



Report of an IALA Seminar on the Preservation of Lighthouse Heritage

Executive Summary

A seminar on the subject of the Preservation of Lighthouse Heritage was held in Piraeus, Greece between 3 and 7 June 2013. The seminar was kindly supported by the Hellenic Navy Lighthouse Service and the Aikaterini Laskaridis Foundation.

The seminar was attended by 50 delegates representing 14 countries (see 0).

A series of 36 presentations were given under the following headings:

- Case Studies;
- Building restoration;
- Traditional lenses;
- Traditional lenses and historic lighthouses;
- Selection criteria for preservation / conservation;
- Harmonisation with modern society;
- Case studies in Greece.

A presentation was made by students from the national technical University of Athens (NTUA).

There was a technical visit to the Dana Lighthouse, on Poros Island.

An evening programme of lighthouse associated presentations and performances were hosted by the Aikaterini Laskaridis Foundation on Tuesday 4 and Wednesday 5 June 2013.

The social programme consisted of Welcome reception and a seminar dinner at the Hotel Grande Bretagne, both events were hosted by the Aikaterini Laskaridis Foundation.

The seminar produced 15 conclusions (see ANNEX C).



Table of Contents

Executive Summary	1
Table of Contents	2
1 Introduction	5
2 Welcome reception	6
3 Session 1 – Opening & Case Studies	6
3.1 Introduction from the Director of the Hellenic Navy Lighthouse Service	6
3.2 Introduction from the President of the Hellenic Maritime Museum	6
3.3 Welcome from IALA	6
3.4 Setting the scene	7
3.5 The lighthouses as a tool for diversification of coastal tourism in Greece	9
3.6 EC Pharos project – Greece	9
3.7 Hellenic Navy Lighthouse Service – Efforts on Application of identified solutions on Lighthouses	10
4 Session 2 – Case Studies (continued)	10
4.1 Sumburgh Head Lighthouse, Scotland	10
4.2 Didimar Lighthouse, Oman	11
4.3 Paternoster Project, Sweden – since the Gothenburg Seminar, 2005	12
4.4 Tenaro, Maleas and Dana Poros restorations	12
4.5 Overview of session and Q and A	13
5 Session 3 – Building restoration	13
5.1 Historic Lighthouses in Greece: Materials, Damages and Repair	13
5.2 Optimising the internal environment for the long-term conservation of North Foreland Lighthouse, England	14
5.3 Repair to Reproduce the Centennial Lighthouse, China	15
5.4 Structural and Earthquake Resistance Design of Masonry Lighthouses	15
5.5 Overview of session and Q and A	15
6 Session 4 – Building restoration (continued)	15
6.1 Keeping the rain out and the lights on	15
6.2 The lighthouse on St. Nicholas tower of the town of Rhodes - Restoration project	16
6.3 Upgrade Works at North Reef lighthouse 2013	16
6.4 Practical methodology of twin lighthouses restoration	17
6.5 Overview of session and Q and A	18
7 Session 5 – Traditional lenses	18
7.1 Cost effective solution to keep historical lenses without mercury bath.	18
7.2 LED Light Sources in Traditional Optics	19
7.3 Traditional Revolving Optic re-engineered for continued operation without mercury	19
7.4 Breathing new life into Prismatic Optics?	20
7.5 Overview of session and Q and A	20

8	Session 6 – Traditional lenses and historic lighthouses	21
8.1	Working to keep historic lenses in towers	21
8.2	Conservation & restoration of lenses for display	21
8.3	Project Case Study – Norway	22
8.4	Surveying the Greek lighthouse network and its history	23
8.5	Overview of session and Q and A	23
9	Session 7 – Selection criteria for preservation / conservation	24
9.1	An overview of historic lighthouse protection in China	24
9.2	Criteria for conservation and new uses of historical lighthouses in Greece	24
9.3	Historic lighthouses – Selection criteria in Norway	25
9.4	The intangible values of built heritage. Could lighthouses acquire a new meaning?	26
9.5	Overview of session and Q and A	27
10	Session 8 – Harmonisation with modern society	27
10.1	AtoN from a cultural perspective - Papua New Guinea	27
10.2	Integration of historic lighthouses in the life of modern society	28
10.3	Maritime cultural landscape	28
10.4	France and lighthouse history: a global heritage?	29
10.5	Overview of session and Q and A	30
11	Technical Visit	30
12	Session 9 – Case studies in Greece	31
12.1	When the myth enhances the memory	31
12.2	A first report on the Ionian lighthouses: Lakka, Panagia, Antipaxi and Othonoi	31
12.3	Restoration and strengthening of traditional buildings and lighthouses, methods of structural Analysis, experiences and open issues, presentation of characteristic projects	32
12.4	Lighthouse promotion and restoration as a historical, architectural and single-operating volume – An example using Killinis Lighthouse	32
12.5	Overview of session and Q and A	33
13	Conclusions and Closing	33
13.1	Restoring Gavrio Lighthouse.	33
13.2	Seminar conclusions	34
13.3	Closing of the workshop	34
14	Social programme	34
15	Partner programme	34
ANNEX A	List of Delegates	35
ANNEX B	SEMINAR Programme	46
ANNEX C	Workshop Conclusions & Recommendations	56
ANNEX D	Welcome remarks from Mrs Marilena Laskaridis, Vice President, Aikaterini Laskaridis Foundation	57

ANNEX E	Welcome from Vice Admiral Evaggelos Apostolakis HN, Hellenic Navy, Chief of the General Staff	58
ANNEX F	Welcome from Mr. Vasilis Michaloliakos Mayor of Piraeus	60
ANNEX G	Welcome from Professor Ioanna Papayianni, Aristotle University of Thessaloniki (AUTH)	61
ANNEX H	Progress summary, Bob McIntosh, Northern Lighthouse Board and Chair of IALA Heritage Working Group	62
ANNEX I	Introduction from the Director of the Hellenic Navy Lighthouse Service, Commodore Konstantinos Manolioudakis HN	64
ANNEX J	Introduction from the President of the Hellenic Maritime Museum, Mrs Anastasia Anagnostopoulou-Paloumbi	66
ANNEX K	Script of presentation by Students from the National Technical University of Athens	67
ANNEX L	Farewell Speech of the director of the Hellenic Navy Lighthouse Service, Commodore Konstantinos Manioloudakis HN	69

SEMINAR ON THE PRESERVATION OF LIGHTHOUSE HERITAGE

1 INTRODUCTION

A seminar on the subject of the Preservation of Lighthouse Heritage was held at the Aikaterini Laskaridis Foundation and the Hellenic Maritime Museum between 3 and 7 June 2013. The seminar was attended by 50 delegates representing 14 countries.



Group photograph taken during the technical visit to Dana lighthouse

A list of participants is at 0.

All the technical presentations form part of the output of the workshop, and will be posted on the IALA Website, Heritage Page <http://www.iala-aism.org/about/heritage/index.html>. For further information contact Bob McIntosh on bobm@nlb.org.uk.

2 WELCOME RECEPTION

The Aikaterini Laskaridis Foundation hosted a welcome reception at which representatives of the various organisations involved in the seminar made speeches of welcome. These included representatives of the:

- Aikaterini Laskaridis Foundation, Mrs Marilena Laskaridis, Vice President (ANNEX D);
- Hellenic Navy's Chief of the General Staff, Vice Admiral Evaggelos Apostolakis HN (ANNEX E);
- The Mayor of Piraeus, Mr. Vasilis Michaloliakos (ANNEX F);
- Greek Ministry of Culture; Mrs Evgenia Gatopoulou, Director General for Monuments Restoration, Museums and Technical Projects ;
- Aristotle University of Thessaloniki, Professor Ioanna Papayianni (ANNEX G);
- IALA, Mr Gary Prosser, Secretary-General, IALA.

Bob McIntosh, Northern Lighthouse Board gave a report of the progress being made by the IALA Heritage, Conservation and Civil Engineering Working Group, of which he is Chairman (ANNEX H).

End of Day 1

3 SESSION 1 – OPENING & CASE STUDIES

This session was chaired by Bob McIntosh, Seminar Chairman and Chairman of the IALA Heritage, Conservation and Civil Engineering Working Group.

3.1 Introduction from the Director of the Hellenic Navy Lighthouse Service

The remarks of Commodore Konstantinos Manolioudakis HN are at ANNEX I.

3.2 Introduction from the President of the Hellenic Maritime Museum

The remarks of Mrs Anastasia Anagnostopoulou-Paloumbi are at ANNEX J.

3.3 Welcome from IALA

Echoing his comments from the previous evening, Gary Prosser, Secretary-General of IALA, thanked all those who had contributed to the creation of the seminar. He said that Piraeus was the best place for such an event, given the interest in Greece for heritage issues involving lighthouses and the practical steps being taken to restore many of the lighthouses. Gary Prosser said that IALA take heritage matters involving Aids to Navigation (AtoN) seriously, acknowledging that lighthouses seem to have found their way into the public's psyche. He also acknowledged that many AtoN Authorities struggle with heritage issues, not least because of funding requirement in a challenging financial climate; the results of cost / benefit analysis can sometimes be hard to convince hard pressed managers. Perhaps those present could help spread the word and show that alternative use for lighthouses can lead to an economic advantage. It was confirmed that, as at the last IALA Conference on 2010, there will be a heritage session during the 2014 Conference, in A Coruña, in May.

Following presentations to Mr Panos Laskaridis, President of the Aikaterini Laskaridis Foundation and to VAdm Evaggelos Apostolakis HN, Chief of the General Staff the previous evening, a presentation was made to Cdre Konstantinos Manolioudakis HN, Director of the Hellenic Navy Lighthouse Service.

Gary Prosser ended by extending special thanks to Bob McIntosh and Panos Chiotis for their part in developing and then running the seminar.

3.4 Setting the scene

The presentation was made by Bob McIntosh, Northern Lighthouse Board.

Presentation abstract

Good morning Ladies and Gentlemen,

I would like to add my welcome and hope that you enjoy participating in the seminar over the next four days. I am particularly appreciative of our hosts' efforts in organising this event but also your efforts to attend despite the difficult financial climate that has affected everyone in some way and I hope that by the end of the week you will feel that it has been worthwhile.

I am here today in my role as Chair of IALA's working group on Heritage and Conservation matters relating to Historic Lighthouses and other Aids to Navigation and Equipment. I have been involved in the work of this group now for about 13 years but also feel that my experience gained with the Northern Lighthouse Board, where for over twenty five years I have been responsible for maintenance and project work at many of our 100 Historic Lighthouse dating from the 18th and 19th centuries, has led to my interest and passion for these excellently engineered buildings.

For as long as people have been navigating around the coast of their country they have used landmarks to identify where they were and to help them avoid dangerous hazards. As the vessels developed they travelled further and faster and therefore the risks to their safety increased until it became apparent that more was needed than using existing landmarks and thus Aids to Navigation started to appear around the worlds coastline. In Scotland for example the earliest Aid to Navigation consisting of a beacon was reported one thousand years ago but it wasn't until 1786 that the Northern Lighthouse Board was provided for by an Act of Parliament to co-ordinate the response to demands for Aids to Navigation from the vessel owners and the merchants whose trade was seriously affected by the losses, particularly during major storm events.

