First-Time Application of Adjustable Aluminium Stretchers for Oversized Paintings from National Gallery Singapore

Introduction

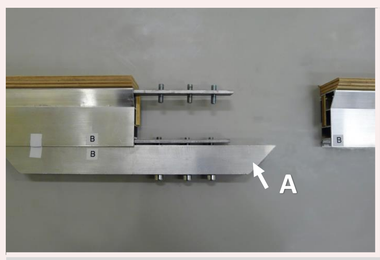
Two oil canvas paintings, *Boschbrand* (*Forest Fire*, 1849) by Raden Saleh and *España y Filipinas* (*Spain and the Philippines*, 1884) by Juan Luna, were selected for permanent display at the inaugural opening of National Gallery Singapore in 2015. *Forest Fire*, measuring 298 cm x 396 cm, is Saleh's largest painting. It was accessioned to the collection rolled face outwards on a wooden roller. *Spain and Philippines*, at 230 cm x 81 cm, was executed on fine plain-weave linen fabric of very irregular structure (18weft x 24warp/1cm^2), with the weft direction corresponding to the painting's vertical orientation. The less dense weft arrangement caused the formation of long, horizontal paint layer cracks and canvas support tears. In addition, the painting was stretched over the non-original strainer, which was damaged by insect infestation. Both artworks required new, adjustable stretchers for proper display. The poor performance of conventional, large-sized wooden stretchers; their inability to correct local canvas deformations; and their contribution to the concentration of stress at the corners of the paintings prompted a search for better alternatives.

Boschbrand (Forest Fire, 1849) by Raden Saleh. Collection of National Gallery Singapore. Presented in the forefront is the HCC Paintings Conservation team involved in the stretching of the painting.

Adjustable aluminium stretcher

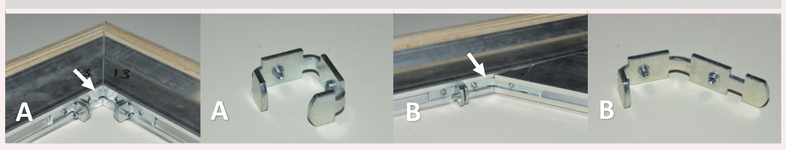
An adjustable aluminium stretcher was selected for *Forest Fire*. The main frame is composed of patented extruded aluminium lined on the sides and back with laminated plywood strips to allow for easy side or back stapling during stretching. The side plywood strips act as traditional bevelled edges, which rise the canvas away from the aluminium bars. The aluminium-plywood body gives excellent stability, ensuring that the bars are completely resistant to warping. The strength of the employed materials also means that fewer cross-bars are needed to support the stretcher.

The cross-bars are constructed with a horizontal centre bar made of four sections spanning the width, three vertical centre bars spanning the height, and four diagonal corner bars spanning the width and height.



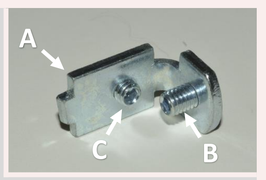
The 396-cm length of two stretcher bars was achieved using two profile extenders (A), which allows for making virtually any stretcher size.

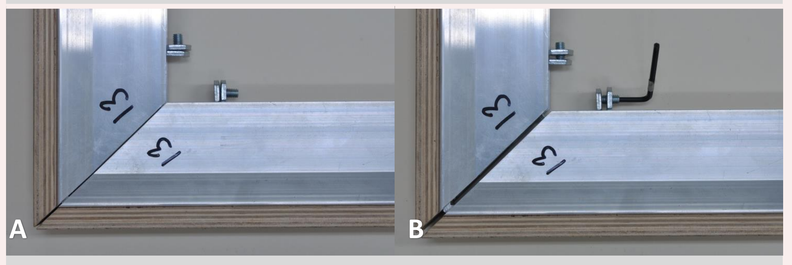
The stretcher bars are held together by aluminium connectors inserted into the external and internal section of each corner. The external connectors are L-shaped and movable, and their function is to hold the stretcher bars in the same plane. The internal connectors are part of the expansion system. There are two types of the internal connectors. Type A is used in the right-angle corners while type B is used only with the diagonal corner bars.



