

Scientific Tracks - Day 1

From Julius Caesar to Composite Materials

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Caissons technology is been used all over the world, and is present in harbors in very different typologies and following different construction systems. Moreover, do we know its origins? Why is useful to know it? Since Julius Caesar used something similar to caissons to quickly build a contention system in Brindisi to avoid Pompeius leaving Italy, up to the Normandy landings in June 1944 where the Mulberries played a central role, many harbors have been built with this technology. We know some examples coming from romans, and since then (excepting the Middle Ages), many examples of that technology can be found all over the centuries. Knowing this history, we can learn from the past and have a wider idea of the challenges that we are facing, some of then 2000 years old. The greatest changes have not been conceptual but point occurring, backed by the materials used. Parallelisms can clearly be seen in each new stage: timber, opus caementitium (Roman concrete), iron and concrete. Amazing drawings and method statements have been set for centuries, and many important historic leaders have been involved in episodes related to caissons. That shows the importance of this "big boxes" made of timber, steel or concrete all along our history, and the importance of harbors in general. Julius Caesar, Herodes, Claudius, Phillip II of Spain, Richelieu, Napoleon III in France , Winston Churchill are some of the famous names that have been in contact with this technology. However, the biggest challenge today is to find solutions in a more sustainable way: we can find today's solutions by understanding the past. The aim of this reflection is about that, finding a sustainable system that could be used in remote

areas, mainly in Development Countries, where some traditional equipment or tools are not always available. The search for new, more efficient forms led to the construction of increasingly more complex elements, many of which still require an economically viable construction system. New materials and technologies offer us many possibilities for those new forms and shapes, and composite materials are adapted to new challenges of caissons technology, but their high prizes still to be an important issue: Circular Economy can provide a solution. Caissons in composites or recycled composites would be then a real alternative to concrete caissons.

Biography: Eduardo Cejuela has a Master's Degree in Civil Engineering for Universidad de Cantabria (Spain) and is performing his PhD in Coastal Engineering, investigating new possibilities of caissons technology, leveraged through the historical knowledge in this subject. He has published two papers about history of caissons construction and its new challenges and possibilities. He has worked most of his professional career as a contractor in infrastructure projects, usually in contact with remote areas, that have marked his way of understanding engineering and ingenuity as a powerful tool to build in areas with limited access to technology. This way of understanding engineering has led him to investigate since the origin of caissons how they were built, and how could they be built today in very remote areas, by transporting it or by using technologies well known in some remote areas, as construction in fiber glass or composite materials could be. He is now working as consultant for different engineering companies, mainly estimating costs and proposing method statements for construction of infrastructures in Africa's remote areas.

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