Assessment of digital monitoring measurement for historic textiles

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Key words: tapestry, digital image correlation, finite element modelling, full-field monitoring, textile conservation

ABSTRACT

Historic tapestries, are regarded as hand-woven textiles and share considerable similarities, both mechanically and kinematically, with engineering fabrics. These priceless and vulnerable textiles, are prone to a mechanical deterioration due to a self-weight loading which can progressively rupture the tapestry and also accelerate a propagation of existing slits and holes. Employing digital monitoring methods such as the Digital Image Correlation (DIC) technique; is found to be an effective way for monitoring a full-field continues surface for such applications. Nevertheless, to the best of authors' knowledge, the vast majority of the DIC routines have been explicitly developed and validated for engineering purposes where a material surface is coated with black and white inks in order to have acceptable texture patterns (see Fig1a). In the case of historic tapestries, adhering chemicals (such as ink) on the textile's surface is certainly prohibited and therefore the textile conservationists are limited to the inherent available woven patterns (see Fig1b). To systematically investigate the effect of inherent tapestry patterns, in the present work, four Glasgow-based historic tapestries are considered and digitally analysed. The results confirms the importance of conducting the pre-monitoring DIC assessment; where the imaging setups cannot be altered during a course of long-term digital monitoring process.

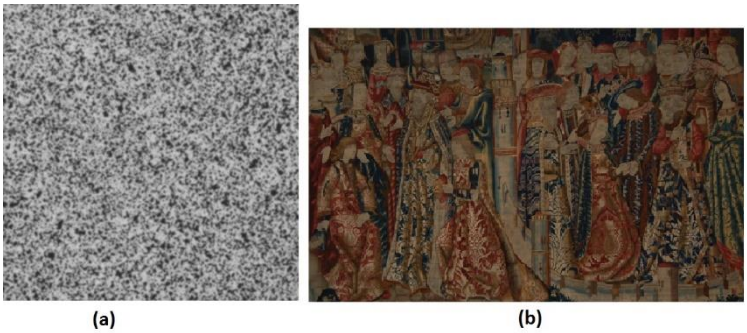

Figure 1: (a) Standard DIC speckle patterns (Sutton et al. 2008), (b) Historic tapetsry inherent patterns