

CENTRE FOR HISTORICAL STUDIES OF PUBLIC WORKS AND URBAN PLANNING (CEHOPU)

2024 Activity Report

“Bringing past and future together: CEHOPU preserves, investigates and disseminates the values of the heritage of civil engineering and urban planning through accessible and innovative technologies and criteria.”

CEHOPU has continued to perform its statutory functions throughout 2024, in order to guarantee the conservation, promotion and enrichment of the heritage of civil engineering and urban planning. To this end, the Centre has focused its work on three main activity areas:

1. Conservation and enrichment of specialised engineering and urban planning documentary fonds
2. Research on the heritage of public works and urban planning
3. Transfer of knowledge and dissemination to society



CEHOPU-CEDEX spaces dedicated to the Carlos Fernández Casado and Jaroslav Josef Polivka Fonds (left) and Eduardo Torroja Miret Fond (right). Source: authors' own work.

CONSERVATION AND ENRICHMENT OF SPECIALISED ENGINEERING AND URBAN PLANNING DOCUMENTARY FONDS

CEHOPU's Documentation Centre's role is to guard and preserve the documentary legacy of the civil engineering, while rigorously applying international archival principles and standards, such as those established by the International Council of Archives (ICA). Within this framework, CEHOPU manages the documentary fonds of three internationally relevant engineers: the **Eduardo Torroja Miret Fond**, the **Carlos Fernández Casado Fond** and the **Jaroslav Josef Polivka Fond**, which was recently incorporated to the Documentary Centre in 2023.

Each of these fonds is in a different stage of organisation and archival processing state, due to their order of arrival. These processes cover identifying, classifying, valorising, organising, installing and describing the documentation. Throughout 2024 each of the fonds has been developed within these phases according to each fond's needs. In the case of the **Eduardo Torroja Miret Fond**, works have focused on digitalising plans and documents. Regarding the **Carlos Fernández Casado Fond**, new heterogeneous documentation has been received, which will enrich the 'Teaching and Research', 'Personal' and 'Library' sub-fonds, with the consequent elaboration of the first inventories of this documentation.



Sample of the varied documentation received at CEHOPU-CEDEX belonging to the extension of the Carlos Fernández Casado Fond and the Jaroslav Josef Polivka Fond. Source: authors' own work.

In addition, it is worth mentioning the meticulous cataloguing work of the photographs of the technical office, which has been carried out in collaboration with two contract workers from SEPE's Primera Experiencia Profesional en Administraciones Públicas (First Professional Experience for Public Administrations) programme. In relation to the **Jaroslav Josef Polivka Fond**, both the identification and documentary classification phases have been started, and their results have been translated into the fond's classification plan. Simultaneously, labours of valuation regarding material preservation criteria have been started, as so have the ordination, installation and documentary description phases, in accordance with the established classification plan.

It should be noted that, during this process, a special attention has been given to the systematisation of the hierarchical structure of the three fonds with the aim of standardising their categories as far as possible. This approach seeks not only to ensure internal coherence between the current collections, but also to establish a

structural basis that can be applied to future accession of documents.

Finally, reflecting CEHOPU-CEDEX's commitment to modernising and improving its fonds management and dissemination services, the CEHOPU-CEDEX personnel have been trained in the use of AtoM (Access to Memory). AtoM is an open-source web application designed for the description and dissemination of archival fonds according to ICA standards. This platform allows the creation of multi-level archival descriptions and supports import and export in standard formats, facilitating the interoperability of information between different systems and platforms. All the archive information will be uploaded to this platform in the future, broadening the scope of the information and improving its accessibility to researchers, professionals and the public, according to different levels of access.

RESEARCH ON THE HERITAGE OF PUBLIC WORKS AND URBAN PLANNING

CEHOPU's research activities are structured according to four thematic and functional areas —'Historical Heritage', 'Modern Heritage', 'Landscape and Territory' and 'Digital Technologies' —, whose latest goal is to understand, preserve and revitalise the heritage of civil engineering and urban planning.

This strategic vision, which is based on pre-existing subject areas and working methodologies at the Centre, has been

developed through diverse research projects during 2024. Among them is the project Carlos Fernández Casado's Colección de Puentes de Altura Estricta: A Pilot Project for the Enhancement of Spanish Documentary Heritage of Public Works. This three-year research project is co-financed by the Agencia Estatal de Investigación (State Research Agency – AEI) and studies the relations of an iconic work of modern engineering from the cultural landscape perspective with the help of digital technologies.

