



ROMAN ART AND ARCHITECTURE'S IMPACT ON MODERN ARCHITECTURE

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INTRODUCTION

They assert that Rome wasn't built in a day, which is absurd, but whatever long it took to build the Italian city, the days, months, years, and centuries of toil have left a lasting impression on architecture. Ancient Roman architects may have drawn inspiration from the Greeks, Etruscans, Egyptians, and Persians for some of their earliest designs, but they also fundamentally altered the nature of architecture by giving the world buildings it had never seen before, as well as public buildings, roads, and infrastructure that could be used by people from all walks of life. Roman architecture achieved its apex during the Pax Romana era, a time when the Roman Empire did not grow or experience invasion. Rome therefore produced some of the most significant architectural innovations still in use today between 27 BC and 180 AD. The most important innovation brought about by Roman architecture was arguably the widespread use of concrete. In addition to being stronger than marble, which was formerly the material of choice, concrete was also found to be readily ornamental and moldable, eliminating the need for cutting by Roman builders. Even the Roman Emperors had to stay to a budget; concrete could be produced locally, making it far more cost-effective. The Romans of antiquity just left their imprint on historical records and continue to influence the different activities the sector does in today. But what many people overlook is the impact of Roman architecture today, since large colosseums and imposing temples with thick pillars are out of fashion. The world-famous Colosseum, Pantheon, and Amphitheatre come to mind when people think about Roman architecture. Roman architecture is also credited for giving the specific residences in their homes their own shapes, taking over flexibility and inventiveness that had previously been apparent. The ability of the Romans to construct pillars, domes, and arches without sacrificing structural integrity is well-known across the industry and is still very difficult to do even in the modern period.

Roman architecture was significant not only for its magnificent structures and regal designs, but also for the idea of infrastructure, which enabled the empire to run smoothly. The first extensive and intricate road system linking towns and cities to the capital was constructed by the Romans. It is hardly surprising that the architecture and infrastructure of many nations were influenced by the Roman Empire's extensive area. After the collapse of the Roman Empire, a number of significant national monuments were erected to recreate this period of exquisite architectural design. Famous structures all across the globe contain columns, domes, and arches, and Roman architecture was especially influential in Paris. When Napoleon was chosen as Emperor in 1804, he ordered a variety of building projects with the intention of turning Paris into a new Rome.



Figure 1 <https://structurae.net/en/structures/place-vendome>

Just two instances of French architects adopting Roman ideas into their designs are the Arc de Triomphe and the Place Vendôme. Roman arches may be seen at Union Station in Washington, D.C., for instance. Despite being a Greek invention, arches were first utilized in Roman architecture. Arches were mostly employed to document important events throughout the Roman period, albeit they were first built to assist subterranean drainage systems.



Figure 2 <https://www.britannica.com/topic/Arch-of-Constantine>

One of the oldest still standing arches is the Arch of Constantine, which was built to honor Constantine I's victory against Maxentius at the Battle of the Milvian Bridge. The White House is the most famous federal building with Roman influences, but it is by no means the only one.