In Scotland's case, for in excess of 150 years, technological advances provided new Aids to Navigation that often required larger lighthouses, more buildings and more staff to operate and maintain the buildings and equipment. However by the 1950s the ever-improving technology then allowed an increase in the provision of automatic AtoN and over the second half of the 20th century "progress" brought the loss of many of the traditional aspects of Lighthouses including lightkeepers, fog signals and in many cases the traditional lenses.

In Scotland, unfortunately, many of the changes in technology and the impacts on the lighthouses were not well documented and in many cases the old equipment, fixtures and fittings have been lost. Thankfully some equipment has been saved and is now displayed at Scotland's Lighthouse Museum in Fraserburgh or other locations such as at Mull of Galloway Lighthouse.

Why are IALA holding this seminar with the title 'Preservation of Lighthouse Heritage'?

In 1996 IALA established an Advisory Panel for the Preservation of Historic Lighthouses, Aids to Navigation and Related Equipment of Historical Interest and now as a working group within the IALA Committee structure although the aim remains the same: to assist IALA members with guidance and information on looking after their Historic Lighthouses as well as to encourage greater commitment by IALA members to allow the preservation of lighthouse heritage and to improve access for the public.

What has IALA done to protect Historic Lighthouses?

IALA has produced guidance through the work of this group which resulted in the publication of the IALA Lighthouse Conservation Manual in 2006 covering topics such as National Conservation Plan, Alternative Use, Public Access, Funding Options, Managing the Consequences of Technical Change and Recording and Documenting Changes. Since then further guidelines have been published covering Agreements for Complementary use of Lighthouses, Branding and Marketing of Historic Lighthouses, a Business Plan for the complementary use of a Historic Lighthouse, the Selection and Display of Heritage Artefacts and the Management of Surplus Lighthouse Property. These are all available on the IALA website.

What is IALA doing to promote Lighthouse Heritage?

One of the ways that IALA has tried to help its members is by organising events like this where members are invited to send representatives to share the work they have done and to learn from what other members have achieved. However in addition to Lighthouse authorities many other groups outwith IALA are working with Historic Buildings as well as lighthouses around the world and we have tried to encourage academics, cultural authorities, conservation organisations and anyone interested in historic lighthouses to attend these events and share their knowledge and experiences.

The earlier events started with a Workshop on The Alternative Use of Historic Lighthouses, held in Kristiansand in May 2000.

In August 2005 a seminar was held in Gothenburg, Sweden on the Practical Aspects of Lighthouse Preservation. The Seminar provided an opportunity for discussion on issues surrounding all aspects of the preservation of lighthouses, including historic lighthouses. The Seminar provided examples of practical solutions to the diverse problems facing aids to navigation authorities when dealing with building maintenance in remote and harsh environments.

In June 2009 a seminar took place in Santander, Spain with the title of 'The IALA Seminar on the Heritage Issues of Introducing New Technologies in Aids to Navigation'. Sixty delegates attended it, from twenty countries and it provided an excellent opportunity for delegates to share expertise and exchange information. There were two days of presentations on many different topics from local projects to projects around the world and a technical tour was included to several local lighthouses altered to allow alternative use.

In June 2013 we have arrived in Piraeus, Greece for our third seminar, The Preservation of Lighthouse Heritage, where we hope to update our knowledge on many of these topics and to determine the way ahead.

What will IALA do in the future to assist in the Preservation of Lighthouse Heritage?

It is anticipated that the access to the information produced by the group will be more widely available and easily accessible to members and non-members through a Heritage page of the IALA website and that the Working Group will continue to provide a platform for discussions between members and Heritage bodies e.g. lighthouse museums, national and international cultural authorities.

It is hoped that the success of this and earlier seminars will allow further events to be organised in the future to allow an increase in the opportunities for exchange of information and experiences between all the groups. After the seminars it is proposed to extend discussion of the presentations to within the working group meetings and to produce more detailed conclusions and to publish the material to a wider audience.

Where does the future of our Historic Lighthouses lie and what is the best way to ensure their long-term survival?

In the years that I have been involved in work with historic lighthouses, the rapid changes in technology have diminished, but not removed the need for traditional Aids to Navigation but it has also significantly impacted on the need for many of the associated buildings and in some cases even the need for the lighthouse themselves, but we as a group would like to prevent this from being the end result.

I hope that you all enjoy this seminar and I would like to take this early opportunity to thank all those from our hosts Hellenic Navy Lighthouse Service, the Steering Committee, the Hellenic Maritime Museum, the Aikaterini Laskaridis Foundation and IALA staff who have brought this seminar from concept to fruition. It is now up to us the attendees to make this seminar the success it should be after all the hard work to date

The seminar will be drawn to a close on the final day with discussion on what has been presented, possibly what needs further research and the presenting of the conclusions and recommendations of the event which will bring together the thoughts of representatives from the fourteen countries represented here this week.

Are Lighthouse Authorities and therefore IALA best placed to lead on the Preservation of Historic Lighthouses?

3.5 The lighthouses as a tool for diversification of coastal tourism in Greece

The presentation was made by Ioannis Spilanis, Assistant Professor, University of the Aegean, Greece. There is no accompanying PowerPoint presentation.

Presentation abstract

Lighthouses are an integral part of the long maritime tradition of the country along with other items such as artisanal and industrial shipyards, harbours, coastal castles etc. It is therefore necessary to be included in a broader program that will link them with the broader country's maritime tradition combined with other professions such as trade. The lighthouses despite the development of modern technical tools and the changing needs of navigation (and fishing activity) in terms of travel insurance they still have an operational role for the modern navigation and especially marine tourism in all its aspects. They can also contribute to the renewal and differentiation of coastal tourism in the context of the Integrated Maritime Policy.

The maintenance of the buildings cannot be an end in itself, even for those lighthouses that are architectural or technological monuments. Their conservation must be accompanied by a plan for reuse. So in addition to the creation of a network of visited lighthouses (when near roads or when connected with paths for trekking) for the above characteristics but also as points with spectacular view, we should consider using them as centres observation of coastal flora and fauna, as rooms that can be occupied by artists and writers, and for other functions that can arise in the future. Only if these lighthouses are used on a regular basis, their maintenance can be feasible in long term.

Consequently, the lighthouses can be used together with the other elements of our natural and cultural heritage with the aim of upgrading and diversifying the coastal and insular tourism product of the country that is in a long-term crisis.

The key points of the presentation were:

- 1 Cultural Tourism.
- 2 Coastal Tourism.

3.6 EC Pharos project – Greece

The presentation was prepared by Ioanna Papayianni and Vasiliki Pachta, Aristotle University of Thessaloniki, Greece. It was made by Ioanna Papayianni.

Presentation abstract

The EC-PHAROS Project (2004-2007), was approved by the European Programme Culture, responding to the need of considering lighthouses as monuments and find solutions to integrate them in the life of modern society. It was co-ordinated by the Aristotle University of Thessaloniki. Five European countries (Greece, UK, Norway, Cyprus, Italy) formed a consortium and knowledge started to be produced.

First step was the networking and creation of a website. Then select lighthouses as model case studies and start working and exchanging experiences. One basic step was the restoration of the structures properly, but in parallel a great number of dissemination activities were realized (Exhibitions - Historic Lighthouses: from the past to the future, training seminars, Conference, Workshops, presentations in National and International Conferences, mass media tributes).

During and after the project and under the close cooperation with the Hellenic Lighthouse Authority, totally twelve historic lighthouses were studied (Megalo Emvolo, Tenaro, Psathoura, Gourouni, Maleas, Trikeri, Sousaki, Tamelos, Dana, Kapsali, Posidi, St Sostis) and the technical recommendations for their repair were embodied in their restoration projects.

The key points of the presentation were:

- 1 Short presentation of EC-PHAROS Project goals and networking.

- 2 Realized activities on scientific, cultural, educational and social level.
- 3 Inspiration of the Hellenic Lighthouse Authority and further cooperation.

3.7 Hellenic Navy Lighthouse Service – Efforts on Application of identified solutions on Lighthouses

The presentation was made by Panos Chiotis, Hellenic Navy Lighthouse Service, Greece.

Presentation abstract

The automation of lighthouses and the reduction of their operating costs were considered as technological-economical achievement, while the simultaneous removal of the keepers, had a negative effect to the maintenance and preservation of lighthouse buildings.

In Greece, the abandonment of many lighthouses during the 80's and 90's, created a lot of problems on their operation and preservation state and gradually (in the beginning of the 21st century), the need for their restoration was emerged.

The Hellenic Navy Lighthouse Service, seeking solutions for the rehabilitation and maintenance of historic lighthouses, started to cooperate with a group of scientists from Greek Universities.

Today, after the European Programme 'EC-PHAROS', the Hellenic Navy Lighthouse Service is trying to transfer the scientific knowledge and experience into the lighthouse worksites. During the last five years, the Hellenic Navy Lighthouse Service has restored several Lighthouses in Greece, under the recommendations of the Aristotle University of Thessaloniki.

In this paper the efforts of the Hellenic Navy Lighthouse Service towards the restoration of Greek historic lighthouses are presented, as well as the problems confronted. Totally 16 Lighthouses have been restored or are being restored, under the supervision of the Hellenic Navy Lighthouse Service, nine of them with funding from its own resources and direct labour operations, (Korakas at Paros Island, Kapsali at Cythera Island, Gourouni at Skopelos Island, Sigri at Mytilene Island, Cassandra at Chalcidice, St Nikolaos at Kea Island, Drepano at Crete Island, Soysaki at Korinthos and Vrisaki at Lavrio), four lighthouses with public funding, through local municipalities and councils (St Sostis at Mesolongi, Emvolo at Thessaloniki, Kastro at Mytilene Island) and three with private funding through the 'Aikaterini Laskaridis' Foundation (Dana at Poros Island, Cape Matapas and Cape Maleas at Laconia of Peloponnese).

The restoration of more 46 lighthouses has been proposed in 2007 by the Hellenic Navy Lighthouse Service, to be included in EU financial programs, through the project 'Promotion of Cultural Value of the Stone Lighthouses'. After six years of constant efforts, the Kokkinopoulo Lighthouse (Psara Island) started to be financing, while four more lighthouses are waiting for the final approval (Trikeri at Volos, Konhi at Salamis Island, St. Elias at Amorgos Island and Monemvasia at Peloponnese).

The key points of the presentation were:

- 1 The Hellenic Masonry Lighthouse network.
- 2 The abandonment of some of them and their crucial problems.
- 3 The Hellenic Lighthouse restoration programme
- 4 The achievements.
- 5 The future of the Hellenic Masonry Lighthouse network.

4 SESSION 2 – CASE STUDIES (continued)

This session was chaired by Jo van der Eynden, Norwegian Lighthouse Museum.