During the first year of the project, two work packages have been combined: on the one hand, a documentary study of the Colección de Puentes de Altura Estricta (Strict-Height Bridges Collection – CPAE); and on the other hand, visits to some of the built bridges and their surroundings have been made. The documentary study has included the consultation of the **Carlos Fernández Casado Fond**, located at CEHOPU. This work has been complemented with the consultation of civil engineering historical fonds located at the Archivo General de la Administración (General Archives of the Administration – AGA).



Collection of images of different bridges of the CPAE. Source: Carlos Fernández Casado Fond, CEHOPU-CEDEX.

Regarding the visits, field data was collected from the bridges of the CPAE located in Madrid. Specifically, the bridges at Puerta de Hierro and Villaviciosa de Odón were surveyed in 3D using laser scanning technology. As a result, their geometry, materials and state of conservation have been captured in point clouds, as a preliminary step for their Heritage-BIM-methodology modelling.

Furthermore, CEHOPU has continued to collaborate with other research centres in 2024. Since 2021, a member of the centre has been participating as a researcher, together with The Facultad de Geografía e Historia, Universidad Complutense de Madrid (Faculty of Geography and History, Complutense University of Madrid), in the project Agua y luces. Tratados españoles de arquitectura hidráulica en la Ilustración (Water and Lights: Spanish Treatises on Hydraulic Architecture in the Enlightenment). The project is funded under the Proyectos de Generación de Conocimiento (Knowledge Generation Projects) call, part of the Ayudas a proyectos de I+D+i (State R&D&I grants) Programme, managed by the Ministerio de Ciencia, Innovación y Universidades (Ministry of Science, Innovation and Universities). Other research partners include the **Miguel Aguiló Foundation** and the **Patrimonio de las Obras Públicas** (Public Works Heritage) research group at the Escuela Técnica Superior de Ingenieros de Caminos, Canales y Puertos, Universidad Politécnica de Madrid (School of Civil Engineering, Technical University of Madrid). As a result of this collaboration, a project has been submitted to the 2024 Proyectos de

Generación de Conocimiento call of the Plan Estatal de Investigación Científica y Técnica y de Innovación 2024-2027 (State Plan for Scientific and Technical Research, and Innovation 2024–2027). The proposal focuses on exploring the usage of digital twins for investigating, disseminating and the tourism management of the heritage of the public and architectural works.

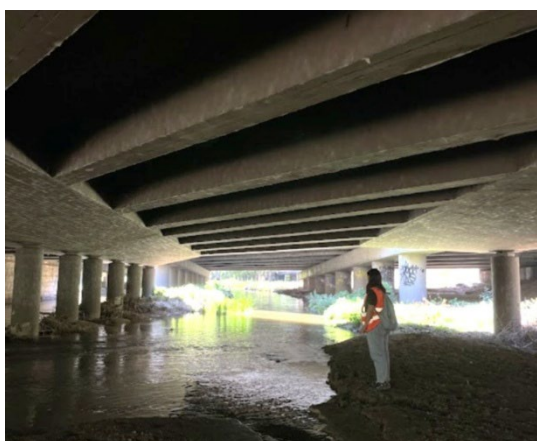
Building on these digitising systems, the project's main objective is to establish groups of works, routes and itineraries that bring heritage and landscape together and contribute to a sustainable territorial revitalisation in rural unpopulated areas of Spain. The call's resolution will take place during 2025.

In the same vein, and related to the CPAE research project, CEHOPU has taken part, as an associate member, in the **2024 call for Ayudas a Proyectos de I+D** Realizados en Colaboración entre Grupos de Investigación Pertenecientes a las Universidades y Organismos de Investigación of the Comunidad de Madrid (Grants for R&D Projects Carried Out in Collaboration between Research Groups Belonging to Universities and Research Organisations of the Community of Madrid). The submitted project, AVECINAS-CM: Las aves como vecinas: exploraciones en torno a la reconciliación ecológica en la Comunidad de Madrid (AVECINAS-CM: Birds as Neighbours: Explorations Around an Ecological Reconciliation in the Comunidad de Madrid), was granted funding for a three-year development, starting on January 2025.

