上述目的將透過以下途徑實現:

- 為學術、職業及持續教育界別的資歷釐定明確及客觀的
- 確保進修人士所獲得的資歷及其相應學習課程的質素;及
- 拉近學習成果與行業需求的相關性。

The primary objective of establishing HKQF is to provide a platform to encourage and facilitate lifelong learning, with a view to enhancing the capability and competitiveness of the workforce in Hong Kong.

The objectives are to be achieved through:

- Defining clear and objective standards applicable to qualifications in the academic, vocational and continuing education sectors;
- Assuring the quality of qualifications and the associated learning programmes available to learners; and
- Assuring relevancy of learning to industry needs.

#### 資歷架構特點

#### **Qualification Framework Features**

七級架構:由最基礎的第一級至最高的第七級。

行業主導:資歷按行業發展及市場需求而訂定。

質素保證:獲認可的資歷及課程,均通過嚴格的評審程序。

資歷認受:從業員透過多元途徑,獲取認可資歷,

能力獲得肯定。

Seven-level hierarchy: Ranging from Level 1 (the lowest)

to Level 7 (the highest)

Industry oriented: Qualifications formulated based on

industry development and market

demand to formulated

Quality Assurance: Qualifications and training courses are

recognized through rigorous assessment

Qualifications Capabilities of practitioners are recognition:

recognized through various channels.



Qualifications Framework provides a clear award title for different QF Levels

#### 製造科技業(模具、金屬及塑膠) 「過往資歷認可」機制 Manufacturing Technology (Tooling, Metals and Plastics) Industry Recognition of Prior Learning (RPL) Mechanism

資歷架構下的「過往資歷認可」機制是確認從業員在職場上所積累的工作經驗和能力的一個機制。有關機制提供另一個途徑,讓從業員取得資歷架構認可的資歷,提升他們在學習甚至工作上的進階機會。對於學歷不高但已擁有豐富行業經驗的從業員,「過往資歷認可」機制尤其有用。

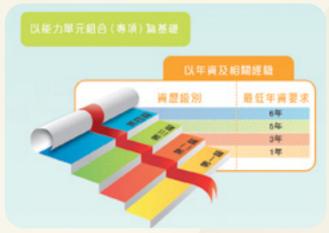
生產力促進局已獲教育局局長委任為製造科技業(模具、金屬及塑膠)「過往資歷認可」 評估機構,於2017年3月15日起為業界從業員提供辦理第一至第四級資歷的認證服務,協助業內從業員確認於工作上累積的知識、技能和經驗。製造科技業的「過往資歷認可」共有60個第一至第四級的資歷,涵蓋以下六個職能範疇:

- 市場、銷售及客戶管理
- 產品設計及開發
- 製程設計及開發
- 採購、物流計劃及監控
- 產品製造
- 產品品質監控及檢測

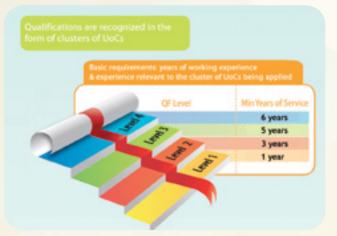
As a measure to recognise work experiences and competencies acquired by practitioners at the workplace, a Recognition of Prior Learning (RPL) mechanism under the QF provides an alternative route for practitioners to obtain QF-recognised qualifications without undergoing a training programme and facilitates their subsequent progression in learning, and probably in careers. It is particularly useful to practitioners who do not possess high academic attainment but have acquired substantial practical experience in industry.

HKPC is appointed to be the Recognition of Prior Learning (RPL) Assessment Agency (AA) for QF Level 1 to 4 for Manufacturing Technology (Tooling, Metals and Plastics) Industry to enable practitioners to receive formal recognition of the knowledge, skills and experience they acquired at the workplace. The service was officially launched on 15 Mar 2017. There are a total of 60 clusters from QF Level 1 to 4 under the Recognition of Prior Learning (RPL) Mechanism of Manufacturing Technology (Tooling, Metals and Plastics) Industry which covers the six functional areas below:

- Sales, Marketing and Customers Management
- Product Design and Development
- Process Design and Development
- Procurement, Logistics Planning and Control
- Product Manufacturing
- Product Quality Control and Testing



申請「過往資歷認可」的年資要求



Years of Relevant working experience of practitioners required for applying Recognition of Prior Learning



#### 「過往資歷認可」機制 — 模具業

#### Recognition of Prior Learning (RPL) Mechanism - Tooling Industry

模具業是工業之母,在製造科技業有著關鍵角色。模具業在上述60個第一至第四級資歷的認證服務中佔 23個,專供模具業的從業員申請,列表如下:

Tooling Industry, known as "The Mother of Industry". It plays critical role on Manufacturing Technology Industry. There are 23 clusters which are specified for practitioners of tooling industry to apply, out of abovementioned 60 clusters from QF Level 1 to 4 under the Recognition of Prior Learning (RPL) Mechanism of Manufacturing Technology (Tooling, Metals and Plastics) Industry. The details of the clusters are shown as follow:

#### 資歷級別第1-3級 QF Level 1 - 3

(於5年過渡期內,模具業從業員可透過提供資歷證明文件獲得以下資歷。同時亦可選擇接受評估,以確認具資歷架構第1-3級的資歷)

(Practitioners can seek recognition of qualifications at QF Level 1 to 3 by verification of the supporting documents in years of working experience during 5 years transitional period. Practitioners also may opt for assessment to attain qualifications at QF Level 1 to 3.)

「能力單元組合」名稱 Name of RPL Cluster	編號 Code	級別 Level	評估方法 Assessment Methodology
模具設計及開發 (三級) Mould Design and Development (Level 3)	MTPD303A	3	實操考核 Practical Assessment
採購工作 (模具業) (三級) Procurement (Tooling Industry) (Level 3)	MTPU301A	3	筆試 Written test
模具加工 (銑削門類) (三級) Mould Manufacturing (Milling Category) (Level 3)	MTPM303A	3	實操考核 Practical Assessment
模具加工 (研磨門類) (三級) Mould Manufacturing (Grinding Category) (Level 3)	MTPM304A	3	實操考核 Practical Assessment
模具加工 (打磨組裝門類) (三級) Mould Manufacturing (Benchwork Category) (Level 3)	MTPM305A	3	實操考核 Practical Assessment
模具加工 (車削門類) (三級) Mould Manufacturing (Turning Category) (Level 3)	MTPM306A	3	實操考核 Practical Assessment
模具加工 (放電加工門類) (三級) Mould Manufacturing (EDM Category) (Level 3)	MTPM307A	3	實操考核 Practical Assessment





#### 「過往資歷認可」機制 ─ 模具業 ─ 續 Recognition of Prior Learning (RPL) Mechanism – Tooling Industry – Continue

資歷級別第4級 QF Level 4

(模具業從業員必須透過接受評估,以確認具資歷架構第4級的資歷)

(Practitioners attain qualifications at QF level 4 through assessment.)