4.1 Sumburgh Head Lighthouse, Scotland

The presentation was prepared by Nicholas Groves-Raines, Director, and Dr J Stewart Stirling, Senior Conservation Consultant, Grove Raines Architects, Scotland.

The presentation was made by Stewart Stirling.

Presentation abstract

Dating from 1820, Sumburgh Head is one of Robert Stevenson's earliest lighthouses and the first to be built on Shetland. It is widely recognised as one of Scotland's finest examples of early 19th century industrial architecture and the site in which it is located hosts an internationally important seabird breeding colony and is a designated site of special scientific interest.

Dr Stirling's presentation will aim to provide delegates with an overview of the project, which comprises conservation and repair of the buildings and their adaptation to form an exhibition centre covering both marine life and the story of the site, offices, volunteer accommodation and a high-quality holiday home for short-term visitor accommodation, as well as construction of a new-build education centre. The issues and challenges faced by the project team from inception up to the present time will be described, focussing especially on factors that have influenced the design and construction of the development. The history of the site and the various aspects of cultural significance it possesses will be summarised and explained, as will the background to some of the more important architectural, technical or conservation decisions taken during both pre- and post-contract stages of the project.

The project is currently on site and scheduled for completion next spring.

The key points of the presentation were:

- 1 Cultural significance.
- 2 Conservation and repair.
- 3 Adaptation and re-use.
- 4 Sustainability.

4.2 Didimar Lighthouse, Oman

The presentation was made by Ali Al Kalbani, AMNAS, Oman.

Presentation abstract

In the 19th Century, the development of 'Fresnel' lenses permitted the light from lamps lit by whale oil, then kerosene, to be focussed into a narrow beam. By the end of the 19th Century this advance in technology was transferred to Arabia. The first lighthouse in Oman was built on the island of Didamar in the Strait of Hormuz. This is one of the three islands lying about 10 miles off the Musandam Peninsula. European seafarers called the two wedge-shaped outer islands Great and Little Quoin after the quoin or wedge that was used to elevate ship-borne cannon.

The Committee of Enquiry on Lighting and Buoying of the Gulf, which met in 1909, recognised that a major light should be established to guide vessels through the Strait. Didamar (or Little Quoin) being tall but conveniently flat-topped, provided an ideal site for a lighthouse.

The optic, manufactured by Chance Brothers of Smethwick, UK, would be lit using kerosene lamps and rotated by a clockwork mechanism driven by lead weights running down the central pillar of the open framework cast steel tower. The whole installation was first assembled in the UK, each component being given its unique identification mark, before disassembly and shipment to Oman.

The key points of the presentation were:

- 1 Location of Didimar lighthouse.
- 2 Importance of the lighthouse.
- 3 History of the lighthouse.
- 4 Refurbishment of the lighthouse.
- 5 Old and new light system in the lighthouse.

4.3 Paternoster Project, Sweden – since the Gothenburg Seminar, 2005

The presentation was made by Anders Eydal, National Property Board, Sweden.

Presentation abstract

The thirty-two meter high iron structure, lighthouse Pater Noster, was in a great need of renovation. 2002 was the lighthouse taken ashore to be restored and put back on its Island Hamneskär in the year 2007 and has been in operation ever since.

Also the other houses on Hamneskär; dwellings, engine room, etc. has been restored and are now used as a hotel with good restaurant facilities.

The lighthouse is greatly exposed to the sea environment and the management/maintenance of both the lighthouse and dwellings has not been without problems.

The effects of moisture, salt, wind and sea waves are considerable on the lighthouse with its lantern and the problem of moisture sealing and protection repairs of the galvanized iron construction is a big challenge.

The dwellings are exposed to the same forces. Among other things the kerosene house, blew off its foundation or was moved by very high waves, during the winter of 2011/2012.

An equally great challenge for the dwellings has been to repair them so that they can generate money for the hotel. All available resources must be used. Major difficulties are to reach the Island. On the other hand it is an enticement and a part of the experience of the Island.

The key points of the presentation were:

- 1 Problems with the Lighthouse, corrosion, moisture.
- 2 How can you have a hotel on an Island.
- 3 Hardships with winds and waves.
- 4 Maintenance of the buildings and their use.
- 5 Harbour and other things for the future.

4.4 Tenaro, Maleas and Dana Poros restorations

The presentation was made by Demetris Eftaxiopoulos, Architect on behalf of Aikaterini Laskaridis Foundation, Greece.

Presentation abstract

In 2008 the Laskaridis Foundation funded the full repair of the lighthouse in Tenaro. One and a half month's of preparation was required in order to transport materials by sea, build a platform to stockpile materials on the coastal rocks, find a way to lift materials up to the lighthouse with a small railway vehicle and determine what tools and supplies would be needed. Then, it took eight and a half months of hard work, beset with difficulties, setbacks and mishaps until the buildings could be fully restored and handed back to the Lighthouse Department.

- In 2009 it was Maleas' turn. This lighthouse was, in fact, smaller but had suffered more damage and access to it was even harder. Its restoration, again not free of troubles or hindrances, was completed in five and a half months, this time with substantial help from the local community.
- In 2011 the project took over the stone lighthouse in Poros, which was almost in ruins and several structural interventions were needed. The experience gained and nearly ideal conditions helped in enabling the reconstruction of the building, almost from scratch, in just three and a half months.
- Despite harsh conditions, lack of infrastructure, long distances and fatigue, those of us who worked on these sites were compensated by being in contact with wonderful wild nature and, most importantly, the satisfaction that we had managed to bring back to life three remarkable Architectural Monuments.

The key points of the presentation were:

- 1 Technical description.
- 2 Access difficulties.
- 3 Difficulties of survival.
- 4 The greatness of Nature.

4.5 Overview of session and Q and A

In response to the question ‘Now that lighthouses at Tenaro, Maleas & Dana have been repaired, how can we ensure that they are maintained?’ it was replied that the maintenance will be carried out by lighthouse keepers staying on site and they will monitor building condition to ensure that more major maintenance can be carried out before serious damage. It was also confirmed that the lighthouses continue to be operational Aids to Navigation.

At this point it was commented that materials used must be specific to the location and the use of trained and certificated staff is very important.

It was then asked if the use of new materials at Tenaro, Maleas & Dana lighthouses had been successful? It was replied that they were the best available at the time of the project, taking account of the economic cost of the materials and the time taken which would have been more expensive and taken longer with traditional materials.

Focussing again on the use of new materials, it was asked if they had been used at Pater Noster lighthouse successfully? In this case the sponsor had covered the cost of the modern paint; it is still difficult to confirm effectiveness but it was considered the best way to proceed.

It was then commented that Pater Noster lighthouse is important and thus important to repair and protect for the future.

Further comment was made that concrete specific admixtures need to be used in new concrete to prevent salt penetration and avoid damage and cause corrosion in the reinforcement.

In response to the question ‘what was the main problem at Didimar Lighthouse in relation to the high temperatures experienced in Oman?’ it was replied that the threat of corrosion to the steelwork due to high humidity. Therefore the use of regular painting has been instigated, approximately every three years to reduce corrosion.

Ali Al Kalbani then requested any information or specifications for the painting of steelwork lighthouses (ali.alkabani@amnas-oman.com).

Stewart Stirling was asked for his definition of what was required in a Conservation Management Plan? He said that the purpose is to:

- allow the team to understand all aspects of the important conservation aspects of the project;
- find information by consulting other documentation such as IALA Conservation manual;
- determine how the building works;
- choose appropriate repair materials to complement existing;
- take account of the design considerations.

5 SESSION 3 – BUILDING RESTORATION

This session was chaired by Ron Blakely, Trinity House, England & Wales.

5.1 Historic Lighthouses in Greece: Materials, Damages and Repair

The presentation was prepared by Ioanna Papayianni and Vasiliki Pachtla, Aristotle University of Thessaloniki, Greece. It was made by Ioanna Papayianni.

Presentation abstract

Greece with the long coastline has a great number of historic Lighthouses (141), which is continuously increasing. Most of them date from the 19th century and have been repaired after the 2nd WW.

The authentic building materials are mainly stone or bricks built with lime mortars and covered with renderings and plasters. Metallic beams and other connections have been also used for the construction of simple architecture towers and lighthouses.

Since lighthouses are continuously exposed to the harsh marine environment, they present serious damages. Their pathology is aggravated, since they are not manned as in the past and the cost of repair became overwhelming under the current economic recession.

A survey of a number of lighthouses, showed that many pathology symptoms were caused by inappropriate repair interventions, in particular by using cement based mortars and non resistant to chlorides materials.

The presentation aimed at presenting the materials and characteristics of the historic lighthouse structures and to propose compatible materials and techniques for repairing them. This could be the core for establishing a manual of practice for repair works for the maintenance and stabilization of lighthouses.

The key points of the presentation were:

- 1 Description of the main pathology symptoms (types and causes) of Lighthouses.
- 2 Analysis results and characterization of Lighthouses' main building materials (mortars, stones, bricks).
- 3 Proposals for compatible restoration materials and techniques.

5.2 Optimising the internal environment for the long-term conservation of North Foreland Lighthouse, England

The presentation was made by Belinda Colston, Lincoln University, England.

Presentation abstract

North Foreland Lighthouse is a grade II listed building located 1.2 miles north of Broadstairs in Kent and marks the southerly entrance to the River Thames. The original structure, dating back to 1691, consisted of a twelve metre high octagonal tower constructed from brick quoins and flint panels. The first application of an exterior render was in 1866, and it is believed that the lighthouse was re-rendered in the early 1980s using a cementitious material. The lighthouse had remained manned until its conversion to automatic operation in 1998.

Like many lighthouses and coastal buildings, North Foreland is exposed to the harsh conditions of a coastal environment and subject to extremes of weather. Inappropriate remedial repairs to the lighthouse during the 1980s have led to extensive vertical cracking in the cement-based exterior render, resulting in the ingress, and subsequent trapping, of moisture (and soluble salt) in the mass masonry walls. It is believed that this source of moisture has impacted on the internal environmental conditions within the tower, driving salt-induced decay of interior surfaces.

Since October 2009, a programme of research has been underway, in collaboration with Trinity House, to characterise internal environmental changes within the lighthouse. In the first instance, the aim is to determine the optimal environmental conditions needed to stabilise the observed fabric decay. Ultimately, it is hoped to use the results of the research to develop a model of the interactions between building fabric, moisture content and environmental conditions in order to predict, and hence prevent, fabric deterioration in other historic lighthouses.

The key points of the presentation were:

- 1 Internal environment.
- 2 Salt decay.

- 3 Moisture measurement.
- 4 Ventilation.

