

## Shroud: technologies for conservation, monitoring and use. CISS workshop at the Turin Polytechnic

Shroud: a good to be delivered to the generations of tomorrow. Beyond the question of authenticity and of the same scientific research on the formation of its imprint, the cloth today is first of all a precious and fragile find that must be protected from the risks of degradation to pass it down intact to posterity.

This was discussed at the Polytechnic of Turin, during the workshop "Technologies for the conservation, monitoring and use of the Shroud", an operating table for scientists, held in the afternoon of Friday 14 June at the Sala delle Cacce in the Castello del Valentino. The International Center of Studies on the Shroud has given its contribution to the meeting both on the front organizational, and above all by offering its wealth of knowledge on Linen: fabric, imprint, blood, possible factors of decay. A contribution much more appreciated because aimed at celebrate the 60th anniversary of the Centre's life. But certainly an intervention not merely celebratory, tense rather to lay the foundations for future research. And in fact the assembly dissolved with a commitment to review open themes, to transform them into research paths to be discussed shortly, perhaps in small areas of study.

441 centimeters long by 111 tall, the famous linen, woven in a herringbone pattern is the one which, according to tradition, would have wrapped the body of Christ deposed from the cross. An opinion on which the Church itself does not take a stand, even if the Linen is unanimously recognized as important lever of faith and symbol of the Cross, being the sufferings imprinted on the fabric in absolute harmony with the narration of the Passion and death of Christ that is read in the Gospels. Such as therefore defend this find which, however you look at it, is unique and precious? Such as keep it, monitor it and protect it from deterioration? And how to allow exposure to public, albeit from time to time, in times of display, but in optimal conditions for the health of the cloth and for the fruition?

With its interdisciplinary skills, the Ciss has put at the service of the Polytechnic and of the employees his authoritative scholars work in different fields: prof. Nello Balossino, CISS Deputy Director and director of the Museo della Sindone, university professor and criminalist, Dr. Paolo Di Lazzaro, deputy CISS director, ENEA manager, Enrico Simonato, chemist, CISS registrar, the dssa. Paola Iacomussi, researcher at the IINRIM national metrology research institute, and a member of CISS Scientific Committee. The team was joined by prof. Piero Savarino, former professor of chemistry at the University of Turin, member of the Conservation Commission of the Shroud and scientific advisor of the Papal Custodian of the Shroud, dr. Marco Bonatti, Head of Communications of the Diocesan Commission for the Ostensions of the Shroud, and director of all exhibitions from 1978 to the present, and prof. Luigi Fabrizio Rodella, pathologist, lecturer at the University of Brescia.

The contribution of the engineer is also fundamental. Stefano Masiello, supplier operations manager of Thales Alenia Space, responsible among other things for monitoring the optimal environmental conditions of Shroud case in the avant-garde case, made with the most up-to-date technologies design and manufacturing, following the 1997 fire in the Duomo Chapel, precisely from Thales Alenia Space Italia.

The Holy See and the CEI were informed of the initiative, which welcomed it. The Archbishop of Turin, Msgr. Cesare Nosiglia, supported it, entrusting his greetings to Don Luca Peyron, in charge of the University Pastoral of the Diocese. The rector of the Polytechnic, prof. Guido Saracco, he hoped that concrete projects for the optimal conservation of the icon will emerge from the comparison so important for Turin and the world.

"This relic, of extraordinary historical and spiritual value, has been a source of devotion for thousands of years - he observes the professor. Gian Maria Zaccone, historian and director of the CISS - Then in 1898, when the first photograph of the icon, which highlighted the negativity of the image, was opened question of the origin of the imprint and therefore of the authenticity of the Curtain. A misleading problem, because it is not only the belonging or not of the Sheet to the funerary outfit of Christ that influences on its uniqueness and its value. The priority today is to deliver this treasure intact to history future".

### **The priorities**

Three open fronts to meet the challenge and as many the strategies to identify and translate into action. First of all, monitoring is essential, with the acquisition of the motorized image (for example, by means of complete scans useful to inspect specific micro-sections of the cloth), multispectral analysis, and verification of potential biological attacks to prevent any fabric contamination. So the fruition, which has, must be carefully evaluated directly to deal with hostages and their modes, with the cloth vertically - as per tradition - or horizontally, according to the appreciated

formula of the extraordinary veneration of the Linen for young people, in August 2018. All analyzing also the appropriate paths and identifying lighting solutions, at very low lux, therefore extremely respectful of the integrity of the sheet, but always uniform and in line, in terms of color and definition of the impression, with the expectations of the public. Finally conservation, in ordinary time, in an appropriately environment air-conditioned and in a display case injected with inert gas, and even in a period of ostension, when the priority is to understand whether it is more or less appropriate to move the Linen from the place where it usually comes guarded.

