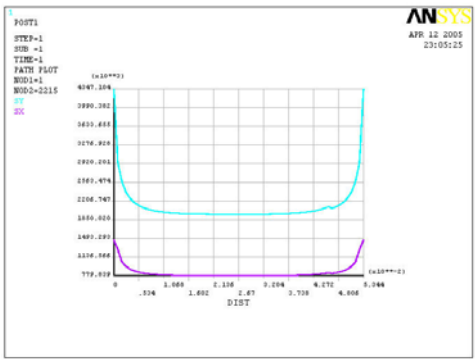
An engineering approach to tapestry conservation

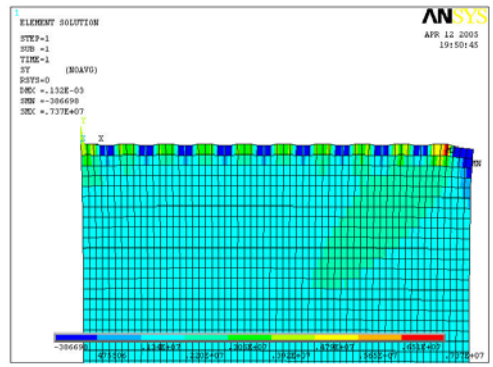
This poster illustrates work undertaken for a dissertation, part of a BEng degree at the University of Southampton. Computer modelling was used to analyse the effects of different hanging methods for tapestries, and a repair technique was also modelled. The author was working with a project team from the Textile Conservation Centre and the School of Engineering Sciences.

Velcro hanging method



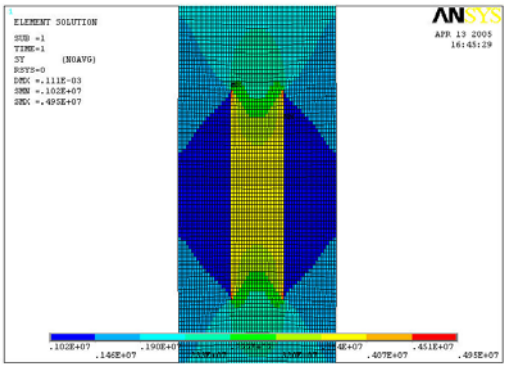
This figure shows that a hanging method such as a Velcro strip allows fairly uniform stress distribution. Highest stresses are achieved in the two corners but with added support in those areas little damage would be done to the tapestry. The turquoise line shows the stresses in the y-direction (the weft), which are much larger than those in the x-direction (the warp), shown by the purple line.

Press-stud hanging method



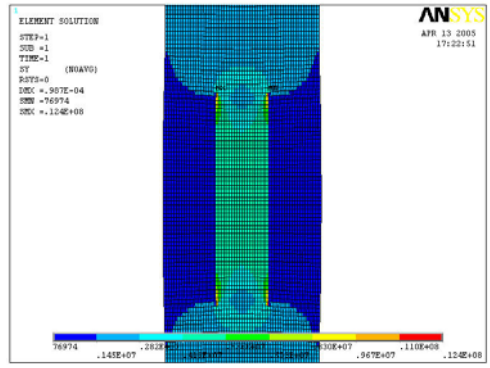
This figure shows a tapestry fixed with press-studs at irregular intervals. The press-studs act as localised loads on small areas, resulting in an increase in stress, shown by the green areas. In this analysis a stud was not included in the right-hand corner in order to investigate the effects of uneven fixation. The model shows that this would have an extremely detrimental affect on the tapestry as shown by the increased regions of maximum stress (red quadrilaterals). Not only does this affect the top edge of the tapestry but it also induces a pattern of increased stress below the area.

Linen repair patch



The introduction of a patch of a different material dramatically changes the distribution of the stresses within the tapestry. The maximum stress experienced in the tapestry has increased and the location of the largest stresses has moved to the corners of the patch.

Stiffer repair patch



Increasing the Young's Modulus of the patch material in the model has an immediately obvious effect on the stress distribution of the tapestry. The area affected by the patch has decreased. Although with a stiffer patch the stresses have decreased in general, the uneven distribution is a point of concern since the stress is focused into certain small areas rather than more evenly distributed throughout the weave. This means that the weakened area, which the patch is protecting, would barely move whilst hanging but an extreme amount of load would be put on the stitching of the patch and may weaken the previously strong areas which the patch would now pull on.

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