



150 Years

Past and Present of the Aids to Navigation of Japan

Japan Coast Guard
Maritime Traffic Safety Department

History

Origin of lighthouse dates back in the history when fire/smoke was used to indicate locations to ships at prominent points or islands.

Origin of lighthouse

Oldest lighthouse in the world is said to be the Faros Lighthouse built on Faros Island at the entrance of Port of Alexandria of Egypt in B.C 279.

Japanese lighthouse started from primitive fire/smoke signal system 'NOROSHI'.

Boarder guard soldiers deployed at Iki-Tsushima islands used fire/smoke signals in A.D 664, which were found useful for navigation by Japanese diplomatic mission envoy to China.



Faros Lighthouse



Fire lighthouse
'TOMYODAI'



NOROSHI at Jogashima (Miura)

European style modern lighthouses

EDO-Treaty concluded between Japan and the UK, France, Holland and the United States in 1866 required the Government of Japan to build lighthouses at 8 locations surrounding the Bay of Tokyo, etc. As Japan did not have the civil engineering capability to build modern architecture lighthouse, the Feudal Government purchased necessary parts and gears as lenses from France and the UK, with engineering instructions of foreign civil engineers.



Kannon-Saki lighthouse
(Yokosuka)



Government hired engineers
(1869)

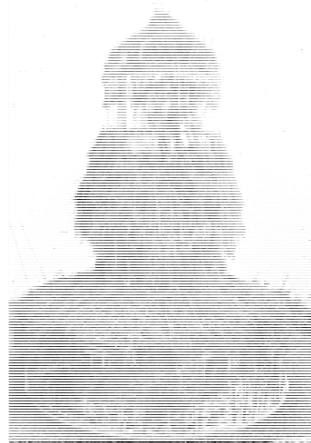


Richard Henry
Brunton (Scotland)

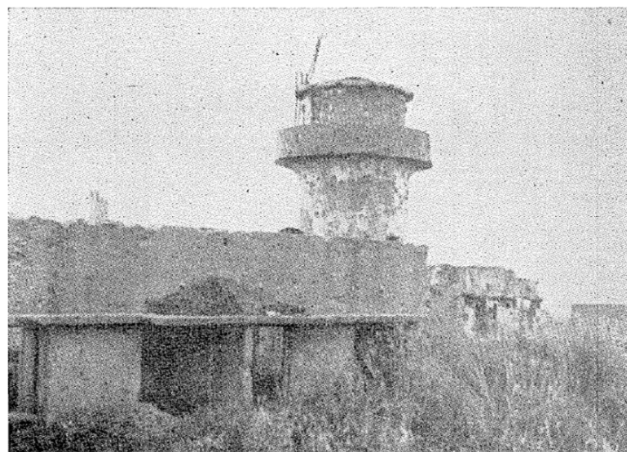
History of Japan's Aids to Navigation

Wartime and Post-wartime lighthouses

Based on the agreement between the Navy and Ministry of Transport and Communication, coastal lighthouses were integrated in the air defense surveillance system in 1942. External color was camouflaged and light beam directions were changed to lower or totally put off depending on tactical requirements. Point ASHIZURI lighthouse was destroyed in March 1944 by the US air raid. 30% of lighthouses across the country were destroyed in the war.

