

CITFDIGEST



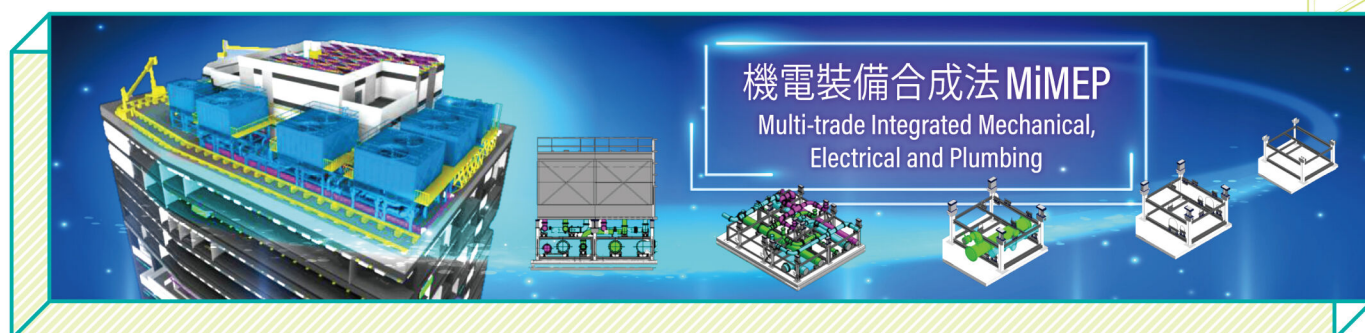
CITF 建造業
創科基金

二零二二年十二月 DEC 2022 / 第十四期 ISSUE 14

融匯科技 創建香港 WE INNOVATE, WE BUILD

為迅速解決市民的住屋需要，政府除了鼓勵業界採用「機電裝備合成法」外，還積極研究可否在公屋的建造過程中引入「機電裝備合成法」，以進一步縮短建築周期，加快施工，增加房屋供應。

To promptly address the housing needs of the public, apart from encouraging the industry to adopt MiMEP, the Government not only encourages the industry to adopt MiMEP but also studies the possibilities of introducing MiMEP into the construction process of public housing to further shorten the construction period, speed up the construction process and increase housing supply.



甚麼是「機電裝備合成法」？

「機電裝備合成法」指多種屋宇裝備結合成為多工合成構件，在場外預製工場生產，並運送至工地進行組裝，以完成屋宇設備的安裝，將現場安裝工序減至最少的方法。

建造業創新及科技基金支援業界採用「機電裝備合成法」

建造業創新及科技基金督導委員會於二零二二年七月中通過組裝合成建築法評審小組委員會的建議，把「機電裝備合成法」納入基金資助範圍，以加強支援機電業界採用創新科技和建築方法。

粗略來說，基金在項目設計和項目建築兩方面，為項目顧問和機電分包商提供70%的配對資助。項目設計方面，項目顧問和機電分包商可就設計「機電裝備合成法」建築信息模型、更新模型和制定預製計劃等分別獲發最多港幣500,000元資助。至於項目建築方面，機電分包商可就「機電裝備合成法」場外預製工場的租金和「機電裝備合成法」多工合成構件的額外運輸及安裝費用獲發最多港幣2,500,000元資助。

雖然我們沒有限制可申請資助的工程項目類別，但合資格的「機電裝備合成法」項目必須為一個六層或以上的建築項目或「機電裝備合成法」水平及/或垂直安裝面積不少於3,000平方米的项目。為進一步推動整個業界採用「機電裝備合成法」，基金只會資助符合級別3和級別4的「機電裝備合成法」多工合成構件。基金不會資助本地普及已久的模組安裝方法，包括電梯、自動扶梯、冷凍機、發電機、空氣處理機組、配電箱/掣櫃，以及那些一般會以場外預製的形式，運送至工地組裝的多工合成構件。

What is MiMEP?

Multi-trade Integrated Mechanical, Electrical and Plumbing (MiMEP) refers to the integration of multi-trade building services components into a single volumetric assembly of prefabricated modules, manufactured offsite, then transported to the site for connection of modules to complete various trades of building services installations to minimise on-site works. Installation efficiency will be enhanced as no site restrictions will be placed upon MiMEP.

The CITF supports the industry to adopt MiMEP

In mid-July of 2022, the Steering Committee of the CITF approved the MiC Vetting Sub-committee's proposal to include MiMEP into the funding scope to better support the Electrical & Mechanical (E&M) industry to adopt innovative technologies and construction methods.