5.3 Repair to Reproduce the Centennial Lighthouse, China

The presentation was made by Jun Fu, China MSA

Presentation abstract

Lingao Lighthouse is located at the Lingao Cape of Hainan Province. Exposed to wind and storms for ages, the tower and some supporting parts suffered from corrosion and damages of various degrees, posing a potential danger to the safety of the tower structure and maintenance operation. The lantern glass was totally destroyed, with the original lantern went out and some structural components inside, like supporting saddle, damaged or lost. When a new lantern was installed on the tower, the original style was undermined. Moreover, the ancillary buildings built afterwards also conflict with the architectural style of the Lighthouse, which not only affected the value of the Lighthouse as a historical relic, but clashed with the landscape of Liberation Park at the Lingao Cape. Therefore, protective repairs of the Lighthouse became necessary. Based on the practice and experience in restoration of Lingao Lighthouse, this paper explores the ideas and methods in repair and preservation of historical lighthouse in China. That is, in brief, to repair the old as the original to reproduce the historical sense of the centennial lighthouse with the purpose of carrying forward the long-established lighthouse culture in China.

The key points of the presentation were:

- 1 Corrosion due to exposure to wind and storms.
- 2 Damage due to exposure to wind and storms.
- 3 Faithful and sympathetic restoration.

5.4 Structural and Earthquake Resistance Design of Masonry Lighthouses

Milton Demosthenous, Frederick University, Cyprus was unable to attend the seminar and no presentation was made

5.5 Overview of session and Q and A

It was asked if at North Foreland lighthouse, had any difference been noted when monitoring humidity and temperature between different facades of the lighthouse i.e. sea facing or away from the sea? It was replied that this had been checked but no differences were found.

It was commented that in Greece the sea facing side of the towers need special attention due to worse conditions. It was also said that the information presented on over ventilation was very interesting.

It was then asked if it is true that thick layers of coating on North Foreland lighthouse prevents the structure from breathing. In response it was said that the building is already impervious due to cement renders and flint construction but that rendering has cracked due to thermal movement and so elastomeric coating has been used on the outside. One future option is to remove existing render inside and apply a lime render.

6 SESSION 4 – BUILDING RESTORATION (continued)

This session was chaired by Ioanna Papayianni, Aristotle University of Thessaloniki, Greece.

6.1 Keeping the rain out and the lights on

The presentation was made by Ron Blakely, Trinity House, England and Wales.

Presentation abstract

During the 19th / 20th Centuries there was a vast expansion of the building and refurbishment of lighthouses, which incorporated substantial lantern structures which are still performing as

intended to this day other than the fact that the roof intersection with the ventilator in some cases has succumbed to corrosion.

The presentation will discuss the initial investigation, corrosion mechanisms and subsequent repair so as to allow the lantern to perform into the future by protecting the current Aids to Navigation.

The key points of the presentation were:

- 1 19th Century Lanterns.
- 2 Corrosion.
- 3 Refurbishment.
- 4 Repair.
- 5 Health & Safety.

6.2 The lighthouse on St. Nicholas tower of the town of Rhodes - Restoration project

The presentation was made by Mrs Katerina Manoussou-Ntella, Hellenic Ministry of Education and Religious Affairs, Culture and Sport, Greece.

Presentation abstract

The historic light standing on the platform of the central tower of Hospitaller Fort St. Nicholas is a landmark of the town of Rhodes and part of the fort's evolution, as it is already present in a 1675 drawing of Cornelius de Bruyn. Originally, it must have been an 'open flame' light which, in 1863, was replaced by the present installation, constructed by the 'French Company of Ottoman Lighthouses'. The off-centre location of its heavy stone turret, seven metres high, over the spiral staircase of grand master Zacosta (dated 1464), contributed to the gradual dislocation of the stairwell caused by earthquakes, patchy repair and weathering, which often resulted in the almost complete disintegration of the masonry. The resulting danger of collapse threatened the heraldic display and relief figure of St. Nicholas on the tower's face since the 1960s.

Restoration, undertaken by the Ministry of Culture in early 1998, began with the dismantling of the steel lantern and cracked masonry turret. In collaboration with the Navy Lighthouse Service a temporary metal light was placed on the tower and remained in operation until the end of the work. In late 1998 the restoration of the medieval stairwell and staircase were complete, worn stone blocks and treads having been replaced with new ones of the same material. In the required specialist studies the preservation of the lighthouse as an important element of specialized technology was considered obligatory. The turret was rebuilt in its 1863 form, but its foundation was shifted to the top of the solid part of the circular masonry of the tower, which was about 5 metres thick, to the SW of its original position. In late 2006 the restored light was ready for operation in its new location, which poses no threat to the integrity of the medieval monument underneath.

The key points of the presentation were:

- 1 General principles of restoration of Historic Monuments.
- 2 Techniques of conservation of traditional structures.
- 3 Lighthouse history.

6.3 Upgrade Works at North Reef lighthouse 2013

The presentation was made by Lyndon O'Grady, Australian Maritime Safety Administration.

Presentation abstract

North Reef lighthouse was built in 1878 and is situated on a coral atoll approximately 100km offshore in the Great Barrier Reef in Queensland. Extensive reconstruction and upgrade works were recently undertaken to this historic lighthouse.

The lighthouse is of an early Australian design and is constructed utilising a timber frame, which is clad externally with iron plating. It is unique in Australia as being built utilising a caisson sunk into

the reef. It is also a rare example of a lighthouse having the former keeper's quarters attached to the perimeter of the base of the tower.

The presentation outlined the work undertaken to fully refurbish this remote lighthouse. There were descriptions of the works that included refurbishment of internal and external surfaces of the tower, lantern room and former keepers' quarters.

The presentation also outlined the many difficulties encountered including weather, access and fauna/flora considerations.

There was discussion of the many benefits of modernisation at the site including: enhanced relevance through installation of AIS station, ongoing maintenance cost reductions and reduced on-site hazards to personnel.

Photographs and relevant drawings further explaining the upgrade process were included.

The key points of the presentation were:

- 1 Reconstruction works on heritage buildings.
- 2 Working in remote localities.
- 3 Modern AtoN technologies in a heritage building.

6.4 Practical methodology of twin lighthouses restoration

The presentation was prepared by Andriani G. Diagouma, Hellenic Ministry of Education and Religious Affairs, Culture and Sport and Panos Chiotis, Hellenic Navy Lighthouse Service, Greece. The presentation was made by Andriani G. Diagouma.

Presentation abstract

This presentation showed the possibility of defining a practical methodology correlation regarding the rehabilitation of twin lighthouses.

This is the example of Kokkinopoulo lighthouse on Psara Island and its twin Kobe lighthouse on Lemnos Island. Both of them are two of the most important standing monuments of the North Aegean lighthouse network. These twin lighthouses have been built under a parent construction project by the French Company «Administration Générale des Phares de l' Empire Ottoman», during a period when these Islands were under Ottoman rule. For this reason, even they are far from each other, they have similar morphological and typological architectural elements.

The restoration of the Kokkinopoulo lighthouse started as a case study. Along the way through *in situ* approach the following criteria concerning the necessity of the project were taken into account: large degree of damages, accelerated corruptions, significant morphological alteration due to previous failure and irreversible repairs, a request for its restoration by the local Psara Island community, the significance of the lighthouse location as a landmark, the symbolism of the project implementation in the historical Psara Island as well as the possibility of EU funding by the National Strategic Reference Framework (NSRF) program.

The basic principles of approach and documentation, regular contacts with review committees and funding organizations as well as the positive conclusions derived from the successful completion of the NSRF financing procedure are essential elements, which are evaluated and used as a practical guide for the restoration project of the twin Kobe lighthouse of Lemnos Island providing valuable policy knowledge for accelerating the strategies and the effectiveness of such efforts.

The key points of the presentation were:

- 1 Kokkinopoulo and Kombi lighthouse art and science description and history.
- 2 The basic principles of approach and documentation of twin lighthouses.
- 3 General principles of a practical guide for the restoration project of the twin Kokkinopoulo and Kombi lighthouse.

6.5 Overview of session and Q and A

The first question was what were the problems of Corrosion in relation to the Trinity House presentation on domes leaking and their repair?

The reply was that 'one needs to appreciate the complexity of the structure and be prepared in terms of the extent of repairs and the associated costs'. From external evidence, one should anticipate that both will be greater than expected. In many cases, when working on domes, the greatest cost is in providing proper and safe access to the affected areas.

A general question asked was whether any authorities have proposals in place to collect water and treat it for use by visiting staff? AMSA advised that they collected water on sites where they already exist but they have no recycling facilities at any sites. Trinity House advised that they have trialled the use of reverse osmosis techniques and filtration systems and they have proved successful. They have also placed silver ceramic balls in the station water tanks to remove any bacteria during long-term storage the water then passes through a UV filter prior to point of use, which will allow the water to last for 10 years.

A three stage freeing of rain water in ground tanks prior to storage where there is no salt content has been experimented with; if salt is present RO is used prior to storage.

It was then asked how the Tower of St Nicholas Lighthouse was supported on the old structure?

The reply was that the tower was reconstructed on another area of the old structure where the roof was stone 5 m thick.

The evening programme was entitled 'Lighthouses in Literature'.

End of Day 2

7 SESSION 5 – TRADITIONAL LENSES

This session was chaired by Christian Lagerwall, SMA, Sweden.

7.1 Cost effective solution to keep historical lenses without mercury bath.

The presentation was made by Vincent Roget, Gisman Co. France.

Presentation abstract

Specializing in Marine Aids to Navigation, GISMAN issues from the French company BBT created in 1860. The presentation was made in four parts:

The first part introduced Fresnel Lenses, the mercury baths and some BBT experiences.

The second introduced the GISMAN worldwide experience in refurbishing lighthouses:

- Design and installation of lantern houses;
- Refurbishment of the optic parts with rotating beacon or long range LED beacon;
- Installation of solar generator;
- Installation of lightning equipment in conformance with IALA recommendations.

The third part introduced the cost effective solution to keep historical lenses without mercury bath: the revolving pedestal with a slewing ring designed by GISMAN and CETMEF (French Lighthouse Authorities).

The final part presented, in detail, the refurbishment of the Gosier Lighthouse with a revolving pedestal without mercury, achieved by the CETMEF in October 2009.

The key points of the presentation were:

- 1 Experience in lighthouse refurbishment.
- 2 Revolving pedestal without mercury for historical lenses.

7.2 LED Light Sources in Traditional Optics

The presentation was made by Link Powell, GLA R&RNav.

Presentation abstract

Many lighthouse services today are removing or decommissioning traditional optics and installing new, smaller, self-contained devices. There are often good economic reasons for doing this but sometimes there is a need to retain traditional optics. Some reasons for retaining the optics are:

- High luminous range requirement;
- Optics with complex characters or sectors;
- Managing future strategy; and
- Heritage.

If a traditional optic is retained, the choice of light source to use with it is important. Fitting a modern 'off the shelf' lamp in a large optic can produce poor results, so care must be taken in choosing a suitable lamp.

Over the last few years, in a drive to reduce energy requirements, LED lamps have been temporarily installed in a variety of large optics to see how the combination performed. R&RNav have developed a LED light source that has performed well in traditional optics. The results of various light measurements with LED light sources are shown in this paper, together with details of problems encountered during the experiments.