「能力單元組合」名稱 Name of RPL Cluster	編號 Code	級別 Level	評估方法 Assessment Methodology
市場營銷 (模具業) (四級) Sales and Marketing (Tooling Industry) (Level 4)	MTMM401A	4	筆試 + 面試 Written test + Interview
注塑模具設計及開發 (四級) Plastic Injection Mould Design and Development (Level 4)	MTPD404A	4	筆試 + 面試 Written test + Interview
鈑金衝壓模具設計及開發 (四級) Sheet Metal Stamping Die Design and Development (Level 4)	MTPD405A	4	筆試 + 面試 Written test + Interview
壓鑄及鑄造模具設計及開發 (四級) Metal Die Casting and Foundry Die Design and Development (Level 4)	MTPD406A	4	筆試 + 面試 Written test + Interview
項目控制 (模具業) (四級) Project Control (Tooling Industry) (Level 4)	MTPD407A	4	筆試 Written test
自動化生產線設定(模具業) (四級) Automated Production Line Setting (Tooling Industry) (Level 4)	MTPR401A	4	筆試 + 面試 Written test + Interview
採購及供應商管理 (模具業) (四級) Procurement and Supplier Management (Tooling Industry) (Level 4)	MTPU401A	4	筆試 Written test
模具加工 (銑削及放電加工門類) (四級) Mould Manufacturing (Milling and EDM Categories) (Level 4)	MTPM406A	4	筆試 + 實操考核 Written test + Practical Assessment
模具加工 (銑削及研磨門類) (四級) Mould Manufacturing (Milling and Grinding Categories) (Level 4)	MTPM407A	4	筆試 + 實操考核 Written test + Practical Assessment
模具加工 (銑削及打磨組裝門類) (四級) Mould Manufacturing (Milling and Benchwork Categories) (Level 4)	MTPM408A	4	筆試 + 實操考核 Written test + Practical Assessment
模具加工 (車削及放電加工門類) (四級) Mould Manufacturing (Turning and EDM Categories) (Level 4)	MTPM409A	4	筆試 + 實操考核 Written test + Practical Assessment
模具加工 (車削及研磨門類) (四級) Mould Manufacturing (Turning and Grinding Categories) (Level 4)	MTPM410A	4	筆試 + 實操考核 Written test + Practical Assessment
模具加工 (車削及打磨組裝門類) (四級) Mould Manufacturing (Turning and Benchwork Categories) (Level 4)	MTPM411A	4	筆試 + 實操考核 Written test + Practical Assessment
模具加工 (打磨組裝及研磨門類) (四級) Mould Manufacturing (Benchwork and Grinding Categories) (Level 4)	MTPM412A	4	筆試 + 實操考核 Written test + Practical Assessment
模具加工 (打磨組裝及放電加工門類) (四級) Mould Manufacturing (Benchwork and EDM Categories) (Level 4)	MTPM413A	4	筆試 + 實操考核 Written test + Practical Assessment
品質控制 (模具業) (四級) Quality Control (Tooling Industry) (Level 4)	MTQI403A	4	筆試 Written test

#### 申請要求及程序

#### **Application requirement and procedure**

「過往資歷認可」第一至三級申請流程 Application procedure of QF Level 1-3 under Recognition of Prior Learning (RPL) mechanism



「過往資歷認可」第四級申請流程 Application procedure of QF Level 4 under Recognition of Prior Learning (RPL) mechanism



凡成功通過「過往資歷認可」的申請人,在取得資歷 證明書後,可即時申請發還75%的評估費用;及後成功修 畢任何一個資歷架構認可的課程,更可申請發還餘下25%的 評估費用。

Practitioners who have successfully completed the RPL assessments and obtained the Statements of Attainment are eligible to apply for reimbursement of 75% of RPL assessment fees. The remaining 25% of RPL assessment fees will be reimbursed to applicants upon completion of a QF-recognised course or programme afterwards.

#### 相關網站:

香港資歷架構:

http://www.hkqf.gov.hk

香港資歷名冊:

http://www.hkqr.gov.hk

製造科技業(模具、金屬及塑膠)「過往資歷認可」:

http://rpl.hkpc.org

「過往資歷認可」資助計劃:

https://www.hkqf.gov.hk/tc/support/dss/rpl\_

reimbursement/index.html

#### **Related Links:**

Hong Kong Qualifications Framework (HKQF):

http://www.hkqf.gov.hk

Hong Kong Qualifications Register (HKQR):

http://www.hkqr.gov.hk

Recognition of Prior Learning (RPL) of Manufacturing Technology

(Tooling, Metals and Plastics) Industry:

http://rpl.hkpc.org

**RPL Support Scheme:** 

https://www.hkqf.gov.hk/tc/support/dss/rpl\_reimbursement/

index.html







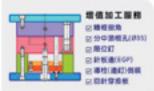




#### 01 龍記標準模架

模具標準化在中國已經是大勢所趨,使用標準件的高 性價比優勢,成為用家的最佳選擇。在模架的精度已進 一步提升之後,能記再推出更多的追加工服務,使標準 模具的用家達至更加省時、省力、省錢。





#### 02 特大模架加工服務

除了華南河源廠現有的600多台大型及精密加工中心 之外,杭州廠新增的特大模架加工設備包括大型五軸 加工中心、五面加工機、大型龍門加工中心、臥式三軸 及四軸加工中心、五軸及四軸深孔鎖床及精密大型平 面磨床等,共計已超過一百台。龐大的工程人員隊伍, 配合先進的繪圖及編程軟件,確保能滿足各類型模具 製造廠的需求。





