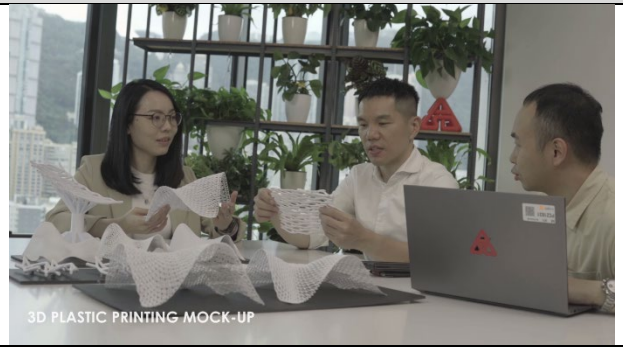
“Weaving Love” 3D Printed Metal Pavilion

Time Stamp	Still Frame	English Script	Chinese Script
Introduction 項目簡介			
00:03		"Weaving Love", nestled in the wedding garden of the Tseung Kwan O Immigration Headquarters, is the first large-scale 3D metal printed pavilion in Government project. The project merges technology and art to create an intimate, cozy, and romantic environment for newlyweds and their guests.	坐落於將軍澳入境事務處總部婚禮花園的「織 • 愛」，是首個政府工務工程建造的大型3D金屬打印建築作品。作品將科技與藝術融為一體，為新婚夫婦及其賓客創造一個親密、舒適及浪漫的環境。
Design Process 設計過程			
00:07		By utilizing a digitalized workflow, the design team employed sophisticated digital design tools such as parametric modeling to create a highly accurate digital model. This enabled structural analysis and the printing of 3D plastic mock-ups, helping the team visualize their design during the development process.	設計團隊透過數碼化的工作流程，利用參數化建模製作出高準確性的電子模型，以進行結構分析及打印3D 塑膠樣板，幫助團隊將設計作品可視化。

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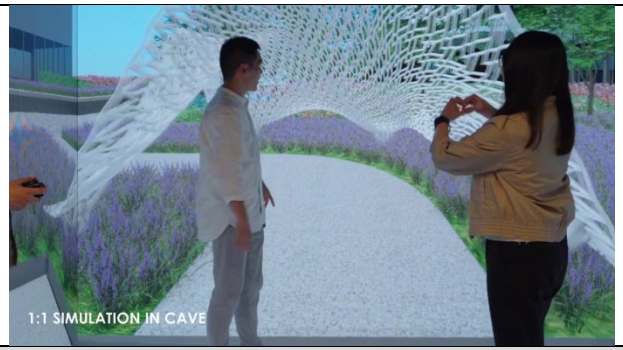
00:10		Furthermore, the team integrated the digital model into the BIM model of the Immigration Department headquarters, allowing it to be displayed in the BIM CAVE for a 1:1 visualization of the space. This provided the team with an immersive experience, facilitating the optimization of the design.	另外，團隊將電子模型結合入境事務處總部的BIM模型，在BIM CAVE系統中以一比一的比例展示作品，為團隊提供沉浸式體驗，從而推動設計的優化。
Fabrication 製造過程			
00:12		Wire Arc Additive Manufacturing (WAAM) was adopted in the project, utilizing an electric arc to melt metal wire, which was then deposited layer by layer by a robotic arm to form a three-dimensional object. The printing path was directly generated from the digital model and supplied to the robotic arm, guiding its precise movements. This automated fabrication technique significantly reduced labor requirements and fabrication time, as the robotic arm could operate continuously, with only a minimal number of staff needed to oversee the process. However, WAAM encountered challenges related to printing angles. Maintaining the molten metal in the correct position	作品的建造過程採用了電弧增材製造（WAAM）技術。該技術通過電弧熔化金屬線，並利用機械臂逐層沉積成設計形狀。機械臂的打印路徑由電子模型直接導出，為機械臂輸入精確的打印坐標。 這種機械化製造過程只需足夠的人員來監控流程，且多支機械手臂可以全天候運行，大大減少了人力需求和製造時間。 然而，WAAM 在打印角度方面仍存在局限。在較大的傾斜角度下，液態金屬難以保持在正確位置，導致打印表面不平坦，出現斑點。
00:12			

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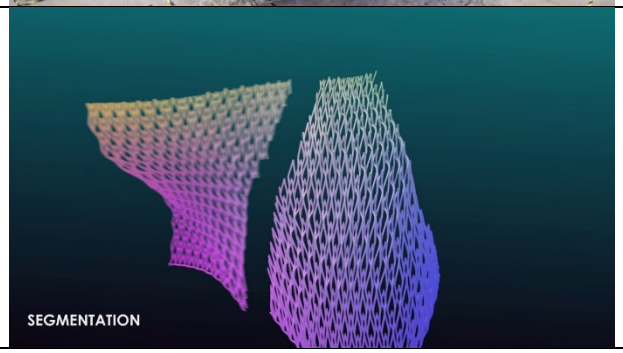
00:14		became difficult at steeper cantilevered angles, which resulted in uneven surfaces and blobby appearances.	
00:16			
00:23		Cantilever angle analysis was conducted to understand the range of printable geometries, enabling precise segmentation of the structure. Additional supports were utilized to orient the structure within the printable angle range as needed.	傾斜角度分析使團隊了解可打印範圍，從而能精確地分割作品，並使用額外的支撐件將管子調整至可打印的角度範圍內。

