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中国-葡萄牙文化遗产保护科学“一带一路”联合实验室

CHINA-PORTUGAL JOINT LABORATORY
OF CULTURAL HERITAGE CONSERVATION SCIENCE
SUPPORTED BY BELT AND ROAD INITIATIVE

《遗产研究国际动态》(内刊)
中国－葡萄牙文化遗产保护科学“一带一路”联合实验室
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监测和预防性保护木质建筑文化遗产 .《韩国文化遗产研究期刊》, Vol. 56, No. 4, 2023, 192-214.
Source：
Monitoring Report on Key Management Objects of Cultural Heritage. National Heritage Agency of Korea, National Institute of Cultural Heritage, 2023.
Monitoring and preventive protection of wooden building cultural heritage. *Korean Journal of Cultural Heritage Studies*, Vol. 56 No. 4, 2023, 192-214.

1 韩国文化遗产原型的概念和政策的实施

1999 年，韩国在《文化遗产保护法》中增加了“维持原型”的新条款，文化遗产的历史痕迹必须按原样保存、实施最少干预、采用可逆的处理方法，并强调了文化遗产的原始形态就是现在的样子，它被认为是“原型”，必须得到保护。这时原始形态的概念已经不是指它最初创造的时间，而是包括时代的痕迹。2022 年，将这一概念明确为“原相”。即文化遗产保存基于其价值，价值通过原相体现。介入时应考虑真实性、完整性、可持续性。原相是通过位置、配置、环境、形态与设计、材料与物质、用途与功能，以及传统技法和管理体系、意义、脉络、精神等无形属性体现出来的。

20 世纪末，当国际古迹和文物理事会（ICOMOS）和国际文化遗产保护和修复中心（ICCROM）等国际组织在文化遗产管理中重视 “原始保护”和“真实性”时，韩国文化遗产厅和国家文化遗产研究所开始了安全诊断和详细诊断等“安全检查”来保障“原始性”和“真实性”。但当时，这项做法仅限于部分文化遗产，自 2010 年以来，文化遗产厅通过“文化遗产看护人项目”来进行更大范围的监测和预防性保护。监测开始的“原始数据”就是当年。留下现状记录，并留下照片、测量数据以及

1 The prototype of Korean cultural heritage and policy implementation

In 1999, South Korea added a new clause "maintaining the prototype" to the Cultural Heritage Protection Law. Historical traces of cultural heritage must be preserved as they are, with minimal intervention, and reversible treatment methods. It also emphasized that the original form of cultural heritage is what it is now. It is considered "prototype" and must be protected. At this time, the concept of original form no longer refers to the time when it was originally created, but includes traces of the times. In 2022, this concept will be made clear as "original phase". That is, cultural heritage is preserved based on its value, and the value is reflected through the original phase. Authenticity, integrity, and sustainability should be considered when intervening. The truth is manifested through location, configuration, environment, form and design, material and substance, use and function, as well as intangible attributes such as traditional techniques and management systems, meaning, context, and spirit.

At the end of the 20th century, when international organizations such as the International Council on Monuments and Antiquities (ICOMOS) and the International Center for the Conservation and Restoration of Cultural Heritage (ICCROM) emphasized "original protection" and "authenticity" in cultural heritage management, the Korean Cultural Heritage Agency and the National Institute of Cultural Heritage began "safety checks" such as safety diagnosis and detailed

变化和损伤的示意图等各种材料，以便可以作为后代需要的文化遗产“原始形态”的信息。

1.1 政策支持

国宝宝藏建筑文化遗产保护管理条例【自2024 年 5 月 17 日起生效】【国家遗产厅令2024.5.17.2 号】

第六章 重点文化遗产的管理

第十九条（重点管理文化遗产的选择和注销）①国家遗产厅厅长公布建筑文化遗产中有下列情形之一的濒危文物，选为重点管理的文化遗产，并通知国立文化遗产研究院进行集约化管理。1. 地方政府负责人认为有必要定期测量和检查的严重老化、损坏和变形以及由安全隐患的文化遗产。2. 作为定期调查和详细安全诊断的结果，被评为 D-F 的文化遗产点中，国家文化遗产研究院长要求的对象。3. 由于灾害等造成的损害，需要紧急进行文化遗产安全诊断和对策的文化遗产。4. 由有关小组委员会即文化遗产委员会确定需要集约化管理的文化遗产。5. 由国家遗产厅长通过现场检查等确定需要集约化管理的文化遗产。②在重点管理的文化遗产中，评估结果为已经解决问题或没有必要时，国立文化遗产研究院长可以与国家遗产厅长协商，将其从受重点管理的文化遗产名录中删除出来。③国家遗产厅长根据第 1 项和第 2 项选择或删除受重点管理的文化遗产的，必须通知国立文化遗产研究院长和主管地方政府负责人，地方政府负责人通知当地主管文化遗产机构。

第二十条（实施重点管理的文化遗产监测）①国立文化遗产研究院长应当定期监测选定重点管理的文化遗产的保护环境、结构稳定性、损坏程度和老化程度。②第一款规定的监测可以由国立文化遗产研究院直接进行，也可以通过地方政府委托外部专业机构进行。③地方政府负责人在开始监测时，必须接受国立文化遗产研究院的技术咨询，选择并实施适合文化遗产特点的方法，每季度向国立文化遗产研究院长报告监测结果。如果确定有异常，必须立即报告。④国立文化遗产研究院长必须每半年对

diagnosis to ensure "originality" and "authenticity". At the time, however, the practice was limited to parts of the cultural heritage, and since 2010, the Office of Cultural Heritage has been conducting more extensive monitoring and preventive protection through the "Cultural Heritage Caretaker Project". The "original data source" from which monitoring began is that year. The current situation is recorded, and various materials such as photographs, measurements, and drawings of how they were changed and damaged are left so that they can be used as information on the "original form" of cultural heritage that future generations need.

1.1 Policy support

Regulations on the Protection and Administration of National Treasures and Architectural Cultural Heritage [Effective from 2024.5.17] [Order No. 2 of the National Heritage Administration, 2024.5.17]

Chapter VI Key cultural heritage management

Article 19 (Emphasis on the selection and cancellation of cultural heritage) ① The Director of the National Heritage Department announces the objects endangered by one of the following points in the architectural cultural heritage, selects them as the cultural heritage for key management, and informs the National Institute of Cultural Heritage to carry out intensive management. 1. The cultural heritage with severe aging, damage and deformation, as well as hidden dangers caused by safety hazards, which the head of the local government deems necessary to regularly measure and inspect. 2. As a result of regular investigation and detailed safety diagnosis, among the cultural heritage points rated as D-F, the objects required by the Director of the National Cultural Heritage Research Department. 3. Cultural heritage that requires urgent safety diagnosis and countermeasures for cultural heritage due to damage caused by disasters, etc. 4. The cultural heritage that needs intensive management is determined by the relevant subcommittee, the Cultural Heritage Committee 5. The cultural heritage that needs to be intensively managed is determined by the Director of National Heritage through on-site inspection, etc. ② In the cultural heritage under key management, when the evaluation result is that the problem has been solved or it is not necessary, the Director of the National Institute of Cultural Heritage may, in consultation with the Director of National Heritage, remove it from the list of cultural

监测结果和未来计划进行一次全面审查，并通知国家遗产厅长和地方政府负责人。

2 韩国实施文化遗产重点管理对象监测体系的目的

通过对国家指定文化遗产的安全检查，实现预防性保护管理；通过科学监测，建立合理的保护管理体系；通过监测和详细诊断等结果，分析提出积极的保护管理措施，为集约管理的文化遗产提供中长期保护管理政策的基础数据、为利用科学数据建立长期保护措施奠定基础、为促进文化遗产结构安全研究，积累基础数据。

2.1 监测领域和内容

1）结构安全领域实施部门：安全与防灾实验室（文化遗产监测监督管理）

调查项目和内容：视觉调查、损坏类型和位置摄影记录调查；构件截面阻力调查、缺失行间距和裂缝测量调查；振动测量调查、位移测量调查、结构行为分析和调查。

2）保护科学领域绩效部门：保护科学研究实验室、文化遗产保护科学中心（砖石）

调查项目和内容：表面风化：裂缝、剥落、分解、分解、材料修复等。生物风化：藻类、地衣、羚羊、草本植物、树木等。表面变色：白色、棕色、黑色等。无损详细调查：超声波测量、裂缝监测、图像分析等。

3）生物损害领域绩效部门：修复技术实验室（木制）

调查项目和内容：白蚁对木制文化遗产损害特性的调查；真菌等微生物分布的调查。

2.2 庆州佛国寺大雄宝殿监测案例分析

佛国寺始建于公元 530 年，由新罗第 23 代王法兴王创建，最初称为华严佛国寺或法流寺。公元 751 年，由国相金大城扩建，并于 774 年竣工。佛国寺不仅是韩国宗教信仰的中心，更是文化交融的重要场所。在历史长河中，吸引了无数的僧侣、学者和信徒，他们在这里交流思想、传播文化。作为朝鲜半岛与外部文

heritage under key management. ③ If the Director of National Heritage selects or deletes cultural heritage under key management in accordance with items 1 and 2, the Director of the National Institute of Cultural Heritage and the person in charge of the local government must be notified, and the person in charge of the local government shall notify the local competent cultural heritage agency.

