HK OCCUPATIONAL SAFETY & HEALTH ASSOCIATION 香港職業安全衛生協會

安全通訊 Safety Bulletin

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香 港 職 業 安 全 衛 生 協 會
THE HONG KONG OCCUPATIONAL SAFETY AND HEALTH ASSOCIATION

Technical Visit and Experience on Construction Safety Training Platform (XR)

Author: VTM Digital Limited

HKOSHA recently collaborated with VTM Digital Limited, a passionate extended reality (XR) training and learning company, to conduct an immersive XR construction safety workshop. The event was a resounding success, and our members experienced firsthand the transformative power of XR within the construction industry.

What is XR? Extended reality (XR) is a universal term inclusive to immersive learning technologies virtual reality (VR), augmented reality (AR), and mixed reality (MR). Adding to or simulating the real world through digital materials is an effective way to modernize corporate training programs.

Group Photo from XR Construction Safety Workshop at VTM's Office.

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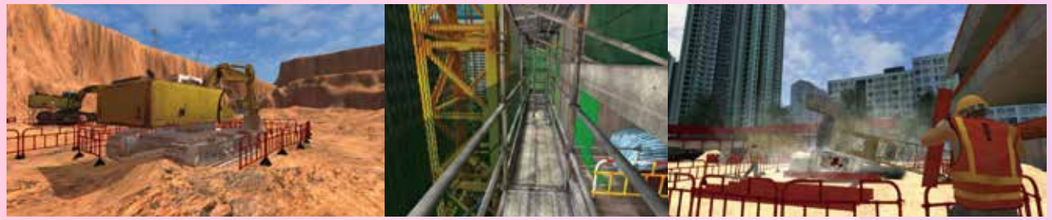
We engaged in candid discussions during the workshop, exploring practical scenarios where XR significantly enhances safety. From virtual site inspections to hazard simulations, we learned how XR can revolutionize safety awareness. Members donned VR head-mounted display, immersing themselves in virtual construction environments. Through this tactile experience, they grasped how XR can revolutionize safety training.

VTM showcased something really important during the workshop — the “Accident Preview Mode.” This model is designed not to frighten participants but to realistically simulate industrial accidents. Why? Well, it helps everyone understand just how crucial safety is. Think of it as a powerful tool for improving safety training and helping us all be more aware of risks.

Interactive Q&A and Feedback: Members actively participated, sharing valuable insights and experiences. This engagement highlighted the importance of continued collaboration between XR technology and safety practices.

HKOSHA Executive Council Member, Mr John LAI experienced the XR training and presented HKOSHA souvenir to VTM Digital Limited in the workshop.

Introduce Construction Training Platform (CTP)



Vision in CTP VR Training

The Construction Training Platform (CTP) is Hong Kong’s pioneering VR-based training solution for the construction industry. With over 40 XR modules available, CTP has trained more than 10,000 workers across 70+ construction worksites. However, what exactly does CTP offer?

Modules in CTP

CTP aims to enhance construction professionals’ safety awareness and knowledge. Within this platform, a series of modules provides valuable training experiences, catering to novice and seasoned workers. These modules are essential tools, offering various learning modes and practical insights to ensure a safer and more informed workforce.

Modules Category:

- Emergency Response
- Construction Site Safety Overview
- Tunnel Safety
- Piling Works
- Working at Heights
- Lifting Operations
- Confined Spaces
- Electrical Work
- Hot Work
- Powered Access Platforms
- Pedestrian and Roadway Works
- Working off the ground
- Foundation Work
- Slope Engineering
- Water Safety
- Modular Building Assembly

In just 3-5 mins VR training time, trainees can experience what may take weeks or months for them to encounter in the field. This time-efficient method allows trainees to familiarize themselves with a work environment before they physically enter it. Even those who have never visited a specific facility or location can navigate it, avoiding potential hazards

Beyond Training: Data, Efficiency, and Unlimited Use

CTP does not stop at training alone. We provide comprehensive training data records, data analysis, and an account system. However, there is more; leveraging VR, CTP accelerates training while improving efficacy. It maximizes production capacity and minimizes non-productive hours. The result reduced human error and fewer safety and environmental hazards.