Operation principle

The expansion of the stretcher corners and crossbars was achieved by pushing the internal connectors outwards using the adjacent L-shaped plates (A) and screws (B). The task involved ensuring that the pushing screws at the twenty-six expansion points were each turned an equal number of times, so that force is evenly distributed. After the expansion, the internal connectors and adjacent L-plates were tightened with the screws (C).





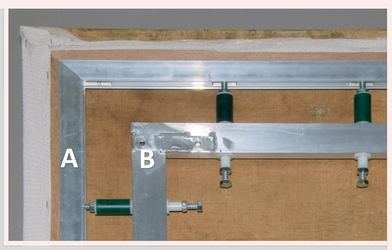
Corner of the stretcher before expansion (A) and after expansion (B).

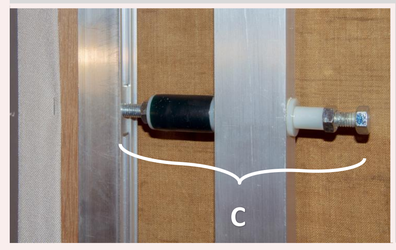
Self-adjusting constant tension stretcher

A self-adjusting tension stretcher was used for *Spain and the Philippines*. The stretcher frame was fitted with arranged expansion mechanisms, which allows the painting to expand and contract, thereby minimising stress concentration at the corners and providing an even tension throughout the painting.

España y Filipinas (Spain and the Philippines, 1884) by Juan Luna. Collection of National Gallery Singapore. View of the front (A) and back (B) of the painting after it is stretched over the self-adjusting constant tension stretcher.

The stretcher consists of the rigid internal (A) and movable external (B) aluminium frames. The external frame is composed of patented extruded aluminium lined on the sides and back with laminated plywood strips. This provides more scope for fixing the tacking edges of the painting during stretching.

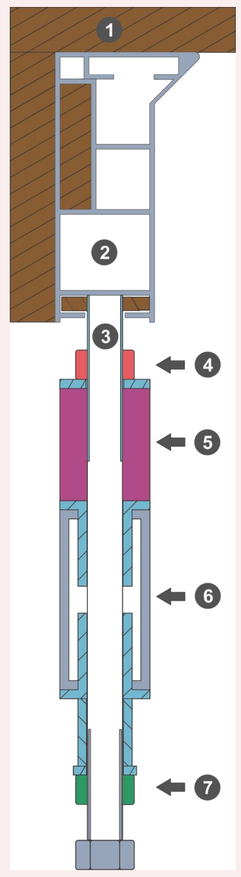




Both frames are connected by means of fourteen built-in perpendicular tensioning devices (C).

An important feature of this stretcher is that the tensioning devices contain urethane compression springs instead of regular steel wire springs. The advantages of urethane springs are longer service life, abrasion and corrosion resistance, and high economy (being entirely maintenance-free). Their UV sensitivity is irrelevant as they are not exposed to light when installed in the stretcher.

Tensioning



Tensioning is a simple task that involves loosening the activation nut (7) at the tensioning device. This releases the urethane compression spring (5), which controls the movement of the individual stretcher bar. As a result, the tensioning mechanism finds equilibrium with the canvas. The necessary tensioning adjustments can be made by turning the tensioning nut (4) to increase and decrease the compression of the urethane spring.

(1) wooden lining; (2) external aluminium frame; (3) tensioning bolt; (4) tensioning nut; (5) urethane compression spring; (6) internal aluminium frame; (7) activation nut

Conclusion

Both types of aluminium stretchers provide an alternative to conventional wooden stretchers. Aluminium is well suited for large-format paintings as it is lightweight and does not warp with changes in relative humidity and temperature. This greatly reduces the strain imposed on the painting by environmental changes. Both stretchers are manufactured in Poland, by a specialist company providing quality stretchers for artists and conservators.

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