# DEFECT GROWTH IN MODEL PANEL PAINTINGS BY FULL FIELD INTERFEROMETRY

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A typical panel painting structure consists of gesso ground on a wooden substrate, a number of layers of egg tempera paint, a layer of gold leaf and finally a layer of varnish (Figure 1). The multilayered structure creates the opportunities for layers to detach one from another due to the variety of interfaces and materials present; a typical example is expansion or contraction of wood at a rate that is different from that of the paint and priming layers when humidity and/or temperature changes; thus creating internal non-visible defects. Monitoring of the defects present in an artefact is of paramount importance for evaluation of material and selection of conservation measures.

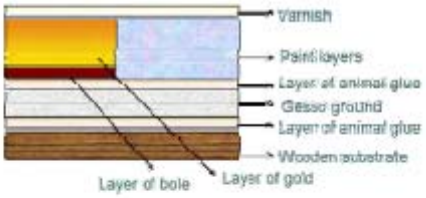


Figure 1: Cross section of a panel painting showing the different materials used.

To study defects produced on panel paintings, a series of model panel paintings, following the traditional techniques, were produced and subjected to a specific cycling process comprised of: artificial ageing, interventive restoration treatment and ageing.[1] During all stages the samples were recorded by means of full field interferometry.[2]

The high sensitivity under low loading conditions of full field interferometry inspection offers the capability of recording and detecting, from surface illumination, subsurface non-visible and/or inborn defects in wood panels. In addition, it permits the collection of remote non-contact and non-destructive analysis in realistic museum exhibition environments to trace growth and expansion of previously detected detached regions (Figure 2). Thus full field interferometry provides strong advantages for art conservation of panel paintings where detection of detachment growth and deterioration is invisible by most known tools and practices or requires extensive physical contact and removal of the artwork to a conservation lab.

This paper focuses on the procedural investigation with full field interferometry of characteristic defects of panel paintings in order to obtain information about their growth, progress and reaction to conservation and restoration treatments (Figure 3). The aim of the research was achieved by construction of model panel paintings with known defects which were systematically investigated in fresh, artificially aged and restored condition (Figure 4). The results allowed the authors to communicate in this paper interesting observations directly visible to the eye of the conservator for a better understanding of the artwork.

Figure 2: Example of a panel painting examined with non-contact, non-destructive full field interferometry

Figure 3: Model panel painting during before and after the conservation treatment

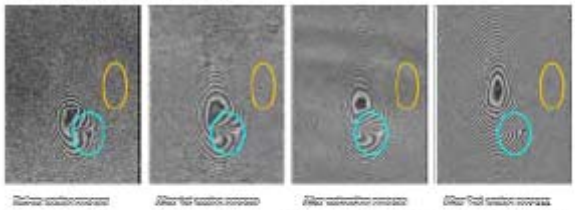

Figure 4: Recording of a model panel painting by full field interferometry through of the stages of cycling

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