THE HARBOR BEACH LIGHTHOUSE LENS

Bring Back the Light!

Augustin-Jean Fresnel (pronounced Fruh-nell), a nineteenth-century French physicist, is credited with inventing the compound lenses which are still widely used in lighthouses.

The Fresnel lens appears much like a giant glass beehive with a lamp in the center. The lens is composed of rings of glass prisms positioned above and below the lamp to bend and concentrate the light into a focused bright beam. Before Fresnel’s invention, lighthouses used mirrors to reflect light and could be seen only at short distances. The Fresnel lighthouse lens light can be seen from a distance of 20 or more miles.

There are many sizes of Fresnel lenses, called orders, the largest being a first order; the lenses decrease in size through second order, third order, etc. The Harbor Beach Lighthouse was equipped with a Fresnel Fourth Order lens, the type used in major harbor lights which led the mariner into the channel at the entrance of a harbor mouth. It was also frequently used on islands and in harbors to mark shoals and islands. The Fourth Order lens was by far the most commonly used lens on the Great Lakes.

To help sailors determine their location, lighthouses displayed beams in a unique flash sequence in order to be distinguished from other lighthouses. The Harbor Beach flash sequence is white for one second, a 4-second eclipse, red for one second, and a 4-second eclipse.

The original Fresnel lens was installed in the lighthouse in 1885 and operated continuously until it was removed. The original Harbor Beach Lighthouse Fourth Order Fresnel lens is on display in the Grice House Museum in Harbor Beach.

The Fourth Order Fresnel lens you see lighting up the night sky from the lighthouse is an exact replica of the original lens in appearance and performance. The original lens was removed by the Coast Guard years ago and was eventually conserved in the nearby Grice Museum because of its high value and concern about remaining safe a mile offshore. Over the years, several different lenses were installed in the lantern room, but none ever had the brilliance of the original.

In a way, the personality of our lighthouse changed when the original lens was removed, changing to something less than its original self. Lighthouses are known by their “daymark” paint scheme and their structural appearance, but at night the only way to identify one is by its light.

The Harbor Beach Lighthouse Preservation Society became aware of the beautiful replica Fresnel lenses being crafted by Dan Spinella at Artworks Florida over the past several years. The lenses are identical in appearance and performance to the originals with two key exceptions: the prisms that amplify the light beam are cast in acrylic plastic using molds made by 3D printing, and the light source is a high-efficiency LED-360 degree bulb. The brass components are hand polished using several steps of grit to end up with a high-gloss finish. Ours is the 15th lens Artworks Florida has built and installed in the US.

The Lighthouse Society had over 95 separate donors contribute to raise the nearly $65,000 the lens and motorized base cost to purchase and install. In addition, the lighthouse is completely solar powered, and additional capacity had to be added to supply both the new lens and the exterior lighting that has been in place for several years. Harbor Beach Lighthouse is one of the very few active lighthouses in the world that is lit up at night!

The lighthouse is the symbol of the Harbor Beach community. This place was just a bay on the sunrise shore of Lake Huron in the mid-1800s when the area had its first stirrings as a lumber port. The local people petitioned Congress over an 11-year period for continuation of construction funding that eventually reached over $1 million to complete this “harbor of refuge” and lighthouse in 1885. For decades it was recognized as “the world’s greatest man-made harbor”, and is still the largest freshwater harbor in the world. Once again the community came together to restore the spirit of the lighthouse with this “Crown Jewel of Harbor Beach”.

Sponsored by The Harbor Beach Lighthouse Preservation Society

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