Roughly speaking, the CITF will provide 70% matching fund to project consultants and MEP sub-contractors in adopting MiMEP in both project design and project construction. In terms of project design, project consultants and MEP sub-contractors can each receive a maximum of HK\$500,000 for designing the BIM model on MiMEP, updating the model and formulating prefabrication plans. As for project construction, MEP sub-contractors may be subsidised up to HK\$2,500,000 for the rent of off-site prefabrication workshop and additional delivery and installation costs of MiMEP modules.

Although there is no restriction on the type of construction projects, an eligible "MiMEP" project shall be a building project of not less than 6 storeys high or any project with MiMEP installation horizontal area and/or vertical area not less than 3,000sqm. To promote further adoption of MiMEP across the industry, the CITF only subsidises MiMEP modules reaching LEVEL 3 and LEVEL 4 at this stage. The CITF will also exclude prevailing practices on MiMEP adoption including elevators, escalators, chillers, generator sets, AHU's, switch boards and those which are mostly prefabricated offsite for delivery to site in modules.

<https://www.citf.cic.hk>

CITF 建造業創新及科技基金

[citf.cic.hk](https://www.citf.cic.hk)



發展局
Development Bureau



CONSTRUCTION INDUSTRY COUNCIL
建造業議會

「機電裝備合成法」的四個級別 4 Levels of MiMEP

1 級別 LEVEL

預製組件

(例如：水管、預先絕緣塑膠管等。)

Prefabricated component (e.g.: Water pipes, pre-insulated plastic piping and etc.)



有關「機電裝備合成法」的資助範圍、模式及上限等資料，請參閱已上到基金網頁的申請框架。

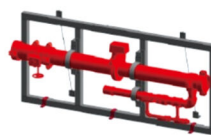
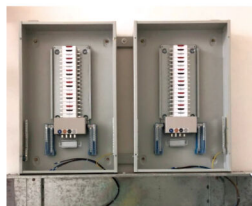
Please refer to the Application Framework uploaded onto the CITF website for more information on the MiMEP funding scope, mode and ceiling.

2 級別 LEVEL

單一工種組裝成的元件

(例如：消防管道、電力品質監控系統/微型斷路器板合成構件等)

Single-trade sub-assembly (e.g.: Assembly of FS pipes, assembly of PQM or MCB Board and etc.)



3 級別 LEVEL

多工種集成元件 (例如：帶結構支撐的預製減壓閥、預製機房多工合成構件等)

Multi-trade integrated unit (e.g.: Prefabricated pressure reducing valve with structural supporting frame, prefabricated plant room module and etc.)



4 級別 LEVEL

「組裝合成」建築法形式的機電裝備

(例如：獨立式多工合成機房)

MiMEP in form of MiC (e.g.: Free-standing integrated plant room module)



常見問題 FAQs

我可否就同一構件同時申請基金為「組裝合成建築法」及「機電裝備合成法」而設的資助？

Can I apply for the subsidy on the same modules under both categories of MiC and MiMEP of the CITF?

答：申請人可就同一工程項目向建造業創新及科技基金申請「組裝合成建築法」及「機電裝備合成法」的資助，惟「組裝合成建築法」組件和「機電裝備合成法」多工合成構件必須並非指同一構件。

Ans: Applicants may apply for the CITF on MiC and MiMEP for the same project provided that its MiC and MiMEP modules are not referring to the same modules.

水管和排水設施分包商可否向基金申請「機電裝備合成法」的資助？

As a plumbing and drainage sub-contractor, can I apply for the MiMEP category under CITF?

答：總承建商指定的機電分包商如符合基金的申請資格，便可申請機電裝備合成法的資助。指定的機電分包商應為主要負責統籌「機電裝備合成法」的設計及生產工作的分包商。合資格的機電分包商可就項目設計及/或項目建築申請基金為「機電裝備合成法」提供的資助。

Ans: Subject to the eligibility requirement of the CITF, the MEP Sub-contractor nominated by the Main Contractor is eligible to apply for MiMEP subsidy. The nominated MEP Sub-contractor should take up the main coordination work on the MiMEP design and fabrication. Eligible MEP Sub-contractors can apply for MiMEP subsidy for project design and/or project construction.