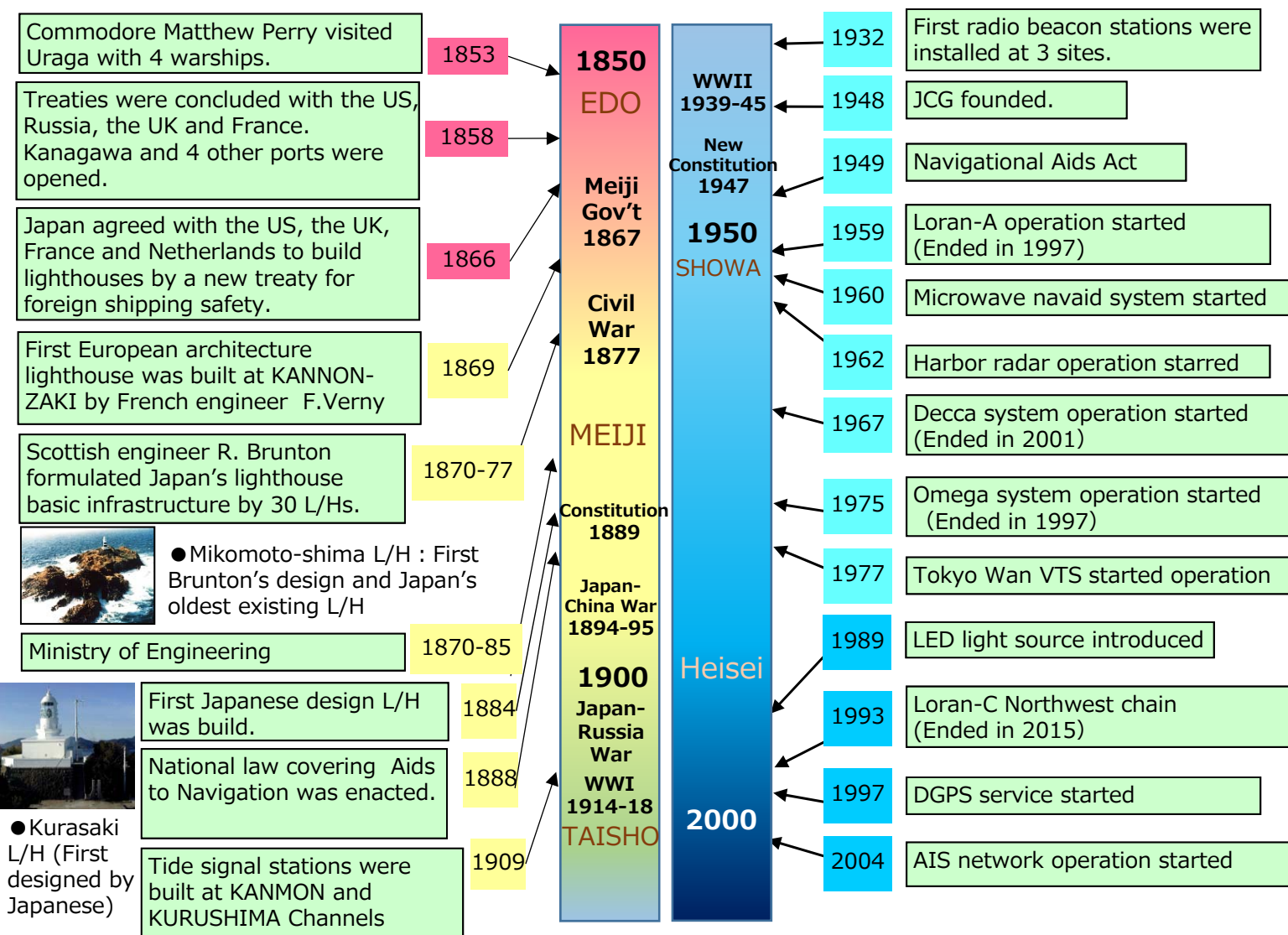


Camouflaged lighthouse
(Point Muroto/Kochi)



Bombed lighthouse
(Kagoshima)

