

## — The Lambert Pillar

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ARCH 384 Elective  
SSEF Competition "UP"

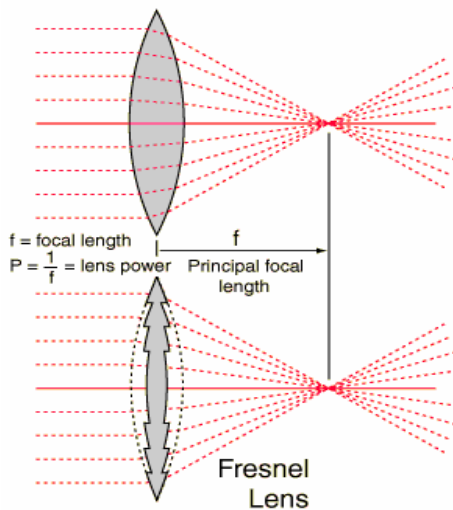
Since the beginning of human exploration on the waters of this world, navigational aides have been employed to ensure safe travel through often treacherous waters. Historically, one of the most important aides is the lighthouse. Lighthouses have evolved over thousands of years, beginning with nothing more than a signal fire on top of a hill to the modern day fully automated lighthouse. Modern lighthouses no longer fully rely on light signaling as their sole way of communicating with ships at sea, but are often equipped with advanced radar and satellite technology. Lighthouses are generally not very picturesque buildings, but are quite simple in the construction and purpose due to their usually desolate and somewhat dangerous sites. Despite the fact that they are not the most beautiful structures, they often create a very nostalgic feeling for many people and thus, have an interesting yet somewhat foreboding allure.

The first known lighthouse to be built, The Lighthouse of Alexandria (or Pharos Lighthouse) at the mouth of the Nile River was built in 270BC. It was conceived of by Ptolemy Soter, ruler of Egypt at the time, but was not completed until after his death. This lighthouse was far larger and more well known than any other lighthouse in history and is considered to be one of the seven wonders of the world. In its time, it was the tallest building in the world standing roughly 117m, or 40 storeys tall. It used a large mirror at the top of the tower to direct light from the sun during the day and used a large fire by night. This mirror could



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Pharos Lighthouse

reflect light about 50km offshore. In the early 14<sup>th</sup> century, two strong earthquakes caused the lighthouse to collapse, reducing it to little more than a pile of rubble. In 1480, the rest of the lighthouse was dismantled and the stone from the old lighthouse was used to create a medieval fort to protect the city of Alexandria.



One of the most significant advancements in lighthouse technology, was the invention of the Fresnel lens. Around 1800, the French physicist, Augustin Fresnel, realized that the curvature of the lens was what gave the lens its focusing power, and that this curvature could be broken up and made smaller and still perform the same function. A lens of the size required to project light far off to sea is a very heavy piece of glass, and it would often be too heavy to be supported by the simple structure of a lighthouse. So, by breaking the curvature into pieces, the desired focal length remains the same, while the weight of the lens is significantly reduced. This invention allowed the light source to become larger and stronger without putting too much weight on the structure. To this day, Fresnel lenses are commonly found in lighthouses all across the world.

Up until the 20<sup>th</sup> century, lighthouses have required a keeper to maintain them ensuring that boats off the coast are warned of the dangerous shores ahead of them. In addition to maintaining the lighthouse, the keepers were often involved in rescue operations if a ship did require assistance. The keepers lived either in a small living space at the base of the tower or in a small house directly beside it. In 1907, Nils Gustaf Dalén invented the sun valve which turned the light off in the daytime, and back on in the night. Because of this invention, lighthouse keepers were no longer needed. Non-automated lighthouses were slowly phased out in favour of newer technology bringing about a whole new era in navigation. As technology improved more features were added to lighthouses, such as radar and satellite positioning systems. And without the need of a lighthouse keeper, lighthouses no longer needed room to house their keepers, allowing the lighthouse to become little more than a signal tower. Modern day lighthouses emit radar signals which travel much further than the light from a lighthouse can, especially in bad weather. And as this radar and satellite positioning technology improves more and more, the lighthouse as we know it has become less significant in its function. Despite the fact that it is no longer as important of a navigational tool as it used to be, lighthouses are still used and in desperate situations, can still be very important to the safe passage of a vessel.