#### 03 龍記高精模架

龍記高精模架以先進精密的設備,於溫控車間生產。 從材料到檢測都用心去做,為出口以至國產精密模具 配套。





#### 04 龍記模架配件

導柱導套是模架最重要的配件。龍記與鋼廠緊密合作,從 原材料開始,就為質量把關;加上全自動的數控車床生產 線,使產品質量更為可靠。





### 優質鋼材

產品種類更齊全,無論高精優質或大眾化經濟型的產 品,一應俱全,適合不同用家的需要。除了全球採購的 LKM系列優質模具銅之外,還推出CN系列的國產模架 用銅,為一般需求的模架用銅提供更多選擇。





### 鋼材熱處理服務

杭州廠除新增的六個真空熟處理爐為客戶提供一站式 服務之外,我們還增設了中碳鋼及P20調質服務,加上 容積更大的消除應力爐,更快速為特大模架及模具生 產廠配套。





#### 07 網上認證

為確保模具用家的利益,以至方便客戶取得購買籠記 產品的證明, 龍記網上認證系統能向所有直接客戶提 供更貼身服務。詳情可參考籠記官方網站或直接向籠 記銷售人員查詢。





### 已網購 www.lkm.com.cn/b2b

二十多家的龍記直續店鋪及三十多家經銷商已遍布了華南及華東主要模具廠密集的區域。為了方便偏遠 地區的客戶,龍記推出網購平台。只要進入龍記官方網站,就可以直接進入龍記網購。開立公司帳戶之後, 便可隨心所欲的進行採購,完成交易之後,產品將會由快遞公司送到指定的地點。









集團總公司(香港)

接單部電話:(852)23412321

河源龍記金屬製品有限公司 總機/接單部電話: (86) 0762-321 0502

杭州龍記金屬製品有限公司 接單部電話: (86) 0571-8213 3281

WWW.LKM.COM.CN LKMSALES@LKM.COM.HK



### 激光抛光技術: 環保・經濟・快速 Laser Polishing Technology: Eco-friendly, Cost-effective and Rapid Metal Surface Finishing

資料提供: 香港生產力促進局 Contributed by Hong Kong Productivity Council







### 背景

產品的表面光潔度會影響到產品的力學性能、光學 性能、耐腐蝕性及用家對產品的視覺印象。表面打磨 抛光是一種勞動密集及耗時的工作。用傳統方法打磨拋 光一些形狀複雜的零件,約佔零件生產總週期的30%-50%時間。此外很多現有工業領域都偏向產品微型化 發展,比如消費電子產品及醫療設備,這些領域對微型 零件的需求有顯著增加。然而,高精度的微型零件加 工是很富挑戰的事情,因為微型零件在表面光潔度加工 前已接近零件尺寸的公差。目前要打磨抛光一些複雜的 零件,需要熟練的技術人員,使用的方法以傳統技術 接觸式為主,因此較難控制打磨拋光的產品質量。 再者,模具製造行業對打磨拋光技工的技術要求 更嚴格,因為在過程中稍有不慎就會損壞價格昂貴的 模具。精湛技術的打磨抛光技工需要經長年累月的學 徒生涯才能培養。熟練的技工是一種珍貴資源,由於 人手打磨抛光是一種要求嚴格且單調的工作,打磨抛光 過程中所產生的懸浮顆粒會傷害到技工的呼吸系統。 因此很多企業很難招聘到熟練的打磨拋光技工。現時在模具 及五金行業,非常缺乏年輕人加入從事這類工作,引致青黃 不接的問題。

為提升本地廠家在國際市場的競爭力,有需要把打磨 抛光工藝自動化,來降低成本和縮短生產周期。市面上 曾有研究嘗試將打磨拋光機器與機械手或數控加工中內 整合為自動化系統,可是此種方法與傳統接觸式打磨 拋光有同樣的局限,不能打磨拋光有精細紋理或深槽 特徵的工件。而且傳統的打磨拋光工藝是消減材料的 技術,導致最終產品的尺寸出現偏差。基於上述情況, 橫跨不同工業領域的廠家都渴求一種創新的打磨拋光 技術來提升產品質量和縮短加工時間。

### **Background**

The surface finish of a part/product could significantly affect its mechanical properties, optical properties, corrosion resistance and visual impression to the customer. Surface polishing is a labourintensive and time-consuming task. The conventional polishing operations for parts with complicated geometries could take up 30-50% of total manufacturing time required to manufacture the parts. Besides, the trend towards miniaturization in a number of industries, such as consumer electronics and medical devices. has significantly increased the demand of microparts. Achieving sufficient precision in these microparts is challenging because surface roughness levels are approaching part tolerances. Nowadays, the polishing of complex parts is generally performed by highly skilled technicians using manual abrasive techniques. The quality of the polished parts might thus not be readily controlled. In addition, the required skill of technicians in mould and die production industry is especially high since a small mistake in the polishing process could make the expensive mould/ die unusable. Their sophisticated polishing skill is generally obtained through long years of apprenticeship. Skilled technicians are a scarce resource because manual polishing is a demanding and monotonous work, and the suspended particulate generated in the process could be harmful to the respiratory system. Therefore, companies always find difficulty in recruiting skilled technicians for this job nature. The shortage of young generation to engage in polishing further enlightened the problem, especially in mould and metal parts industries.

To enhance the competitiveness in the global marketplace, automating the polishing process for cost and lead-time reduction is critical. It can be found that some attempts have been made to integrate the abrasive polishing system with robot or machining centre for realising automated polishing process in prior studies. However, it cannot overcome the inherent limitations of the contact-type polishing process, which cannot polish the fine surface texture and slot feature with high aspect ratio. In addition, the abrasive polish is a subtractive manufacturing process which could lead to dimensional deviation of the final parts. Based on the aforementioned problems, the manufacturers in different industry sectors always hunger for a new polishing technology for enhancing product quality and reducing processing time.