Aids to Navigation history overview

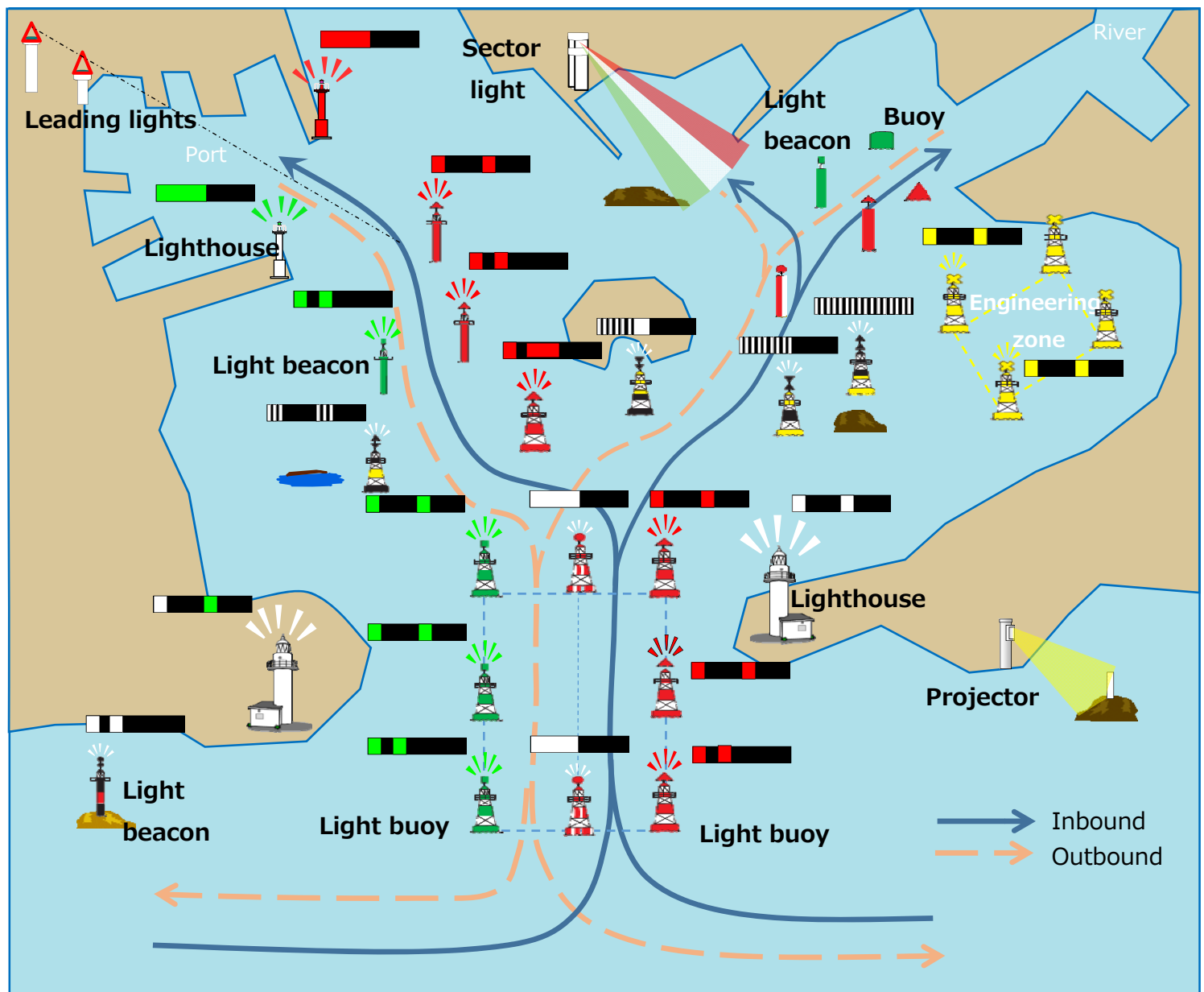


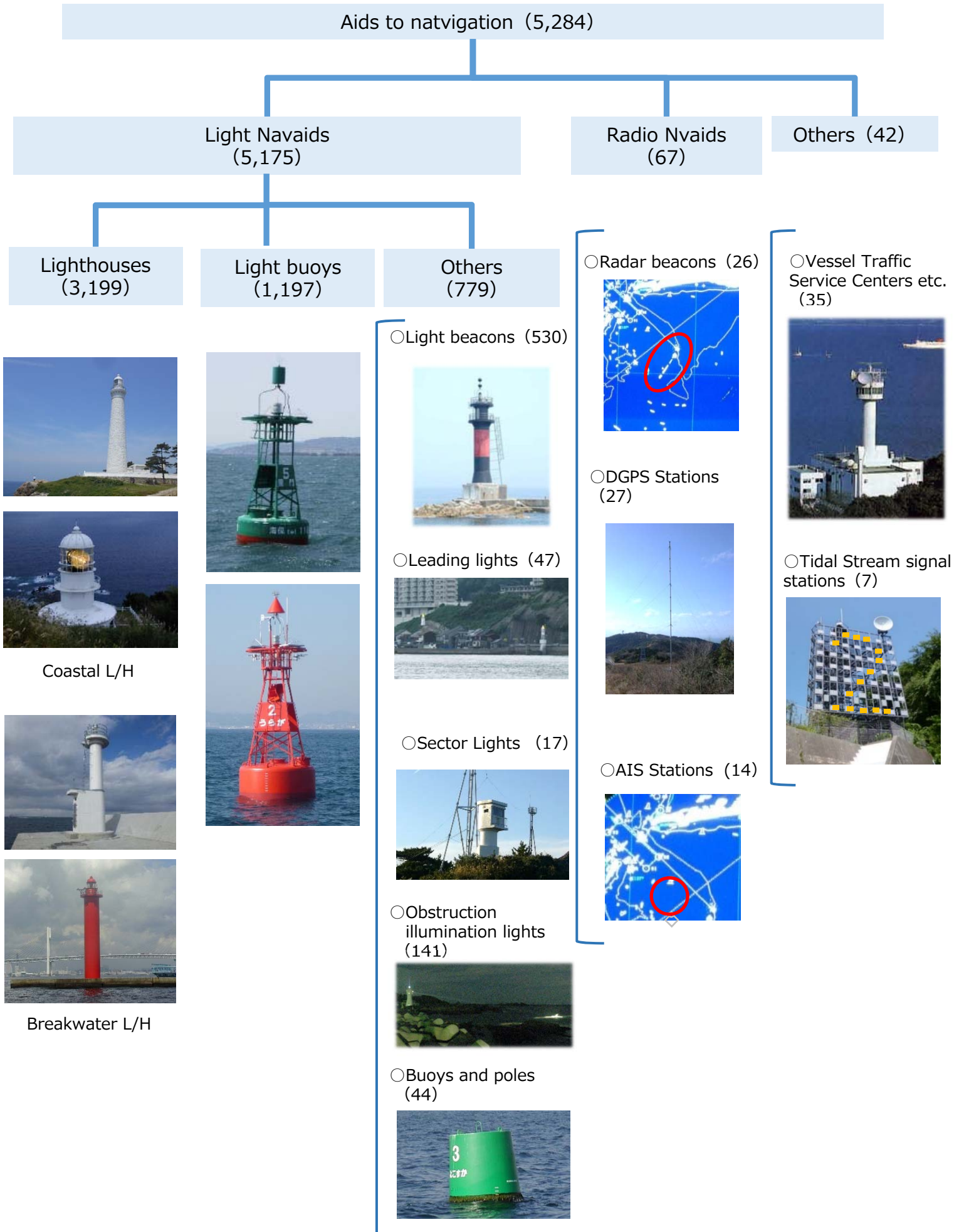
Roles of Aids to Navigation

Aids to Navigation are for assisting ships' safe coastal navigation by means of lights, objects, colors, sounds, radio waves, etc. They typically consist of lighthouses and buoys depending on their purposes. As Aids to Navigation are commonly used by many ships in general, including foreign flag vessels, their characteristics e.g., external color, shape, light color, flashing patterns, etc. are internationally standardized.

Except in areas where special traffic rules are in force, ships have the liberty to navigate freely based on their safe and efficient sailing plan taking the waterways depth and ship's draft into account. In order for ships to navigate safely in accordance such plans, assistance of Aids to Navigation is indispensable for their accurate positioning and determining obstruction whereabouts.

Example of Aids to Navigation Deployment





Existing Meiji-era Historical Lighthouses (23)