The key points of the presentation were:

- 1 LED Light Sources.
- 2 Traditional Optics.
- 3 Energy Saving.
- 4 Sector Lights.

7.3 Traditional Revolving Optic re-engineered for continued operation without mercury

The presentation was made by Jørgen Royal Petersen, DMA, Denmark

Presentation abstract

In 2008 The Danish Maritime Safety Administration (DaMSA), now Danish Maritime Authority (DMA) had thirteen (13) operational lighthouses with mercury bath system.

Spillages of mercury at Nakkehoved lighthouse caused by an earthquake in Sweden in December 2008 tighten up the focus on use of mercury at Danish Lighthouses. Due to the environmental aspect it was decided to close down all mercury bath systems before 2015.

In general high intensity LED flashing lanterns with a range of approx. 18 NM range was chosen to maintain the light but at listed and historic lighthouses considerations should be taken for preserve the revolving optic.

In co-operation with The Technical University of Denmark (DTU) design and re-engineering efforts was taken to re-engineer the revolving system at Nakkehoved Lighthouse (lighthouse museum and listed lighthouse). The major aim was to avoid significant changes of the original construction and preserve the authentically expression of the unique installation at an operational lighthouse.

At the end of 2012 a draft project was presented by DMA and this was approved by the Danish Agency for Culture. In January 2013 the detailed design project was initiated and in the end of April 2013 the re-engineered system was put into operation.

The key points of the presentation were:

- 1 Historical background and environmental aspect of Mercury Bath System.
- 2 Consideration and solutions for maintaining the light.
- 3 Re-engineering of the Mercury Bath System at Nakkehoved Lighthouse.
- 4 Lesson learned and recommendations.

7.4 Breathing new life into Prismatic Optics?

The presentation was made by Bert Frame, Sealite, UK

Presentation abstract

The presentation charted the evolution of light sources in Lighthouse lenses and described how Prismatic lenses have followed these developments to get the best possible optical efficiency out of the combinations and clarify why subsequent modernisations have been difficult to date.

Following on from this summary it described how advances in LED technology make it possible once again to restore these icons of heritage to 'best in class' offering the most optical efficient method of lighting our seaways.

The presentation was designed to be 'picture heavy' to assist non English speaking delegates to realise the potential that now exists by describing combinations that have been modernised and verified in the field.

It was concluded that authorities need no longer wrestle with the dilemma of retaining old lenses which are past their best in terms of performance and up keep cost. They can once again be the most optically efficient method of providing a large range light.

The key points of the presentation were:

- 1 Awaken participants to the potential of retaining prismatic optics as a viable option.
- 2 Brief summary of how light sources and lenses have evolved.
- 3 Suitability of LEDs as the next revolution.
- 4 Summary of differing options to suit the varying types and vintages of lenses.

7.5 Overview of session and Q and A

Asked whether the stated reduction in power consumption of LED to between 1/6th and 1/10th can enable the use of battery backup, it was said that the combination of varying the intensity of the LED and the duration of flash gives the user an infinite range of power requirements. Asked if it was the case that more LEDs lead to a better distribution of light then is there a drive towards the use of smaller LEDs? It emerged that the key factor is to match the size of the LED to the optics. It will also lead to a greater overlap of the visibility of the LED's.

In answer as to whether optics are included in the aspects of a listed lighthouse, it emerged that national regulations can vary and that the response to restoration projects can be affected by the approach of the 'customer'. Experience has shown that public action can be effective and it was urged that those supporting sympathetic restoration of all aspects of a lighthouse need to engage with the relevant AtoN Authority.

Interest was shown in obtaining the results of the work of the Danish Maritime Authority on re-engineering traditional revolving optics for continued operation without mercury. Whilst co-operation with other technical universities would be welcome it was pointed out that the project has only been operating for six weeks and that, in due course, the outcome of the project would be shared with the IALA EEP Committee.

Given the presentation on retaining original optics in lighthouses it was asked if efforts were ever made to recover them from museums / exhibitions. The response was that yes such approaches have been made but there is a cost involved and sometimes a pragmatic decision needs to be made. It was also pointed out that lighthouse authorities often do not know where the original optics were sent to and that it would be helpful if there were a database of the resting places of original optics.

With regard to utilising original optics with LED lights it was said that as apparently similar optics can behave very differently, the current practice is to use the existing three LEDs, shown in the presentation, and to analyse the results of using each and then making a decision.

8 SESSION 6 – TRADITIONAL LENSES AND HISTORIC LIGHTHOUSES

This session was chaired by Bob McIntosh

8.1 Working to keep historic lenses in towers

The presentation was made by Chad Kaiser, Lens Expert, USA.

Presentation abstract

Classic Fresnel lenses are a significant and historic part of many lighthouses. Cleaning and basic maintenance is important to help lenses serve as active AtoN for years to come. Identifying Problems and knowing how to deal with them will prevent damage to the lens and reduce Maintenance and Conservation Costs.

- Inspection:
 - identifying loose, chipped or broken lens segments.
- cleaning the glass and bronze:
 - using the Correct Products and Procedures.
- litharge & wood shims:
 - when to repair or replace the lead caulking.
- emergency stabilization:
 - how to prevent a bad situation from getting worse.
- crating & storage:
 - if a lens is to be removed, how to do it safely.
- environmental dangers:
 - temperature, humidity, UV light & people.
- benefits of having a lens in the tower
 - spending time and money on maintaining and restoring lenses will add to the visitor experience and encourage them to return in the future.

The key points of the presentation were:

- 1 Appropriate care and basic maintenance of Fresnel lenses.
- 2 Common problems with lenses and how best to deal with them.
- 3 Why a classic Fresnel lens is important to a lighthouse.

8.2 Conservation & restoration of lenses for display

The presentation was made by Stuart McDonald, National Museum of Scotland.

Presentation abstract

In collaboration with the Northern Lighthouse Board, (NLB) NMS has been collecting Scottish lighthouse mechanism and lenses as the Board moved to fully automate their lights.

The main lenses NMS currently has in the collection are from Sule Skerry, Inchkeith (the 1835 lens), and the later lens and mechanism that replaced it, the Eilan Glas lens, and mechanism (on loan to the Science Museum London) and most recently delivered the Tod Head lens and mechanism.

The engineering conservation section has been responsible for the work on this variety of lenses and the work spans back over many years.

The presentation discussed some of the conservation/restoration of the lenses and mechanism to enable them to be displayed in a museum environment and some of the plans to have them rotating. It also covered some of the challenges of the installation of lenses into exhibition spaces within a museum.

Finally the presentation went into detail about the conservation techniques employed on the earlier Inchkeith lens. This lens made up part of the NMS new temporary exhibition Shining Lights which ran from Friday 15 October 2010 – Sunday 3 April 2011, celebrating the bi-centenary of the Bell Rock lighthouse.

The key points of the presentation were:

- 1 Conservation.
- 2 Restoration.
- 3 Museum Gallery Exhibition.
- 4 Light house lens and mechanisms.

8.3 Project Case Study – Norway

The presentation was prepared by Hilde Andresen & Arild Fredriksen, Norwegian Coastal Administration.

The presentation was made by both Hilde Andresen & Arild Fredriksen.

Presentation abstract

There are 83 listed lighthouses around the coast of Norway.

The cost of maintaining all these listed buildings has been and still is a great challenge for the Norwegian Coastal Administration.

At the end of the demanning process the NCA wanted to ensure that the lighthouses were not left to decay as had happened on occasion earlier. Some 'Guidelines for Rent' were developed, and some examples of the alternative use of different lighthouses today were given.

During recent years, there has been an increasing emphasis on the responsibility the different authorities have for their own specific cultural heritage. As a consequence, the different authorities are now obliged to develop management plans for all their protected buildings and installations. The NCA has started developing management plans for their listed lighthouses, and a survey of the scope for this work and the way it is being carried out was shown, together with examples of important issues being treated in the management plans. A standard for putting up information signs on the lighthouses has been created and examples were given of how this plan has been carried out in the southern part of Norway.

The key points of the presentation were:

- 1 Guidelines for alternative use.
- 2 Examples of alternative use.
- 3 The process of developing management plans.

- 4 The story told by the different lighthouses.
- 5 Design for information signs on lighthouses.

8.4 Surveying the Greek lighthouse network and its history

The presentation was made by Professor Nikos Belavilas, National Technical University of Athens (NTUA), Greece.

Presentation abstract

The history of the Greek lighthouse network, the documentation and surveying of the around 120 historical buildings, started in early 1990s. Since then, a few photographic and artistic works and a single old book from 1918 - Ιστορικόν περί των φάρων των ελληνικών ακτών από της αρχαιότητος μέχρι σήμερον written by the first Director of the Lighthouse Service Captain Stylianos Lycoudis - was the only published material related to this important sector of maritime and industrial heritage.

A group of volunteers, architects, historians, mechanical engineers and a sculptor started a first project under the umbrella of the National Research Foundation and the new-born International Organisation for Industrial Archaeology and Industrial Heritage (TICCIH) in Greece. That research initiative led to a first corpus of elements, a few papers and an important public presentation in a special session and an exposition during the 10th International Congress of TICCIH on 'Maritime Technologies', at Thessaloniki 1997.

In the following period mainly the National Technical University of Athens and the Ionian University prepared several publications, graduate and post-graduate research, diploma projects etc. A European research project has led to more documentation. It was the programme 'EC-PHAROS - an Holistic strategy for the Preservation, Restoration and Integration in the life of modern societies of Old European Masonry Lighthouses' (2004 - 2007). For Greece, Aristotle University of Thessaloniki undertook the responsibility. In the meantime, the Ministry of Culture and Lighthouses' Service proceeded to create a new framework for the protection of numerous monumental buildings and, fortunately for some of them, in restoration. An important step was the relatively recent restoration programme by the Aikaterini Laskaridis Foundation for the southern Peloponnesian lighthouses.

After nearly twenty years of early or mature actions in the documentation and preservation of the historical Greek lighthouses, it seems necessary to form a nation-wide multi-scientific co-ordination and collaboration towards a safe, valid and long-term planning for the future of the whole network and its monuments, mechanisms, buildings, and landscapes. The presentation illustrated the progress of the research and actions taken with regard to the stated issues and its perspectives.

The key points of the presentation were:

- 1 Greek Lighthouses.
- 2 Greek Waters.
- 3 Maritime Network.
- 4 Aegean Sea
- 5 Ionian Sea

8.5 Overview of session and Q and A

The first question concerned the covering of optics during the day or the need to keep them rotating, to avoid a fire risk from UV light being focussed by the optic. It was recommended that the optics be covered if possible but that where the public are admitted this can cause difficulties. This question was extended to seek advice on whether a different procedure needs to be followed in unmanned lights, to which it was indicated that modern lights are not as combustible as their predecessors but that harm has been caused to both technicians and surrounding curtaining.

It was confirmed that neither silicone nor a detergent containing silicone should be used for cleaning optics as it will result in damage. Caution was recommended against the use of new cleaning fluids until they had been properly tested and the application of a mixture of alcohol and distilled water was urged as a tried and trusted cleaner.

