

## ***"Gamma" remedial conservation after disaster: a technique not to be overlooked***

*Laurent Cortella*

Organic materials present in art-works, archives, or other artefacts that constitute our heritage, are not only at-risk during disaster when it occurs, but sometimes also for a long time after the disaster, particularly when uncontrolled conditions after a disaster lead to bio-deterioration phenomena. Fungi (rots, molds) and insects are the worst pest. Preventive conservation aims to avoid such situations.

Possible failure analysis can anticipate some crisis circumstances, and early response can limit the future problems, but arresting ongoing damaging processes when items deteriorate at dangerous rate, or reinforcing their structure when they are in a too fragile condition become often a necessity. This is the definition of remedial conservation and it is also necessary to be prepared to implement the most effective techniques for that.

Among the available techniques, the so called "nuclear" techniques can be very helpful. Indeed, thanks to its penetration power, gamma ray-based techniques offer the possibility to perform ionization in the whole volume of infested artefacts, ensuring very reliable biocidal effects. Ionization can also trigger and pilot co-polymerization by cross-linking of radio-curable resin used to consolidate the weakest artefacts made of porous materials.

ARC-Nucléart has been implementing these techniques for 50 years and has treated thousands of artefacts since then. Examples of treatments will be presented. They include mass treatments after large-scale infiltrations in storage building of National Archives, and the recent emergency rescue of a mummy after flooding in a Museum. Interesting, if necessary, techniques of freeze-drying can complete the biocidal treatment, as it is applied for waterlogged archaeological organic materials. In case insects or fungi attacks have been so virulent that it is impossible to save the objects by conventional conservation techniques, last-chance consolidation by radio-curable resin have also been carried out for polychrome or natural wooden sculptures.

### ***Biography***

*After his master's degree in nuclear physics and engineering, Laurent Cortella had an initial 5 years' experience in material sciences research, obtaining a PhD in this speciality, and another 5 years in radiological protection at French Commission for Atomic Energy (CEA). In 2002, the CEA gave him the opportunity to be available as head of facilities management and research engineer at ARC-Nucléart\*, Grenoble, France, where he operates since that time.*

*He is in charge of research and services of irradiation for remedial conservation of cultural heritage (biocidal treatments against pest and consolidation with radio-curable resin of the*

*most weakened objects made of porous material). Thanks to those techniques, he worked on the conservation of many thousands of artefacts.*

*Beside nuclear techniques for heritage, he has been involved in many problematics of organic materials preservation, from museums or churches historic collections to archaeological waterlogged wooden artefacts, which gave him the opportunity to develop a cross disciplinary expertise. He also intervenes in advising as well as carrying out cultural heritage treatments in France and abroad, "from excavation to the museum", always trying to make the link in a pragmatic way between the research and the implementation of the available techniques.*

*As responsible of an intermediate scale irradiation facility, he also provides custom irradiation service for research and industry in link with R&D programs or for radiation resistance qualification tests for instance.*

*\* ARC-Nucléart is both a laboratory and a workshop for cultural heritage preservation, dependent of the CEA, the French Ministry of Culture, and the Grenoble City. It operates many technical facilities, the main one being a <sup>60</sup>Co pool irradiator.*