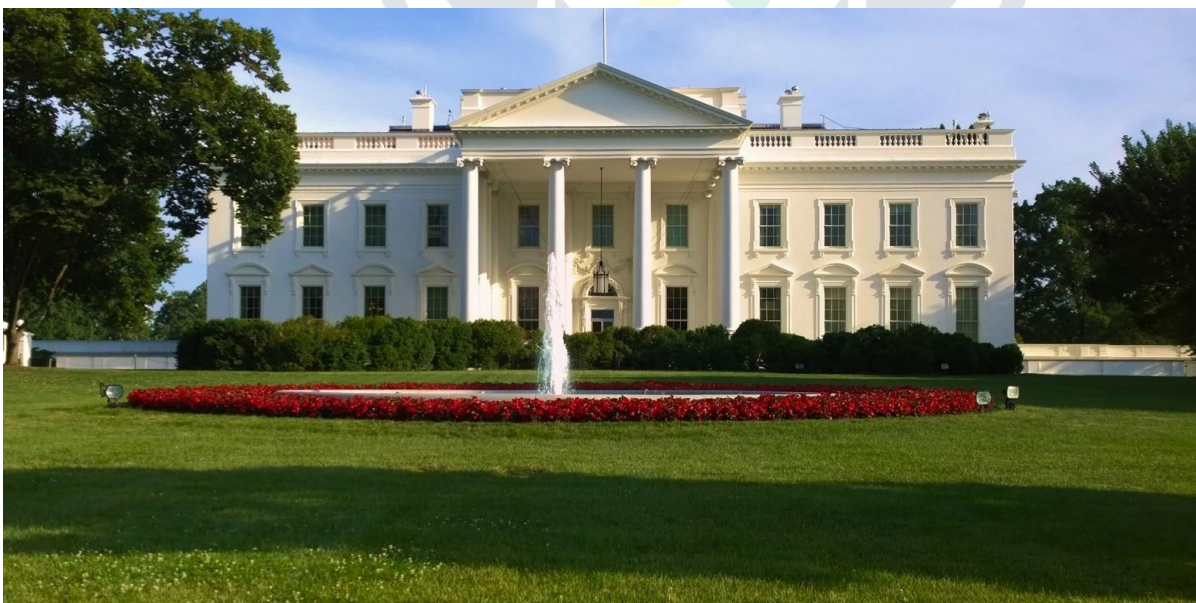


Figure 3 <https://www.whitehouse.gov/about-the-white-house/>

In Federal Hall in New York City, doric columns, which are fluted columns without capitals, may be seen. Whether in the design of large, imposing monuments or in the infrastructure that supports almost every city, the influence and effect of Roman architecture can be seen all over the globe. In the strictest sense, a city was influenced by Roman design if it had roads and bridges.

Building Methods: Dome, Vault, and Arch

The Etruscans, who had a great deal of expertise in construction, taught the Romans a lot. The "arch" and the "vault," among other aspects of Roman architecture, are discussed in the article. These were created to assist Roman engineers in moving beyond what the Greeks had accomplished. Roman vaulting methods made use of simple geometric shapes including the groyne vault, segmental vault, and semi-circular barrel vault. As approved construction methods, the vault's surface was often coated with stucco or tiles. One of the best examples of Roman vaulting is seen at Rome's Basilica of Constantine and Maxentius. Large communal structures with vaulted ceilings and roofs, such public baths and basilicas, were a logical development of the vault. Roman architects often employed domes in their construction, as seen in the Diocletian Baths, Hadrian's Pantheon, and the Baths of Caracalla.

The Colosseum's arches are built of cement, a highly durable construction material that the Romans created from volcanic ash and rock that they already had on hand. The ash that was utilized in the Colosseum's building, according to contemporary experts, is still structurally sound. The submerged Roman constructions turned out to be far more durable. The volcanic ash and saltwater combined to form crystals that filled the concrete's fractures. Steel reinforcement is necessary to create a structure that is very robust and resistant to damage.

Roman concrete is still studied by experts today to see how it was successful in the past. Additionally, the sculptural art of the time has shown to be quite durable. Romans used marble sculptures of persons they adored to depict outstanding human achievements and successes. There are still many Roman relics in museums across the globe.

SCIENCE AND TECHNOLOGY

The ancient Romans were innovators in a variety of fields of science and technology, and the results of their work continue to influence modern society. Roman engineering prowess was really astounding. Aqueducts and other structures that facilitate easier water flow were designed and constructed by individuals who had a thorough understanding of the physical principles. Mines and mills were run by water. Another important achievement at the period was the construction of a vast road network. Their roads were constructed by first laying gravel, followed by paving them with big, flat boulders. Because of how large the Roman road network was, it was sometimes believed that "every road goes to Rome." This facilitated commerce and transit for the Roman populace and promoted the adoption of novel farming practises. The knowledge of climate, soil, and other topics pertaining to planting helped the Romans become

effective farmers. They created or enhanced techniques for field irrigation and drainage, as well as agricultural planting. Modern farmers continue to use their methods, such as rotating crops.