預先組裝的自動扶手梯是否為合資格申請基金資助的「機電裝備合成法」項目？

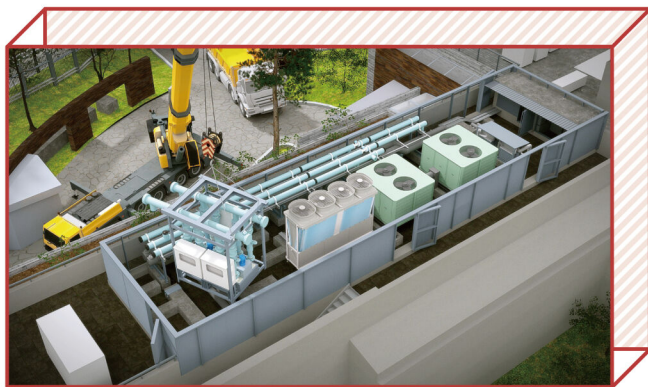
Is pre-assembled escalator considered as eligible MiMEP for CITF subsidy?

答：由於預先組裝的自動扶手梯歸納為在香港普及已久的模組安裝方法，因此不被納入基金就「機電裝備合成法」提供資助的範圍內。

Ans: Pre-assembled escalators falls within prevailing existing practices in Hong Kong and will therefore be excluded from the CITF subsidy for MiMEP.

為進一步提升建造效率、縮短施工流程和改善工地安全，建造業創新及科技基金(基金)一直積極鼓勵業界採用場外生產技術。除了資助業界採用「組裝合成」建築法之外，基金剛把「機電裝備合成法」納入資助範圍。為了讓大家更清楚明白「機電裝備合成法」的應用，我們邀請了機電工程署和協興建築與我們分享在工程項目採用「機電裝備合成法」的經驗。

To further enhance construction efficiency, shorten the construction process and improve site safety, the Construction Innovation and Technology Fund (CITF) has been proactively encouraging the industry to adopt off-site production technologies. In addition to subsidising the industry's adoption of the 'Modular Integrated Construction' construction method, the CITF has just included the 'Multi-trade integrated Mechanical, Electrical and Plumbing' (MiMEP) into its funding scope. In order to give you a better understanding of MiMEP adoption, we invited the Electrical and Mechanical Services Department and Hip Hing Construction to share with us their project experience in MiMEP adoption.



團隊在設計過程中應用建築信息模擬技術，成功提升系統及模組設計的準確度。
The team adopted BIM technology in the design process, successfully improving the precision of the system and module design.

Q1. 可否簡單介紹一下機電工程署採用「機電裝備合成法」的工程項目？

機電工程署緊貼工程新趨勢，首次應用「機電裝備合成法」(MiMEP)、建築信息模擬(BIM)技術及政府物聯通、語義人工智能等數碼技術，更換漁農自然護理署轄下大龍獸醫化驗所四部已使用逾20年的製冷機。

在該試驗項目中，我們主要把BIM的優勢發揮在更廣泛的層面上，例如採用多種數碼技術，包括三維激光掃描、擴增實境、「機電裝備合成法」、資產管理和項目管理等。

Q2. 機電工程署當初為什麼會萌生採用「機電裝備合成法」的念頭？

機電工程署為發展局轄下的重要工務部門，自二零二一年六月與發展局、建造業議會和香港機電工程商聯會成功合辦「機電裝備合成法」論壇後，一直積極推動「機電裝備合成法」。我們選定了大龍獸醫化驗所的製冷機更換工程為試驗項目，在維修、保養、改建和加建工程中成功應用「機電裝備合成法」和BIM技術完成更換工程。我們通過各種方式宣傳這個「機電裝備合成法」試驗項目，例如機電創科日2022、署長日誌、機電傳聲、Autodesk Hong Kong BIM Awards 2022等，我們亦積極參與最近舉行的2022年建築創新博覽。機電工程署會繼續致力推動業界在類似的改裝工程項目中採用「機電裝備合成法」。

Q3. 採用「機電裝備合成法」有什麼需要注意的地方？

為免重複工序，「機電裝備合成法」模組的設計必須十分精準。詳細的空間規劃和物流配套對於是否可採用「機電裝備合成法」亦至關重要。我們需要精確掌握模組的尺寸，以便在狹小的機房內安裝模組，並避免與現有裝置發生碰撞。此外，還需要詳細分析從廠房運送模組和設備到指定地點所途經路線的寬度和高度。上述限制將決定每個模組的實際尺寸。因此，要成功採用「機電裝備合成法」，需適當配合BIM技術。