Finally, other significant **academic activities** carried out by CEHOPU members in 2024 are noteworthy. Among these are:

the **participation in a thesis committee** at the Universidad Politécnica de Madrid, in the field of industrial heritage; and the taking part in the scientific committees for two international congresses, such as the **1st Ibero-American Congress on Sustainable Social Housing**. Rethinking the House, Transforming the City, which took place in March at the Facultad de Arquitectura, Universidad Nacional

Autónoma de México (Faculty of Architecture, National Autonomous University of Mexico), in Mexico City, and the **4th International AhAU Congress: City and Nature**. Approaches from an environmental-history angle, organised by the Association of Architecture and Urban Planning Historians, which took place in October, at the Real Colegio María Cristina in San Lorenzo de El Escorial.



Images of the fieldwork carried out in 2024 on two of the Strict Height Bridges built by Carlos Fernández Casado in Madrid. Left: Bridge Puerta de Hierro. Right: Bridge at Villaviciosa de Odón. Source: authors' own work.

TRANSFER OF KNOWLEDGE AND DISSEMINATION TO SOCIETY

The Centre disseminates its results through scientific work and outreach activities that try to approach a broad and diverse audience to the magnitude, significance and singularities of the rich cultural legacy of the heritage of the civil engineering and urban planning, promoting their learning, reflection and enjoyment. Thus, the scientific activities developed by CEHOPU during 2024 has resulted in the following more prominent outcomes: organisation of research

conferences, development of travelling exhibitions and collaborations in temporary exhibitions, editing of books, publication of articles in scientific journals, and participation in international conferences.

Due to the 200-year anniversary of the Canary-Islands-born Agustín de Betancourt's decease, CEHOPU has actively participated in the dissemination of his figure in the framework of the so-called '**2024. Betancourt Year**'. CEHOPU contributed to the [International Congress Betancourt and the Legacy of Engineering](#). Water and Territory, that took place in April at the Escuela Técnica Superior de Caminos, Canales y Puertos, Universidad de Castilla La Mancha (School of Civil Engineering, Castilla La Mancha

University) in Ciudad Real and at the Biblioteca Nacional (Spanish National Library) in Madrid, with the presentation of a paper within the thematic area 'Estrategias para la caracterización, protección y puesta en valor del patrimonio de la ingeniería civil' ('Strategies for the Characterisation, Protection and Value Enhancement of the Civil Engineering Heritage'). Additionally, CEDEX has organised, together with the Colegio de Ingenieros de Caminos, Canales y Puertos (CICCP) the travelling exhibition *Betancourt (1748-1824) y los inicios de la ingeniería moderna en Europa* (Betancourt (1748-1824) and the Origins of Modern Engineering in Europe). An [opening session](#) has been held at each venue the exhibition has visited, where a CEHOPU specialist, along other experts in the field, have given a presentation on the engineer's figure and has led a guided tour at the exhibit. On the occasion of this exhibition, both a [brochure](#) and a brief [catalogue](#) have been edited in Spanish and English.

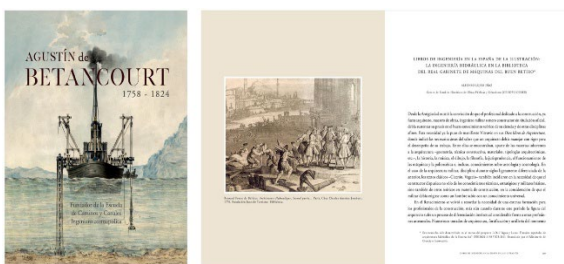
In relation with the publications, several texts have been published in scientific journals and exhibition catalogues. One of them, '[BIM Innovation at CEDEX. The Application of BIM in Research on Civil Engineering and Environmental Assessments](#)', which was issued in the **journal Tramos of the Ministerio de Transporte y Movilidad Sostenible** (Ministry of Transport and Sustainable Mobility), explores the main applications of BIM methodology in the various fields of work of CEDEX. Among them, the article highlights the application of Heritage-BIM in the 3D digitisation of public works, which aims to promote research and protection



Cover of the Ministry of Transport and Sustainable Mobility's journal Tramos n° 749, and two pages of the article 'BIM innovation at CEDEX. The application of BIM in research on civil engineering and environmental assessments'.