### 激光拋光技術

隨著激光技術的發展而出現的激光拋光技術漸漸獲得 明顯優勢。它的原理是利用固定能量密度和波長的 激光束照射工件表面。激光照射零件表面時,會在極短 的時間內融化表層的材料。由於融化材料的表面張力 引致材料流動,從而形成光滑表面,達到拋光目的。 由於這技術能控制激光束的軌跡、溫度以及掃描速度,從而 做到高精度的加工。連續型激光或脈衝型激光均可使用在 激光抛光技術上。前者可對粗糙表面(Ra = 0.4 - 10 μm) 進行粗加工,而後者可處理經打磨或精加工的表面 (Ra = 0.2 - 0.8 μm)。工藝上可先用連續型激光照 射工件表面,接著再用脈衝型激光來提升光潔度。 圖 1 及 2 分 別 展 示 激 光 抛 光 原 理 圖 及 設 備 工 作 平 台。 激光加工有急速升溫以及冷卻的特性。由於加工過程中 不會影響零件主體溫度,避免對零件精確度造成影響。 此技術更可處理傳統方法無法處理的一些複雜的 幾何面。

### **Laser Polishing Technology**

With the advancement of laser technology, the advantages of laser polishing become obvious. Its principle is that a thin layer of material is irradiated and then melted by a laser beam with an intense energy density and specified wavelength. The surface tension of the molten material leads to the flow of the material. In such a way, a smooth surface is then formed. This process can achieve high accuracy by precise control of laser beam trajectory, temperature and speed. Both Continuous-Wave (CW) and pulsed lasers can be used in the process. The former can handle the rough surface (Ra =  $0.4 - 10 \mu m$ ), while the latter can handle fine-finished surface (Ra = 0.2 -0.8  $\mu m$ ). The workpiece can be first processed by CW laser, followed by pulsed laser for further enhancement. Figs.1 and 2 show the schematic of laser polishing and the working platform of the machinery, respectively. The temperature of the main body of the processing part basically does not change due to processing characteristic of rapid heating and cooling on the thin surface layer. This can greatly reduce the thermal stress, which could significantly affect the dimensional accuracy of the part. In addition, this technology can handle complicated surfaces which are hardly polished via conventional methods.

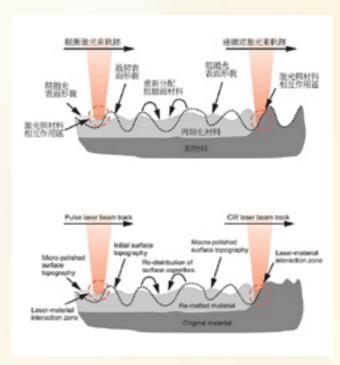


圖1:激光抛光原理圖

Fig.1: Schematic of laser polishing process.



圖2:激光抛光設備工作平台(德國Fraunhofer ILT 提供) Fig.2: Platform of laser polishing machinery (courtesy of Fraunhofer ILT, Germany).

### 技術優勢

激光抛光是一項清潔生產的綠色技術,能迎合目前市場環保主流,又可以提升產品質量、降低成本及縮短生產周期等要求。反之傳統技術受限於低效率及產品質量差的缺點。而目前化學拋光雖被廣泛採用,但中國政府在過去十年一直著手環境保護。可預見未來對化學品使用和釋放的限制將會增加,導致生產成本上漲。激光拋光技術則依靠激光的特性和革新的加工方式,有著以下難以取代的優點:

- 一、 可打磨抛光一些複雜的幾何面;
- 二、縮短生產周期和時間,提高效率;
- 三、 避免材料表面被打磨用的磨料污染;
- 四、 高度自動化, 高品質穩定性及重覆性;
- 五、 可選擇打磨拋光位置, 達到高光潔度的表面, 例如處理 皮革紋理表面;
- 六、激光是一種非接觸性的技術,可到達傳統工藝無法接觸的死點;
- 七、 减少材料表面的沙孔或裂紋缺陷;
- 八、過程不使用化學試劑,保護環境。

### **Process Advantages**

Laser polishing is a green production enabling technology. It can also improve product quality, reduce cost and shorten lead-time for the severe competition in the global marketplace. Manual polishing is inefficient and poor in product quality. Even though chemical polishing is widely adopted, China government has been promoting environmental protection over the past decade. More restrictions on the use and release of chemicals have been established, resulting in higher production cost. Laser polishing technology, which relies on the attractive characteristics of the laser, renders the following advantages over the conventional polishing techniques:

- a.) Capable of polishing intricate surface;
- b.) Short processing time;
- c.) High chemical cleanliness due to no use of abrasives;
- d.) High repeatability due to automation;
- e.) Enabled selective polishing for realisation of excellent surface finish on fine surface texture, such as leather texture;
- f.) Enhanced accessibility due to non-contact nature;
- g.) Reduced surface pores and cracks;
- h.) No environmental impact due to chemical-free process.

### 實例驗證

重 溫 一 些 過 去 的 工 業 實 例 , 來 驗 證 激 光 抛 光 實 際 應 用 表 現 。 圖 3 是 表 面 光 潔 度 為 R a ≈ 1.5 μ m h 的 模 具 鋼 試 件。 區 域 A 經 連 續 型 激 光 粗 抛 光 , 光 潔 度 可 達 到 Ra≈0.12µm。區域B先後經連續型及脈衝型激光拋光, 光潔度更可達到Ra≈0.09μm。區域C先經激光加工形成 表面紋路,然後經連續型激光拋光。利用激光拋光技術 就容易做到傳統工藝不能處理的有紋路表面。圖4a是 皮紋表面的注塑模具,該模具有一半面積的皮紋經激光 抛光處理。圖4b在試件上的皮紋有一半來自激光拋光 處理的模具成型,而另一半則由沒有拋光成型,可見 激光抛光技術具有自由選擇拋光區域的獨特優勢。 圖5是用於玻璃成型的高碳鋼模具,原本的表面光潔度 為Ra≈1-2μm。激光抛光後可達到光潔度為Ra≈0.35-0.4μm。 圖6是一件醫療植入物一心室輔助裝置的 鈦合金零件(LVAD)。使用傳統拋光工藝需要三小時才能 達到表面光潔度的要求,可是激光拋光只需五分鐘便能 達到。以上實例可以證明激光拋光技術優於傳統工藝。

### **Experimental Results**

The quality of laser-polished surface has been validated by various experimental results presented in prior studies. Fig.3 shows a tooling steel plate with the initial surface roughness of Ra ≈ 1.5μm. Area A was polished by CW laser and surface roughness of Ra ≈ 0.12µm was achieved. Area B was polished with both CW and the pulsed laser. The surface roughness of Ra ≈ 0.09µm was achieved. Lastly, Area C was firstly processed by laser structuring to form a surface pattern, followed by CW laser polishing. It can be seen that laser polishing technology can easily realise the glossy textured surface, which is impossible by any conventional techniques. Fig.4a shows the plastic injection mould surface with leather texture. It can be seen that half mould surface has been laserpolished. Fig.4b shows the corresponding moulded part surface and the laser-polished surface finish can also be obtained. A unique advantage on polishing tooling with fine surface texture can be seen. Fig.5 shows a mould made of high carbon tooling steel for glass part production. The initial surface roughness was Ra ≈ 1 - 2μm. Ra ≈ 0.35 - 0.4μm was achieved by using laser polishing. Fig.6 shows a medical part made of titanium alloy for a Left Ventricular Assist Device (LVAD). The traditional polishing process takes about three hours to achieve the required surface finish, while laser polishing only takes 5 minutes. Based on the above case studies, the advantages of laser polishing technology were clearly validated.