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00:29		3D scanning was conducted for quality control and the 3D scanned results were compared with the digital design model to identify any possible deviations.	項目透過 3D 掃描進行品質控制，並將掃描結果與電子模型比較，以識別打印偏差。
00:33		The segmented parts were aligned and welded together to assemble the pavilion.	將打印完成的組件對齊後焊接在一起。
00:35		After the assembly was completed, another 3D scan was conducted to check the as-built quality of the entire work. The scanning revealed that the printed pavilion closely matched the digital model, with a similarity of nearly 99%.	團隊在組裝完成後再次進行 3D 掃描，以測量整個作品的竣工品質。掃描結果顯示，竣工品與電子模型非常匹配，相似度接近 99%。

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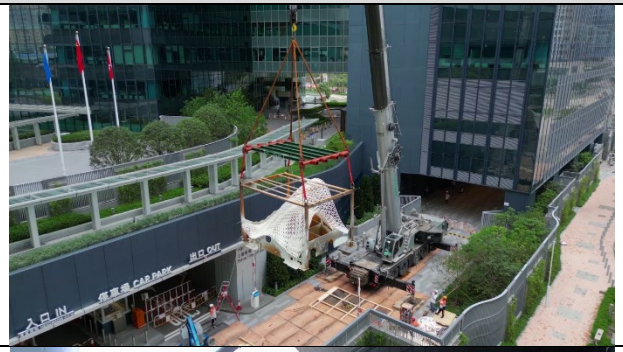
00:44		The entire prefabricated pavilion was supported by a steel frame, packaged and then transported to Hong Kong.	整件預製完成品以鋼架支撐並包裝好，然後運往香港。
On-Site Installation 現場安裝			
00:51		On-site installation simulation was conducted using the BIM model to ensure there were no clashes with the surrounding buildings and to identify the optimal crane location for lifting the pavilion in the wedding garden.	團隊利用了 BIM 模型模擬現場吊運和安裝過程，確保不與周圍建築物發生碰撞，確定放置起重機的最佳吊掛位置。
00:54			

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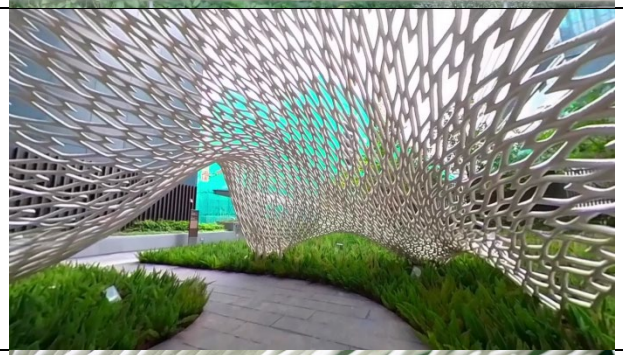
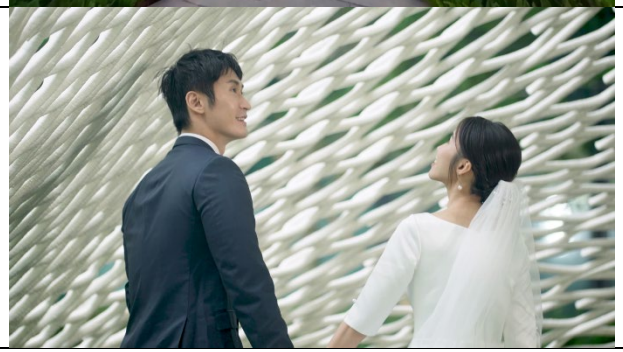
Finished Product 成品			
01:03		The design drew inspiration from the elegance of a bridal veil gently billowing in the breeze. The pavilion served not only as a photo backdrop but also provided various immersive spatial experiences.	作品的設計靈感源自在微風中飄動的新娘頭紗所營造的優雅。作品不僅是一個拍照背景，空間還提供不同的沉浸式體驗。
01:07		The wavy tubes undulated in an orderly manner, as if stirred by the wind. They served not only as expressive forms but also as daylight reflection devices to create varying lighting effects. The interplay of light and shadow wove through the reflections, resembling a three-dimensional abstract oil painting.	金屬管起伏有序，如隨風拂起。純白的管壁提供不同的光線反射角度。光影在反射中相互交錯，就像一幅立體的抽象油畫。
01:12		A couple strolls slowly along the path, immersed in a romantic atmosphere.	一對新人在作品的「婚禮步徑」慢步，沉浸在浪漫的氛圍中。

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01:17		The pattern featured 1,312 unique heart-shaped designs, symbolizing the couple's wholehearted commitment to love.	作品的紋理由 1,312 個獨特的心形圖案組成，象徵著新人一心一意、對愛的承諾。
01:25		The beauty of "Weaving Love" lay in its balance of aesthetics, practicality in fabrication, durability, and structural safety. It showcased how unprecedented complexity in architectural geometries could be realized through advanced technology. The project transformed cold, rigid, and industrial materials into an artistic and organic piece of architecture. In addition to creating a unique spatial experience, the project successfully reduced material waste by over 80%, construction time by 70% and costs by 50% compared to conventional building methods.	「織 · 愛」的獨特之處在於能夠利用創新技術實現複雜流暢的設計，確保作品的可行性、結構安全和耐用性，將傳統冰冷的工業材料轉化為富有藝術性的建築作品。除了營造獨特的空間體驗外，與傳統建築方法相比，材料浪費減少超過八成，所需時間減少了七成，成本減少了五成。