Q4. 與傳統方法相比，「機電裝備合成法」能在成本控制及提高建造質素方面帶來什麼好處？

這試驗項目採用「機電裝備合成法」進行，工程期間沒有出現重複工序或位置偏差的情況，可謂非常成功。項目時間控制得宜，整個更換工程在不影響客戶的正常運作下，節省近60%施工時間。此外，由於大部分工序在廠房處理，工地的人手可節省約50%。就此而言，建築安全方面的潛在風險可大大降低。再者，隨着工程質量和準確度提高，建築廢料可減少約70%。這項目進一步證明，「機電裝備合成法」等科技不僅適用於新建項目，還可以為維修、保養、改建和加建項目帶來好處。

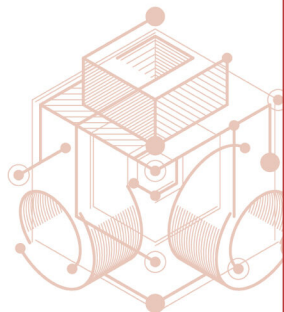
Q5. 你認為基金的新措施能協助業界更廣泛及更有效應用「機電裝備合成法」嗎？

雖然建造業大型承建商應用「機電裝備合成法」的情況越趨普遍，但對於中小型承建商而言，他們可能因無法負擔高額的初期投資費用而未能作出新嘗試。因此，基金的新措施肯定能減輕業界採用「機電裝備合成法」的財務負擔，從而吸引更多持份者進入市場。長遠而言，正如上述「機電裝備合成法」所帶來的各種潛在好處，定能使業界更廣泛地應用有關技術。

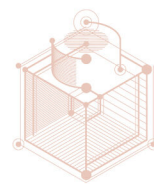
機電工程署
EMSD



想獲取更多「機電裝備合成法」資助範圍、模式與上限的資訊？
可參考上載於基金官網的申請框架。
Please refer to the Application Framework uploaded onto the CITF website
for more information on the MiMEP funding scope, mode and ceiling.



機電署善用多項創新技術為大龍獸醫化驗所更換製冷機，包括首次使用機電裝備合成法預製機電組件。
The EMSD used a number of innovative technologies to replace the chillers at TLVL, including prefabrication of E&M components with the use of MiMEP for the first time.



Q3 Are there any considerations regarding the use of MiMEP adoption?

High level of precision on the MiMEP module design is essentially required to avoid double handling work and a detail planning of the spatial arrangement and the logistic consideration is crucial for feasibility of MiMEP adoption. We have to be very sure of the accurate sizes of the modules so as to fit them in with the congested plant area and avoid conflict with existing installations. Moreover, detailed analysis of width and height of the delivery route from the factory to designed site for modules and equipment delivery is required. The above constraints would determine the physical size of each module. Therefore, the success of MiMEP adoption can only be accomplished with appropriate use of BIM.

Q4. As compared with conventional method, what are the benefits of adopting MiMEP, say in terms of cost control and build quality?

The MiMEP approach adopted in this project was considered very successful as there was no double handling or misplacement during the process. The time control of the project was so precise that 60% time saving was achieved without any disturbance to normal operation of end users. In addition, as most of the construction tasks were handled off site, on site manpower resources could save by around 50%. In this connection, the potential risk in construction safety could be largely reduced. Furthermore, with enhanced quality and accuracy of works, the construction waste could be reduced by around 70%. The success in Tai Lung Veterinary Laboratory further demonstrates that technological applications such as MiMEP are not limited to new projects but can also benefit Repair, Maintenance, Alteration and Addition projects.

Q5. Do you think the CITF can achieve a wider and more effective use of MiMEP across the industry with its new measures?

While MiMEP application is becoming more prevalent in construction industry for large size contractors, small or medium-sized contractors which may not be able to afford such high initial investment are deterred from pursuing such attempt. Therefore, the new funding support of the CITF would certainly attract more stakeholders in the E&M trade to enter into MiMEP market by easing their financial burden. In the long run, the CITF would impress practitioners with the benefits of MiMEP applications in projects, facilitating its healthy and sustainable development.

Q1. Can you briefly introduce your department's MiMEP project?

Keeping up with new engineering trends, EMSD applied MultiTrade Integrated Mechanical, Electrical and Plumbing (MiMEP), Building Information Modelling (BIM) technology and digital technologies such as Government Wide IoT Network, semantic AI etc. for the first time to replace four chillers which had been in service for more than 20 years in Tai Lung Veterinary Laboratory under the Agriculture, Fisheries and Conservation Department.

The pilot project essentially leverages the benefits brought by BIM in wider aspects such as 3D laser scanning, Augmented Reality, MiMEP, asset management and project management with the adoption of various digitalization features.