【1】 Rokkosaki
(Suzu)
10 Jul. 1883



【2】 Himesaki
(Sado)
10 Dec. 1895



【3】 Inubosaki
(Choshi)
15 Nov. 1874



【4】 Mikomotoshima
(Shimoda)
11 Nov. 1870



【5】 Shiriyasaki
(Higasi-dori)
20 Oct. 1876



【6】 Mihonoseki
(Matsue)
8 Nov. 1898



【7】 Kyogamisaki
(Kyotango)
25 Dec. 1898



【8】 Shimizu
(Shizuoka)
1 Mar. 1912



【9】 Omaesaki
(Omaesaki)
1 May 1874



【10】 Kinkasan
(Ishinomaki)
1 Nov. 1876



【11】 Tsunoshima
(Shimonoseki)
1 Mar. 1876



【12】 Izumohinomisaki
(Izumo)
1 Apr. 1903



【13】 Sugashima
(Toba)
1 Jul. 1873



【14】 Shionomisaki
(Kushimoto)
15 Sep. 1873



【15】 Ogishima
(Takamatsu)
10 Dec. 1895



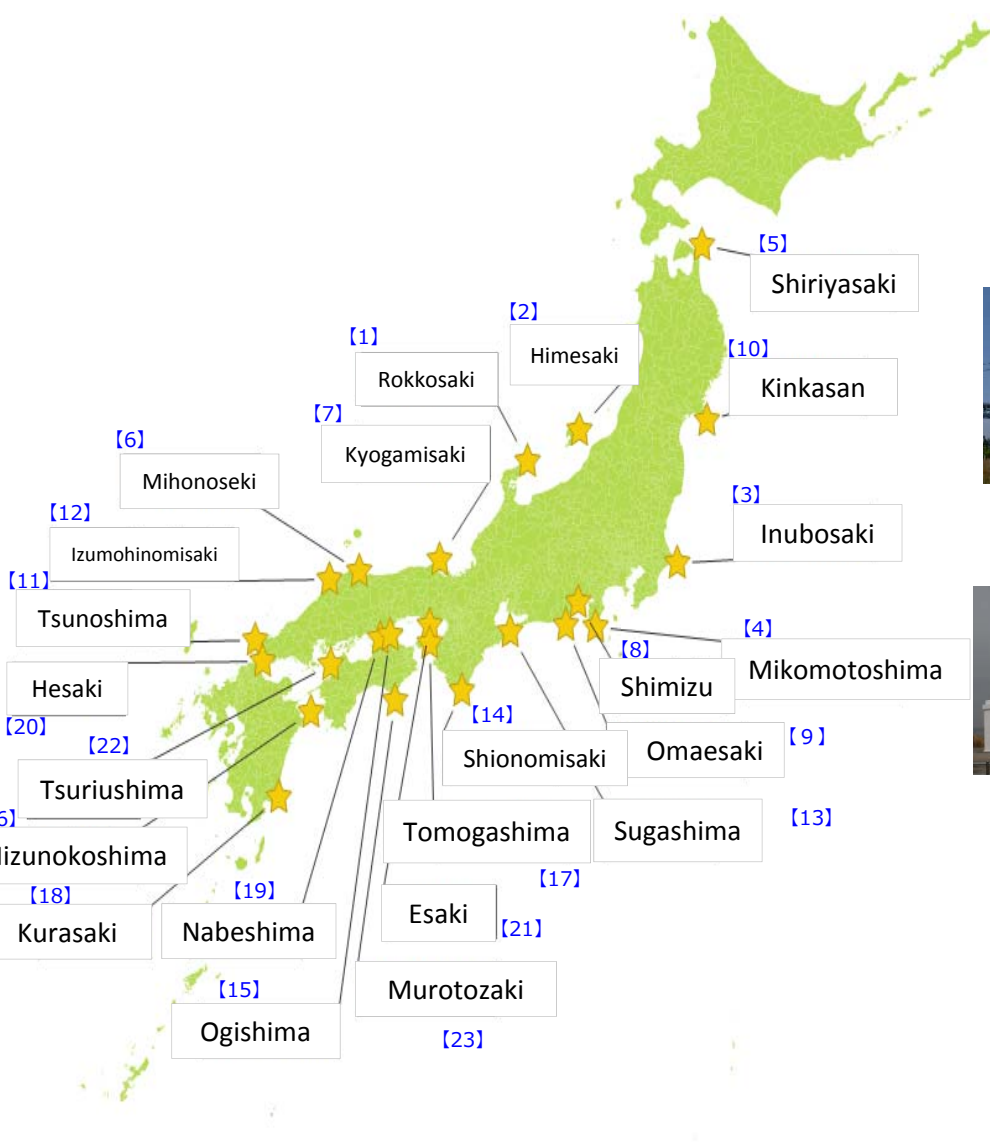
【16】 Mizunokoshima
(Saeki)
20 Mar. 1904



【17】 Tomogashima
(Wakayama)
25 Jun. 1872



【18】 Kurasaki
(Nichinan)
15 Aug. 1884



【19】 Nabeshima
(Skaide)
15 Nov. 1872



【20】 Hesaki
(Kitakyushu)
22 Jan. 1872



【21】 Esaki
(Awaji)
27 Apr. 1871



【22】 Tsurushima
(Matsuyama)
15 Jun. 1873

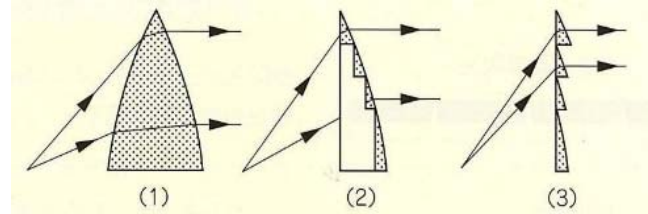


【23】 Murotozaki
(Muroto)
1 Apr. 1899

Lighthouse Mechanism

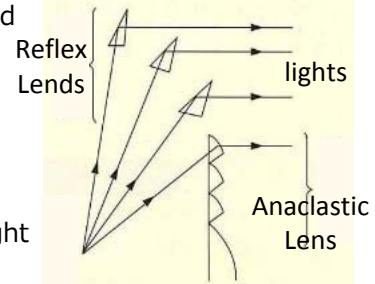
Fresnel Lens

Lighthouse lens was created in 1822 by Augustin Fresnel and therefore is called 'Fresnel Lens'. They are classified into 6 classes depending on their focus lengths. Specially designed light bulbs are used for light sources but in Meiji-era, petrol or gas had been used.