Also, once a VR environment is created, it becomes a reusable asset. This limitless reuse extends the potential for training and knowledge acquisition while reducing the time and cost of off-site training. CTP is not just about safety. It is about revolutionizing how we prepare our workforce for the construction industry’s challenges and inspiring change and improvements.

One of the CTP Subscribers - Airport Authority Hong Kong Training Scene

Ready to embark on your XR training journey? Reach out and scan to contact us and learn more about us!

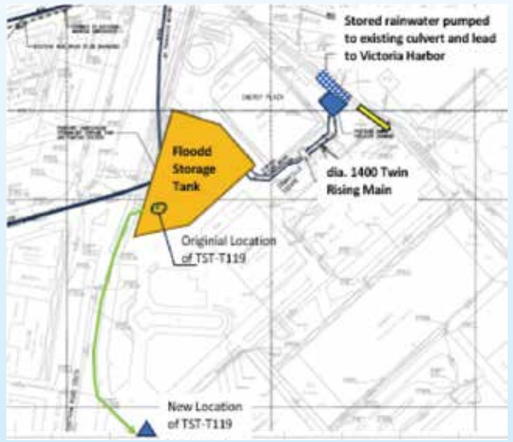
VTM

Higher-order Innovation and Practice for Downtown Tree Transplanting

Author: Chun Wo Construction and Engineering Company Limited – Kwan Lee Holding Limited Joint Venture

Background

Chatham Road South (near Granville Road) is the last flooding black spot in the Kowloon region. In the year 2021, the Drainage Services Department (DSD) engaged Meinhardt to design a drainage system intercepting the overflow drain at Cameron Road, Granville Road, Kimberley Road, and Observatory Road, and further drain to a flood storage tank of 18,000m^3 storage capacity. Under acceptable weather and sea tide conditions, the stored rainwater will be pumped to the nearby box culvert, which leads the drainage to Victoria Harbor. CW-KL JV was awarded as the main contractor of this contact and possessing site on 19 August 2022.



The conforming pumping station is located at a portion of the Urban Council Centenary Garden (UCCG), with an aged Ficus Bebjamina (reference TST-T119) in that portion of UCCG. Prior to the construction of the pumping station, it needs to be transplanted to another portion of UCCG, which is about 100m to the south of the current location. With the steel support for transplanting, the total weight is about 100 tons and the covering dimension is about 4m (wide) x 7m (long) x 16m (tall). Having proposed the transplanting work to the HK Police and Transport Department, CW-KL JV was allowed to conduct the transplanting work between 01:30 and 04:30 on Sunday early morning. The permitted time may be even less due to actual traffic conditions. The Project Team has to plan thoroughly and execute the work plan in a precise manner. The following has been deployed/applied to complete this remarkable tree transplanting work on time, limiting duration and congesting the Tsim Sha Tsui Region.

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Utilization of Hydraulic Jack to Lift the Tree

Compared to the traditional crane uplifting method, which involves the mobilization routing of large mobile cranes into existing urban parks with extensive vehicular access and securing sizable stable sitting ground, hydraulic jacks utilize significantly less space during installation and operation. They also significantly reduce transplant preparation work and minimize reinstatement work for the existing facilities and street furniture. This benefits the care of neighbors and the public in existing urban parks.

Even the best method was to clear-cut all of the connecting roots outside the target root ball from the environment before the tree was lifted; usually some sinker roots remained. It is one of the challenges in the tree transplanting operation - It creates a shock load and swinging of trees when it presents itself. Lifting through wires, ropes, and synthetic fabric slings by crane may create unnecessary shock load due to stretching in lifting gears and lifting the tree in any direction. Hydraulic jack does not cause such conditions. Hydraulic jacks have the advantage that they only uplift and downlift the tree without any lifting gears and lift it in any direction. It makes uplifting and downlifting much more foreseeable and reduces the potential failure of lifting gears.