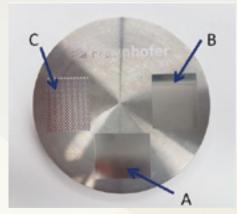
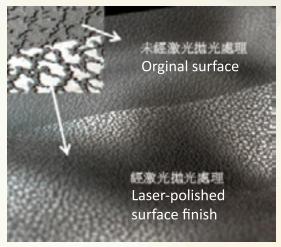
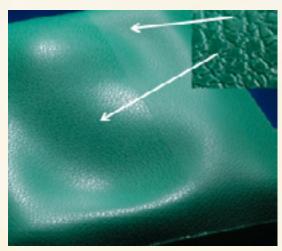


圖3:激光拋光效果對比 (德國Fraunhofer ILT 提供) Fig.3: Comparison of different laser-polished surfaces (courtesy of Fraunhofer ILT, Germany)



(a) 注塑模具

(a) The surface of plastic injection mould



(b) 注塑試件

(b) The surface of plastic injection moulded parts

圖4:激光抛光皮紋模具及試件表面 (德國Fraunhofer ILT 提供)
Fig.4: Laser polishing of textured plastic injection mould and its
moulded part surface (courtesy of Fraunhofer ILT, Germany)

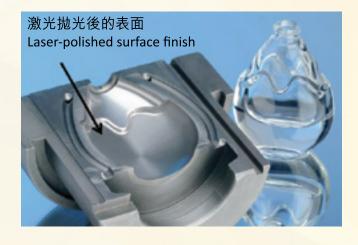


圖 5 : 激 光 抛 光 後 的 高 碳 鋼 模 具 用 於 玻 璃 成 型 ( 德 國 Fraunhofer ILT提供)

Fig.5: Laser-polished mould made of high carbon tooling steel for glass part production (courtesy of Fraunhofer ILT, Germany)



(a) 機加工後 (a) Before laser polishing

(b) 激光抛光後 (b) After laser polishing

圖 6: 激光抛光前後的心室輔助裝置的鈦合金零件(德國 Fraunhofer ILT 提供)

Fig.6: Laser-polished titanium alloy part for LVAD (courtesy of Fraunhofer ILT, Germany)

### 結論及技術開發計劃

激光抛光技術作為高效快速的創新技術,可以大幅提高抛光質量和產能。這技術適合應用於本地各個工業領域,當中包括模具、汽車零部件、醫療植入物、珠寶、鐘錶等。憑藉其龐大潛力以及擁有的優勢達入大潛力。這項目致力於針對本地工業情況,改造激光拋光工藝,並掌握工藝中的技術重點。項目包括開發一台激光拋光設備來處理形狀複雜的零部件,深入改進激光拋光設備來處理形狀複雜的零部件,深入改進激光拋光設備來處理形狀複雜的零部件,深入所指內對不過工藝參數與拋光質量的關聯。本局將會撰寫技術指置等範疇,以供各工業領域的廠家借鑒,共同推廣激光拋光技術的發展和應用。

#### **Conclusions and Technology Development Plan**

Laser polishing, as a fast and efficient innovated technology, can greatly enhance the surface quality and productivity. This technology could be applied in various local industrial sectors, including mould & die, automotive part, medical implant, jewellery, watch, etc. Based on its great potential and expected advantages, the attention of local manufacturers will be drawn and further development will be conducted. Hong Kong Productivity Council has been funded by the Hong Kong Government for the development of new laser polishing technology. The project is aimed at establishing the critical knowledge to master the laser polishing process. A laser polishing machinery for processing parts with complicated geometries will be developed. In addition, an in-depth investigation into the relationship between different processing parameters and the quality of the polished surface will be extensively conducted. A guidebook manifesting the detailed laser polishing system design, physical mechanism, process design & limitation, parameter configuration determination, quality control & assurance as well as case studies under the project will be complied.



(a) 模具 Mould



(b) 汽車零部件 Automotive part



(c) 醫療植入物 Medical implant



(d) 珠寶 Jewellery



(e) 鐘錶 Watch

圖7:激光抛光可應用在不同工業領域

Fig.7: Applications of laser polishing in various industrial sectors



若貴公司有意對激光拋光技術加深了解及查詢,請致電 2788-5481 或電郵到 wailunchan@hkpc.org 聯絡香港生產力促進局顧問陳偉倫博士。 Should you require any further information about laser polishing technology, please feel free to contact, Dr Chan Wai-lun, Consultant at Hong Kong Productivity Council, at 2788-5481 or via e-mail: wailunchan@hkpc.org.



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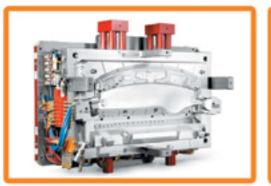


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### 華東考察:追求卓越的模具業

### Mission to Huadong : Pursuit of Excellence in Mould Industry



香港工業總會("工總")名譽會長孫啟烈教授、第14分組香港模具協會("模協")名譽會長陶偉洪及副主席蔡俊杰於2017年6月率領從事模具及塑膠的會員公司代表,到訪上海及寧波,參觀多間製造模具及注塑機的企業。模協希望透過是次考察,加强各地同業之間的溝通,為行業的持續發展尋找合作的契機。

Federation of Hong Kong Industries (FHKI) Honorary President Professor Cliff Sun, FHKI Group 14 Hong Kong Mould and Die Council (HKMDC) Honorary President Mr To Wai-hung, and Vice-Chairman Mr Felix Choi, led a group of member delegation from mould and plastic industry to Shanghai and Ningbo in June 2017. During which delegates visited few factories of high-precision molding and injection machine. The main objectives were to reinforce communication and co-operation with industry practitioners in the Mainland and hence improve production efficiency and synergising sustainable development of the mould industry.



