Good roman civilization was ahead of its time because of advanced technology rese...

Environment, Water

1. Concrete invention

Roman technology is engineering practice that supported the Roman civilization resulting to expansion of its commerce and military for almost a thousand years. The Roman architecture has endured for more than 2000 years due to the way the Romans perfected use of three architectural elements; concrete, arch and vaults. These elements helped in lightening the loads that the Roman structures carried resulting to a strong and stable structure. Concrete was first created through building a form and later pouring in alternate layers of rocks, Roman casement, gravel or bricks. As each of the layers was poured and spread, the Roman workers pounded the layers firmly using tamp. Concrete varied and included ceramic tile, pieces of rock and brick rubble that was gotten from remains of previously demolished buildings. Roman concrete also consisted of hydraulic mortar (binder that was mixed with water and was hardened over time). Most of the material qualities of the Roman concrete were similar to modern Portland cement. By mid 1st century, there was frequent use of the material as brick-faced concrete, though aggregate variations allowed for different materials arrangement. Further, material innovative developments coined Concrete Revolution, contributing to the structurally complicated forms like Pantheon dome. There was no use of reinforcing elements like steel rebar. Lime and gypsum were used as binders and the volcanic dusts also called Pozzuolana-makes concrete to be more resistant to the salt water. Pozzuolana mortar which was used had high silica and alumina content. In particular, hydraulic mortar that is responsible for cohesion was the structural ceramic structure that had its utility being largely derived from rheological plasticity in its

paste state. The hydraulic cements settings and hardening was derived from material hydration and subsequent physical and chemical interaction of the hydration products. It differed from slaked lime mortars setting and most common pre-Roman world common cements. The Roman concrete once set exhibited minimal plasticity, though it retained some tensile stress resistance. Concrete core was used to bond different facing materials. They were veneered over by decorative material.

2. Aqueduct system

An aqueduct is a navigable channel or water supply that is constructed in order to convey water. In Ancient Rome, aqueducts were constructed in order to bring constant water flow from the distant sources into towns and cities, supplying the public baths, fountains, latrines and private households. Through the sewage system, the waste water was removed and released into water bodies that were near, keeping the towns free from the noxious waste. Some of the aqueducts served water for agriculture, mining, processing and manufacturing. Water in the aqueducts moved through gravity, along a gradient that was downward within the conduits of bricks, stone or concrete. Most of aqueducts were buried underground and followed the contours. Where lowlands or valleys intervened, conduit was the bridgework or there was use of high-pressure lead, stone or ceramic pipes. Most of the aqueduct system included sluices, sedimentation tanks and distribution tanks which regulated supply at need. Most of the Roman aqueducts proved more durable and reliable. There was employment of various surveying tools in plotting the aqueducts’ course across landscape; chorobates were used to check the horizontal levels where there was fitting

of a flat-bedded wooden frame with water level. The bringing of aqueduct water to the high elevations of the city, it made it possible for establishing sites throughout the city for well-appointed public baths. Drinking water was now delivered to the public fountains ate very high pressure. These fountains and public baths became Roman civilization’s distinctive features, and in particular, the baths became important social centers. Aqueducts eventually became expression of wealth and power in a city. Ordinary people also benefited because less polluted water was near their living quarters

3. Arch

Arch in Roman architecture consisted of two piers, where each had been topped by a platform known as impost. The angle blocks of stones or bricks called voussors are placed on imposts in an arched curved manner which is capped by the arch’s central block called keystone. Arches row is known as arcade. These arches allowed Romans to create structures that were taller, wider and lighter. The Romans also discovered that through building of arches entirely inside the buildings walls, it would make the walls even stronger. Romans did not invent arch because since the prehistoric times it was being used by ancient Egyptians, Greeks and Babylonians. However these cultures arch use was only limiting to supporting small structures like storerooms, or supporting the roof. The arch designs limited a building’s scope and size hence builders were not able to construct extremely large buildings like palaces or large government buildings. The ancient created very unique arches that was able to support very huge amounts of weight. They were able to accomplish this by help of concrete which was strong and durable. The Romans were therefore able to build massive structures like

aqueducts that provided the cities with water. These were built either above or below ground; they made Romans to have lots of water supply through fountains and the indoor plumbing. These aqueducts were made of cement that was from the volcanic pumice called Pozzuolana.

The Roman architects were freed by arch in exploring varying structures. Several cultures have continued to adopt the Roman arch, with some developing it further like in the Arab world. The Muslim architects in the Arab world developed arches that were scalloped, pointed and horse-hoed which are mostly used for palaces and mosques. Borrowing as well as modification of Roman arch meant that the Ancient Rome architecture had a lasting impact. The arch mainly solved the problem of arches not being able to hold large amount of weights and have also caused the Romans themselves to have further architecture advancements. Through combined arches, the Romans were able to form roofs or ceilings called vaults. They also used the arch principles to form hemispherical roof known as a dome and an early example of such a dome was the Roman Pantheon. Some of the Roman arch’s long-term effects include the Chartres in France, India’s Taj Mahal majesty and the Washington D. C. capital building stateliness. None of the above mentioned structures would have come to being without arch, dome or vaults. Hence the Roman arch offered solution to important problem just by being able to support large amount of weight. Due to this people have been able to come up with buildings that are large and more varied. Through the world, the spread of arch together with dome and vaults has had a lasting architectural impact.

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