Roman Art's Afterlives

Roman life became to totally depend on art. They decorated their temples, their shops, and their houses with mosaics, which are large works of art made from small pieces of stone. However, sculpture was the kind of Roman art that left the most enduring impression. Roman statues had been solid metal or marble sculptures. Marble became quite expensive and took real skill to carve, thus it served as a social status symbol. Bronze gained even more prestige as a result of its increased high price.

Roman sculpture was heavily influenced by ancient Greece and developed into a highly intelligent art form that sought to look as naturally existing as possible. The majority of temples and important government buildings were covered with reliefs, panels of marble with the backgrounds intricately carved so that the figures pop out in almost three dimensions. These panels were assembled to tell stories and show events from Roman history or mythology. Romanesque reliefs had a significant impact on Christian history, and those depicting events from the Bible are found in many of the most significant and significant churches worldwide.

The golden ratio, a geometrical approach for a ratio of 1:1.618, was explored by the Romans and the Greeks as the ideal ratios for the human body. This ratio has evolved into the foundation for the finest aesthetic choice, which is still in use today. Several types of Roman sculpture left behind enduring contributions to art. With realistic figures that were created in geometric proportions, Christian sculptures throughout European history showed Biblical subjects and those in Roman patterns. Even now, most of the presidents that we have in the United States are represented through sculpture, including the enormous statue of Abraham Lincoln in Washington, D.C.

Additionally, the Romans often produced equestrian statues—statuettes of important generals or leaders—in metal or marble. Generals, monarchs, and dictators have all placed orders for equestrian sculptures throughout history as a way to compare their own regimes to the thriving Roman Empire.

The components and methods used in Roman architecture

The first building constructed entirely of marble was the Temple of Jupiter, which was built in Rome in 146 BC. However, it may only become the preferred building material after the Empire started to expand and construction projects had been supported by utilising that state, allowing for the production of impressive Roman monuments. The most popular kind of marble is Carrara from Tuscany, however other types of marble, such Parian and Pentelic had been widely used and was readily available across the Empire, including in Athens and Paros. Additionally, the Roman builders liked to choose coloured marble, such as yellow, purple, red, and green marble that was supplied from North Africa, Central Turkey, Egypt, and Euboea.

In addition to marble, travertine white limestone was another material that was widely used. It was easily obtainable from the quarries that operated just outside of Tivoli, and Roman architects preferred it as a stand-in for marble when it was unavailable, notably for stairs, the margins of windows, entryways, and clearing. Even though lime mortar was not invented by the Romans, they were pioneers in using it to create concrete that could be used as a building material. Cement debris had previously been used as filler very regularly, but architects of the time soon realised they could use it to create innovative and novel constructions because of its capacity to support heavyweight.

A VARIETY OF COLUMNS

Doric column

The pinnacle of Doric columns is simple and devoid of ornamentation. The columns are fluted, and as a result, they have vertical ridges along the length of them. Additionally, they are placed immediately at the floor without an ornate foundation. For instance, the Federal Hall in New York City's columns.



Figure 4 <https://www.cnbc.com/2021/07/14/iconic-manhattan-spot-to-be-covered-in-scaffolds-for-up-to-10-years.html>

Ionic Column

Ionic columns feature more flutes than Doric columns and are slenderer. They feature a stone on top that is coiled inside of itself on each side like a scroll. These columns have a tiny base but are not always at the ground like Doric columns. for instance, the courthouse in Delaware County's columns



Figure 5 <http://www.josephduganinc.com/projects/historical-restoration/delaware-county-courthouse-2>

Corinthian Column

The ornate kind of column is the Corinthian. Acanthus leaves are intricately carved into the pinnacle. These columns have flutes as well. Compared to Ionic columns, the foundation for such columns is more intricate. As an illustration, consider the Capitol Building in Washington, D.C.'s columns.