Although the number of lighthouses has decreased to about 1500 worldwide, there are many different construction techniques used to create lighthouses. The most well known is a simple reinforced concrete tower with the signaling light at the top of the tower. Most people think of this type of construction when thinking about lighthouses, but in fact, lighthouses are built in many shapes and sizes, usually determined by specific site conditions, and cost. The type of lighthouse tower that inspired the design of this project is the skeleton tower design. Lighthouses in this style consist almost entirely of a tall steel framework with the signaling devices at the top of the tower. As mentioned before, lighthouses are generally not created to be beautiful structures, but the location and type of structure has so much potential to become something more than a simple signaling tower. Many people are drawn to lighthouses, even though they are quite often inaccessible. Perhaps it is the isolation of these sites that causes this attraction. The fact that lighthouses are towers, also presents a good opportunity for a lookout, which was in fact one of the functions of older non-automated lighthouses. As lighthouse keepers are no longer required, this lookout tower could be used not just by someone performing maintenance duties or looking for ships in distress, but also by the any person that happened to be passing by. Lighthouses are located along shorelines, thus overlooking the ocean, and due to their towering structure, they can look out for very far in many directions. The views from these isolated



Les Eclarieus Lighthouse:  
Reinforced Concrete Construction



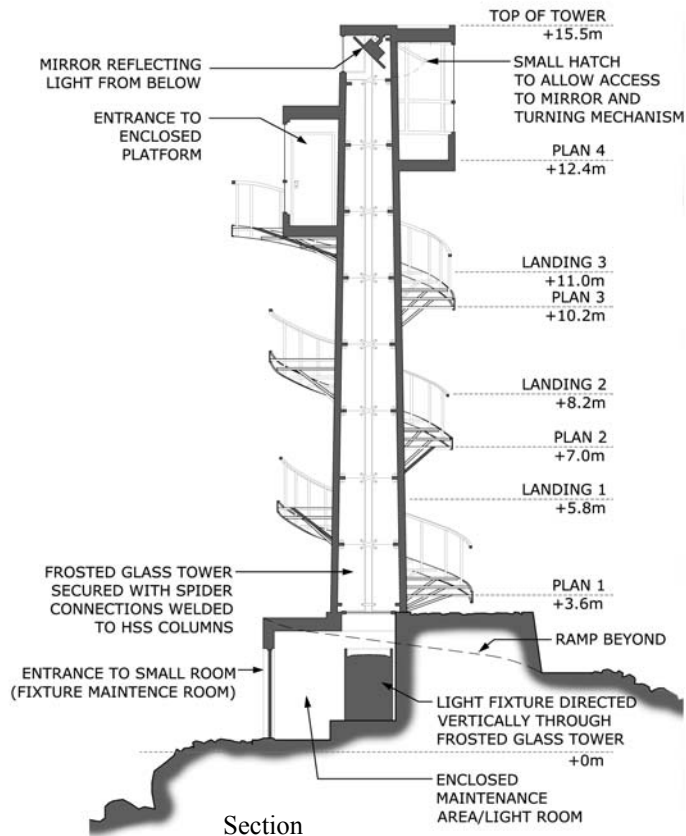
Rawley Point Lighthouse:  
Steel Skeleton Tower Construction

positions along shorelines can be incredible and these views should not be wasted purely on an automated signaling device, but rather should be available to anyone who desires to take in the beauty of the landscape around them.

This idea of having not just a maintenance platform but an observation deck was one of the driving ideas behind this project as well as the emphasis on the verticality of the structure. In order to reach the observation deck, one would follow the spiraling ramp leading up to the base of the tower, then continue up the staircase as it wrapped up the tower. By not enclosing the staircase within structural walls as many lighthouses do, you would be able to fully experience the surrounding landscape. As you climbed up, you would also be turning with the staircase giving you at least a full 360 degree view of the treacherous yet beautiful terrain. Unlike most lighthouses, the light for this design is placed at the bottom of the tower rather than the top. The light is angled straight up through a slightly tapering core of frosted glass and redirected by a large mirror with a rotating mechanism at the top of the tower. This idea is very similar to the way the Pharos lighthouse worked with a large mirror redirecting the light source out to sea. The lighthouse also functions very similarly to the way someone using the observation deck would experience the tower, moving up, then once at the top, redirecting the views, and light outwards towards the water. To make this idea of redirection very noticeable, the frosted glass core slightly tapers causing a small portion of the light to be refracted outwards making the core light up and emphasizing the vertical beam of light shining through the core.



Elevation



Section

The simplicity of the structure makes this tower very elegant and much more enticing than most lighthouses constructed in more typical fashions. Lighthouses are usually built in isolated and untouched areas, often quite far from human civilization. The pure, simple beauty of nature was definitely an inspiration for this design and due to the fact that it was sited far from any human development, it works very well with its surroundings.

Lighthouses, along with a lot of other architecture, are now built with a very functionalistic idea behind them and have very little thought put into their more aesthetic qualities. The advancement of technology (specifically radar) has made lighthouses far more efficient, yet at the same time less important in naval navigation. Slowly, the potential beauty of these structures was forgotten and instead, money and efficiency became the most important factors in their construction. The first lighthouse built was by far the most impressive one ever built in the course of human history. The Pharos lighthouse is obviously far more impressive than our “lambent pillar” but the same idea of creating something that is not purely functional but beautiful as well is very evident in both.

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