Fresnel lens

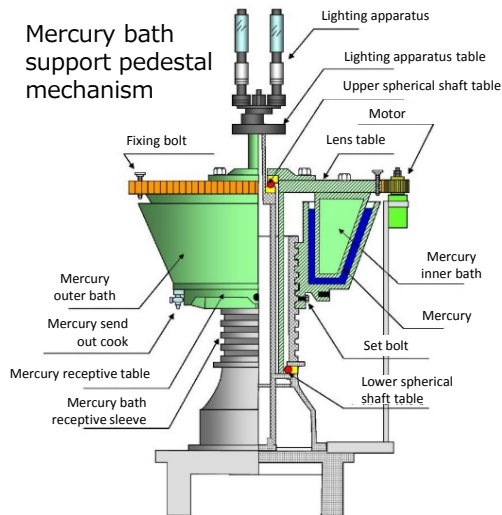
Fresnel lens was so created as to lessen the heavy weight of large diameter convex lens and also to manufacture easily. In case powerful light is needed, reflex lens is also used to supplement the light strength.



Section of Large-scale Fresnel lens

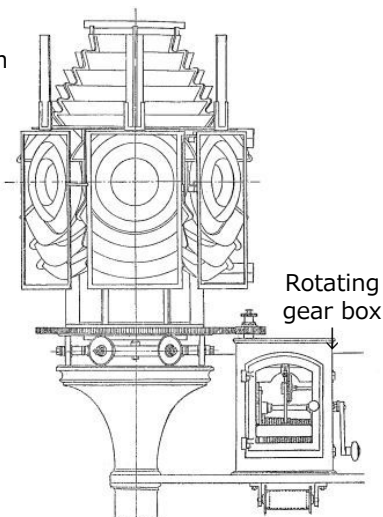
Light Rotating System

Mercury bath rotator pedestal, in which heavy lens mechanism is supported by buoyancy in the Mercury bath pedestal with low rotation friction, had been used as light rotating system. Rotation power source had been a weight gravity in the past, but modern lighthouses use electrical power. (Exists at 55 lighthouses)



Mercury bath pedestal

Rotating mechanism



Rotating gear box



Rotating gear



← Gravity weight

Cultural Value Sharing

Lighthouses officially registered as culturally valuable

◇ Cultural Properties

- : Historic sites 2
- : Registered Tangible Cultural Properties 14

◇ Local Heritage

- : Registered in Shimonoseki City 2

◇ Others

- **Civil Engineering Heritage**
Japan Society of Civil Engineering
Chikyu-Misaki L/H, etc.
- **Industrial Modernization Heritage Group**
Ministry of Economy, Trade and Industry
Shiriyasaki L/H, etc.
- **Machinery Heritage**
Japan Society of Mechanical Engineering
Kashino-Saki L/H