Article 20 (Implement cultural heritage monitoring under key management) ① The director of the National Institute of Cultural Heritage shall regularly monitor the protective environment, structural stability, degree of damage and degree of aging of the cultural heritage selected for key management. ② The monitoring stipulated in the first paragraph may be carried out directly by the National Institute of Cultural Heritage or by external professional institutions entrusted by local governments. ③ When starting monitoring, the head of the local government must accept the technical consultation of the National Institute of Cultural Heritage, select and implement methods suitable for the characteristics of cultural heritage, and report the monitoring results to the director of the National Institute of Cultural Heritage on a quarterly basis. If any abnormality is determined, it must be reported immediately. ④ The director of the National Institute of Cultural Heritage must conduct a comprehensive review of the monitoring results and future plans every six months, and notify the director of the National Heritage Department and the head of the local government.

2 The purpose of implementing a monitoring system for key cultural heritage management objects in South Korea

Realize preventive protection management through safety inspections of nationally designated cultural heritage. Through scientific monitoring, establish a reasonable protection management system, analyze and propose active protection management measures through monitoring and detailed diagnosis results, provide medium- and long-term protection management policy basic data for intensively managed cultural heritage, lay the foundation for using scientific data to establish long-term protection measures, and accumulate basic data for promoting research on the safety of cultural heritage structures.

化交融的桥梁，佛国寺促进了中韩文化的碰撞与融合。不幸的是，在壬辰倭乱时期惨遭焚毁。其后经过复原重建，即为现在的建筑物，真正保持原貌的只有建筑物的石造部分。1995 年，佛国寺被列入联合国教科文组织的世界遗产名录。

监测木质建筑文化遗产首先要做的是检查地基和基础设施的状况。这是因为二者是接受所有力的地方，可以让木质建筑文化遗产长时间站立。因此，应监测底座与排水的关系、底座有无沉降、有无排水渠、坡度等内容。

第二部分是柱子和柱础的状态。应检查柱子有无倾斜、上升和下降，柱子尺寸有无变化以及柱子和柱础有无位移的发生。这是因为柱子的不稳定会导致与每个构件的接缝部损坏，导致物理变化，进而导致墙壁损坏。

第三部分是对屋顶的瓦片有无、屋顶新旧瓦的使用比例、有无偏心载荷、由于降雨和降雪导致瓦片之间的间距的变化、有无漏水进行检查。如果屋顶因瓦片分离或损坏导致继续泄漏到建筑物中，则可能对枋以上部位进行拆除修复，因此进行监测，非常有必要。

图 1：庆州佛国寺大雄宝殿
Figure 1. Daxiong Hall in Gyeongju Buddhist Temple

2.3 主要监测结果

• 台基面石的剥落和表面污染显著，并且可能继续扩大。

• 主殿的斗拱向外劈。

• 檩条等水平材料的接头处发生分离。

2.1 Monitoring areas and content

1) Implementing department in the field of structural safety: Safety and Disaster Prevention Laboratory (Cultural Heritage Monitoring Supervision and Management)

Investigation items and content: visual survey, damage type and location photographic recording survey; component section resistance survey, missing line spacing and crack measurement survey; vibration measurement survey, displacement measurement survey, structural behavior analysis and investigation.

2) Performance Department in the field of Conservation Sciences: Laboratory of Conservation Sciences Research, Scientific Center for Conservation of Cultural Heritage (Masonry)

Investigation Items and Contents: Surface Weathering: Cracks, Flaking, Decomposition, Decomposition, Material Repair, etc.; Biological Weathering: Algae, Lipstick, Antelope, Herbs, Trees, etc.; Surface Discoloration: White, Brown, Black, etc.; Non-destructive Detailed Investigation: Ultrasonic Measurement, Cracks Monitoring, Image Analysis, etc.

3) Performance Department in the field of Biological Damage: Laboratory of Restoration Technologies (Wooden)

Investigation Items and Contents: Investigation of Damage Characteristics of Wooden Cultural Heritage by Termites ;Investigation of the Distribution of Microorganisms such as Fungi.

2.2 Analysis of Monitoring Cases of Daxiong Hall in Gyeongju Buddhist Temple

Founded in 530 AD by King Faxing of the 23rd generation of Silla, it was originally called Huayan Buddhist Temple or Fariu Temple. It was expanded in 751 AD by Prime Minister Kim Dacheng and completed in 774. Buddhist Temple is not only the center of Korean religious beliefs, but also an important place for cultural integration. Throughout the long history, it has attracted countless monks, scholars and believers, who exchange ideas and spread culture here. As a bridge between the Korean Peninsula and external cultures, Buddhist Temple has promoted the collision and integration of Chinese and Korean cultures. Unfortunately, it was burned down during the Japanese Rebellion. It has since been restored and rebuilt, that is, the current

• 柱头裂缝、损坏和倾斜等变形。

• 屋顶瓦片发生了位移和松动，屋顶瓦片的损坏明显，观察到大量已经脱落或有脱落风险的滴水瓦。需要采取措施防止因脱落瓦片而导致的安全事故。

• 在主要结构材料中确认到了损坏、分离和偏移等损坏。

• 梁的下部出现裂缝，周围有明显的变形，需要注意监测以确定进展情况并防止进一步损坏。

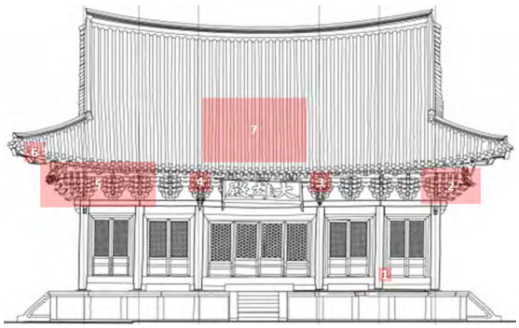

图 2：大雄殿南侧面
Figure 2. South side of Daxiong Hall

图 3：监测照片
Figure 3. Monitoring photos

3 综合结果与建议

在主要结构构件中确认了损坏、间距变化和倾斜等损坏，在许多木制构件中确认了裂缝和开口。屋顶瓦片发生了松动。虽然结构变形的尺寸不大，但在主要结构构件周围构件观察到了明显的倾斜。

building. Only the stone parts of the building really remain in their original appearance. In 1995, the Buddhist Temple was added to the UNESCO World Heritage List.

Monitoring Wooden Building Cultural Heritage The first thing to do is to check the condition of the ground and the base. This is because the ground and the base are the places that receive all the forces that allow the Wooden Building Cultural Heritage to stand for a long time. Therefore, the relationship between the base and drainage, the presence or absence of settlement of the base, the presence or absence of drains, slope, etc. should be monitored. The second part is the status of the column and the base. The column should be checked for tilt, rise and fall, changes in the size of the column and the occurrence of displacement of the column and the base. This is because the instability of the column can cause damage to the joint with each component, resulting in physical changes, which in turn lead to wall damage. The third part is to check whether there are tiles on the roof, the proportion of new and old tiles on the roof, whether there are eccentric loads, changes in the spacing between tiles due to rain and snow, and whether there are any leaks. If the roof continues to leak into the building due to separation or damage of tiles, it may be demolished and repaired above the square, so it is very necessary to monitor.

2.3 Key monitoring results

•The peeling and surface contamination of the pedestal foundation stone is significant and can continue to expand.

• The bucket arch of the main hall is split outward.

• Separation occurs at the joints of horizontal materials such as purlins.

• Deformation such as cracks, damage and tilt of the stigma head.

• Roof tiles have been displaced and loosened. The damage of roof tiles is obvious. A large number of drip shingles that have fallen off or are at risk of falling off have been observed. Measures need to be taken to prevent safety accidents caused by falling shingles.

• Damage such as damage, separation and deviation have been confirmed in the main structural materials.

• Cracks appear in the lower part of the

年度 Year	项目 Project	内容 Content	备注 Remarks
2013	修缮 Repair	阻燃处理 Flame retardant treatment	庆州市 Gyeongju
2015-2016	修缮 Repair	檩条以上部位解体修缮 Disassembly and repair of the above parts of the purlin	庆州市 Gyeongju
2017	修缮 Repair	地震破坏修复工作 Earthquake damage repair work	庆州市 Gyeongju
2017-2018	调查 Survey	丹青纹样实测调查 Measured investigation of Danqing pattern	庆州市 Gyeongju
2021	修缮 Repair	指示牌 Sign	庆州市 Gyeongju
2023	调查 Survey	被选为重点管理监测对象名录 Selected as a list of key management monitoring objects	国立文化财研究院 National Institute of Cultural Property

表 1：庆州佛国寺大雄宝殿修缮情况
Table 1. Refurbishment of Daxiong Hall of Gyeongju Buddhist Temple

综合结果（等级）：D 级（详细诊断）

建议：由于主要结构构件的内部和外部以及屋顶已经确认了大量损坏，因此建议通过详细的安全诊断确定损坏和变形的范围和原因，并做出保护措施。

等级：A（良好）、B（轻微修缮）、C（注意观察）、D（详细诊断）、E（修缮）、F（立即修缮）、其他等级（已报预算，流程正在进行中）

beam and there is significant deformation around it. Attention needs to be paid to monitoring to determine the progress and prevent further damage.

3 Comprehensive findings and recommendations

Damage such as damage, changes in spacing, and tilt were confirmed in the main structural members, and cracks and openings were confirmed in many wooden members. Loosening of roof tiles occurred. Although the size of the structural deformation was not large, significant tilt was observed in the members around the main structural members.

Comprehensive Results (Grade): Class D (Detailed Diagnosis)

Recommendations: As a significant amount of damage has been confirmed in the interior and exterior of the main structural members, as well as in the roof, it is recommended that the extent and cause of damage and deformation be determined through a detailed safety diagnosis, and that protective measures be taken.

