The development of the pointed ogival arch was the technological advancement that stuck out to me the most from this week’s reading. This arch, common to gothic architecture, was an improvement over the domed, semicircular arch and solved the problem domed arches created by distributing horizontal loads to walls, pushing them outwards and making them prone to topple over. The development of this arch in the Gothic Era was particularly important as it allowed for Cathedrals to be built taller without proportionately increasing their area as the semicircular dome necessitated.

One aspect of this development that was of particular interest to me was that it is one of the few cases where historians can trace the transmission of a technology from one culture to another with a reasonable degree of confidence. It is surprising to me that there are not more technologies for which this is the case. It seems that the transmission was not documented, and historians came to the conclusion of its transmission by noting how pointed arches appeared first in India and gradually began appearing in the middle east and then in Europe over the course of several hundred years. Historians, it seems, are able to attribute some of the last stages of the pointed arches journey from Egypt to Europe to specific visits to Europe by prominent figures in the Catholic Church who then had the arch used in new cathedral constructions back home.

Architecture in this period as in all before it, relied mostly on masonry, which was very good at withstanding compression loads, but was very weak in tension. This posed a particular problem for large cathedrals with high ceilings. The ogival arch solved this problem by first distributing the loads from the roof to the walls at a steeper angle, greatly reducing the horizontal tension loads. Second, the architects supported the pointed arches with buttresses and flying buttresses which supported the walls of cathedrals from the outside and transferred the tension loads on walls into compression loads in the buttresses.

Andrew, I would imagine that learning about the structures built by ancient civilizations is rather fascinating after learning about the mechanics of solid materials. I have been trying to relate some of the concepts that this class has talked about, such as how loads are distributed by arches, to my knowledge of statics and to truss problems in particular. I imagine that through your solid materials class, you have a much greater understanding of how these types of structures work including the advantages and challenges of different designs. I imagine you also have a greater understanding of how materials play into this and what a challenge it was for these civilizations to overcome their lack of steel reinforcement.

Shelby, I agree that the use of a suspension system in ancient Egyptian chariots is very ingenious and surprising. Of course, a suspension system is an obvious necessity for any modern vehicle, but did not expect it to be used by ancient Egyptians. I suppose it was all the more important for them since they did not have the advantage of rubber, air-filled tires to provide additional shock absorbency to the chassis. Using only solid, rigid wheels and riding on rough terrain in battle, I imagine the ride must have been extremely bumpy. It probably would have been completely unmanageable for an archer without a suspension system.

Kory, I also found it very fascinating that the Roman Colosseum had a retractable canvas roof. I had never heard that before and it was a very ingenious feature to include in the building. I wonder if canvas roofs were at all common at the time or if a retractable roof had ever been built before. I like how you liken their roof to that of many modern stadiums. It is very cool to think that this feature began almost two millennia ago with the Romans. I also liked how they were able to flood the stadium floor in order to reenact naval battles. I would very much have liked to see that.

Paul, I too think that the use of a suspension system in ancient Egyptian chariots is ingenious and surprising. In hindsight, I was thinking I chariot with hard wheels being ridden over a rough battlefield probably would have been completely unmanageable for an archer without a suspension system. However, the Egyptians apparently made do with no suspension and with a very crude suspension system for some time before the technology was developed more fully. I like how we can trace the refinement of this technology rather than merely considering it as something that the Egyptians figured out all at once and then never changed.

Robert, what really intrigued me about Julius Caesar’s bridge was how the Roman Army was able to build it with their Germanic enemies waiting for them on the other side of the Rhine River. At first, I thought maybe the bridge was built in secret, which seems reasonable considering it was accomplished in only ten days. But the commentators seemed to imply that the Germanic soldiers watched Rome build the bridge and saw the army march across the river. I wonder if they attacked the Romans while they were constructing the bridge, and if they did, how much more difficult it must have been for Julius Caesar’s army to build the bridge.

Brett, the Egyptian chariots seem to be a popular topic on the discussion board. What I liked most about the chariot video was how, as you observed, the design was refined and optimized over the years until had had become the best it could be with the technologies available to the ancient Egyptians. I think this aspect is very important for the chariot to be considered an important act of engineering. It is not enough to simply build a functional chariot and call that an engineering feat. An important aspect of engineering is exploring the design parameters and finding an optimized solution.