⑯ Shiriyasaki
(higasi-dori)
20 Oct. 1876



⑮ Kinkasan
(Ishinomaki)
1 Nov. 1876



⑩ Inubosaki fog horn (closed)
(choshi)



② Nokogirisaki (Land)
(Ooi)



⑤ Inubosaki
(Choshi)
15 Nov. 1874



⑫ Tateishimisaki
(Tsuruga)
20 Jul. 1881



③ Mihonoseki
(Matsue)
8 Nov. 1898



⑨ Izumohinomisaki
(Izumo)
1 Apr. 1903



⑪ Sunosaki
(Tateyama)
15 Dec. 1933



⑬ Tsunoshima
(Shimonoseki)
1 Mar. 1876



⑱ Tomogashima
(Wakayama)
25 Jun. 1872



① Mikomotoshima
(Shimoda)
11 Nov. 1870



⑥ Nojimasaki
(Minamiboso)
18 Dec. 1869



⑭ Mutsureshima
(Shimonoseki)
21 Nov. 1871



⑰ Sadamisaki
(Nishiuwa)
18 Oct. 1871



⑧ Anorisaki
(Shima)
1 Apr. 1873



⑦ Daiosaki
(Shima)
5 Oct. 1927



④ Sugashima
(Toba)
1 Jul. 1873



Mercy from the Royal Family

Meiji Emperor visited Mutsure-Shima lighthouse (Shimonoseki) on 12 June 1872 on his way of journey in Kyoto, Sanyo, Saikai area and since then, merciful opportunities have been kindly provided by the Royal Families to lighthouse service staff members for their works under harsh environment.

Royal Visits

Meiji Emperor and Empress visited the lighthouse engineering factory of the Ministry of Engineering (Preceding organization of JCG Traffic Safety Dept.) in Yokohama on 18 Mar. 1874 and inspected a new lighthouse test model.



Meiji Emperor



Royal visit monument (Yokohama)

Mercy from Empress Jomyo



Empress Jomyo

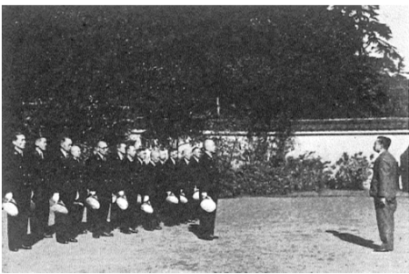


Staff and his family listening to the radio presented by the Empress



Flower vase from the Empress

Royal audience granted to lighthouse service staff



Invitation to the Royal Tea Party



Royal presence in events



10th Anniversary of Tokyo Wan VTS Center



(1951-2003)



Royal Tea Party (2015)



Lighthouse 100th Anniversary



Voluntary cleaning service at Tama Royal Graveyard

As Japan Lighthouse Association (Toko-kai) was founded by the mercy fund granted from Empress Jomyo in October 1938, ex-lighthouse service members and Toko-kai volunteers clean her tomb before 17 May, which is her death anniversary.

Local Sightseeing Resources / Lighthouse lovers and supporters

Variety of events are held across the country leveraged by lighthouse popularities. Lighthouses are loved and supported by many people in local communities.



Public day of Samekado L/H (Hachinohe) Since Apr. 2013



The Nippon Foundation project 「sea and japan」/Japan Romanticists Association



Lighthouse lover/historian
(Ms. Fudo)



Lighthouse Forum hosted by
'Lighthouse Lovers'

Inubosaki/Brunton Association and others also provide kind understanding and cooperation to JCG aids to navigation services.

Local Unique Design Lighthouses

In cooperation with local communities, lighthouses specially designed for local specialties/sightseeing resources to match the historical town views near ports have been built to promote local sightseeing industries.