The frequency of cleaning was said to be variable, depending on conditions at given lighthouse but a caution was given about over cleaning, with the possibility of damage arising not only from the cleaning but the proximity of people.

Turning to lighthouses being used for residential purposes in Norway, it was confirmed that residency in the approximately seventy lighthouses being used in this way that residency is not permanent. The premises are all open to the public. It was pointed out that before a lighthouse can be converted to residential use the normal national legislation, governing such matters as fire safety, had to be complied with and that this can raise individual challenges. In most cases, access to the Aid to Navigation needs to be barred due to security reasons.

Professor Belavilas said that with regard to plans for lighthouse construction, there had been a perceptible change in 1860 when engineers had begun to be put in charge.

There was no clear answer to suggestions about the desirability of EU or UNESCO regulation of lighthouse restoration. The Chairman invited the delegates to think about the suggestions over lunch.

9 SESSION 7 – SELECTION CRITERIA FOR PRESERVATION / CONSERVATION

This session was chaired by Professor Nikos Belavilas, National Technical University of Athens (NTUA), Greece.

9.1 An overview of historic lighthouse protection in China

The presentation was made by Jun Fu, China MSA.

Presentation abstract

There are more than 40 lighthouses older than 100 years in China. Most of them are still active Aids to Navigation. In the presentation the general status of Chinese historic lighthouses was briefly introduced.

China MSA has always paid great attention to the protection of historic lighthouses. The presentation illustrated the principle of 'Keep it as it was', which is adhered to by China MSA. At present, China MSA has made an overall plan for historic lighthouse protection, including the maintenance of historic lighthouses, modernization of historic lighthouses, publicising expansion of historic lighthouse culture and publication of a Chinese Historic Lighthouse Gallery.

The presentation showed what has been done in the past for historic lighthouse and some cases of historic lighthouse maintenance were also introduced, together with the specific working plan for the next few years with respect to historic lighthouses.

The key points of the presentation were:

- 1 Keep it as it was.
- 2 Lighthouse protection planning.
- 3 Regulation.
- 4 Historical Lighthouse Stamp.
- 5 Complementary uses of historic lighthouses.

9.2 Criteria for conservation and new uses of historical lighthouses in Greece

The presentation was made by Nikos Charkiolakis, Hellenic Ministry of Education and Religious Affairs, Culture and Sport, Greece.

Presentation abstract

Among the one hundred and forty-one major lighthouses of traditional architecture in Greece, forty-six are listed by the Hellenic Ministry of Culture, as historic monuments, dated after the year 1830.

During the last five years (2007-2012), sixteen of these have already been conserved, under a project of the Hellenic Navy Lighthouses Service.

Up to today, conservation studies and works can be characterised by an experimental approach, which cannot always ensure the required results. Preferably, from now on, both studies and works will be carried out using a more scientific approach. This can be ensured by following all International Principles, such as the Granada Convention, the Venice Charter and the Charter of Industrial Heritage.

As far as the criteria of new uses of historic lighthouses are concerned, such as guest houses, restaurants, museums or cultural centres, with the exception of lighthouses of strategic importance or those playing a role in national security (i.e. illegal immigration control etc.), these must be the following:

- ensuring the authenticity of their architecture and building materials;
- minimising the new structures only when absolutely necessary (i.e. installations etc.);
- protection of the surrounding and wider natural environment;
- accessibility from the sea or/and from the land;
- economic sustainability.

In any case, new uses must be adapted to the potential of each monument and not the other way round.

The key points of the presentation were:

- 1 Criteria for Conservation.
- 2 New Uses.
- 3 International Principles.

9.3 Historic lighthouses – Selection criteria in Norway

The presentation was prepared by Danckert Monrad Krohn who was unable to attend. Jo van der Eynden, Lindesnes Lighthouse Museum made the presentation on his behalf.

Presentation abstract

Primarily experience from developing and implementation of the Norwegian national plan for preservation of lighthouses in the 1990's, close cooperation with the Norwegian lighthouse administration, Trinity House Lighthouse Service and Northern Lighthouse Board in this matter. Participation in lighthouse preservation projects in Estonia and Mozambique and not least, many years of participation in the IALA PHL (Preservation of Historic Lighthouses Panel).

By rough estimates there are some 60.000 lighthouse structures worldwide and some of these are of great historic interest. Today it is a common opinion that some of these structures should be preserved. But which? How the most important and representative ones for preservation be identified? To manage this challenge it is necessary to establish clear selection criteria.

In the 1920's several countries, among them Norway, had realized that some of the lighthouses represented an important part of the nations coastal heritage and it was suggested that some of them be listed. However at that time it was only the lighthouse tower itself that caught interest - the tower as an outstanding architectural monument. Nothing of the many other structures of the light station like living quarters, landings, gardens etc. Nothing of the technical equipment like lenses, fog warning signals, radio beacons etc caught any interest. Today there is a wider scope. As stated in the conclusions from the IALA workshop in 2000 on Preservation by alternative use: "Lighthouse

stations should be kept as a single entity”. Of course this more complex scope make the task even more difficult, but also more meaningful.

When the work on the National plan for preservation of lighthouses in Norway was started, the overall ambitions were that the choice should as far as possible reflect the nation’s entire lighthouse history, from the very beginning in the mid 1600 till today.

A thorough investigation of accessible archive material was made and from this a preliminary choice of stations were made for further investigation. In 1994 a number lighthouses were visited and registered. From an assessment of this material, compared to the criteria that were settled 84 lighthouse stations were for preservation.

These criteria were:

- Age. The most classical criteria. In the national plan of course the oldest lighthouse station, Lindesnes lighthouse from 1655 were chosen, but also the last manned lighthouse that was built in 1938, Andenes Lighthouse, was on the list, as well as other light stations in between.
- Authenticity. This criteria applies where all original materials and equipment are left. It may be technical equipment like lenses, shutters, winding mechanisms, fog warning systems, radio beacons etc. But also building details and archeological remains from previous situations.
- Technical Equipment. This is a very important criterion, partly mentioned in the above criteria about authenticity. Experts from the lighthouse services are best equipped to identify equipment.
- Architecture. The shape and form of a lighthouse are partly decided by the experience of natural forces, but also by the architectural ideas of the time.
- Materials. Stone, concrete, cast iron, wood.
- Type of Lighthouse. Coastal lights, leading lights, harbour lights
- Part of Navigational Structures. Actually all lighthouses belong to one and the same navigational structure that embrace the total globe. But within this gigantic structure some of them are more easily recognized. An example is Oksøy, Grønningen, Odderøya lighthouse. Environmental Relations. This is a quite complex criterion. Many lighthouses are an important part of a landscape and many of them are within zones of nature reservations with their own regulations.
- Alternative Use and Accessibility. This is foremost about accessibility. Concerning this we have learned a great deal from the Trinity House Lighthouse Service. Their Business Plan for the Lighthouse Estate has been a model and inspiration. In this plan all opportunities are investigated thoroughly and stakeholders identified. We are greatly indebted to Director of Administration David Brewer who has been very generous in sharing his experience.

The key points of the presentation were:

- 1 A national plan for lighthouse heritage preservation.
- 2 Criteria for categorising heritage lighthouses.
- 3 The plans and the potential for extending the project on a national and international level.

9.4 The intangible values of built heritage. Could lighthouses acquire a new meaning?

The presentation was made by Amalia Androulidakis, Hellenic Ministry of Education and Religious Affairs, Culture and Sport, Greece

Presentation abstract

The preservation level of built heritage has become a sign, an indicator of development per se, and thus it is considered to be one of the social and cultural scopes of political decisions taken by the governments of most European countries. In most of these cases, the original meaning, the essence of the architecture, has not been understood and what is mainly evaluated is the history of the building, its appearance, and the state of preservation of its structure.

ICOMOS and UNESCO have recently developed a strong interest in intangible heritage. There have been attempts also to identify the intangible values of built heritage; the memory that a building carries, the knowledge, the sacred, even the use are recognised as such intangible values. According to Mounir Bouchenaki, until recently UNESCO Assistant Director General for Culture and then Director of ICCROM, 'the intangible heritage should be regarded as the larger framework within which tangible heritage takes on shape and significance'.

It is evident that the intangible values are at least as equally important for the existence and prospective of a monument as its physical substance. Architectural conservation projects cannot simply conserve the original state of a building, since even buildings that have not been structurally changed acquire all sorts of 'intangible values' through their use. Architectural conservation ought to respect these intangible values, but in the case of buildings that have little or no active modern use like the lighthouses, the question of how these intangible values can be recovered and recreated remains essential and also problematic. The questions had been formed: what are these intangible values of built heritage? How do they develop throughout the life of a building? How is the form of a building connected with its meaning as perceived each time by the observer or the user? Are there any invariants in a particular architectural form that are connected with its essence? And finally, could a methodology be applied in order to identify the essence of architecture, the invariants of a form and how these have been perceived in diverse cultural contexts and periods? The presentation attempted to answer these questions.

The key points of the presentation were:

- 1 Architectural Conservation.
- 2 Intangible Values.
- 3 Phenomenology.

9.5 Overview of session and Q and A

The only question had a fundamentally philosophical core, asking if a tangible lighthouse affected intangible values. In consequence there was insufficient time to adequately respond. However, there was considerable interest in the final presentation of the session and Amalia Androulidakis agreed to provide her speaking notes, as part of the output from the seminar.

10 SESSION 8 – HARMONISATION WITH MODERN SOCIETY

This session was chaired by Vincent Guigueno, former curator of 'Phares' French Maritime Museum, Paris, 2012.

10.1 AtoN from a cultural perspective - Papua New Guinea

The presentation was made by Adam Hay, Nawae Construction, Papua New Guinea

Presentation abstract

Papua New Guinea is an island country located in the South West Pacific. A large proportion of the mainly Melanesian population still live in small, isolated, traditional communities and villages in coastal and island areas. The observation of traditional and cultural customs is still very strong in most areas, particularly those more remote from urban centres or provincial capitals.

The majority of AtoN in the modern sense (lighthouses and beacons) were introduced during colonial occupation and all existing structures were built post the 2nd World War, mainly 1960s / 1970s / 1980s.

There are now over two hundred and seventy AtoN in PNG. Only a small percentage are owned by the 'state', the majority exist on ground that is culturally or traditionally owned. As such, these AtoN sites are tied closely with nearby communities and the cultural link between the ground or reef on which AtoN are located in nearly all cases precede installation of the AtoN.

The availability of the AtoN site depends on interaction between the sites, nearby communities, maintenance contractors and the National Maritime Safety Authority. This presentation will provide

an overview of the value of AtoN sites in a cultural sense and discusses various elements of this interactive cycle, with a focus on how this challenging issue is managed, the issues it presents and possible challenges for the future.

