

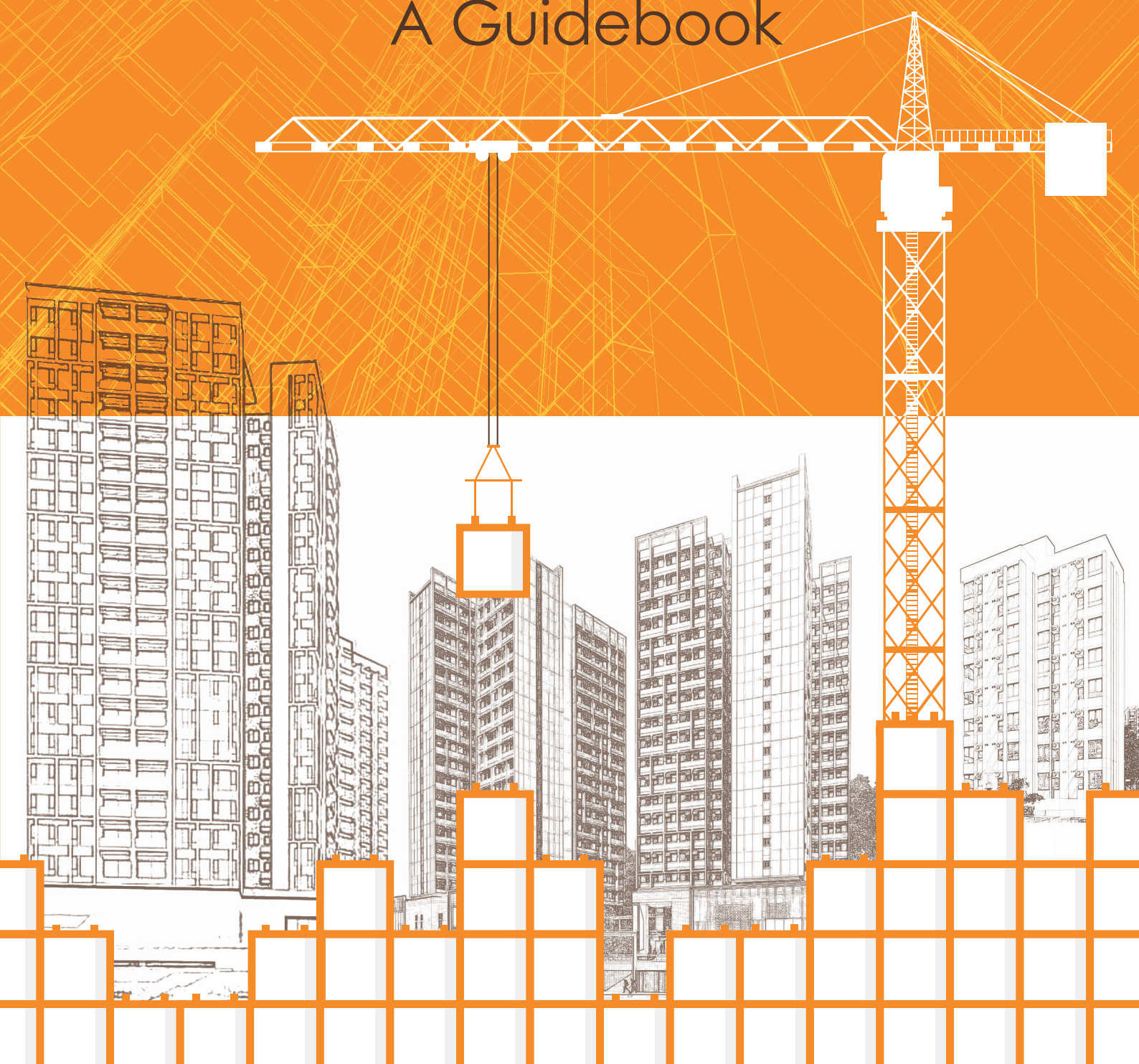


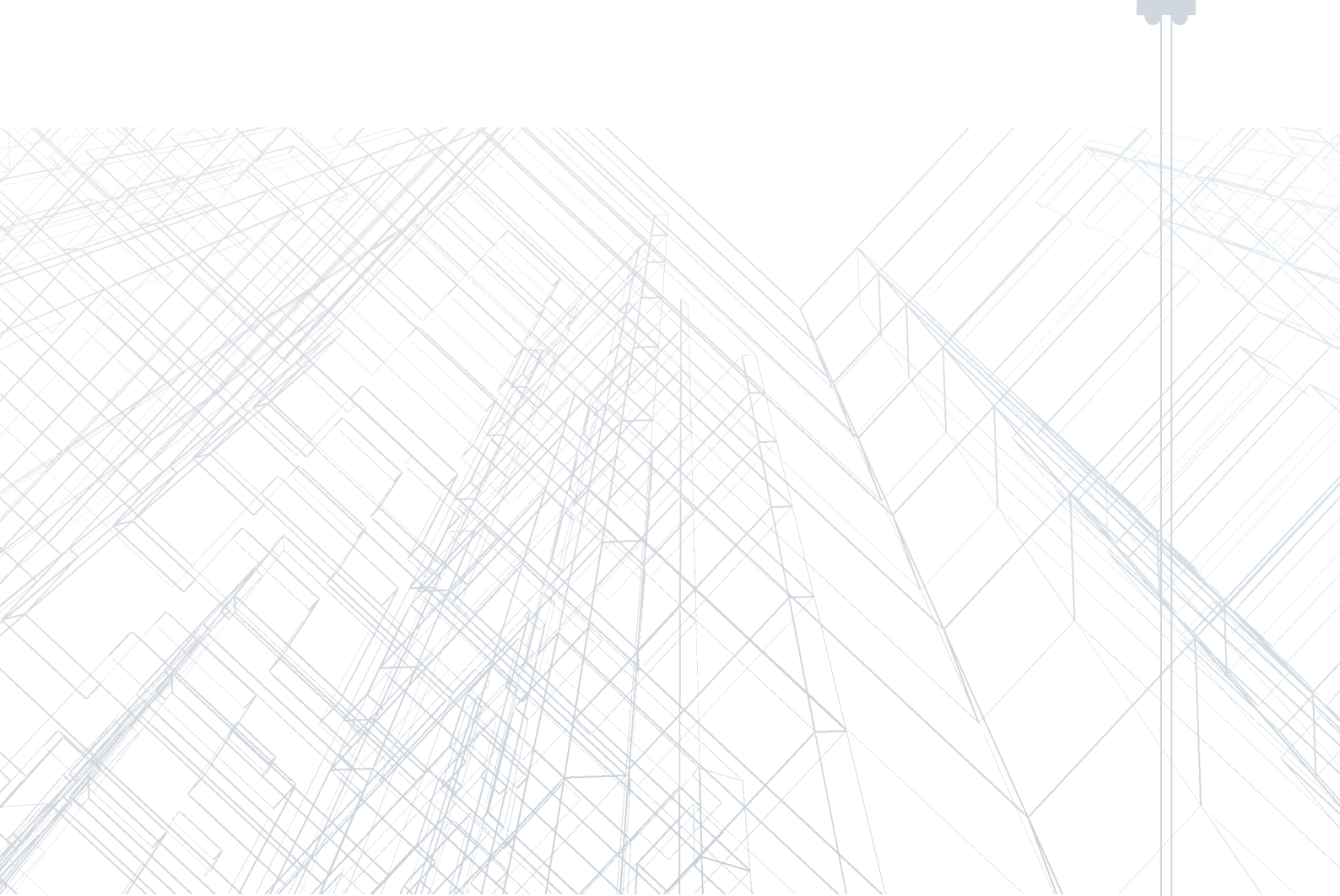
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模塊組合建造實驗室
MiC Laboratory

Safe Heavy Lifting in Modular Integrated Construction for High-Rise Buildings A Guidebook





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Foreword ● ● ●

The Government of the Hong Kong Special Administrative Region has been spearheading the adoption of Modular Integrated Construction (MiC) since 2017. MiC is a new quality productive forces, revolutionising the building industry by offering a faster, safer, and more sustainable approach to construction. One of the most critical challenges in high-rise MiC projects lies in the safe lifting of heavy and bulky modules using tower cranes.

Lifting operations are inherently complex and pose significant risks, especially in dense urban environments where spatial constraints and site logistics require meticulous planning and precise execution. To address these challenges, I appreciate that the MiCLab of The University of Hong Kong has conducted an extensive study to enhance the safety of MiC lifting operations. This guidebook is a key outcome of that study, systematically identifying the risks associated with module lifting and introducing safety assurance and safety control measures alongside innovative smart crane lifting technologies. It aims to equip industry stakeholders with the knowledge and tools necessary to ensure safer and more efficient lifting practices.

Hong Kong continues to lead in the adoption of MiC technology and it is essential to foster a strong culture of safety and innovation. By equipping industry professionals with the insights and strategies needed to achieve a safe lifting environment, this guidebook will drive the broader and more effective implementation of MiC.

Ir LAU Chun Kit, Ricky, JP

Permanent Secretary for Development (Works)

The Government of the Hong Kong Special Administrative Region

Preface ● ● ●

The Government of the Hong Kong Special Administrative Region has promoted the adoption of Modular Integrated Construction (MiC) in the construction industry since 2017. MiC is the most advanced off-site construction technology, with demonstrated benefits such as shortened construction periods, enhanced site construction productivity, improved site health and safety, and reduced construction waste. MiC has been increasingly adopted in both public and private buildings in Hong Kong.