### 華東地區汽車部件模具製造

#### Mould manufacture for automobile components in Huadong

「考察團首天到訪的上海宏旭,讓汽車部件模具同業留下深刻的印象。」陶先生說。上海宏旭模具工業有限公司於2000年成立,是一家從事汽車車身模、檢具、治具設計、製造的外商獨資企業。公司年產模具約12000噸、檢具約235套,目前為長城汽車戰略合作夥伴、福特汽車全球供應商及通用汽車之優秀供應商,出口至美國、德國、西班牙、法國、日本等國家。公司近年更發展新興市場印度、巴西、南非、阿根廷,並部署涉足中東及俄國等地。

汽車供應鏈一般採用及時(Just-in-time)營運模式,因此製造 大型車身覆蓋件在華東華北較具地利優勢,既可節省物流 成本,又可方便原生產拓展目標市場。大眾、通用、福特、 豐田、本田等國際一流企業及內地合資廠,均以華東及華北 為樞紐,再逐漸拓展至重慶及華南等地區,而華南地區的供 應商目前以生產汽車電子產品及內飾件為主。

蔡俊杰先生表示:「宏旭是一家相當專業的汽車製模企業。他們會深入了解每個汽車品牌的設計及要求,預先做好技術準備,再向客戶溝通,並妥善處理資料存儲,讓良好的技術及經驗可以累積。」一家善用科技、管理質素高、硬件軟件俱佳的企業,難怪能被上海市模具協會認定為「上海汽車覆蓋件模具骨幹企業」。

隨著控制成本及品質的壓力增加,汽車業運用更多先進的資訊科技,藉此提高設計及製造能力。業界使用與數控機械有關的電腦輔助製造技術,以及快速成型或3D打印技術。宏旭也不例外,早於2006年已全面導入3D實體化設計技術和製造技術、全過程數位化測量技術、同步工程技術以及車身匹配技術,完整形成公司主營業務方向。



'On the first day the delegates visited Shanghai Horngshiue, which made a deep impression on those of us who make moulds for automobile components,' observed Mr To. Shanghai Horngshiue Industrial Co Ltd was founded in 2000, and is a wholly foreign-invested company which designs and makes moulds, checking fixtures and jigs for automobile bodies. The company makes about 12,000 tons of moulds and dies a year, with around 235 checking fixtures. It is a strategic partner of Great Wall Motors, global supplier of Ford, and favoured supplier of General Motors. It exports to USA, Germany, Spain, France and Japan. In recent years it has moved into new markets in India, Brazil, South Africa and Argentina, and is beginning to deploy in the Middle East and Russia.

Automobile supply chains generally use the just-in-time model. For this reason, there is a distinct geographical advantage in manufacturing large vehicle body panels in East or North China, since it not only saves logistical costs, it also helps original producers to expand their target markets. Leading international companies like VW, General Motors, Ford, Toyota and Honda and their Mainland joint venture factories are all gradually expanding into places like Chongqing and South China from their axis in East and North China, and South China suppliers currently focus on making automobile electronic parts and interior fittings.

With the growing pressure to control costs and quality, the automobile industry is using more advanced information technology to boost its design and manufacturing capabilities. The industry uses computers linked to digital control devices to support its manufacturing technology, along with rapid prototyping and 3D printing. Horngshiue is no exception. As early as 2006 it introduced 3D design and manufacturing throughout, along with whole process digital measuring, concurrent engineering, and car body matching. This completely defined the direction of the company's core business.

Mr Felix Choi commented: 'Horngshiue is a pretty professional automobile mould manufacturing company. They study in depth the designs and requirements of each car brand, and get their technology ready before contacting the customer; they also make suitable arrangements for stocking materials, and accumulate good technology and experience.' With its good use of technology, its high management standards, and its excellent hardware and software, it is no surprise that the company has been recognised by the Shanghai Mould and Die Council as 'a key Shanghai company for automobile body panel moulds'.

蔡先生續指:「位於寧海縣的方正模具,亦是一家有目標有策略的企業。」寧海縣方正模具廠於1999年成立,其後改名為寧波方正汽車模具有限公司,是一家研發、製造、經營汽車塑膠注塑及吹塑模具的國家級高新技術企業。公司主要製造汽車內外飾模具、汽車油箱模具、雙色模具等,是全球福特、豐田,以及德國、俄羅斯及印度大眾和一汽大眾的供應商。

考察團的成員補充:「方正有兩項獨特的之處,一是其國際化的研發團隊,二是積極遠大的銷售目標。」方正在德國、墨西哥及北美均有設廠,並有歐洲及日本的權威專家駐內地的廠房,掌握了歐亞非等多地的優秀模具設計、製造標準和經驗,被寧波市科技局認定為「寧波市企業研究院」。公司購置了多台全球製造模具一流的加工設備,如德國OPS五軸加工中心、日本OKUMA龍門式五面體加工中心、義大利 Fidia D318 五軸加工中心等等。截至2015年,公司共獲得知識產權保護55項,當中包括發明專利、實用新型專利及軟件著作。

About the group's next destination, Mr Choi observed: 'Fangzheng Mold in Ninghai County is also a company with clear targets and strategies.' Ninghai County Fangzheng Mould Factory was set up in 1999, later changing its name to Ningbo Fangzheng Automobile Mold Company Limited. It is a high-tech enterprise of national importance which researches, manufactures and operates plastic injection and blowing moulds for automobiles. Its main products are moulds for interior and exterior fittings, moulds for vehicle petrol tanks, and dual colour moulds. The company is a supplier for Ford and Toyota world-wide, and for Volkswagen and FAW-Volkswagen in Germany, Russia and India.

A delegate added: 'Fangzheng has two distinctive assets. One is its international R&D team, the other is its positive and ambitious sales targets.' The company has plants in Germany, Mexico and North America, and in its Mainland facility there are resident leading experts from Europe and Japan, who have a thorough knowledge of the best in design and manufacturing standards and practice from Europe, Asia and Africa. The company has been recognised by the Ningbo Science and Technology Bureau as a 'Research Academy of Ningbo City'. The company has bought in many pieces of processing equipment which are in the world front rank for mould and die manufacturing, such as 5-axis manufacturing centres from OPS in Germany, Okuma gantry 5-face machining centres from Japan, and 5-axis Fidia D318 machining centres from Italy. As of 2015 the company had registered 55 intellectual property rights protections, including patents for inventions, new use patents, and software copyrights.