Q2. Why did your department come up with the idea of MiMEP adoption in the first place?

Being a key works department under the DEVB and riding on the success of organising the MiMEP Forum in June 2021 jointly with DEVB, CIC and HKFEMC, EMSTF has been playing an active role in promoting MiMEP. The Chiller Plant Replacement at Tai Lung Veterinary Laboratory has been selected as pilot project to showcase completion of retrofitting project with successful implementation of MiMEP with BIM (Building Information Modeling). This successful pilot project with MiMEP application was widely promulgated through various ways such as E&M I&T Day 2022, Director Blog, Voice Link, Autodesk HK BIM Awards 2022, and active participation in recent Construction Innovation Expo 2022. EMSD will spare no efforts in promoting MiMEP with BIM for future adoptions of these technologies in similar retrofitting projects.

基金統計數字

Funding

Statistics

獲批項目及總金額名單 (截至2022年11月30日)
List of Approved Projects and Amount (as at 30 Nov 2022)

	數量 Numbers	獲批總金額(港元) Amount(HK\$)
建築信息模擬軟件 Building Information Modelling (BIM) Training	682	2,900 萬
建築信息模擬硬件 BIM Software and Hardware	894	1 億
創新建築科技 Advanced Construction Technologies	1 063	3.85 億
「組裝合成」建築法 Modular Integrated Construction	61	1.42 億
預製鋼筋 Prefabricated Steel Rebar	150	1.2 億
人力發展 Manpower Development	35	1,300 萬
總數 Total :	2 885	7.9 億



(852) 2100 9000
(852) 2100 9090
enquiry@cic.hk
<https://www.citf.cic.hk>



Follow & Like us
CITF 建造業創新及科技基金



[citf.cic.hk](https://www.citf.cic.hk)



Q1. 可否簡單介紹一下貴公司的「機電裝備合成法」工程項目？

協興建築在將軍澳入境事務處總部工程項目中的數個環節採用了「機電裝備合成法」概念：



A 坐廁合成構件 MiMEP of closet
(即已安裝排氣管道、給排水管道、鋼架中的傳感器)
(i.e. completed with exhaust air duct, drainage pipework and water pipework, sensors in a steel rack)



B 預製冷卻塔裝置模組
Pre-fabricated Cooling Tower Plant Module

Q2. 貴公司當初為什麼會萌生採用「機電裝備合成法」的念頭？

現今，香港建造業正面對熟練工人短缺、工人老齡化、對環境和安全問題日益關注所帶來的挑戰。為了在不影響安全及環境的情況下提高生產力和建造質素，轉型至場外製造似乎是最可行的方案。因此，我們採用「機電裝備合成法」，以便迎接挑戰，取得突破。

Q3. 採用「機電裝備合成法」有什麼需要注意的地方？

在採用「機電裝備合成法」前，我們需要注意以下幾點：

- A. 模組化、重複度高但變化度低；
- B. 每個模組之間的連接；
- C. 可容許的現場組裝和預製件誤差；
- D. 供場外製造和組裝的地方；
- E. 方便運輸和運送的模組尺寸和重量；
- F. 對成本和時間的整體影響；
- G. 「機電裝備合成法」所需的安裝空間會較傳統方法所需的多一點，亦需要安裝更多鋼架以支撐預製組件，這意味着項目竣工後預留作維修用途的空間將少於傳統方法；以及
- H. 如可行的話，建築師應把同類型機房和洗手間的豎管設計在同一垂直位置，以增加採用更多垂直的「機電裝備合成法」預製組件的可能性。

Q4. 與傳統方法相比，「機電裝備合成法」能在成本控制及提高建造質素方面帶來什麼好處？

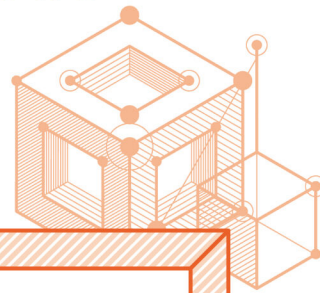
採用「機電裝備合成法」能帶來以下好處：

- A. 節省現場施工時間；
- B. 預製工場的工作環境較建築工地的好，有助改善手工質量，工人亦可以使用機械來進行製造和裝配工作；
- C. 將高空勞工密集的工作減至最少，有助預防工人在工地中暑；
- D. 減少噪音、粉塵污染和材料浪費；以及
- E. 通過使用BIM技術盡早協調細節，減少白費工夫的情況。