Lifting using tower cranes in MiC projects dominates on-site construction activities and significantly affects construction safety and efficiency. By nature, MiC integrates structural, electrical, mechanical, plumbing, finishing works, and furniture in many cases, into prefabricated volumetric modules, which therefore become heavy and bulky. The lifting of such hefty modules may cause their collisions with the surrounding facilities, such as moving objects and static structures. Consequently, such risks should be well monitored and prevented.

Various codes of practices and guidebooks have been developed to promote safe lifting in construction, with typical examples including the Lifting Safety Handbook co-published by the Development Bureau (DEVB) and the Construction Industry Council (CIC), Code of Practice for Safe Use of Tower Cranes published by the Labour Department, and Reference Material on Heavy Lifting Operation for MiC Projects published by the CIC. However, several knowledge gaps have been identified, which must be addressed to achieve safe module lifting and facilitate the wide adoption of MiC. These gaps primarily include the incompletely understood risks posed by module lifting in MiC, absence of systematic and consistent safety assurance and safety control (SA/SC) guidelines for MiC module lifting using tower cranes, and lack of codes or handbooks with systematic smart solutions for monitoring and preventing the collision risks posed by module lifting in MiC.

Therefore, MiCLab of The University of Hong Kong was funded by the DEVB to conduct a study aiming to achieve zero-accident module lifting in MiC through developing SA/SC guidelines for module lifting using tower cranes and a smart monitoring and risk prevention system for collision-free module lifting. As a part of the research that reports the MiC lifting risks, contributing factors, mitigation measures, and a smart monitoring system, this Guidebook should assist clients, consultants, and contractors in managing module lifting in MiC projects and help raise the awareness of the construction industry regarding the safe use of heavy-duty tower cranes in MiC.

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