Ratings: A (Good), B (Minor Repair), C (Observation Attention), D (Detailed Diagnosis), E (Repair), F (Immediate Repair), Other Ratings: (Budget has been reported and the process is ongoing)

实践案例 Case Study

韩国景福宫御膳房遗址复原项目

South Korea Gyeongbokgung Imperial Kitchen Site Restoration Project

资料来源：
景福宫御膳房修复调查报告书，2012.
Source:
Survey Report on Gyeongbokgung Imperial Kitchen Site Restoration, 2012 .

1 项目背景

景福宫御膳房修缮项目启动于文化遗产厅政策基调“从保存到活用”转变的时间点。项目将根据1907年的《北阙图》复原御膳房建筑原型，同时复原内部用品。通过充分展示景福宫王室的饮食文化，活化利用宫廷和王室的生活文化场景，促进文化产业发展。这也将成为提升韩食及韩食作为国家品牌价值的核心驱动力之一。

项目将景福宫御膳房的内烧厨房、外烧厨房、生物房等建筑物复原为原形，根据各建筑的用途，对食品、生活、动线、生活器材等进行调查。包括了确定各殿和内部空间的用途，厨房的设施和工具，以及器具和碗具等具体摆放位置，御膳房工作人员的职务与工作内容、动线、运营方式等内容。

项目推进日程：2012.5.1—2012.11.30

项目管理机关及组织框架：韩国国家遗产厅、窮陵文化遗产科、监督委员会、咨询委员、研究者团队

2 项目内容

韩国景福宫位于首尔钟路区社稷路161号，背靠北岳山，处于首尔市中心位置。始建于1395年，是朝鲜王朝的正宫，其名称源于《诗经·大雅·既醉》中的“既醉以酒，既饱以德；君子万年，介尔景福”。占地面积为12.6万

1 Project background

The time point when the renovation project of Gyeongbokgung-yaki kitchen started and the policy tone of the Cultural Heritage Department changed from "preservation to utilization". Therefore, the prototype will be restored according to the "North Que Map" in 1907, and the internal items will be restored at the same time. In this way, the living culture of the court and the royal family can be utilized, the cultural industry will be activated, and the food culture of the royal family of Gyeongbokgung will be fully displayed. This will also become one of the core driving forces for the promotion of Korean food and Korean food as a national brand value.

The project restores the inner soju room, outer soju room, biological room and other buildings of the Royal Kitchen of Gyeongbokgung to their original form, and investigates the food, life, circulation, and living equipment according to the purpose of each building. It includes the determination of the use of each hall and internal space, the facilities and tools of the kitchen, as well as the specific placement of utensils and bowls, the duties and work content of the staff, the movement line, and the operation method.

Project Promotion Agenda: 2012.5.1 - 2012.11.30

Project Management Authority and Organizational Framework: Korea National Heritage Agency, Buling Cultural Heritage Section, Supervisory Committee, Advisory Committee, Researcher Team

2 Project content

Gyeongbokgung Palace is located at 161

坪（57.75 公顷），整体布局呈正方形，宫殿建筑多以木材为主要材料，屋顶多为歇山式，铺灰黑色筒瓦，暗红的柱，搭配绿色窗棂，木料表面常以龙、凤、云、花等图案装饰。

宫城外围及前朝区域包括光化门、东十字阁、兴礼门等。光化门是正门，始建于 1395 年，最初叫“四正门”，后更名，曾被日军移建，历经多次修复。

王室办公及宫廷活动区域主要有勤政殿、思政殿、庆会楼等。勤政殿是主殿，用于君王登基和大型朝会，矗立在二层台基上，面阔五间，斗拱飞檐；思政殿是皇室书房和办公室；庆会楼是建于莲池中央的石舫，用于国王举行宴会。

王室后庭及休闲区域包含康宁殿、交泰殿、慈庆殿、香远堂等。其中乾清宫是高宗十年所修的后宫寝居之所，由长安堂、玉壶楼、坤宁阁等组成。

御膳房作为宫殿的重要组成部分，主要负责为王室成员准备饮食。在当时，御膳房的食

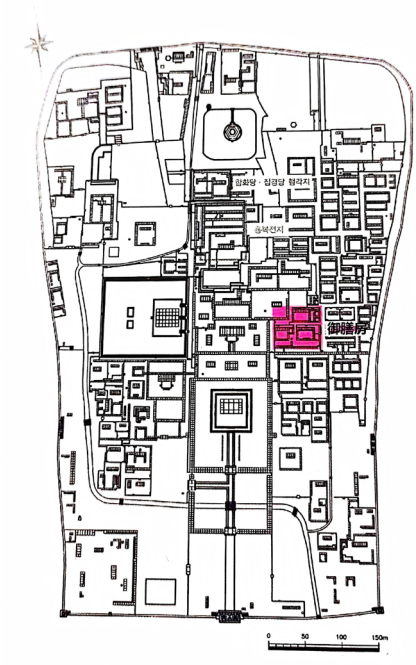

图 1：景福宫御膳房区位图（颜色部分）
Figure 1. The location map of Gyeongbokgung Imperial Kitchen (color part)

Sheji Road, Jongno District, Seoul, South Korea. It is located in the center of Seoul, backed by Beiyue Mountain. Founded in 1395, it is the main palace of the Joseon Dynasty. Its name is derived from the "Daya Drunk" in "The Book of Songs". "Drunk with wine, full with virtue; a gentleman for ten thousand years, Jieer Gyeongbok". It covers an area of 126,000 Ping (57.75 hectares), and the overall layout is square. The palace buildings are mostly made of wood as the main material. The roofs are mostly mountain-style, with gray black tubular tiles, dark red columns, and green window lattices. The wood surface is often decorated with patterns such as dragons, phoenixes, clouds, and flowers.

The outer and former areas of Miyagi include Gwanghwa Gate, East Cross Pavilion Guanghua Gate is the main entrance. It was built in 1395 and was originally called the "Four Main Entrance". It was later renamed. It was moved by the Japanese army and has been restored many times.

The main areas of the royal office and palace activities include the Qinzheng Hall, the Hall of Ideology and Politics, and the Celebration Hall. Qinzheng Hall is the main hall, which is used for monarchs to ascend the throne and large-scale court meetings. It stands on the foundation of the second floor, with a width of five rooms and bucket arches and cornices. The Hall of Ideology and Politics is the royal study and office. Qinghui Building is a stone boat built in the center of the lotus pond, which is used for kings to hold banquets.

The backyard and leisure areas of the royal family include Kangning Hall, Jiaotai Hall, Ciqing Hall, and Xiangyuan Hall. Among them, Qianqing Palace was the sleeping place of the harem built by Gao Zong in ten years. It consisted of Chang'an Hall, Jade Pot House, Kunning Pavilion, etc.

As an important part of the palace, the imperial kitchen was mainly responsible for preparing meals for the royal family. At that time, the selection of ingredients, cooking methods and presentation of dishes in the imperial kitchen represented the highest food standard of the Joseon Dynasty.

Initial Construction and Expansion of Gyeongbokgung Palace: After the Korean Emperor Li Chenggui moved his capital to Hanyang in 1394, he ordered the construction of Gyeongbokgung Palace. It was first

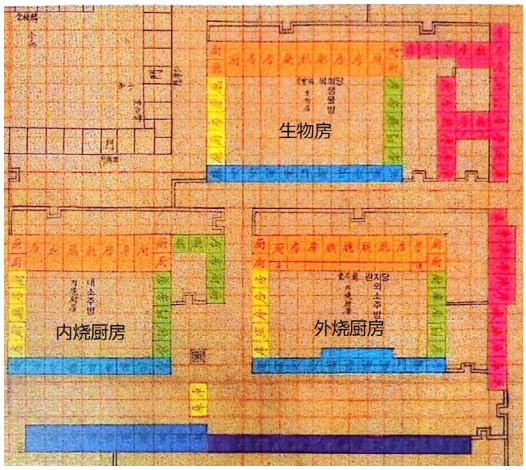

图 2：御膳房配置图
Figure 2. Imperial kitchen configuration diagram

材选用、烹饪方法及菜品呈现都代表了朝鲜王朝最高的饮食水准。

景福宫初建与扩建：1394 年朝鲜太祖李成桂迁都汉阳后，下令修建景福宫，1395 年 9 月首次完工，最初有 390 多间房屋。在太祖至世宗大王期间经历多次扩建，挖明堂水、引衿川、建庆会楼等，世宗时初具朝鲜王朝法宫面貌。

毁坏与重建：1553 年明宗时期发生大火灾，除勤政殿外大部分建筑被烧毁，次年动员人力修复。万历朝鲜战争中，景福宫几乎全被烧毁，之后 273 年未复建。1865 年高宗时期，兴宣大院君下令进行二次修建，历经 7 年基本恢复极盛时规模。

日本殖民统治时期拆改：1910 年朝鲜进入日本殖民统治时期，景福宫内大部分建筑被拆毁，仅留勤政殿等少数中轴线建筑。1926 年日本在景福宫建造朝鲜总督府大楼。

大韩民国时期复建：1948 年韩国政府成立，1968 年光化门重建，1995 年拆除总督府标志性建筑，2010 年第一次修复工作完成，修复 89 栋建筑，2011 年起进入第二次复原阶段。

御膳房起源与早期发展：韩国御膳房的历史可追溯到三国时代，当时的王室已有专门负

completed in September 1395 and initially had more than 390 houses. During the period from Emperor Taizu to King Sejong, it experienced many expansions, digging Mingtang water, drawing Jin River, and building Qinghui Building. During Sejong's time, it first had the appearance of the Dharma Palace of the Korean Dynasty.