Q5. 你認為基金的新措施能協助業界更廣泛及更有效應用「機電裝備合成法」嗎？

基金絕對可以促使業界更積極考慮採用「機電裝備合成法」。雖然顧問須先設計「機電裝備合成法」的建築信息模型，但「機電裝備合成法」項目能否成功落實，實有賴各方在施工階段的緊密配合。

雖然使用「機電裝備合成法」的整體成本較傳統施工方法為高，但「機電裝備合成法」能帶來多種好處。基金可藉着提供資助鼓勵更多機電承辦商在不同項目中開發和應用「機電裝備合成法」。「機電裝備合成法」不但協助我們面對人手短缺的挑戰和處理對安全及環境的關注，應用創新建築科技亦有助吸引新人投身建造業。

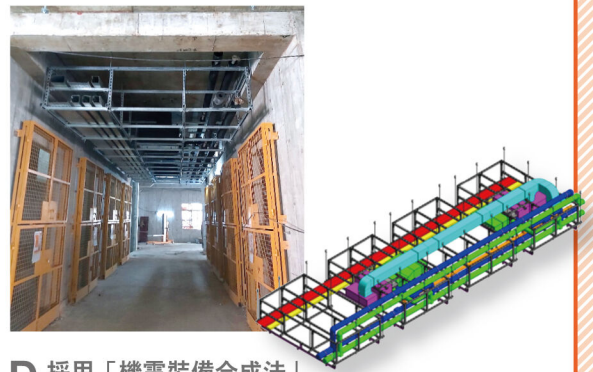


Q1. Can you briefly introduce your company's MiMEP project?

There are several items which we have implemented the MiMEP concept in the project of Tseung Kwan O Immigration Headquarters –



C 預製冷設備水泵裝置模組裝嵌
Chiller Plant Pump Set Modular assembly



D 採用「機電裝備合成法」的典型電梯大堂
MiMEP at typical lift lobby

Q2. Why did your company come up with the idea of MiMEP adoption in the first place?

Nowadays, the local construction industry is facing the challenges of skilled labour shortage, aging workers, and more rigorous environmental and safety concerns. To enhance productivity and uplift build quality while not compromising safety and the environment, turning to offsite manufacturing seems to be the most viable option. We therefore adopt MiMEP in an attempt to not only face up to the challenges but to break through.

Q3. Are there any considerations regarding the use of MiMEP adoption?

There are several points that we need to consider before MiMEP adoption:

- Modularity, high repetition with low variations;
- Connections between each modular;
- Allowable site tolerance and assemble tolerance;
- Areas for off-site manufacturing and assembly;
- Size and weight for transportation and delivery concerns;
- Overall cost and time implication;
- The installation space required for MiMEP will be a little bit more than that of the traditional method. More steel frame will have to be installed to support the MiMEP units. In other words, the allowable maintenance space following project completion will be less than that of traditional method.
- If possible, architect should design the riser location of same type of plant rooms and toilets in the same vertical position to increase the likelihood of adopting more vertical MiMEP solution;

Q4. As compared with conventional method, what are the benefits of adopting MiMEP, say in terms of cost control and build quality?

Adoption of MiMEP can bring the following benefits:

- Save on-site construction time;
- Improve quality of workmanship as the offsite working environment is better than the onsite ones. Machineries can be employed to assist the manufacturing and assembly works;
- Minimise labor intensive works at height and prevent workers from getting heat stroke onsite;
- Reduce noise, dust pollution, and material wastage;
- Reduce abortive works with early detail coordination via BIM.

Q5. Do you think the CITEF can achieve a wider and more effective use of MiMEP across the industry with its new measures?

The CITEF absolutely can prompt the construction industry to consider MiMEP construction method more proactively. Although consultants should take the very first step in designing the MiMEP BIM Model, the successful implementation of a MiMEP project hinges on all parties' close coordination during the construction stage.

Although the overall cost of using MiMEP is higher than that of the traditional construction method, there are multiple benefits MiMEP can bring along. The CITEF subsidy can encourage more E&M contractors to develop and apply MiMEP into different projects. Not only does MiMEP help us to face up to the challenges of manpower shortage and address safety and environment concern, the adoption of modern construction method can also help draw in new bloods to the construction industry.



想獲取更多「機電裝備合成法」資助範圍、模式與上限的資訊？
可參考上載於基金官網的申請框架。
Please refer to the Application Framework uploaded onto the CITEF website
for more information on the MiMEP funding scope, mode and ceiling.