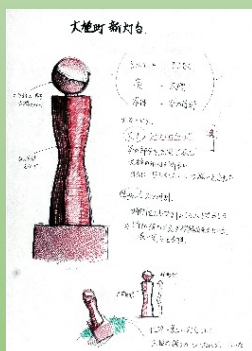
Odawara-Shinko Breakwater L/H (Odawara)
Odawara-Chochin (Lantern)



Mitarai-Ko Breakwater L/H (Hiroshima)
Designed to match the surrounding buildings of Edo-era



Tanwa-Ko West Breakwater L/H (Osaka)
Designed for the National yacht racing event held here.



Ootsuchi-Ko Lighthouse (Ootsuchi/Iwate)
This lighthouse on Horai-Shima, said to have been used as a model of NHK program 'Hyokkori-Hyotan-Jima' was destroyed by tsunami in the earthquake on 11 March 2011.
The lighthouse was reconstructed to the publicly invited design from local town people, which was the first JCG initiative of lighthouse designing. The sun and sand clock design reflects the hopes for bright future and the belief that time surely helps to recover.

Publicly Opened Lighthouses

For the purpose of promoting the Aids to Navigation services and their importance, Toko-kai carries out the lighthouse open program. ※Pubic corporation aims to publicize Aids to Navigation services.

There are 15 lighthouses that can be accessed under this program.

				
①Nyudosaki (Oga)	②Shioyasaki (Iwaki)	③Inubosaki (Chosi)	④Nojimasaki (Minami-Boso)	⑤Kannonsaki (Yokosuka)
				
⑥Hatsushima (Atami)	⑦Omaesaki (Omaezaki)	⑧Anorisaki (Shima)	⑨Daiosaki (Shima)	⑩Sionomisaki (Kushimoto)
				
⑪Izumohinomisaki (Izumo)	⑫Tsunoshima (Shimonoseki)	⑬Toimisaki (Kushima)	⑭Zanpamisaki (Yomitan)	⑮Hennasaki (Miyakojima)



Access for Information

Name	Zip code	Mailing address	Phone no.
JCG Headquarters	100-8976	2 - 1 - 3 Kasumigaseki Chiyoda-ku Tokyo	03-3591-6361
1 st RCGH	047-8560	5 - 2 Minato-machi Otaru Hokkaido	0134-27-0118
2 nd RCGH	985-8507	3 - 4 - 1 Teizan-dori Shiogama Miyagi	022-363-0111
3 rd RCGH	231-8818	5 - 5 7 Kitanaka-dori Naka-ku Yokohama	045-211-1118
4 th RCGH	455-8528	2 - 3 - 1 2 Irifune Minato-ku Nagoya	052-661-1611
5 th RCGH	650-8551	1 - 1 Hatoba-cho Chuo-ku Kobe	078-391-6551
6 th RCGH	734-8560	3 - 1 0 - 1 7 Ujina kaigan Minami-ku Hiroshima	082-251-5111
7 th RCGH	801-8507	1 - 3 - 1 0 Nishi-kaigan Moji-ku Kitakyushu	093-321-2931
8 th RCGH	624-8686	9 0 1 Shimofukui Maizuru Kyoto	0773-76-4100
9 th RCGH	950-8543	1 - 2 - 1 Misaki-cho Chuo-ku Niigata	025-285-0118
10 th RCGH	890-8510	4 - 1 Higashi Kohrimoto-cho Kagoshima	099-250-9800
11 th RCGH	900-8547	2 - 1 1 - 1 Minatomachi Naha	098-867-0118

<Staff Recruitment>

- Professional Officers
 University graduate/post graduate level (Engineering)
 Policy planning, research and development, etc.
- Coast Guard School
 High School graduate level
 IT Systems Course and VTS Operators Course
- Civil Engineers
 Civil Engineering Certificate holders with field service experience
 background
 Design, construction and maintenance of Aids to Navigation



JCG Professional Officer Recruitment
<http://www1.kaiho.mlit.go.jp/saiyo/index.html>
 Civil Service Recruitment
<http://www.jinji.go.jp/saiyo/saiyo.htm>

Coast Guard School Recruitment
<http://www.kaiho.mlit.go.jp/ope/saiyou/bosyu.html>
 Coast Guard School
<http://www.kaiho.mlit.go.jp/school/index.html>



JCG Portal