TOCOWO

Tomography of Congolese Wooden Objects

Sofie DIERICKX[1]*/ Siska GENBRUGGE[1] / Dr. Hans BEECKMAN[1] / Prof. dr. ir. Wannes Hubau[1&2] / Prof. dr. ir. Jan VAN DEN BULCKE[2]

[1] Royal Museum for Central Africa, Leuvensesteenweg 13, 3080Tervuren, Belgium
[2]Department of environment, University of Ghent, Coupure Links 653, 9000 Ghent, Belgium

The Belgian Royal Museum for Central Africa hosts a large body of wooden objects: more than 55.000 sculptures, musical instruments, equipment, furniture, and alike are made of wood or contain wooden elements. Yet for only 6% of this vast collection of objects the wood species have been identified. An identification is very important however, as discovering more about the wood species represented in the collection can provide insight into the processes surrounding the making of them and knowledge about their provenance. Knowing the wood species of an object can also aid the conservators of the museum in determining the best treatment course, considering the specific characteristics of the wood species and its ageing properties.

To date, the practice for identifying African wood species remains a destructive one: a sample of wood is removed, and its anatomical features studied microscopically. Such an invasive method permanently removes a part of the object, ranging from 2 mm^3 to 2 cm^3. The TOCOWO project, which started in September 2020, aims to explore the possibility of micron and sub-micron computer tomography (CT) as a non-invasive alternative for the identification of wood species. This technique has shown promise in the field of wood biology and is now being applied to a large selection of ethnographical museum objects. X-ray computer tomography allows for a visualisation, not only of the object's surface, but also of its interior. As the object turns 360° while being scanned, a 3-dimensional rendition can be obtained. Consequently, any coating the object has been treated with will have little impact on the image obtained with CT scanning.

The preliminary results within this project, based on the scans made in the first half of 2021, are very promising. An important prerequisite to a successful wood species identification is the achieved resolution, which in turn is determined by the object's dimensions, positioning, and added materials. The final objective of this 2-year project is to culminate in a reference database of positive identifications of Congolese wood species, as well as in a comprehensive protocol for the use of computer tomography for the purposes of systematically identifying wooden objects.

Apart from its promising applications for wood identification, the CT technique has also yielded some additional and important conclusions from a conservator's point of view. Thanks to the CT images of collection objects, new insights could be gained with regards to the manufacturing process of an object, as well as (before undetected) insect activity, the structural stability of the wood, and old conservation treatments (such as consolidations or additions).

Bibliography: Marco Fioravanti and others, 'Non-invasive wood identification of historical musical bows', *IAWA Journal*, 38(2017), 285-296.

Kayoko Kobayashi and others, 'Non-destructive method for wood identification using conventional X-ray computed tomography data'*, Journal of Cultural Heritage*, 38 (2019), 88-93.

Rose Whitau and others, 'X-ray computed microtomography and the identification of wood taxa selected for archaeological artefact manufacture: Rare examples from Australian contexts'*, Journal of Archaeological Science: Reports*, 6(2016), 536-546.