Utilization of Self-Propelled Modular Transporter (SPMT)

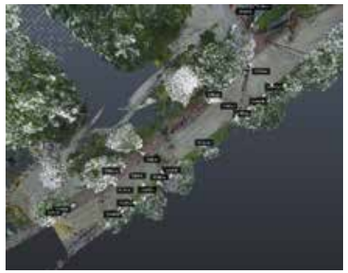
A self-propelled modular transporter (SPMT) is a platform vehicle with numerous wheels explicitly designed for transporting large objects. Its computer steering system, which independently controls each axle of the wheels, ensures even weight distribution and a small turn radius. The added feature of remote control capability provide a high level of movement control. The expertise of the SPMT operator offers a unique perspective during the transplantation, enhancing the project's execution. These unique features make SPMT the ideal choice for reducing damages to the surrounding road furniture and controlling the movement of the transplanting tree during the transit in this project to transport the transplanting tree.

Timing of Translocation

Tsim Sha Tsui is a busy spot full of tourists. To minimize the potential inconveniences caused to the general public, the transportation of trees through Chatham Road South to the final receptor site was controlled to be a single night on Saturday. Given minimizing the traffic impact to the busy Chatham Road South and minimizing bystanders from the general public, the diversion of Chatham Road South was finally selected to be on Mid-night. In order to shorten the road closure period, several measures were done to minimize the transit time at the public road. These measures included the uplifting of the tree by hydraulic jacks were done one week before the translocation, the clear-cutting of the bottom of the tree rootball, the final checking and reinforcement of the run in/out of SPMT in the original planting location and final receptor site by concrete, the pre-loading of the transplanting tree onto SPMT at the day-time of tree translocation, the 3D laser scanning was carried out twice to confirm the clearance of headroom on Chatham Road South, and the utilization of ground penetrating radar was utilized to scan the ground conditions nondestructively to prevent any sinkhole during the passage of the heavy machinery. These measures were successfully implemented, and the transportation of the transplanting tree above Chatham Road South was completed within one hour.

3D Laser Scanning of Transportation Routing and Swept Path Analysis

3D laser scanners use LiDAR (light detection and ranging) to measure and record precise locations and distances. It provides comprehensive spatial data in digital format. It captures millions of data points from physical objects and environment. We understand that there is insufficient headroom for the transplanting tree to pass by at the planning stage. 3D laser scanning was utilized as one of the tools for our better preparation. By creating detailed and precise digital replicas in point clouds, the tree transportation



routing was checked for the extent of obstructions. The dimensions and canopy shape of the existing line of mature trees at Chatham Road South were analyzed. Any potential branch conflicts with the transportation routing are discovered. A crown pruning plan was formulated using a minimal approach to allow the transplanting tree to pass by the existing tree groups at Chatham Road South. The apparent passage of transplanting tree is finally guaranteed. On the day of the translocation operation, the transplanting tree successfully passed the line of trees at Chatham Road South without bombarding existing objects. It helped us eliminate any falling object hazard for the public.

Ground penetrating radar as a loss prevention measure

Ground penetrating radar plays a crucial role in identifying potential voids in the transportation routing to transplanting tree. This non-destructive tool accurately maps the subsurface of the earth by transmitting radio wave pulses at select center frequencies into the ground to study the subsurface. By utilizing ground penetrating radar, we were able to ensure the stability of the ground conditions, particularly since heavy vehicles and the transplanting tree would be loaded onto the Chatham Road South. This proactive measure helped mitigate potential safety risks associated with unstable ground conditions, ensuring a safe and successful operation.

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《預防工作時中暑指引》2023年5月（初版）及2024年4月（第二版）更新比對 - 重點摘要