The key points of the presentation were:

- 1 Culture and cultural heritage has a deeper meaning in some countries than purely related to the age of a structure.
- 2 Preservation of AtoN sites in the south pacific present vastly different challenges to other parts of the world.
- 3 AtoN sites in PNG are not state owned, and in vast majority are leased from customary landowners.
- 4 Managing an AtoN site in PNG requires attention and understanding of cultural profile of a site.
- 5 The cultural profile of AtoN sites are as varied as the people nearby. In a country of over 700 distinct languages and many distinctively cultural differences, the attention and understanding required is therefore very significant.

10.2 Integration of historic lighthouses in the life of modern society

The presentation was prepared by Ioanna Papayianni, Vasiliki Pachta, AUTH, Greece.

The presentation was made by Vasiliki Pachta.

Presentation abstract

Historic lighthouses are considered monuments, which testify in Europe the past, concerning the history of navigation and economic development. At the local level, they are closely connected with the lives of communities, to which they actually belong. Being or not in service, it seems that they should be properly and harmoniously integrated in modern society, so that the values embodied in their monumental character find a passage to coming generations.

With this in mind, it is important to establish a protocol by which an holistic process should be followed for each historic lighthouse. It should refer to the values, such as the landscape, natural environment, the architecture, the mechanical system, the history, the myths, the ethics of the community and art and literature related to the lighthouse. In this context a number of plans or projects for revitalization of lighthouses could be realized, provided that they have been preserved and suitably restored.

The presentation contained proposals for upgrading lighthouses as landmarks of culture and tourism. They concern cultural and educational cruises to the lighthouses of the Aegean Sea, thematic exhibitions, art exhibitions, local traditional activities, theatrical performances, activities for children (play and learn) and volunteer work for preserving buildings and landscapes.

The key points of the presentation were:

- 1 Significance of historic lighthouses' integration and incorporation in the life of modern society.
- 2 Holistic process of the lighthouses' revitalisation.
- 3 Proposals of upgrading lighthouses as landmarks of culture and tourism.

10.3 Maritime cultural landscape

The presentation was made by Jo van der Eynden, Norwegian Lighthouse Museum. There was no PowerPoint presentation but use was made of the internet via www.kystreise.no.

Presentation abstract

The pilot project 'Maritime cultural landscape – Lindesnes', which is a project based on a digital map, where information in the form of text, photos and short films is geo-tagged to geographical positions was presented. A technological platform has been developed, based on the use of digital maps and geo-tagged documentary films, photos and text.

The pilot project is focusing on Lindesnes Lighthouse, and the local environment, presenting the lighthouse history, and the lighthouse as part of a wider cultural landscape with other AtoN, historical harbours, fishing communities, pilots and so on. The project has been developed in close co-operation with the national lighthouse authorities

From the platform developed through the local pilot at Lindesnes, the project has now been widened for use in a national perspective, where a network of maritime museums will co-operate and contribute with information.

The platform has also been used as a Scandinavian pre-project, with the support from the Nordic Council, and hopefully the perspective can be extended to a wider international level, based on the contribution from maritime museums, lighthouse museums and lighthouse authorities. Indeed, the aim is to use this project to build an international maritime heritage network that can be formally recognized at the IALA Conference in Spain in 2014.

The web based service developed in the pilot project will be available world-wide via the URL www.kystreise.no.

The goals of the project are:

- 1 To reach people with maritime history through smart phones, tablets and PC/Mac.
- 2 By utilizing web based, mobile technology museums can reach new groups of interested people with the maritime history of their region. Tourists and students are obvious targets for the new service together with everybody else interested in maritime history.

The content:

Developing a technological platform has been one goal for the project, but the development of content for the service has been even more important. Five thematic documentary films have been made, covering topics from navigational installations, lighthouse history to weather and food from the sea. Short documentary films have been made covering specific geographical places and its maritime history. By using the digital map and assigning icons to geographical positions, the user of the service can get access to documentary films, photos and text telling the story of that specific geographical location.

The key points of the presentation were:

- 1 The technical platform of the pilot-project.
- 2 Examples of the content and the presentations.
- 3 The plans and potential for extending the project on a national and international level.

10.4 France and lighthouse history: a global heritage?

The presentation was made by Vincent Guigueno, former curator of 'Phares' French Maritime Museum, Paris, 2012.

Presentation abstract

From Fresnel and his lens to the factories of Paris where metal towers and optics are produced and the myth of the lighthouse keeper, France has a passionate relationship with lighthouses. They are a heritage of our coast that is known all around the world.

Lighthouses are now in a phase of transition, after the departure of the lighthouse keepers. Conversion will however allow around one hundred and fifty buildings that mark the landscape of the French coast to be preserved. Now they have become heritage sites, lighthouses are opening their doors to visitors, who are fascinated by their history and architecture.

The presentation will address the current issues of Lighthouse Preservation in France to move to a more 'transnational' vision of Lighthouse Heritage. France was, along with Great Britain, a major colonial power, covering all continents, oceans and seas. Many lighthouses were built and lit by French engineers and industrialists all over the world. The presentation will take a few examples of recent cultural initiatives (Algeria, Morocco) that acknowledge this unknown part of French Lighthouse History and Heritage.

The key points of the presentation were:

- 1 French Lighthouse History.
- 2 Lighthouse Preservation in France.
- 3 Lighthouse and French colonial History.
- 4 Historical Lighthouse International Network.
- 5 Co-operation in Lighthouse Preservation.

10.5 Overview of session and Q and A

In view of the fact that Greek lighthouses are owned by the Navy and are not open to the public it was asked how visiting French lighthouses were arranged. The reply was that this has to be on a case-by-case basis, with the example being cited of the limited access to Cordouan lighthouse. There was general acceptance that the safety of visitors needs to be considered most carefully.

Echoing comments made in his welcoming remarks, Commodore Manolioudakis indicated that given the required change in legislation it may be possible, in future, to allow public access to Greek lighthouses.

Prompted by the example of Cordouan lighthouse, the discussion then turned to UNESCO recognition. It was explained that a site needs to be chosen by the government as a candidate for UNESCO recognition and that there has to be an associated management plan. It was then asked if IALA could be asked to support proposals to UNESCO.

It was asked if bringing new stories, as advocated by Vincent Guigueno, would change the history of a lighthouse. It was responded that history is always changing and that the new stories would add another dimension to existing lighthouse history.

The evening programme was entitled 'Lighthouses in Art'.

End of Day 3

11 TECHNICAL VISIT

On Thursday 6 June 2013, a technical visit was organised to view the Dana lighthouse, which involved a return ferry trip to Poros Island.



12 SESSION 9 – CASE STUDIES IN GREECE

This session was chaired by Panos Chiotis

12.1 When the myth enhances the memory

The presentation was made by Nikos Benos-Palmer, Professional sculptor in marble, Greece.

Presentation abstract

In Greece we are at a crucial point between myth and history about lighthouses. With the myth we should enhance the memory.

This is the right moment in time to define comprehensively the conditions for the preservation of lighthouses; new institutions, courageous decisions, the paving of the way towards the objective.

This is the right moment in time to present the characteristics of the lighthouse as a monument in order to accentuate its features; to start the discussion between specialist bodies and to define certain rules for the restoration of lighthouse buildings.

In a country where the density of special sites is remarkably large, the combination of the physical contours of land and sea renders lighthouses as reference points and networks throughout Greece. They are monuments to technology and to Naval Traditions but they can no longer remain in the grip of the military! They are public assets, and should be accessible to citizens. Moreover, the history of lighthouses has also a social dimension to local communities. It is a complete and fascinating story that should be researched.

The links between technology, tradition, local communities and the history of landscapes are elements that lead us to the conclusion that in Greece each lighthouse is perhaps a special case; the variety contained in lighthouses in Greece is unique. These buildings, tempered by the natural formations and masses, reveal generously and comprehensively the Greek paragon. The paragon that created philosophy, art, science and culture.

12.2 A first report on the Ionian lighthouses: Lakka, Panagia, Antipaxi and Othonoi

The presentation was made by Litra Aliko, Hellenic Ministry of Education and Religious Affairs, Culture and Sport, Greece.

Presentation abstract

The systematic construction of autonomous lighthouses began on the site in early June in the 19th century under the care of the English crown. The lighthouses in Paxoi, Panagia and Laka were built by the English in 1825; the one in Antipaxoi in 1906. In 1887, when Charilaos Trikoupis was the Prime Minister of Greece, a law was passed for 'the establishment of a fund for lighthouses'.

The presentation focussed on findings, observations, thoughts and concerns - both about the problems of decay because of abandonment and about the difficulties in the restoration and ultimately their use of the three lighthouses in Paxoi and the one in Othoni.

The Lighthouse of Lakas in Paxoi, the one in Antipaxoi and the one in Panagia were declared as listed heritage monuments, while that of Othonoi was not. The declaration of the lighthouses as monuments in addition to their recognition on the part of the state as cultural heritage ensures that the various problems relating to their protection and safety are addressed properly, since any intervention requires the approval of the authority responsible and in our case is the Department of Contemporary Monuments and Technical Works of Epirus. Because they are isolated and remote, any intervention without the supervision of relevant departments endangers their maintenance and restoration.

The key points of the presentation were:

- 1 Ionian Sea.
- 2 Panagia.
- 3 Paxoi.
- 4 Antipaxoi.
- 5 Othonoi.

12.3 Restoration and strengthening of traditional buildings and lighthouses, methods of structural Analysis, experiences and open issues, presentation of characteristic projects

The presentation was made by Christos Vachliotis, Domos Consulting Engineers, Greece.

Presentation abstract

The presentation referred exclusively to the assumptions, methods of static and dynamic analysis of various listed building proposals, which are classified as newer monuments by the Ministry of Culture and Tourism, as well as in repair mode and straightening of load bearing masonry walls. Eight representative structure proposals were presented, with increased importance factor ($c = 1.30$) take place, based on the Greek Anti-seismic Code.

State Scholarships Foundation Building, Holy Monastery Of Chrysinou, 1st elementary school Acharnon, 46th Lyceum of Athens, Institute Of Byzantine Studies Mystra, Tambakika Samos and the lighthouses at Konghi-Salamina and Monemvasia

For any proposal, structures are given mechanical characteristics of the materials, before and after straightening, analysis method, the behavior q factor, also the software (FM Analysis) and the proposed interventions.

Special emphasis is given to the in situ and laboratory tests for the evaluation of the material mechanical characteristics. Even presented various analyses schedules such as equivalent static and nonlinear analysis. Most of the projects have already been implemented and the basic repair methods show successful results. The presentation concludes with a commentary and evaluation of methods and results.

The key points of the presentation were:

- 1 Traditional buildings of masonry walls.
- 2 Methods of Analysis.
- 3 Mechanical characteristics of materials.
- 4 Seismic behaviour of traditional buildings.
- 5 Restoration of lighthouses.

12.4 Lighthouse promotion and restoration as a historical, architectural and single-operating volume – An example using Killinis Lighthouse

The presentation was prepared by George E. Papandreou, Hellenic Ministry of Education and Religious Affairs, Culture and Sport, Greece and Alexandros A. Vasilopoulos, Decentralized Administration of Peloponnesus, Western Greece & Ionian Directorate of Technical Inspection, Greece

The presentation was made by Alexandros A. Vasilopoulos.

