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Process design for hoist wire rope measurement and adjustment 設計快速量度及調教鋼絲繩的方法

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01 Process Design for Hoist Wire Rope Measurement and Adjustment

GOLD PRIZE AWARD

A rubber tyred gantry crane (RTGC) is a mobile gantry crane that is used by Hongkong International Terminals Limited (HIT). The crane has eight wheels and four gearboxes that operate on four of the wheels. The RTGC has a trolley on top, which moves a spreader to different lines to pick up or set down containers. The spreader hangs on the trolley by a wire rope, which is attached to a wire drum. On top of the trolley, there is an engine room to provide energy for moving the wire drum.

A semi-automated system is used to measure whether the spreaders are flat or need adjusting. If the spreader is not adjusted for a long time, the wire rope lengthens and twists; it then cannot set the containers down smoothly, and accidents may happen. The aim of this project is to design a quick method for measuring and adjusting the wire rope in a semi-automated RTGC.

The designed method requires just 30 minutes to finish measuring and adjusting the wire rope. As this method does not require control adjustment afterwards, the total time required is two hours per month for each RTGC. This method reduces the time required for Land Accuracy adjustment by around 60%.

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設計快速量度及調教鋼絲繩的方法

金獎

輪胎式龍門架吊機(RTGC)是用於香港國際貨櫃碼頭的流動龍門架吊機，4 副車輪共配備 8 條輪胎和 4 個變速箱，吊機頂部設有滑輪起重小車，負責將移動吊具移至不同線路，以此吊起或放下貨櫃。起重小車以固定於線鼓的鋼索連結吊具，頂部並設有機房，為驅動線鼓提供動能。

工作人員經常需以半自動系統衡量吊具，判斷其是否平坦抑或需要修正，一旦吊具長期未經修正，鋼索便會延長並纏繞，繼而影響卸貨順暢甚至引發事故。本項目正是針對這個弊端，為半自動 RTGC 設計出一套能快速測量並修正鋼索的方法。

按照設計所用的方法，工人只需 30 分鐘便能完成整個測量並修正鋼索的流程，而且事後無需控制修正，使得每部 RTGC 每月用於測量及修正的時間縮短至 2 小時，而為修正陸上精確度所需的時間也縮短 60%。

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