資料來源：某知名建築公司

因應勞工處更新了《預防工作時中暑指引》，在此與會員分享兩個版本的差異以供參考。以下只列出重點摘要，請掃瞄二維碼查閱完整版本。

2023年5月（初版）		2024年4月（第二版）	
			
頁數	內容	頁數	內容
3-6	3.2.3. 工作暑熱警告 為了讓僱主及僱員更容易明白在戶外或沒有設置空調系統的室內環境工作的熱壓力水平，勞工處制定了工作暑熱警告，分別為黃色、紅色及黑色三級，顯示僱員在戶外或沒有設置空調系統的室內環境工作時面對的熱壓力水平。詳情請參閱下表： 	3-6	◆ 為了讓僱主及僱員更容易評估在酷熱天氣下處於戶外或沒有設置空調系統的室內環境工作時的熱壓力水平，勞工處基於天文台發布的HKHI數值及「極端酷熱天氣」特別提示制定了工作暑熱警告，分為黃色、紅色及黑色三級，顯示僱員在有關環境工作時面對顯著及遞增的熱壓力水平。僱主 / 負責人可參考勞工處發出的工作暑熱警告，從而可較簡易便利地判斷僱員在工作時所面對的中暑風險。有關發出工作暑熱警告的詳情請參閱下表及第5.1章。  # 若天文台發出「極端酷熱天氣」特別提示，即使香港暑熱指數未達30，勞工處亦會發出黃色工作暑熱警告。

	5.2.1 附錄四列出在不同的工作暑熱警告級別下，在戶外露天環境進行不同勞動量工作的僱員每小時的建議休息時間（有關工作勞動量的界定請參考附錄一）。有關建議基於戶外露天的工作環境和工作勞動量，並未考慮其他可影響所需休息時間的風險因素（見5.4章）和已採取的防暑措施（見5.3章）。		5.2.1 附錄四列出在不同的工作暑熱警告級別下，僱員在戶外露天環境進行不同勞動量工作（未考慮其他熱壓力風險因素和已採取的防暑措施）每小時的建議休息時間。在沒有空氣調節的室內環境工作雖然亦受炎熱天氣影響，但可免受陽光直接照射產生的熱壓力，因此對比附錄四同一勞動量的戶外露天工作，每小時建議的休息時間可減少15分鐘（見附錄四（a））。有關工作勞動量的分類請參考附錄一。
13-17	2023年5月（初版）沒有此節 **5.3 可減少休息時間的情況** 室內環境 [5] 5.3.1 員工在沒有設置空調系統的室內工作地點，所面對的熱壓力與戶外的暑熱情況有很大關係。然而，由於室內工作環境沒有陽光直接照射所產生的熱輻射，因此每小時的休息時間相比起在戶外露天環境下進行同一勞動量工作的休息時間可減少15 分鐘。 5.5.3 僱主若採取各種有效的防暑措施避免相關的風險因素出現，可減少每小時所需的休息時間。此外，僱主應預早就不同工作暑熱警告級別，為相關的不同類別的員工訂明每小時的工作和休息安排，以便在工作暑熱警告生效時，有序安排員工於每小時的不同時段休息，這樣既可減低僱員中暑的風險，亦可儘量減少對整體工作流程和進度的影響。	13-18	如僱主能因應工作的熱壓力風險因素盡可能實施各項適用的防暑措施，可降低每小時所需的休息時間；在一些較輕勞動量的工作，按第4.7章的建議為僱員安排休息可能已經足夠，不一定需要每小時安排休息時段。下文會闡述在工作暑熱警告生效時，可就附錄四列出的建議休息時間作出調整的考慮因素。 **5.3 可減少休息時間的情況** 遮擋陽光 室內環境 [4] 5.3.1 如5.2.2段所述，由於室內環境可免受陽光直接照射產生熱壓力，因此若能安排在戶外露天工作的員工到室內環境工作，或員工本身是在室內環境工作，每小時建議的休息時間比在戶外露天環境進行同一勞動量的工作可減少 15 分鐘。 5.5.3 僱主應預早就不同工作暑熱警告級別，為相關的不同類別的員工訂明每小時的工作和休息安排，以便在工作暑熱警告生效時，有序作出所需的安排。僱主可因應工作的特定情況和需要，靈活安排僱員每小時的休息時間；例如分開僱員於每小時的不同時段休息，或在合共不少於每小時所需的休息時間的前提下，於每小時安排間斷而非連續的休息時間。這樣既可減低僱員中暑的風險，亦可儘量減少對整體工作流程和進度的影響。
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免責聲明

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