Destruction and Reconstruction: A big fire broke out during the Ming Dynasty in 1553, and most of the buildings except the Qinzheng Hall were burned down. The following year, manpower was mobilized to repair it. During the Wanli Korean War, Gyeongbokgung Palace was almost completely burned down, and it was not rebuilt in 273 years. During the Gaozong period in 1865, the King of Heungseon ordered a second round of construction, and after seven years, the structure was essentially restored to its former grandeur.

Demolition and reform during the Japanese occupation period: In 1910, when North Korea entered the Japanese occupation period, most of the buildings in Gyeongbokgung Palace were demolished, leaving only a few central axis buildings such as Qinzheng Hall. In 1926, Japan built the Governor's Palace Building in Gyeongbokgung Palace.

Reconstruction during the Republic of Korea period: The South Korean government was established in 1948, the Gwanghwamun was rebuilt in 1968, and the landmark building of the Governor's Palace was demolished in 1995. The first restoration work was completed in 2010, and 89 buildings were restored. Since 2011, it has entered the second restoration stage.

Origin and early development of the imperial kitchen: The history of the imperial kitchen in South Korea can be traced back to the Three Kingdoms era, when the royal family had an institution dedicated to catering. In the Joseon Dynasty (1392-1910), the imperial kitchen system was gradually improved and became an important department.

The imperial kitchen of Gyeongbokgung has undergone many damages in history, such as the destruction during the "Renchen Rebellion" period. In 1865, the imperial kitchen was repaired when the Gyeongbokgung Palace was rebuilt. However, when the Japanese held the "Korean Property Promotion Association" exposition at

责饮食的机构。到了朝鲜王朝（1392-1910 年），御膳房制度逐渐完善，成为为王室提供饮食服务的重要部门。

景福宫御膳房在历史上经历了多次损毁，如“壬辰倭乱”时期被毁，1865 年景福宫重建时御膳房得到修复，但在 1915 年日本在景福宫举行“朝鲜物产共进会”的博览会时，众多殿阁被毁，御膳房也未能幸免。根据 1880-1890 年的景福宫图和 1907 年的北阙图可以判断位置和规模。

从建筑布局上看，御膳房由多个区域组成，包括内烧厨房、外烧厨房、生物房等区域。每个区域可以分成房、厨、厅、库、门。

3 御膳房职责与分工

内烧厨房：主要负责国王、王后等王室成员的日常饮食，菜品注重精致与营养，烹饪过程严格遵循传统宫廷食谱和烹饪方法。

内烧厨房可以分为 1 案（中心领域）、2 案（本斋领域）、3 案（别斋领域）。中心领域在内烧厨房北侧，由厨 2 处，房 2 处，厅 1 处组成。本斋领域包含了中心领域，由房 7 处，厨 4 处，库 1 处，厅 5 处，门 1 处组成。别斋领域在本斋领域基础上增加了房 1 处，厨 1 处，厅 1 处。中心区域是这里以中间大厅 1 处为中心，左右各 1 个地暖房，左右最外处各 1 个厨房。暖房也分东、西，一边做肉和熟菜，另一边做鱼和生菜等冷品。本斋领域的功能是准备国王

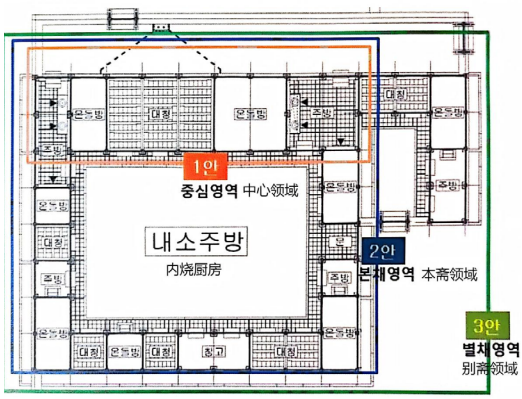

图 3：修复后的内烧厨房配置图
Figure 3. Configuration diagram of the repaired Inner kitchen

Gyeongbokgung Palace in 1915, many halls and pavilions were destroyed, and the imperial kitchen was not spared. The location and scale can be judged according to the map of Gyeongbokgung Palace in 1880-1890 and the map of Beique in 1907.

From the architectural layout, the imperial kitchen is composed of multiple areas, including the Inner kitchen, the Outer kitchen, and the Biological room. Each area can be divided into rooms, kitchens, halls, warehouses, and doors.

3 Responsibilities and division of labor

The Inner kitchen is mainly responsible for the daily diet of the king, queen and other royal family members. The dishes focus on delicacy and nutrition, and the cooking process strictly follows traditional court recipes and cooking methods.

The Inner kitchen can be divided into 1 case (central area), 2 cases (Benzhai area), and 3 cases (Bie-zhai area). The central area is on the north side of the inner-fired kitchen, which consists of 2 kitchens, 2 rooms, and 1 hall. The Benzhai area contains the central area, which consists of 7 rooms, 4 kitchens, 1 library, 5 halls, and 1 door. The Bie-zhai area adds 1 room, 1 kitchen, and 1 hall on the basis of the Benzhai area. The central area is here with 1 middle hall as the center, 1 floor heating room on the left and right, and 1 kitchen on the outermost left and right. The heating room is also divided into east and west. One side makes meat and cooked dishes, and the other side makes cold products such as fish and lettuce. The function of the Benzai Domain was to prepare the king's daily supply of wine or other meals. The Bieshai Domain was for the cooks who made five meals between 5 a.m. and 5 p.m. After work, they took over the office of the internal officials and placed their furniture and utensils for board and lodging.

Outer Kitchen: To undertake the catering preparation for large-scale events such as court banquets and celebrations. It is necessary to make a large number of exquisite dishes and snacks according to the scale and requirements of the event. Outer Kitchen can be divided into 1 case (central field), 2 cases (Benzai field), and 3 cases (warehouse field). The central field is the same as the inner kitchen space configuration, mainly preparing dough cakes and noodles. The Benzai field prepares celebration cakes. The warehouse field stores furniture, tables, utensils and other functions.

每天供给酒或其他餐品。别斋领域是早上 5 点到下午 5 点之间制作了 5 次餐食的厨师们下班后，接班内官的办公地点，摆放他们食宿用的家具和器皿。

外烧厨房：承担宫廷宴席、庆典等大型活动的餐饮准备工作，需要根据活动规模和要求，制作大量精美的菜肴和点心。外烧厨房可以分为 1 案（中心领域）、2 案（本斋领域）、3 案（仓库领域）。中心领域与内烧厨房空间配置一样，主要准备面饼和面条。本斋领域准备庆典糕点。仓库领域存放家具、桌子、器皿等功能。

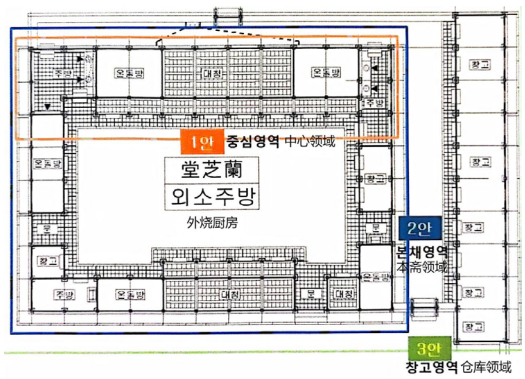

图 4：修复后的外烧厨房（兰芝堂）配置图
Figure 4. Configuration diagram of the restored Outer Kitchen (Lanzhi Hall)

生物房：专门负责准备各种糕点、饼以及茶点的空间，也制作装饰食品用的床花。为王室成员提供休闲时光的小吃，对茶点的制作有很高的要求。生物房可以分为 1 案（中心领域）、2 案（本斋领域）、3 案（别斋领域）。中心领域空间配置与内烧厨房、外烧厨房一样。中心

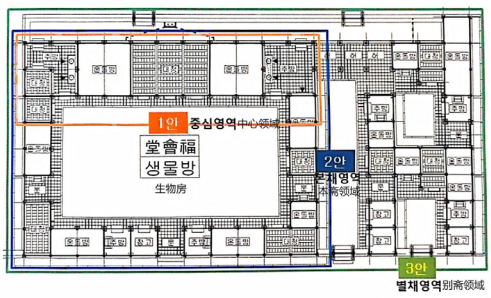

图 5：修复后的生物房（福会堂）配置图
Figure 5. Configuration diagram of the repaired biological room (Fuhui Hall))

Biological Room: A space specially responsible for preparing various pastries, cakes and refreshments, and also making bed flowers for decorative food. Providing snacks for members of the royal family in their leisure time, there are high requirements for the production of refreshments. Biological Room can be divided into 1 case (central area), 2 cases (Benzhai area), and 3 cases (Bieshai area). The space configuration of the central area is the same as that of the inne kitchen and the outer kitchen. The central area is mainly responsible for making various pastries. The Benzhai area is also to assist in the preparation of wine or other meals. The Bieshai area is the dining and lodging space for internal officials, with floor heating room and stove, as well as sundries to meet their daily basic living needs.

4 Court food-related official positions and tasks

The main department in charge of the court's diet is the SiYangyuan. In addition, there are departments such as NeiSifu, NeiXvsi, NeiZisi, NeiZhansi which are jointly responsible for the diet of the king, the princess, and the members of the royal family. The details are as follows:

The emperor's imperial meals were first advised by Li Cao's NeiYiyuan, and then made by SiYangyuan, and finally the inner officials and palace maids were responsible for serving the emperor's meals. Sometimes, the NeiYiyuan would also personally be responsible for making medicated meals and flavoring sauces.