Figure 6 <https://www.britannica.com/event/United-States-Capitol-attack-of-2021>

Roman building types

Aqueducts and Bridges

Water was transported from sources that were usually far away by reservoir conduits, which frequently had many curve levels. The Water Appia is the oldest of them, with roots that can be traced back to 312 BC. However, the greatest example, the Pont du Gard, which was constructed about 14 Promotion, comes from a later era. Spans were designed using basic curve structures that were identical and took into account entrance across gorges and streams.

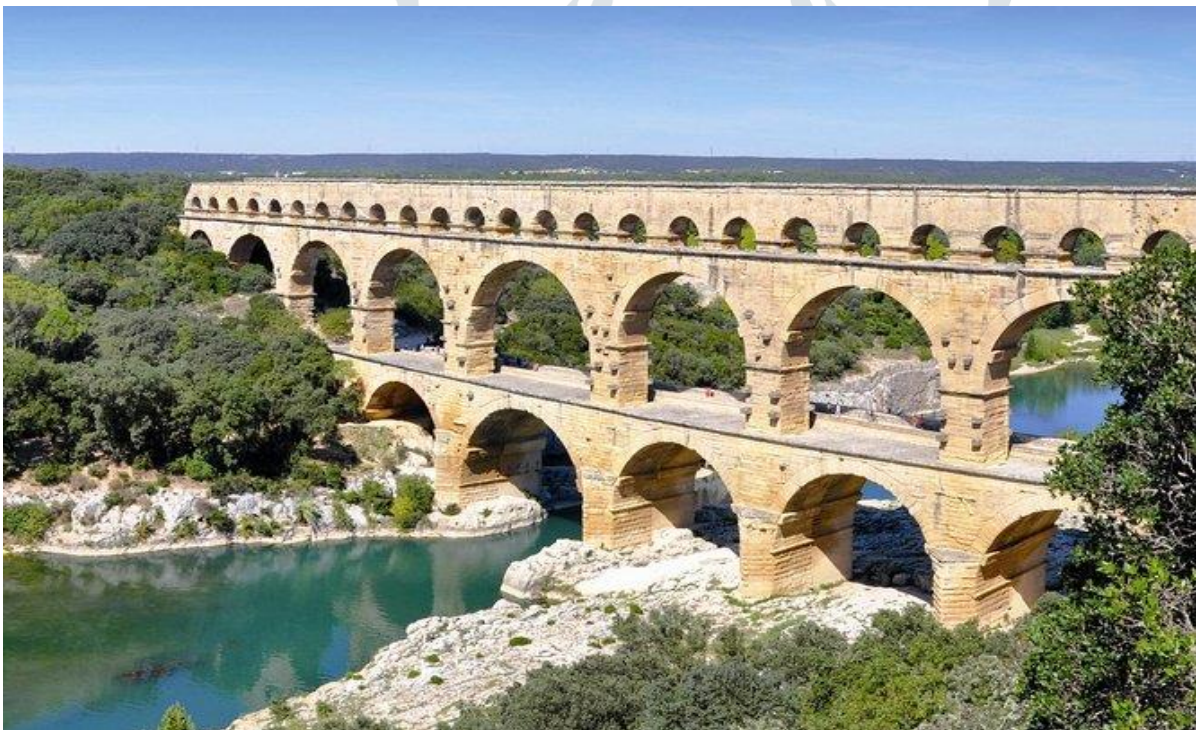


Figure 7 <https://www.viator.com/en-IN/tours/Avignon/Small-Group-Half-Day-Pont-du-Gard-and-Roman-Theater-with-Wine-Tasting-from-Avignon/d483-31254P3>

Basilicas

The basilica was built by the Romans as a location for large gatherings, such as law courts, but its basic design was based on the Christian church. Normally, the basilicas were constructed on one side of the city's commercial district. A main nave was surrounded by walkways and

bordered by segments on all sides, while docks and sections were used to support the basilica's lengthy hallway.