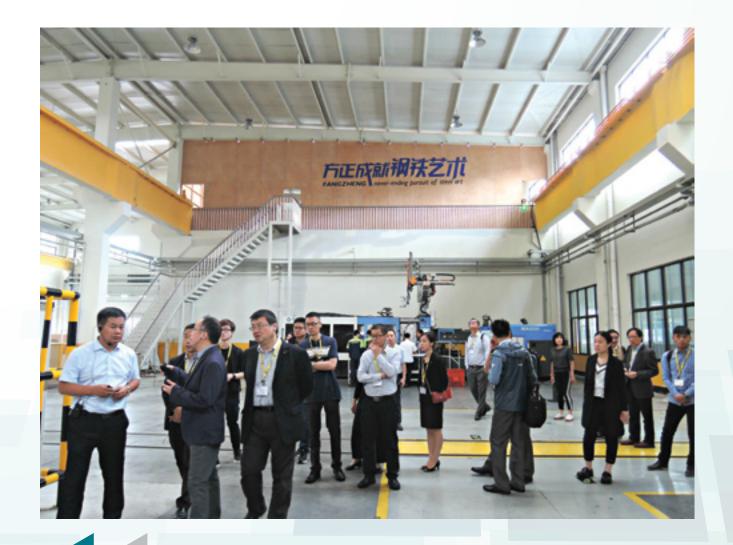


研發投資往往要花大量的資金、人力及時間,回報卻是因事而異。但方正對技術提升的決心及成效,迅速反映在其驚人的銷售增長。方正於年銷售從2012年的2.3億人民幣躍升至2016年的5億人民幣,並目標於2017年把銷售量提升至6億人民幣。

「積極正面的銷售目標,配合努力不懈的科研及技術提升,成為公司不斷向前發展的動力,亦反映他們對模具業前景感到十分樂觀。這種正面態度是值得讓我們香港業界借鏡觀形。每家企業均需要突破限制,主動「走出去」強化自己獨特之處,以達成目標。」蔡先生續指。「方正的目標是成為世界一流的汽車模具製造公司,其實每家企業只要有心,亦同樣可以。」香港模具協會一直希望帶領業界的方向,就是利用各地科技、技術、市場、管理條件,讓這百業之母,不繼追求卓越。

Investment in R&D generally demands the expenditure of a lot of capital, manpower and time, yet the returns are unpredictable. But the determination and effectiveness of Fangzheng with regard to technological improvement was quickly reflected in its startling sales growth. Annual sales grew from 230 million RMB in 2012 to 500 million in 2016, and the target for 2017 has been set at 600 million.

'Ambitious sales targets and untiring commitment to technological improvement are the driving force of the company's steady progress, and they reflect the company's great optimism about the future of the mould and die industry. This positive attitude should be a lesson for our industry in Hong Kong. Each company needs to push beyond its limitations and actively 'Go Global' to reinforce its distinctive characteristics and meet its targets,' observed Mr Choi. 'Fangzheng's aim is to be a world leader in automobile die manufacturing, but in fact any company can do the same, as long as it really wants to.' HKMDC is as eager as ever to lead the industry forward, and this means using the science, technology, market, and management conditions of each locality to make our industry, the mother of innumerable other industries, strive unceasingly for pre-eminence.

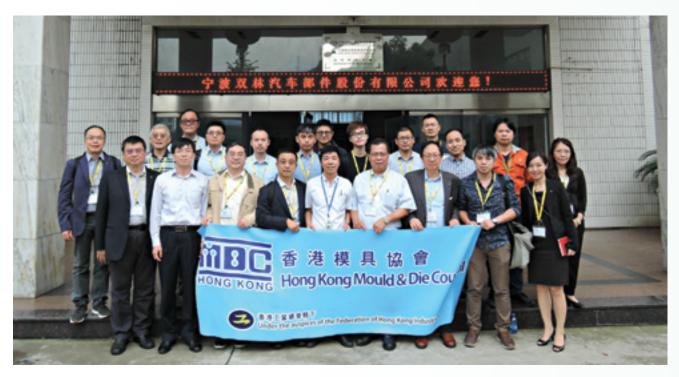




### 推動中小企的模具園區 A Mould Industrial Park Which Encourages Small and Medium Enterprises

考察團其中一個行程到訪的寧波模具產業園區,是寧波工業投資集團有限公司與寧海縣政府合作投資建設的模具產業的專業園區,概念跟內地保稅區及香港科學園有點相似。模具園一方面培育寧波中小模具企業及高新技術企業,推動現代化生產;一方面提供政策優惠,包括高新技術企業優惠政策及園區內「智能汽車小鎮」的相關優惠;整體再配合金融、信息、人才等服務,建設一個小社區模式的 「模具+」 產業配套區。目前,知豆電動汽車、奇藝金屬、天基汽車部件,已進駐園區。

The study group then proceeded to the Ningbo Mould Industrial Park. This is a special park for the mould and die industry set up as a joint venture by Ningbo Industrial Investment Group Co Ltd and the Ninghai County Government. It is similar in concept to bonded areas on the Mainland and to Hong Kong's Science Park. One of the Park's aims is to foster medium and small mould and die companies and high-tech companies in Ningbo, promoting modernised production; another is to provide preferential policies, including benefits for high-tech enterprises and benefits related to the "Smart Car Village" in the Park. It also co-ordinates general services in finance, information and personnel, providing a community-style "Mould+" industry support zone. To date, ZD Electric Cars, Qiyi Metal and Tianji Automotive Components have all set up facilities in the Park.



寧波許多企業,因看準汽車及高新技術的勢頭而升級轉型,像寧波模具產業園區的建設推廣,對企業有很好的幫助。考察團中到訪的寧波雙林模具有限公司,就是其中一個升級轉型的例子。雙林於1987年成立,由家電模具轉型到汽車內外飾件的模具。園區亦盼望有機會培育多些企業,成功升級轉型,推動高新技術。

Many Ningbo enterpirses, confident of the momentum of the automobile and high-tech sector, are transforming and upgrading, and the establishment and expansion of a place like Ningbo Mould Industrial Park is extremely helpful to them. Ningbo Shuanglin Mould Co Ltd, visited by the delegate group, is an example of a company transforming and upgrading in this way. Shuanglin was founded in 1987, and has transformed from a company making moulds for domestic electrics to one making moulds for interior and exterior automobile fittings. The Park hopes to be able to encourage many companies to make a success of their upgrades, promoting the move to high-tech.