5 Utilization plan

Objective: 2021-2030, relying on the imperial kitchen to "build a high-quality cultural industry and maximize value".

1) As a court food education site.

• To provide accurate explanations of court food culture to foreign tourists and domestic tourists.

• As a training base for sightseeing translation guides.

• A training base for domestic tour guides.

• A training base for cultural sightseeing docents. As an educational facility for students in higher education institutions. 71

领域主要负责制作各种糕点。本斋领域也是协助准备酒或其他餐品。别斋领域是内官的食宿空间，有地暖房和灶头，以及满足他们日常的基本生活需求的杂物。

4 宫廷饮食相关官职与任务

负责宫廷饮食的主要部门是司养院。此外，还有内侍府、内需司、内资寺、内瞻寺等部门共同负责王与王妃、王室成员们的饮食。

皇帝的御膳首先要听取礼曹的内医院建议，然后由吏曹的司养院负责制作，最后由内官和宫女负责服务皇帝用膳。有时，内医院也会亲自负责制作药膳和提味酱。

5 御膳房后期活用方案

目标：2021-2030 年，依托御膳房“打造成高品格文化产业，实现价值最大化”。

1）作为宫廷饮食教育场所。

• 为向外国游客、国内游客提供准确的宫廷饮食文化解说。

specialized universities in tourism-related disciplines, 6 aviation-related disciplines, 35 universities in 4-year universities in tourism-related disciplines, universities in cultural heritage management-related disciplines, universities in history-related disciplines, cooking, food and beverage-related disciplines, etc.

2)Foreign education venues such as diplomatic envoys in Korea. Training for families of diplomatic envoys in Korea and influential groups such as foreign teachers.

3)Development of cultural tourism products. Development of high-quality tourism products such as court food culture visits.

• Create an excellent Korean food cultural route.

• Allow tourists to experience the production process directly through the operation of Korean food experience classrooms.

• As a sales venue for Korean specialty products, providing traditional court wine, traditional tea and related delicacies.

官厅名 Official name	下属部门名 Subordinate department name	任务 Task
吏曹 LiCao	司养院 SiYangyuan	负责御膳制作、提供宫廷内的食物、瓷器等 Responsible for making royal meals, providing food, porcelain, etc.
	内侍府 NeiSifu	监督 Supervise
	内需司 NeiXvsi	负责管理米、布、杂物、奴隶等 Responsible for managing rice, cloth, sundries, slaves, etc.
户曹 HuCao	内资寺 NeiZisi	米谷、面、酱、蔬菜、果物 Rice grains, noodles, sauces, vegetables, fruits
	内瞻寺 NeiZhansi	为正 2 品以上官员准备酒 Prepare wine for officials of 2 or higher grades
	司导寺 SiDaosi	宫廷用酱 Court sauce
	司宰监 SiZaijian	鱼类、肉类、烧木等 Fish, meat, wood, etc
	济用监 JiYongjian	人参 Ginseng
	司醞署 SiHaishu	酒与礼酒 Wine and ceremonial wine
	义盈库 YiYingku	油、蜂蜜、胡椒等 Oil, honey, pepper, etc
	司圃署 SiPushu	园圃 Garden
	养贤库 YangXianku	负责儒生的米、豆等 Responsible for rice, beans, etc.
	长兴库 ChangXingku	宫中米、豆、草席、纸等 rice, beans, straw mat, paper, etc.
	宣惠厅 XuanHuisi	特产品 Special product
礼曹 LiCao	奉常寺 FengChangsi	祭祀 Sacrifice
	内医院 NeiYiyuan	制药、煮粥和醍醐汤等 Pharmaceuticals, porridge and daigo soup, etc.
	礼宾寺 LiBinsi	招待宾客的饮食 Food for guests
	昭格署 ZhaoGeshu	酒与酿酒 Wine and winemaking
	冰库 BingKu	储存冰 Store ice
	典牲署 DianShengshu	饲养祭物 Feeding sacrifices
	司畜署 SiChushu	饲养非祭物的各种杂畜 Keeping various miscellaneous animals that are not sacrificed

表 1：宫廷饮食相关官职与任务
Table 1. Court food-related official positions and tasks

• 作为观光翻译向导人员培训基地。

• 国内导游培训基地。

• 文化观光讲解员培训基地。

作为高等教育机构的在校生教育设施。开设旅游相关学科的专科大学 71 所，航空相关学科 6 个，开设旅游相关学科 4 年制大学 35 所大学。（也可包含开设文化遗产管理相关，历史学相关学科开设大学，烹饪，食品饮料相关学科等。）

2) 驻韩外交使节等外国人教育场所。驻韩外交使节家庭以及外教等影响力较大的人群进行培训。

3) 文化观光产品开发。开发宫廷饮食文化探访等高品格观光产品。

• 打造优秀韩餐文化路线。

• 通过运营韩餐体验教室，让游客直接体验制作过程。

• 作为韩国特产销售场所，提供宫廷传统酒、传统茶以及相关美食。

• 将宫廷饮食打造成健康饮食，与大健康产业结合。

• 作为影视剧拍摄地点。

• Turn palace food into a healthy diet and combine it with the big health industry.

• As a film and television drama shooting location.

平台动态 Platform Dynamics

图像资料中的隐藏历史
关于葡萄牙中世纪彩绘手稿中无机蓝色颜料使用的研究

Hidden Histories in Graphic Documents
A Study on the Use of Inorganic Blue Pigments in Portuguese Medieval Illuminated Manuscripts

Catarina Miguel[i]

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人类生产图像资料的历史是一次穿越时间的迷人之旅，它展示了人类寻找愈来愈复杂的方法来记录和分享思想、信息和（历史）故事的过程。从最早的洞穴壁画到如今复杂的数字系统，记录思想、知识和语言的演变——无论是表现形式还是文本形式——都是人类技术、文化和社会进步的独特见证。在这种背景下，采用分析方法对于理解、评估和保护图像资料所代表的重要文化和历史见证至关重要。通过材料分析、年代测定、生产过程识别和保护状况评估等方法，可以深入了解图像资料的起源、真实性和状况，这不仅有助于更深入地了解作品本身，还有助于制定保护和修复策略，确保为后世最佳地保存下来。在过去十年中，与文化遗产其他领域的分析研究同步，图像资料的材料研究已从依赖微样本分析的实验性设计发展到越来越多的现场、无损分析研究，并结合化学成像研究。这使得对作品，特别是在材料均匀性方面的评估更加深入。

本文基于葡萄牙科学与技术基金会（FCT）资助的研究与开发（R&D）项目框架内所进行的一项全面研究，该项目旨在对阿科巴萨修道院早期生产的一套彩绘手稿进行材料、礼拜、书籍学和音乐研究。研究专注于分析修道院早

The history of the production of graphic documents is a fascinating journey through time, showing how humanity has found increasingly sophisticated ways to record and share ideas, information, and (hi)stories. From the earliest cave paintings to today's complex digital systems, the evolution of recording thought, knowledge, and language—whether in representative or textual form—represents a unique testimony to the technological, cultural, and social advancement of humanity. In this context, the use of analytical approaches becomes essential for understanding, valuing, and preserving the important cultural and historical testimonies that graphic documents represent. Through approaches such as material analysis, dating, identification of production processes, and assessment of conservation status, it is possible to delve deeper into the details about the origin, authenticity, and condition of a graphic document, contributing not only to a more profound knowledge of the work but also to the definition of conservation and restoration strategies, ensuring its best preservation for future generations. In the past decade, in line with the analytical studies in other areas of Cultural Heritage, the material study of graphic documents has evolved from once experimental designs heavily reliant on micro-sample analysis to increasingly in-situ, non-invasive analytical studies accompanied by chemical mapping. This allows for a deeper assessment of the work, particularly

期使用的蓝色颜料，梳理其使用的年代顺序，特别是从自然群青蓝向蓝铜矿的转变。研究结果出人意料，改变了艺术史领域对这些颜料在图像资料中使用情况的认知，有助于提升对相关研究对象在全国乃至国际上的重视和评价。

1 从群青到蓝铜矿——阿科巴萨修道院中世纪礼拜手稿中蓝色的故事

中世纪蓝色的意义和起源一直是各种故事和历史的主题，特别是群青蓝色（也称为青金石）的使用以及在艺术史中向蓝铜矿的转变。在中世纪时期，群青被认为是最昂贵的蓝色颜料，仅用于绘画构图中最重要的描绘。相比之下，蓝铜矿——一种成本较低的蓝色颜料——用于不太重要的表现或较大面积，因为它能降低作品的制作成本。然而，后者在颜色的靓丽程度上不能与群青比肩。

本研究旨在确定蓝铜矿何时及如何被引入葡萄牙最重要的中世纪修道院——位于圣玛丽亚·德·阿科巴萨西多会修道院的抄写室中。葡萄牙首位国王阿方索·恩里克斯于 1153 年 4 月 8 日颁布库托特许状创立该修道院，是克莱尔沃的第 53 个附属机构。除了在新成立的葡萄牙王国统一基督教仪式的重要使命外，阿科巴萨的白袍修士还带来了来自勃艮第的新农业方法和技术，这些方法和技术对于提高该地区的农业生产力至关重要。阿科巴萨迅速实现了经济独立，摆脱了对王室捐赠的依赖，成为葡萄牙最稳固的修道院。

2 实现预期结果的全面方法

从阿科巴萨抄写室早期活动所生产的、至今仍存的手稿中，选择了 11 至 14 世纪的 11 部彩绘礼拜手稿，目前这些手稿收藏于葡萄牙国家图书馆（BNP）（图 1）。整体研究方法始于分析手稿文献和审查所记载的礼拜仪式，这从礼拜仪式的角度确定了原始核心的年代，并且识别出手稿中以单页或书册形式陆续添加的内容。这一方法的第一部分至关重要，因为在许多情况下，BNP 数据库为手稿生产提供的年代存在长达一个世纪以上的时序差异，这将从根本上阻

in terms of the homogeneity of its materials.