Figure 8 <https://www.deseret.com/faith/2020/2/13/21129701/daniel-peterson-there-is-much-of-christian-history-in-stone-in-st-peters-basilica-catholic-vatican>

Ancient Baths

Roman showers are the ideal example of a Roman design that combines all of the Roman engineering elements, such as supports, vaults, vaults, and curves, to create attractive interior spaces. The largest examples of these buildings comprised hot and cold rooms, swimming pools, libraries, and most importantly, heating that was conducted through the walls and floors of the building via earthenware channeling. Roman showers were sometimes rather basic on the exterior, but the inside was elaborately decorated with mosaics, sculptures, marble, and parts.



Figure 9 <https://www.discoverwalks.com/blog/rome/top-10-fun-facts-about-the-roman-baths/>

Temples

The sanctuaries of Rome included elements of both the Greek and Etruscan types. They consisted of an interior cell at the back of the building, flanked by segments, and perched on top of a stage that had been elevated to a height of around 3.5 metres. The building had a ventured entry as well as a planned patio. Greek sanctuaries were often constructed to be pulled closer from any location, but Roman sanctuaries had a specific point of convergence. This difference between Greek and Roman engineering may be seen in the layout of their respective sanctuaries.



Figure 10 <https://www.historyhit.com/locations/temple-of-augustus-and-livia/>

Theaters and Amphitheaters

The first Greek period eventually served as the inspiration for the design of the Roman amphitheatres, but the Romans contributed their own modifications to the overall scheme. For instance, the ensemble was constructed of stone and was shaped more like a semicircle. Romans also had a preference for totally enclosed amphitheatres, such as the Colosseum. The lavishly decorated stage structure, which had pediments, tiers of sections, and statues, was another addition.



Figure 11 <https://www.crystalinks.com/rometheaters.html>

Victory Arches

In order to honor certain historical occurrences, such as military triumphs, triumphal arches were built. They typically had one to three entrances and had no other use save serving as sculptural monuments. While subsequent instances were guarded by a flight of steps, some of the earlier ones permitted movement under the arches.



Figure 12 <https://the-past.com/feature/the-triumphal-arch-exploring-the-legacy-of-a-roman-monument/>

ROMANIA ARCH

There are several areas of modern culture where the lingering effects of ancient Rome are obvious. The Roman Empire is where sophisticated elements of law, engineering, literature, philosophy, architecture, and art all originated. The Roman arch, however, is perhaps one of the aspects of Roman civilisation that has endured the longest. A structure may be strengthened or guided by an arch, which has a curved form. In the past, arches were made of stone, brick, or concrete; nowadays, some arches are made of metal or laminated wood. The final block to be installed is the pinnacle central stone, also known as the keystone, which forms the wedge-shaped stones that form an arch's outer sides. The arch is supported from below during construction before the keystone is set. An arch's curvature may take on several unique forms, although it often resembles a rounded or pointed semicircle. Although the Romans transformed the arch, it had always been circular before them.

The Assyrians built vaulted rooms and subterranean drains using arches. These early arches, however, were most suitable for modest constructions. Large structures like palaces or government buildings couldn't be supported by the designs since they weren't cutting edge enough. However, the Romans improved the arch and made it robust enough for extensive usage. By developing an arch capable of supporting large amounts of weight, they set the groundwork for some of the most significant advancements in architectural history. Bridges, gateways, sewers, and aqueducts—which have been crucial to the modernisation of cities—now prominently include arches.

Therefore, how did the Romans do it? By combining lime and volcanic sand, Roman architects developed a very durable kind of concrete thanks to their extensive technical and architectural knowledge. Arches made with this cloth could need to support very large weights. The Romans seldom used mortar; instead, they relied on the accuracy of their masonry to guarantee that the sides of the arch could withstand the pressure from the keystone.

Roman architecture persisted in adapting with improvements at the vault after the arch. A vault is a form with an arched ceiling that gives a space with a roof or ceiling. The vault has been spherical since ancient times, much like the arch. However, everything altered when the Romans arrived, who built their structures with no need for buttresses or supports outside. The Romans were able to easily construct vaults over large areas to build amphitheatres and basilicas because to this breakthrough. The vault also contributed to the development of the copula and the dome, demonstrating just how far-reaching the arch's influence extends.