### 看重人才的大注塑機製造企業

### A Large Injection Mould Machine Manufacturer that Values Talent

「人才是企業之本,但缺乏人才正是製造業其中一樣最大的 挑戰」蔡先生指。「年輕一代,無論香港或內地,都會選 擇較舒適的文職工作,而非到廠房做技術。但長飛亞的技 術人員,很多是從高校畢業,經過內部悉心栽培的,因此 向心力很強,亦造就今天的煇煌成績。」

考察團最後一站到訪的寧波長飛亞塑膠機械製造有限公司 是海天國際控股有限公司的成員。海天國際作為世界上產 量最大注塑機製造企業,為市場提供了二萬九千五百台注 塑機,其中約30%的產品出口至130餘個國家與地區。海天 國際控股有限公司在過去的40多年中致力於注塑機的研發 暨生產注塑機,成功地打造了「海天」的品牌,並在香港 掛牌上市。 'Employees are the most valuable assets and drivers of success for corporations, but lack of talent is one of manufacturing industry's greatest challenges' observed Mr Choi. 'Young people today, both on the Mainland and in Hong Kong, can choose more comfortable office jobs instead of dealing with technology in the factory buildings. But the technicians at Zhafir are mostly university graduates who have been carefully cultivated inside the company. This makes them unusually loyal. They are the reason for the company's outstanding results today.'

The last stop of the delegate group was Ningbo Zhafir Plastics Machinery Co Ltd, part of Haitian International. Haitian International is the world's largest producer of injection mould machines, and has supplied the market with 29,500 machines, around 30% of them being exported to over 130 countries and regions. In the last 40 years or so the Group has dedicated itself to injection mould machine R&D and production, building the Haitian brand and getting listed on the Hong Kong Stock Exchange.



「如果我買了注塑機,沒有良好的售後技術支援,亦得物無所用。因此,售後服務的質素非常重要,而服務的重點就是人,人才就成了關鍵。」考察團成員説。香港人才的適應性和靈活性大,吸受新技術的能力高,高度誠信與專業的工作操守,豪不遜色。因此,業界亦透過各種新的培訓方式,希望吸引新一代的年輕人從事模具及製造業,推動科技創新。

'If I buy an injection mould machine and there isn't good after-sales technical support, my purchase is useless. That's why the quality of after-sales service is so important, and this service centres on people, people are key,' said a delegate. Hong Kong people are very adaptable and flexible, they are good at absorbing new technology, and their honesty and professional work ethic are first rate. For this reason the industry is using all sorts of new training methods to attract a new generation of young people who will take up mould and die work and manufacturing and drive technical innovation forward.





### 交流互引:模具業的持續發展

### Let's Keep in Touch: Further Development in the Mould and Die Industry

香港模具協會籌辦是次考察團,其中一個目標是與各地的 模具業朋友建立更緊密的關係,亦希望藉此可以彼此激發 新思維,讓模具業能持續發展。蔡先生說:「我們看到寧 波業界對模具業的前景是充滿正能量的,協會期望年青一 代亦能抱持這種積極思想,令模具業得以持續發展。」

是次行程收穫甚豐,除了透過海縣模具行業協會及工總第32分組香港自動化科技協會主席黎啟東先生的聯繫,前往幾家高產值的企業廠房觀摩交流外,寧海縣人民政府僑務辦公室代表亦親身與孫啟烈教授及考察團成員會面,逐一向各資深及年青業界作親切的交流,亦讓寧海的同業看到香港業界的生力軍,在此期待雙方未來有更多技術交流與合作的機會。

When HKMDC devised this mission, one of its aims was to build closer relations between mould and die colleagues in different locations. It was hoped that this would give rise to a crossfertilisation of ideas, helping the industry to go on developing. Mr Choi says: 'Having seen how full of positive energy the Ningbo mould and die industry is about the future of their sector, we in the Council hope that young people will maintain a positive frame of mind, so that the mould and die industry will continue to develop.'

The tour reaped a rich harvest. Not only did the Ninghai Mould Association link up with Mr Robert Lai, Chairman of Group 32 of the Hong Kong Automation Technology Council, to arrange networking visit to a number of high value product manufacturing plants, but representatives of the Ninghai People's Government Overseas Chinese Affairs Office also met with Professor Cliff Sun and delegate group, establishing close relations with delegates of the industry both senior and junior. It was also a great opportunity to let our friends in Ninghai met the future face of the industry in Hong Kong, and it is hoped that in days to come the two sides will have many more opportunities for technological exchange and cooperation.







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### 香港模具協會及香港塑膠業協會聯合晚宴2016 HKMDC & HKPIC 27th Anniversary Joint Dinner

香港模具協會及香港塑膠業協會聯合晚宴於2016年11月11日香港金域假日酒店順利舉行,由商務及經濟發展局局長蘇錦樑先生擔任主禮嘉賓,多名工總領導亦有出席此盛會。席間,蘇局長及模協主席楊悰傑博士,分別分享「創潮」營商趨勢及如何以創意為工業注入新動力。

大會亦邀得11間設計創意產品和原型模板設備的企業透過小型展示會及分享環節與會員互相交流,藉此加強跨行業間之聯繫,並發掘更多合作機遇。



Hong Kong Mould and Die Council & Hong Kong Plastic Industry Council have successfully held their 27th Anniversary Joint Dinner at Holiday Inn Golden Mile Hong Kong Hotel on 11 Nov 2016. Two councils were delighted to have Mr Gregory So, Secretary for Commerce & Economic Development, to be the guest-of-honor.

The theme of the event was "Collaborating Across Industries Exploring Creative Synergies Capturing New Opportunities". Gregory So, Secretary for Commerce & Economic Development, was invited to be the Guest-of-Honour of the dinner. During which, Mr So and Dr Yeung, Chairman of HKMDC, delivered their inspiring presentations to share with attendees their insights on the latest technologies and economic situation.

In this special occasion, 11 companies with creative product and devices were also invited for small showcases and exchanges views with members, strengthening the interconnection amongst different industries and helping to explore more future co-operation opportunities.