The present work arose from a holistic study carried out within the framework of a Research and Development (R&D) project funded by the Portuguese Foundation for Science and Technology (FCT), which aimed at the material, liturgical, codicological, and musical study of a set of illuminated manuscripts produced at the dawn of the Alcobaça scriptorium. In this study, we focus on the analysis of blue pigments used in the early days of the scriptorium, aiming to establish the chronology of their use, particularly the transition from natural ultramarine blue to azurite. The results obtained were surprising, leading to a shift in the knowledge of Art History regarding the use of these pigments in graphic documents, contributing to the appreciation of the objects under study, both nationally and internationally.

1 From ultramarine to azurite – the story of the blues in medieval litugical codices from the alcobaca scriptorium

Medieval blue has been the subject of various stories and histories concerning its meanings and origins, particularly the use of ultramarine blue, also known as lapis lazuli and the introduction/transition to azurite in art history. Considered the most expensive blue pigment during the medieval period, ultramarine was selectively used for the most important depictions in pictorial compositions. In contrast, azurite – a less costly blue pigment – was used for less significant representations or larger areas, as it allowed for cost reductions in the execution of works. However, its colour did not always match the beauty of ultramarine.

This work aimed to identify when and how azurite might have been introduced in Portugal's most prominent medieval scriptorium, located at the Cistercian Abbey of Santa Maria of Alcobaça. Founded with the "Carta de Couto" dated 8 April 1153, issued by King Afonso Henriques, the first King of Portugal, the Abbey of Santa Maria of Alcobaça became the 53rd affiliate of Clairvaux. In addition to the important mission of unifying the Christian rite within the newly proclaimed Kingdom of Portugal, the white monks of Alcobaça brought with them new agricultural methods and techniques from Burgundy, which were fundamental in improving

图 1：用于研究阿科巴萨抄写室中世纪彩绘手稿中蓝色颜料使用年代顺序的选定手稿。所标日期遵循 C. Barreira 的礼拜研究结果
Figure 1. Selected manuscripts for the chronological study of the use of blue pigments in medieval illuminated manuscripts from the Alcobaça scriptorium. The indicated dates follow the results of the liturgical studies by C. Barreira

碍建立尽可能准确的天然群青及其转向蓝铜矿的使用时间线的目标。

研究针对用于彩绘首字母以及不太重要的蓝色首字母（在手稿中大量出现）的蓝色墨水的材料特性进行了分析，这些分析涵盖了每部手稿不同执行阶段的代表性部分。采用非侵入式现场分析技术获取蓝色墨水的元素化学信息（手持式能量色散 X 射线荧光光谱分析，h-EDXRF）、分子数据（紫外－可见－近红外光纤反射光谱分析，UV-Vis-NIR FORS）以及化学成像（高光谱成像分析，HSI）。

3 阿科巴萨抄写室早期无机颜料使用的年代顺序

对蓝色墨水的材料分析使得建立阿科巴萨抄写室早期活动期间天然群青和蓝铜矿使用的年代顺序成为可能。这项研究突出了从大约 1175–1191 年（ALC11）到 1196 年（ALC167）期间自然群青蓝颜料的持续使用，以及从大约 1260 年（ALC166 的最后一次添加）到 1318/1330–32 年（ALC26）期间蓝铜矿的使用（图 2）。在这大约 58 年期间，阿科巴萨抄写室同时使用了群青和蓝铜矿。大约在 1260 年之后，随着 ALC166 手稿的最后一次添加，蓝铜矿似乎取代了群青用于蓝色墨水的生产（在 ALC433 的最后添加以及整个 ALC26 中）（图 2）。

4《福音书》ALC167——预期答案的关键

agricultural productivity in the region. Alcobaça quickly achieved economic independence from royal donations, becoming the most well-established monastery in Portugal.

2 A holistic approach for the desired outcome

From the collection of manuscripts produced during the early activities of the Alcobaça scriptorium, which have survived to this day, eleven illuminated liturgical codices from the 12th-14th centuries were selected, currently housed at the National Library of Portugal (BNP) (Figure 1). The holistic approach began with documentary analysis and a liturgical examination of the manuscripts, which allowed for the dating of the original core from a liturgical perspective and the successive additions in the form of folios or gatherings in each manuscript. This first part of the approach was crucial, as in many cases, the dating provided by the BNP database for the manuscripts' production presents a temporal discrepancy of up to more than a century, which would fundamentally hinder the aim of establishing, as accurately as possible, the timeline for the use of natural ultramarine and its transition to azurite in the Alcobaça scriptorium.

The material characterisation of the blue inks used in both illuminated initials and the less hierarchically significant blue initials (found throughout the manuscript in large numbers) was carried out across representative sections from different execution phases in each manuscript. Non-invasive in-situ analytical techniques were employed to obtain elemental chemical

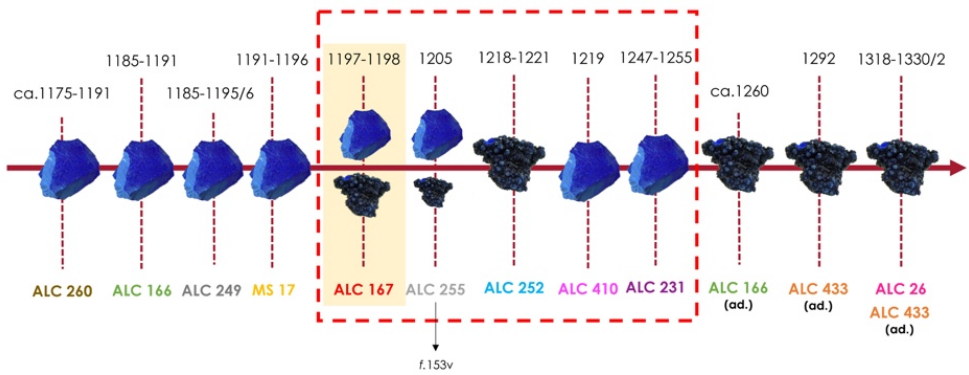

图 2：11 部选定礼拜手稿中无机蓝色颜料使用的年代顺序（添加标记为“ad.”），考虑了礼拜分析确定的精确日期以及在分析的蓝色墨水中识别出的蓝色颜料
Figure 2. Timeline for the use of inorganic blue pigments in the eleven selected liturgical manuscripts (additions marked as “ad.”), considering the precise dates determined by the liturgical analysis and the blue pigments identified in the analysed blue inks

这部非凡的《福音书》于 1197 至 1198 年间制作，是已知最早的在阿科巴萨抄写室中使用蓝铜矿生产蓝色墨水的手稿。更重要的是，它揭示了这种颜料使用的令人惊讶和非凡的方式：虽然群青是整部手稿中用于蓝色字母（次要首字母）的唯一颜料，但在更高等级的首字母（如开篇首字母、章节首字母或段落首字母）中，蓝铜矿作为装饰元素出现在彩绘中。这表明，引入蓝铜矿以扩展色彩选择的原因可能并非出于经济考虑。如果蓝铜矿是由于缺乏群青或为了节省资源而引入的，人们会期望它被用于字母（次要首字母），这些字母数量众多，需要大量的墨水。与此相反，手稿显示蓝铜矿常常与群青和靛蓝（均为高成本颜料）结合使用，用于排版级别更高的首字母（图 3）。

因此，本研究采用的深度跨学科全面方法

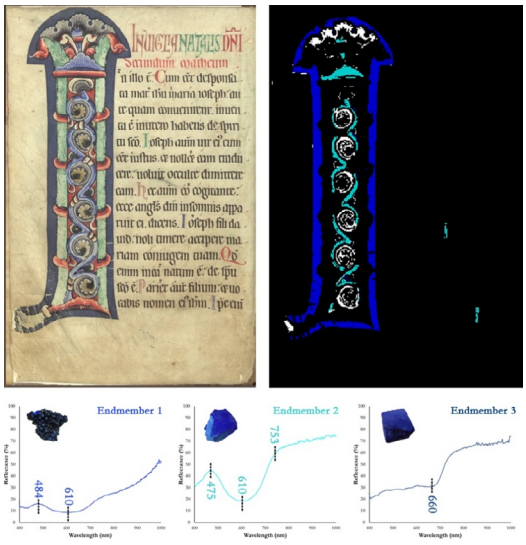

图 3：ALC 167, f.1v 的高光谱成像（HSI）分析得到的分布图。左上：可见图像；右上：HSI 图（连续蓝色区域是使用光谱角匹配器（SAM）算法计算的，以下为端元的容差值：端元 1（深蓝色——蓝铜矿的分布）0.090 弧度；端元 2（青色——群青的分布）0.100 弧度；端元 3（浅灰色——靛蓝的分布）0.085 弧度。下面，从左到右：UV-Vis-FORS 光谱，分别识别出端元 1、2 和 3 中的蓝铜矿、群青和靛蓝。

Figure 3. Distribution maps obtained from hyperspectral imaging (HSI) analysis of ALC 167, f.1v. Top left: visible image; top right: HSI map (the continuous blue areas are calculated using the Spectral Angle Mapper (SAM) algorithm, with the following tolerance values: endmember 1 (dark blue – distribution of azurite) 0.090 rad; endmember 2 (cyan – distribution of ultramarine) 0.100 rad; endmember 3 (light grey – distribution of indigo) 0.085 rad. Below, from left to right: UV-Vis-FORS spectra of endmembers 1, 2, and 3, where azurite, ultramarine, and indigo were identified, respectively.

information (handheld energy dispersive X-ray fluorescence spectroscopy, h-EDXRF), molecular data (fiber optic reflectance spectroscopy in the ultra-violet-visible-near infrared range, UV-Vis-NIR FORS), and chemical imaging (hyperspectral imaging analysis, HSI) of the blue inks.