Prominent figures of **Spanish civil engineering**, such as the already mentioned Agustín de Betancourt or Manuel Lorenzo Pardo, have also been the subject of attention by our researchers. The article '[Libros de ingeniería en la España de la Ilustración: la ingeniería hidráulica en la biblioteca del Real Gabinete de Máquinas del Buen Retiro](#)' ('*Engineering Books in Enlightenment Spain; hydraulic engineering in the library of the Real Gabinete de Máquinas del Buen Retiro*'), was included in the catalogue of the CEDEX co-organised temporary exhibition **Agustín de Betancourt 1758-1824. Fundador de la Escuela de Caminos y Canales. Ingeniero cosmopolita** (Agustín de Betancourt 1748-1824. Founder of the School of Civil Engineering. Cosmopolitan engineer), held at the **Spanish National Library** from March to June 2024. On the other hand, the journal Ingeniería Civil, published by CEDEX, featured '[Manuel Lorenzo Pardo: apuntes sobre la vida y obra del gran ingeniero hidráulico español del siglo XX](#)' ('Manuel Lorenzo Pardo: Notes on the Life and Work of the Great Spanish Hydraulic Engineer of the Twentieth Century'), where

this engineer's transcendental legacy in the planning and management of the country's water resources was reflected.



Cover of the catalogue of the exhibition Agustín de Betancourt 1758-1824. Fundador de la Escuela de Caminos y Canales. Ingeniero cosmopolita, held at the Biblioteca Nacional, between March and June 2024, and two pages of the CEHOPU-contributed chapter 'Libros de ingeniería en la España de la Ilustración: la ingeniería hidráulica en la biblioteca del Real Gabinete de Máquinas del Buen Retiro'.

The travelling exhibitions programme is another major commitment of CEHOPU to **promote the dissemination of the heritage** of civil engineering and urban planning, aiming to reach all audiences throughout Spain, as well as to foster its exposure internationally. Thus, the organisation of two travelling exhibitions must be noted: [Artifex. Ingeniería romana en España](#) (*Artifex. Roman Engineering in Spain*) and the already mentioned [Betancourt \(1758-1824\) y los inicios de la ingeniería moderna en Europa](#). Artifex is a travelling version of the original exhibition organised in 2002 that visited Talavera de la Reina during the summer months of this year. It aims to show the immense technical legacy of the Roman world, presenting their knowledge in diverse fields of technology, and specially its application to civil engineering in Hispania. On the other hand, the exhibition dedicated to Betancourt will travel to Granada, Barcelona, Zaragoza and Coruña during 2024 and 2025. It is a

compendium of another original exhibition organised in 1996 by CEHOPU. The exhibition allows the visitor to appreciate, among other things, Agustín de Betancourt's essential role in the development of the civil engineering profession, as well as his substantial contributions to the science and technology of his time.

The **CEHOPU COLABORA** programme includes activities related to the organisation's participation in exhibitions organised by other institutions. Within this framework, it is worth noting CEHOPU's participation in the exhibition [Agua e ingenio. Un viaje por la historia](#) (*Water and Ingenuity: A Journey Through History*), which was organised by the Escuela Técnica Superior de Ingenieros de Caminos, Canales y Puertos, Universidad Politécnica de Cartagena (School of Civil Engineering, Technical University of Cartagena) and held between 15 March and 15 May 2024 in Cartagena, Murcia. This promotion and communication exercise allows CEHOPU's [Colección de Maquetas de Historia de las Obras Públicas y el Urbanismo](#) (Collection of Models of the History of Public Works and Urban Planning) to be used and given visibility as a highly valuable educational and disseminative tool.

At an internal institutional level, CEHOPU publicises its activity using the channels that CEDEX itself has set up for this purpose, periodically presenting its results and work in progress through the space **Sabemos Lo Que Hacemos** (*We Know What We Do*), the channel **CEDEX Informa** (*CEDEX informs*) and the channel **Ingeniando con el CEDEX** (*Engineering*

with CEDEX). In the latter channel, which aims to bring society closer to the projects being developed at CEDEX, the podcast ['Puentes de altura estricta de Carlos Fernández Casado'](#) (*'Puentes de Altura Estricta by Carlos Fernández Casado'*) has been published.

All these activities are carried out within the framework of the centre's competencies and objectives, formally set out in the aims and functions of the [Real Decreto 1136/2002, de 31 de octubre, por el que se aprueba el Estatuto del Centro de Estudios y Experimentación de Obras Públicas](#) (Royal Decree 1136/2002, of 31 October, Approving the Statute of the Centre for Public Works Studies and Experimentation), which include the promotion and dissemination of science and technology through research, conferences, exhibitions and publications related to the history of civil engineering.