Due to the downward pressure on an arch, it is more supporting than a horizontal beam. The growth of the Roman Coliseum, maybe one of the most iconic structures on earth, has benefited greatly from the advancement of the arch and vault. The ceilings were much more powerful than a flat ceiling because of the arched arches. There are several benefits to using arches in building rather than straight beams. Due to its ability to span bigger openings and construction from tiny brick or stone blocks, arches are superior than horizontal beams (also known as lintels). It didn't take long for civilizations in the region to adopt the innovative and modern Roman arch. Muslims from the Arab world altered the Roman design and gave their magnificent palaces and mosques pointed, scalloped, and horseshoe arches. These distinctive arches have come to represent Islamic art and architecture. Gothic architecture significantly increased the usage of the pointed arch throughout Europe. Not only did pointed arches increase a structure's strength and stability, but they also contributed to the soaring, airy feeling characteristic of many Gothic cathedrals. By the Middle Ages, more advanced vault and arch systems had been developed. The magnificent triumphal arch was further inspired by the Roman Arch.

Usually built over significant thoroughfares, these enforcement systems serve as a reminder of significant naval triumphs. They often include intricate decorations and exact lettering. It is estimated that Rome formerly had more than 50 triumphal arches. There are now very few triumphal arches left, and two of the most iconic ones are the Arch of Constantine in Rome and the Arc de Triomphe in Paris. The same straightforward plan is still used by modern arches centuries after the fall of the Roman Empire. Arch has come to represent some of the most beautiful residences in the globe throughout time. The American Capitol Building is located in Washington, D.C., from the Taj Mahal in India. Many houses may enjoy the beauty, grandeur, and refinement of the arch.



Figure 13 <https://theancientworldofrome.weebly.com/architecture.html>

AFTER THE ROMANS, THE CONCRETE INDUSTRY

The high-quality structures and residences built by the Romans that have endured for many years could not possibly have been built without the use of concrete. Most people nowadays are likely extremely familiar with concrete since it is used virtually everywhere—in our houses, on highways, in bridges, etc.

The Mayans and Egyptians were the first to discover concrete, not the Romans, but the Romans were the first to pioneer it and develop Roman concrete. Despite the fact that Roman concrete was far more fragile than its modern version, this enigmatic mixture of concrete is old because of how long it has defied the natural forces of nature.