3 A timeline for the use of inorganic pigments in the early centuries of the alcobaca scriptorium's activity

The material analysis of the blue inks enabled the extraordinary establishment of a timeline for the use of natural ultramarine and azurite in the early centuries of the Alcobaça scriptorium's activity. This research highlighted the consistent use of natural ultramarine for blue pigments in the period from around 1175-1191 (ALC 11) to 1196 (ALC 167), and azurite from approximately 1260 (with the last addition to ALC 166) to 1318/1330-32 (ALC 26) (Figure 2). During this period (around 58 years), both ultramarine and azurite were used together at the Alcobaça scriptorium. Shortly after 1260, with the last addition to manuscript ALC 166, azurite appears to replace ultramarine in the production of blue inks (in both the final additions of ALC 433 and throughout ALC 26) (Figure 2).

4 The Evangeliarium ALC 167 – or the key to the desired answer

Produced between 1197 and 1198, this extraordinary Evangeliarium stands as the earliest known manuscript where the use of azurite in blue ink production at the Alcobaça scriptorium was identified. More importantly, it reveals the surprising and exceptional way this pigment was used: while ultramarine is the sole pigment used for the blue letterings (secondary initials) throughout the manuscript, in the higher-ranking initials (such as opening initials, chapter initials, or paragraph initials), azurite appears as a complementary element in the illuminations. This suggests that the reason for expanding the colour palette with the introduction of azurite might not have been economic. If azurite had been introduced due to a lack of ultramarine or to save resources, one would expect it to be used in the letterings (secondary initials), which are abundant and require considerable ink. Contrary to this, the manuscript shows azurite often combined with ultramarine and indigo (both high-cost pigments) in producing higher-ranking initials (Figure 3).

对于建立阿科巴萨抄写室早期运营期间无机蓝色颜料的使用顺序至关重要。从 1197–1198 年识别出蓝铜矿的引入，将其使用时间定位在法国大学手稿于 1260 年左右进入阿科巴萨藏书室之前，此前人们认为蓝铜矿是在抄写室引入的。因此，蓝铜矿不仅早约 60 年被引入，而且与群青或靛蓝结合使用，用于创造更高等级的首字母，产生从灰蓝色到明亮深蓝色的纯色调，具有非凡的视觉冲击力。

值得注意的是，这种颜料的引入发生在阿科巴萨修道院领土扩张的时期，期间修道院获得了大量土地，这反映了当时修道院的经济实力。因此，我们认为引入蓝铜矿并非出于经济驱动，而是一种艺术选择，代表了对材料的创新使用以及当时不常见的风格视觉效果。这表明抄写室在其早期几十年间不仅在经济资源方面，还在其抄写员卓越的技艺方面都极为丰富。

这项研究证明，采用跨学科方法并结合日益无损的检测和分析手段，能够发现独特的故事和历史，从而让我们更深入地了解我们的文化遗产、社会知识以及不同民族之间的文化关系。

The deeply interdisciplinary holistic approach adopted in this study was, therefore, essential in establishing the chronological use of inorganic blue pigments during the early operation of the Alcobaça scriptorium. The identification of azurite's introduction from 1197-1198 positions its use well before the arrival of French university manuscripts into the Alcobaça armarium around 1260, the date previously assumed for the introduction of azurite at the scriptorium. Thus, azurite was not only introduced around 60 years [Considering that a generation can be defined as the time interval between the birth of one generation of people and the birth of the next, which typically ranges from 20 to 30 years, we may, therefore consider that the introduction of azurite in the scriptorium of Alcobaça occurred around two generations before the period currently assumed by the History of Art in this study.] earlier, but was also used in conjunction with ultramarine or indigo to create high-ranking initials, producing pure shades ranging from greyish-blue to bright dark blue with an extraordinary visual impact.

It is worth noting that this introduction occurred during a period of territorial expansion for the Monastery of Alcobaça, which included the acquisition of a significant amount of land, reflecting the monastery's economic power at the time. Therefore, we believe that introducing azurite was not financially driven but rather an artistic choice, representing an innovative use of materials and stylistic visual effects uncommon for the period. This demonstrates the wealth of the scriptorium during its early decades, not only in terms of economic resources but also in the remarkable skill of its illuminators.

This work demonstrates that the use of interdisciplinary approaches combined with increasingly noninvasive examination and analysis methods leads to the discovery of unique stories and histories, allowing for a deeper understanding of our Heritage, knowledge of Societies, and the cultural relationships between peoples.

活动报道 Latest Events

ICCROM 开展世界遗产管理：人、自然与文化线上培训

ICCROM Launched World Heritage Management: People Nature Culture (PNC25) Online Program

资料来源 Source：
https://www.iccrom.org/courses/world-heritage-management-people-nature-culture-pnc25

图 1：线上培训项目海报
Figure 1. The poster of the online training program

由国际古迹遗址理事会（ICCROM）、世界自然保护联盟（IUCN）、韩国文化遗产管理局和挪威气候与环境部联合主办的“世界遗产管理：人、自然、文化（PNC25）”将于 2025 年 3 月 17 日至 28 日通过六次线上培训展开。

项目将提供关于遗产管理体系的构成要素以及评估其有效性的工具的总体概述，并认识到适应时代变化和现实的必要性。通过了解该体系的运作方式，可以评估其运行情况和表现，包括如何更好地利用现有资源，同时探索新的工作方式。在课程期间，参与者将被介绍用于

Co-organized by ICCROM, IUCN, Korea Heritage Service and the Norwegian Ministry of Climate and Environment, World Heritage Management: People, Nature, Culture (PNC25) will take place in six online sessions from 17 to 28 March 2025.

The program provides a general overview of what constitutes a heritage management system and tools to assess its effectiveness, recognizing the need to adapt to changing times and realities. By understanding how the system works, it is possible to evaluate how it operates and its performance, including how existing resources can be better utilized while exploring new ways of doing things. During the course, participants will be introduced to key tools and resources for improving management, planning and decision-making processes at World Heritage properties and other heritage places.

The content is aligned with the content of the forthcoming World Heritage Resource Manual on “Managing World Heritage”, the recently published Enhancing Our Heritage Toolkit 2.0 and the Operational Guidelines for the Implementation of the World Heritage Convention.

The program will be structured around six sessions that will tackle the following overarching topics:

- Heritage place approach
- Boundaries, buffer zones and wider context of heritage places
- Governance arrangements, including people-centred and rights-based approaches to heritage management
- Factors affecting heritage places and

改善世界遗产地及其他遗产地的管理、规划和决策过程的关键工具和资源。

培训内容与即将发布的《世界遗产资源手册》中关于“管理世界遗产”的内容、最近发布的《增强我们的遗产工具包 2.0》以及《实施世界遗产公约的操作指南》保持一致。

培训分为六次，将围绕下列内容展开：

• “遗产场所”的工作路径

• 遗产地的边界、缓冲区和大环境

• 治理安排，包括以人为中心和基于权利的遗产管理方法

• 影响遗产地及其社会、经济和环境的因素

• 管理系统

• 管理规划和实施

• 管理成效评估

• 遗产保护和管理结果

此外，该课程将借鉴参与者在其世界遗产地和遗产地实施的经验和方法，以便更好地理解国际背景下的遗产管理。

PNC 是 ICCROM-IUCN 世界遗产领导力计划的旗舰项目，面向世界遗产地及其他遗产地的现场管理者和协调员、管理团队和机构成员以及与遗产工作相关的从业者开放。

项目倡导“遗产地工作路径”，专注于如何在更广泛的社会、环境和经济背景下管理和保护遗产地的多重价值。这包括将基于场所的方法应用于遗产管理，以及采用以人为中心的方法与不同行动者和社区合作。

their social, economic and environmental context

•Management systems

•Management planning and implementation

•Management effectiveness assessment for heritage places

•Heritage conservation and management results

Additionally, the course will draw on experiences and approaches implemented by participants at their World Heritage properties and heritage places, allowing for a better understanding of heritage management in the international context.

PNC is the flagship course of the ICCROM-IUCN World Heritage Leadership Programme, open to site managers and coordinators, members of management teams and institutions, and heritage practitioners working with World Heritage properties and other heritage places around the world.

It promotes a “heritage place approach” to heritage management focused on understanding how to manage and conserve the multiple heritage values of places in their wider social, environmental and economic contexts. This includes applying a place-based approach to heritage management and people-centred approaches to working with diverse actors and communities.