### **The imprint**

Preserved in the Cathedral of Turin, in a suitably air-conditioned chapel and in a case of aluminum and steel, the Shroud still remains a mystery to men. "The Shroud is more than that is not known with respect to what is known - comments Enrico Simonato, chemist and secretary of the CISS - Impressed on linen, the image is certainly not an artifact, it has not been painted, nor is it a hot cast." "It is a very superficial image, which concerns only the outer fibrils of the fabric - the CISS deputy director Paolo Di Lazzaro agrees - so much so that it has not been impressed on the back of the sheet.

From laboratory experiments, aimed at reproducing it, it appears to be caused by accelerated aging, in certain points of the linen, due to radiation of ultraviolet radiation." Moreover, the blood stains on the cloth are not to be overlooked, as emphasized by the prof. Luigi Fabrizio Rodella, pathologist, and professor at the University of Brescia. "Physical stress, light, pathogens can compromise the integrity of blood findings, which instead need to be analyzed and preserved like the image."

### **Icon to study and monitor**

What is certain is that the icon does not lend itself easily to the study: "To do so you should be able to have a reference image, what is called forensic image - observes the prof. Balossino, also the deputy director of the CISS - Not even the digital acquisition finally obtained in 2010 has the right requirements ". The difficulties are linked to the herringbone pattern of the fabric. And to the same nature of the image, without clear contours. "Now - continues Balossino - the scan static multispectral and three-dimensional reworking promise to become tools finally reliable."

Today I continue monitoring the find, guaranteed by Thales Alenia Space, which in 2000 has the retention case handed over to the then Archbishop of Turin, Cardinal Severino Poletto: a container that allows you to operate in any situation, ordinary and emergency and complete of special control sensors. "Here the Shroud is subjected to constant checks - Stefano points out Masiello by Thales Alenia Space - Although these are non-invasive inspections."

### **The Ostensions**

Since its appearance in 1353 in the village of Lirey, the Shroud has immediately established itself as an object public, to watch and therefore to show. And in fact the expositions have marked the story since middle ages to today. Intense moments, a lever of devotion, but in which one must not lower one's guard on the need to protect the exhibit. From this point of view the lighting system used for the 2015 Exhibition and for the extraordinary veneration of 2018 remain technological models specimens in ensuring a uniform perception in all points of the Linen. "The current regulations in The theme of the exhibition of works of art prescribe a maximum radiation of 50 lux - explains Paola Iacomussi, researcher at the IINRIM national metrology research institute, and a member of CISS Scientific Committee - In the case of the Shroud, the light distribution has been calculated based on specific algorithms developed by INRIM ". In order to illuminate all the points of the Shroud it was done use of computer-guided digital projectors and digital video-mapping techniques. The result was appreciated, also because obtained with the minimum amount of means. "We managed to respond to the expectations of the faithful and experts with an adequate rendering of the signs and color of the Shroud, but the cloth was hit by an average of only 17 lux, the lowest illumination - and more respectful of its integrity - until now never had ".

### **New methods of use**

However, the 2018 exhibition dedicated to young people has inaugurated a new way of enjoying it. Left in a horizontal position in her case and in her chapel, she was worshiped during one night, with 2,500 boys parading past her on a catwalk, with just a few seconds of contemplation allowed. It was a mini-exposition, or rather veneration extraordinary, for a limited group of people. A case that can create a precedent. "For the Truth had already been a similar moment for the 2013 television exposition - recalls Dr. Bonatti, who has been in charge of

the Communication of Ostensions since 1978 - On that occasion it was allowed 300 patients to approach the Tarpaulin ". Faster to prepare, less expensive, much less invasive, the formula has certain advantages, at least for small numbers of people. "Everything to provide that the size of the pilgrimage, of the pastoral path, is preserved long, to reach the goal. In this case an icon to see, recognize and finally know". Can this practice replace or complement large ostensions? A possibility on which question.

The experts of the Politecnico will be responsible for bringing their skills to find answers to this like the other open questions. The hope is that in the midst of the confrontation we will identify new ways of search; that in the contribution of various skills useful projects take shape.