IALA

Image 1. *Main rotating beacon system and emergency rotating beacon system installed in Valencia Lighthouse. Maximum efficiency and range.*

Rotating beacons are long range beacons which works by a rotating optical system. These systems can be composed by a single fixed luminous source and a rotating optical system, or it can also be composed by several luminous sources with individual optical systems embedded into a rotating chassis.

These systems have many advantages, some of the most important are the following ones:

• Flashing rhythm is produced by the beacon's turn, that is why **luminous sources can work continuously and do not need rhythmic on/off flashings.** This is an asset for the use of non-instantaneous on/off luminous sources, even though this is not so relevant for the current LED luminous sources.

• The omnidirectional light beam coverage is ensured thanks to the equipment rotation; therefore, horizontal divergence can be limited to a certain number of beam or sectors. **This means that the rotating beacons efficiency increases far above the omnidirectional flashing lanterns.**

• Concerning long ranges (above 18 nautical miles), **rotating beacons considerably reduce the energy consumption compared to equivalent flashing beacons.** This also allow us the use of lower, more reliable and cheaper energy and protection systems.

However, these systems also have some inherent drawbacks, which we should know:

• Rotating systems have moving parts. This often involves a reduction in reliability. Although the strength of these systems is closer, for instance, to that of LED light sources thanks to the use of brushless systems and double engines.

• Rotating beacons usually have a bigger size than equipment without rotating systems.

• These systems should be configurated to one specific rhythm, because both the number of flashes and the flash sequence determine the optical system composition.

ROTATING BEACON USE

The use of rotating beacons should be prioritized when the nominal range is above 20 nautical miles. Furthermore, it should be considered in shorter ranges (between 16 and 20 nautical miles) when there is one of more of the following conditions:

- Too much available space (Lighthouses and big towers).
- Use with autonomous solar systems.
- Possibility of emergency equipment installation (a main rotating system and an emergency flashing equipment with a lower range are the ideal combination).

CURRENT TECHNOLOGY

Current technology in rotating equipment mainly has 2 different branches in terms of projection and light sources:

1. FRESNEL LENS

Fresnel lenses allow the construction of wide aperture lenses and short focal length without the weight and volume of material that should be used in a conventionally designed lens.

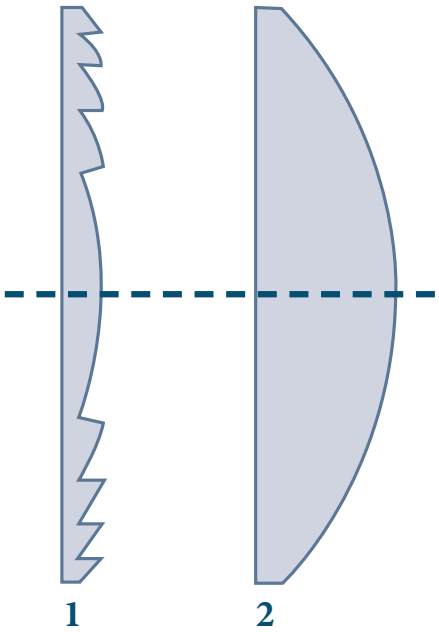

Image 2. *Comparison of Fresnel lenses (1) and classic (2) lenses. (with equivalent power)*

These lenses are usually used in combination with LED light sources which do not rotate with the optical system.

Image 3. *MBR400L Beacon, with Fresnel lens system and LED light source, installed in Malta.*

2. LED PROJECTORS

LED projectors are systems which include both LED light source and the lens in the same compact system. Thus, long-range rotating beacons can be configurated according to customer requirements by combining different quantities and types of these systems; and significantly reducing the energy consumption in comparison with classic rotating beacons.

Regarding rotating engines, double brushless engines are the most commonly used nowadays, because although they are more expensive, they exceed in terms of reliability, low maintenance and lifespan all other alternatives.

For further information on this topic, and as a complement of this article focused on the use of LED light sources in rotating classic systems, we highly recommend you consult consult the Guideline 1049 “The Use of Modern Light Sources In Traditional Lighthouse Optics”, a document where these situations are set out, providing implementation guidance and methods.

Image 4. *MBR400R Rotating beacon, with LED projectors, installed in Rozewie lighthouse (Poland).*