ICOMOS 遗产专家与利益相关者研讨会在佛罗伦萨召开

ICOMOS Conference for Conservation Experts and Other Stakeholders Held in Florence

资料来源 Source：
https://theophilos.icomos.org/forthcoming-dialogue-between-conservation-experts-and-other-stakeholders-in-built-heritage-protection-20th-anniversary-of-the-faro-convention/

图 2：研讨会海报
Figure 2. The poster of the Conference

ICOMOS 遗产保护修复理论和哲学国际科学委员会“遗产保护专家与其他利益相关者关于建成遗产保护的对话”暨《法鲁公约》20 周年研讨会将于 3 月 13-14 日在意大利佛罗伦萨以混合形式召开。

会议将通过北京、台湾、卡拉奇、塞萨洛尼基、贝尔格拉德、墨西哥城、斯德哥尔摩、伊斯坦布尔等地案例，探讨文化遗产的定义及其阐释，遗产保护过程的民主性、遗产保护的包容性对话、遗产保护与利益相关者的内在冲突等。

活动将分为五个环节，分别围绕以下主题展开：

• 文化遗产的定义和阐释

《法鲁公约》将文化遗产定义为从过去继承而来的资源，人们与之产生认同感，这些资源反映了不断演变的价值观、信仰、知识和传统。它涵盖了环境的所有方面。第二次世界大战后，人们逐渐认识到，保护工作不应局限于单个纪念物，而应涵盖更广泛的背景。如今，遗产被视为一种共享资源，不受所有权的限制。

• 重新看待专家的角色：历史教堂与社区在保护中的作用

《法鲁公约》在保护和遗产理解方面是一个重要的发展。在“认识到需要将人和人类价

The ICOMOS TheoPhilos Conference "Dialogue between Conservation Experts and Other Stakeholders in Built Heritage Protection" marks the 20th anniversary of the Faro Convention, and will be held from March 13 to 14 in a hybrid format in Florence, Italy.

The conference will explore a range of critical issues in cultural heritage conservation through case studies from diverse locations, including Beijing, Taiwan, Karachi, Thessaloniki, Belgrade, Mexico City, Stockholm, and Istanbul. It will examine the definition and interpretation of cultural heritage, as well as the democracy involved in this processes. The conference will also focus on fostering inclusive dialogues and addressing the inherent conflicts between heritage conservation and stakeholders.

The events will be divided into five sessions centering on the following topics:

• Cultural Heritage - Its Definition and Its Interpretation

The Faro Convention defines cultural heritage as resources inherited from the past that people identify with, reflecting evolving values, beliefs, knowledge, and traditions. It includes all aspects of the environment. After World War II, it became clear that conservation should go beyond individual monuments and encompass broader contexts. Today, heritage is considered a shared resource, not confined to ownership.

• Renegotiating the Role of the Expert: Historic Churches and the Role of Communities in Conservation

The Faro Convention was a significant development in conservation and heritage understanding. In “recognising the need to put people and human values at the centre of an enlarged and cross-disciplinary concept of cultural heritage” (Preamble), it questions the role of conventional heritage expertise. In effect, it suggests that this role should be renegotiated, for the benefit of both cultural heritage, and for society at large.

• Methodological Approaches for Multi-Disciplinary Work of Conservation and Restoration Experts of Cultural Heritage, for Society.

The new modalities, digital and interactive, of promotion and fruition of Cultural Heritage call for collaboration between Conservation Experts and Other

值观置于一个扩大和跨学科的文化遗产概念的中心”（序言）中，它质疑了传统遗产专家的角色。实际上，它建议重新审视这一角色，以造福文化遗产和社会整体。

• 文化遗产保护与修复专家的多学科工作方法，为社会服务

文化遗产的推广和利用的新方式，包括数字化和互动性手段，要求保护专家与其他利益相关者之间进行合作，同时在相关组织和机构的支持下，共同致力于知识共享，以促进公共利益的提升。

• 城市保护中的公民科学方法：城市边缘地区的案例研究

文化遗产在城市边缘地区的经济、文化和社会复兴中可以发挥重要作用，CULTURAL HERITAGE AT THE EDGE 项目旨在分析其带来的挑战和机遇。这使得与非学术性、地方利益相关者的合作对于这项研究至关重要。该项目在欧洲 7 个城市的边缘地区进行了案例研究，探讨了处理文化遗产时固有的复杂性和矛盾。

• 通过对话、尊重和参与式方法保护本土文化遗产

在建筑遗产修复和保护不断变化的背景下，社区、利益相关者和权利持有者在保护项目中的角色变得越来越重要。地方利益相关者和权利持有者的角色可以有多种形式，从定义一个场所的固有遗产价值，到保护和维护该场所。作为保护过程的一部分，在所有参与者之间建立对话，需要各级政府（地方、国家和国际）制定、实施参与性政策、协议和程序。

Stakeholders, together with Organisations and Institutions responsible, under the aegis of a shared path to knowledge for the enhancement of common good.

•Citizen Science Methodologies in Urban Conservation: A Case-Study at the Urban Periphery

Cultural heritage can have an important role in the economic, cultural, and social revitalization of urban peripheries, and the CULTURAL HERITAGE AT THE EDGE project set out to analyse the challenges and opportunities offered by it. This made the collaboration with non-academic, local stakeholders essential for this research. The project addressed complexities and contradictions inherent in dealing with cultural heritage in 7 case-studies of peripheral urban areas across Europe.

•Safeguarding Indigenous Cultural Heritage Through Dialogue, Respect, and Participatory Approaches

In an ever changing landscape of built heritage restoration and protection, the role of communities, stakeholders, and rights-holders has become increasingly more important in the conservation project. The role of local stakeholders and rights-holders can take multiple forms from defining the inherent heritage values of a site, conserving the site, to maintaining the site. Creating a dialogue between all the actors, as part of the conservation process, calls for the development and implementation of participatory policies, protocols, and processes by all levels of government, local, national, and international.

“文物保护中的遗产建筑信息模型：保护与监测的创新策略”研讨会在美因茨召开

Heritage BIM in Monument Preservation - Innovative Strategies for Preservation and Monitoring Hosted in Mainz

资料来源 Source：
https://architekturinstitut.hs-mainz.de/projects/HBIM-Worms-Conference

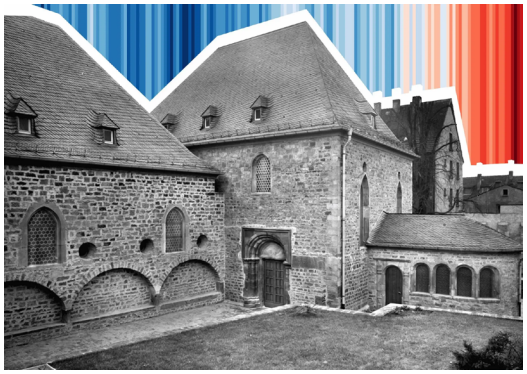

图 3：研讨会海报
Figure 3. The poster of the Conference

遗产建筑信息建模项目启动活动，作为记录、规划和监测有害环境影响消除方法的工具，以联合国教科文组织世界遗产沃尔姆斯犹太教堂为例，并举办关于“文物保护中的遗产建筑信息模型：保护与监测的创新策略”的研讨会将于 3 月 27-28 日在德国美因茨召开。

活动由美因茨应用科学大学研究所（建筑学院）与莱茵兰－普法尔茨州文化遗产管理局、莱茵兰－普法尔茨州文化遗产总管理局的世界遗产秘书处、德国国际古迹遗址理事会和文化遗产记录协会联合举办。

会议将围绕奥斯维辛－比克瑙博物馆、巴黎圣母院、沃尔姆斯犹太会堂等案例，探讨多项议题：

• 气候变化和环境因素如何影响建筑文化遗产？

• 建筑信息建模规划方法如何有助于文化遗产的记录、维护规划和监测？

• 如何在数字模型中记录文物保护和世界遗产特定需求，并使其长期可用？

• 如何整合来自不同来源的跨学科数据（土壤、建筑、考古、地形），以开发全面的保护方法？

美因茨的活动将展示德国和国际上围绕遗产建筑信息建模的最新研究项目和倡议的精彩内容，为联合国教科文组织世界遗产地的可持续保护提供高效信息管理的开发基础。

Kick-off event for the project Heritage Building Information Modeling (HBIM) as a documentation, planning and monitoring method monitoring method for the elimination of harmful environmental influences using the example of the UNESCO World Heritage Site Worms Synagogue and conference on the topic: Heritage BIM in Monument Preservation - Innovative Strategies for Preservation and Monitoring will be hosted from March 27 to 28 in Mainz, Germany.

The event is co-organized by AI MAINZ - Institute of Architecture at Mainz University of Applied Sciences in cooperation with the Directorate of State Monument Conservation and the World Heritage Secretariat at the General Directorate for Cultural Heritage Rhineland-Palatinate (GDKE), ICOMOS Germany and CIPA Heritage Documentation.

The conference will focus on several topics using case studies from the Auschwitz-Birkenau Museum, Notre-Dame de Paris, and the Worms Synagogue:

• How do climate change and environmental influences affect built cultural heritage?

• How can the BIM (Building Information Modeling) planning method contribute to the recording, maintenance planning and monitoring of cultural monuments?

• How can heritage conservation and world heritage-specific requirements be recorded in the digital model and made usable in the long term?

• How can interdisciplinary data from different sources (soil, construction, archaeology, topography) be integrated in order to develop a holistic conservation methodology?

The event in Mainz will provide insights into the exciting topics from current research projects and initiatives around Heritage BIM (HBIM) from Germany and abroad in order to ensure a basis for the development of efficient information management for the sustainable preservation of UNESCO World Heritage Sites.

历史建筑与遗产保护研究所

Historic Architecture and Heritage Conservation Research Group