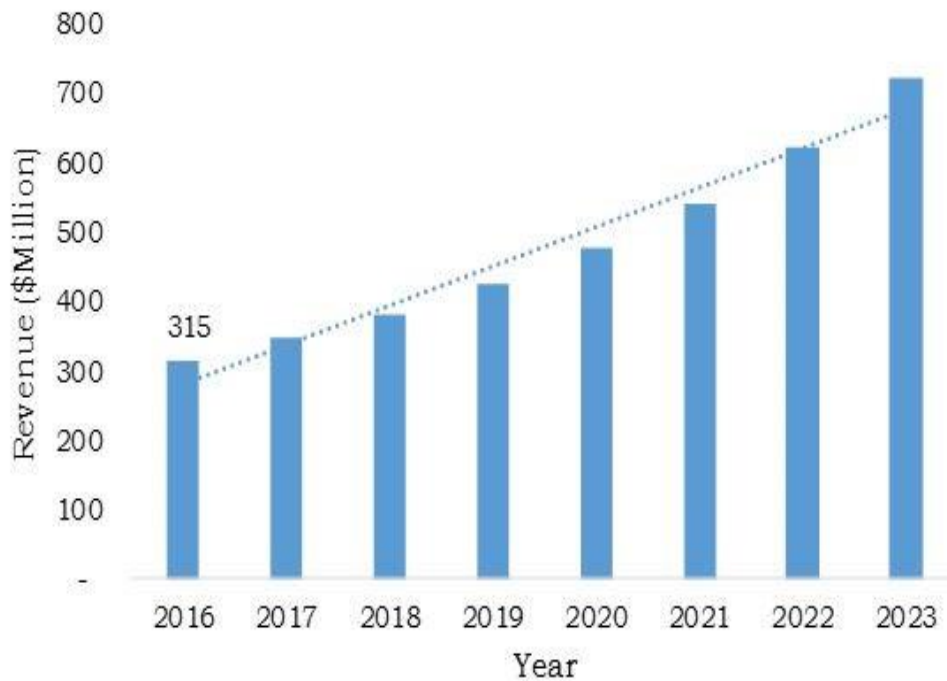


Figure 14 <https://www.alliedmarketresearch.com/green-cement-market>

Before the Romans made it popular, concrete wasn't often created in factories or America. When the Romans arrived in about 2200 years ago, it was second only to water in terms of global resource use. Since concrete is widely used around the globe, the majority of structures in industrialised nations all include some concrete. Everywhere we drive and often walk, there are concrete roads. Concrete is the current standard construction material for cities, shielding us from the forces of nature and giving the materials to develop the necessary infrastructure. It comes as no surprise that cement manufacturing is the foundation of the global construction industry. The data on the left continue to reflect the growth and influence of concrete use globally. The fact that the concrete industry has continued to expand throughout the twenty-first century may be evidence of a Roman concrete design pattern that has been prevalent since the days of the Roman Empire.

THE PRINCIPAL'S ROMAN ARCHITECTURE HAS HAD ON MODERN CIVILIZATION

As Emperors honoured their renown and reputations with big public works of structure, many wonderful works of Roman architecture have been produced as a technique of mentioning the vitality of the Romans. One of the largest structures still standing from that time period is the Arch of Constantine, which was completed in 315 AD to commemorate the Battle of Milvian Bridge. Standing 21 metres tall, it served as the inspiration for London's renowned Marble Arch.

Despite all of the developments in technology, science, materials, and architecture, the Pantheon dome in Rome continues to be the largest unsupported concrete dome on Earth. This over 2000-year-old design, which was commissioned during the reign of Augustus (27 BC–14 AD) and solemnly dedicated in 126 AD, outshines anything now being built.

Roman architecture may not have created the arch or the vault, but they did perfect them. Roman architects were able to construct large roofed systems without the need of pillars because to these architectural documents. These documents have also been helpful because of their capacity to build outstanding bridges and aqueducts, which were essential to the development and expansion of one of the greatest empires in history.

Roman architecture invented notably better architectural concepts that were crucial in allowing major settlements to expand and, as a result, allowed them to expand their empire across vast areas.

By the end of the 0.33 century, eleven aqueducts totaling almost 800 km of artificial water supplies were used to service Rome. This changed how civilizations functioned by releasing people from their reliance on agriculture and allowing them to learn about art, politics, engineering, and the other varied industries that distinguished the Roman Empire from other civilizations.

Without the creation of bridges, many of which may still be in use today hundreds of years after they were built, the innovation and widespread usage of aqueducts could not have occurred. The Alcántara Bridge across the Tagus River in Spain, which was constructed in 106 AD under the direction of Emperor Trajan, is one of the most breathtaking examples. Of his credit, it even bears the phrase, "I even have built a bridge with the goal to close forever," and that claim is still true today. The invention of a sewage system became crucial to city life, although being less appreciated throughout history. The Cloaca Maxima, which was constructed from previously used open drains and canals, was used during the entire existence of both the Republic and the Empire, with some of its components still in use today. Due in large part to an intricate and ingenious sewage system, the Roman Empire's populace was able to enjoy cleaner and healthier lives, which contributed to the empire's allure and helped to appease conquered populations.

Rome's incredible network of roadways comes last but certainly not least. The Appian Way was the first and most significant paved thoroughfare constructed in the middle of the fourth century BCE. It connected Brindisi and Rome, or perhaps shielded a tunnel that was one kilometre long and connected to a crucial naval facility.

Roman structures were built to appear beautiful from the outside since its builders had to rely on using a post-and-lintel system. As a result, they utilised upright posts that looked like columns with a horizontal block called a lintel that was set flat over the top. In addition to being beautiful to the sight, Roman architecture has greatly aided contemporary civilization.

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