Presentation abstract

As a lighthouse (beacon) is characterized every torch that serves in general routes labelling-direction, sailing-naval courses or aeronautical manoeuvres. A torch, in naval terminology is defined any construction that anyhow emits light rays and signalizes at the navigators a specific geographic location which if perfectly-specifically defined and known to them in advance.

The navigation requirements imposed at the beginning of 19th Century the development and establishment of an organized lighthouse network. The integration of the lighthouse network is connected with the notable features topography, the history revolution and the rapid growth of commercial shipping. Lighthouses are Single-Operating (Mono-Functional) shell constructions mostly with load bearing masonry with specific morphological and constructional components and details.

From an architectural construction point of view, the lighthouse could be categorized by:

- 1 The tower plan outline, which may be circular, square, octagonal or hexagonal.
- 2 The Faces-Elevations morphology. The lighthouse's elevations constitute their unique identity and recognition features.
- 3 The relationship between the tower and the lighthouse keeper's residence.

The architectural volume of the lighthouse structures, the geometrical and stereo metrical features-elements of the lighthouse's structure also contribute to a very strong and rigid construction capable to cope with intense climatic conditions. The helical, stone, internal, modular staircase beyond the necessary vertical movement, it contributes to the increase of the structure stiffness (as an inner rim-stiffener of the shell).

Regarding the strength capacity control of the lighthouse construction in comparison with the modern regulations loading demands in the present work are proposed advanced analysis methods using models of high accuracy (refined models). More specifically, nonlinear analysis (geometric nonlinearities) is applied, the shell discretization is achieved using Finite Element Methods (FEM) considering all the construction details of the lighthouse body like the internal spiral staircase, the Openings, any variable bearing wall thickness, the joist's stiffness influence and any other components.

The key points of the presentation were:

- 1 Promotion.
- 2 Restoration.
- 3 Historic.
- 4 Single-Operating Volume.
- 5 Architectural.

12.5 Overview of session and Q and A

There was one question, concerning the apparent omission of examination of foundations in the presentation by Christos Vachliotis, who explained that consideration of the state of the foundations is encouraged but they had not been found to be an issue in the 8 case studies presented. It was explained that a survey of foundations is a requirement before work starts and that this generally requires excavation. However, in the majority of cases the most significant problems are found with the roof. When problems are found with foundations the consideration needs to be given to the possibility of building collapse, probably due to the weight of the roof.

13 CONCLUSIONS AND CLOSING

This session was chaired by Bob McIntosh

13.1 Restoring Gavrio Lighthouse.

An additional presentation was made by students from the National Technical University of Athens, which drew warm applause. The presentation drew warm applause and the script used is at ANNEX K.

13.2 Seminar conclusions

The seminar steering group had drawn up a draft set of conclusions and this was presented to the delegates. In discussion, the draft conclusions were refined and added to. The finalised seminar conclusions are at ANNEX C.

13.3 Closing of the workshop

Closing remarks were made by:

Commodore Konstantinos Manioudakis HN, Director of the Hellenic Navy Lighthouse Service.

Professor Ioanna Papayianni, Aristotle University of Thessaloniki.

Mrs Anastasia Anagnostopoulou-Paloumbi, President of the Hellenic Maritime Museum.

Mrs Marilena Laskaridis, Vice President of the Aikaterini Laskaridis Foundation.

Commodore Manioudakis made small presentations to Bob McIntosh, Mike Hadley, Professor Papayianni, Mrs Anagnostopoulou-Paloumbi and Mrs Laskaridis.

Mrs Anagnostopoulou-Paloumbi then made a small presentation to Mrs Laskaridis

The Chairman remarked that the seminar had covered a wide range of topics thanked everyone for attending and participating in the seminar; he hoped that the seminar had gone some way to spreading the heritage message and looked forward to another such seminar in the forthcoming 2014 – 2018 IALA Work programme. Adding his thanks to those of the previous speakers for all who had contributed to the planning and execution of the seminar, he wished everyone a safe journey home.

Bob McIntosh then declared the workshop closed.

14 SOCIAL PROGRAMME

On Monday 3 June there was a Welcome Reception, kindly hosted by the Aikaterini Laskaridis Foundation.

On Thursday 6 June a seminar dinner was kindly hosted at the Hotel Grande Bretagne, Athens, by the Aikaterini Laskaridis Foundation.

15 PARTNER PROGRAMME

A full programme, including the welcome reception, evening activities at the Aikaterini Laskaridis Foundation, the technical tour and the seminar dinner was organised by the Hellenic Navy Lighthouse Service and the Aikaterini Laskaridis Foundation.

ANNEX A LIST OF DELEGATES

Country

Australia Australian Maritime Safety Administration
Mr Lyndon O'GRADY
Level 1, 25 Constitution Avenue
GPO Box 2181
Canberra ACT 2601
Australia
e-mail (main): lyndon.ogrady@amsa.gov.au

China (People's Republic of China) China Maritime Safety Administration
Mr Wei FU
11 Jianguomennei Avenue
Beijing 100736
People's Republic of China
Phone +86 10 65292587
Fax +86 10 65 292 893
Mobile phone: +86 1 861 820 3687
e-mail (main): ialamsa@126.com

China Maritime Safety Administration
Mr Jun HU
145 Binhai Avenue
Haikou City, Hainan Province
People's Republic of China
Phone +86 0898 68 626 148
Fax +86 0898 68662758
Mobile phone: +86 1387 61 92 000
e-mail (main): fujunan1495@163.com

Denmark Danish Maritime Authority
Mr Jesper Kern HANSEN
Carl Jacobsenvej 31
2500 Valby
Denmark
Phone +45 91 37 60 00
Mobile phone: +45 24 69 07 11
e-mail (main): JKH@dma.dk

Danish Maritime Authority
Mr. Jorgen ROYAL PETERSEN
Driftscenter Korsor
Soebatteriet 2
DK-4220 Korsoer
Denmark
Phone +45 58 36 00 32
Fax +45 58 36 0031
Mobile phone: +45 24 28 82 96
e-mail (main): jrp@dma.dk

Estonia

Estonian Maritime Administration

Mr Ego RIENER
Valge 4
11413 Tallinn
Estonia

Phone +372 6 205 690
Fax +372 620 56 56
Mobile phone: +372 5043 885
e-mail (main): ego.riener@vta.ee

France

Honorary Personal Member

Mr Jean-Marie CALBET
23 route du Petit Moulin
33340 Gaillan Médoc
France

Phone +33 5 56 41 17 43
Mobile phone: +33 6 64 04 19 84
e-mail (main): jeanmarie.calbet@neuf.fr

Consultant for the French Lighthouse Service/Ecole des Ponts

M Vincent GUIGUENO
Direction des Affaires Maritimes
Grande Arche Parois Sud
92055 La Defense
France

Phone +33 1 44 49 84 02
Fax +33 1 44 49 86 80
Mobile phone: +33 6 86 77 07 44
e-mail (main): vincent.guigueno@m4x.org
e-mail (alternative): vincent.guigueno@developpement-durable.gouv.fr

GISMAN

Mr. Vincent ROGET
7 rue Louis Blériot
ZA Toul Garros
56400 Auray
France

Phone +33 2 97 29 41 21
Fax +33 2 97 29 41 30
Mobile phone: +33 6 88 29 13 70
e-mail (main): vincent.roget@gisman.fr

Germany

Waterways and Shipping Directorates North & Northwest

Mr Lars VON LILIENFELD-TOAL
SchloBplatz 9
D-26603 Aurich
Germany

Phone +49 4947 602 423
Fax +49 4947 602 378
Mobile phone: +49 160 97 25 2049
e-mail (main): lars.lilienfeld@wsv.bund.de

Greece

Aikaterini Laskaridis Foundation

Mr Eftaxiopoulos DIMITRIS
Koronias str
11522
Athens
Greece

Phone +30 210 6428 300
Fax +30 210 642 8300
Mobile phone: +30 69 444 17649
e-mail (main): dmtr7@gmail.com

Aristotle University of Thessaloniki

Prof Ioanna PAPAYIANNI
Laboratory of Building Materials, Dept of Civil Engineering
Aristotle University of Thessaloniki
P O Box 482 ZC 54124
Thessaloniki
Greece

Phone +302310 995783
Fax +30 2310 995699
Mobile phone: +306932 424 827

e-mail (main): papayian@civil.auth.gr

Dr Vasiliki PACHTA
Laboratory of Building Materials, Dept of Civil Engineering
P O Box 482 ZC541
Thessaloniki
Greece

Phone +30 2310 995 882
Fax +30 2310 9956 99
Mobile phone: +30 6944 44 3007
e-mail (main): vpachta@civil.auth.gr

Decentralized Administration of Peloponnesus, Western Greece

Dr Alexandros VASILOPOULOS
Greece

Phone +30 2610 991 689
Mobile phone: +30 6948 574 361
e-mail (main): AlexV_civil@yahoo.gr

Department of Modern Monuments & Technical Projects North Aegean

Mrs Andriani DIAGOUMA
19 Vournazon Street
81100 Mytilini
Greece

Phone +30 22510 40511
Mobile phone: +30 6996231482
e-mail (main): antamaistrou@yahoo.gr

Domos Consulting Engineer

Mr Christos VACHLIOTIS
38 Hellanikou str
PC 11635 Athens
Greece

Phone +30 210 7293789
Fax +30 210 7292 789
Mobile phone: +30 6944572607
e-mail (main): info@domos-eng.gr

General Secretary of Culture Department of Contemporary Monument

Mrs Aliko LYTRA
9, Asopiou Street
45 4444 Ioannina
Greece

Phone +30 26510 78062
Fax +30 26510 21203
Mobile phone: +30 697 269 6021
e-mail (main): aliki.litra@hotmail.com

Hellenic Navy

Mr Panos CHIOTIS
Palataki
Piraeus 18510
Greece

Phone +30 210 45 81 523
Fax +30 210 458 14 10
Mobile phone: +30 694 597 55 90
e-mail (main): panos@hotmail.com
e-mail (alternative): yf_dner@navy.mil.gr

Hellenic Navy/General Staff/G4 Dept/Architect

Mrs Maria LEONARDOU
Aerop.I. Halkia
12-15232
Halandri
Greece

Phone +30 210 568 032
Fax +30 210 652 7937
Mobile phone: +30 694 4520230
e-mail (main): mleonardou@gmail.com

Kapanditri

Mr Nikos BENOS-PALMER
Attiki 190 14
Greece

Mobile phone: +30 69 44 80 30 75
e-mail (main): benospalmern@yahoo.gr

Ministry of Culture

Mr Nikolas CHARKIOLAKIS
82 Fokionos Negri Street
113.61
Athens
Greece

Phone +30 210 881 3345
Fax +30 210 6400 185
Mobile phone: +30 69 744 76415
e-mail (main): ncharkiolakis@gmail.com

Ministry of Education & Religious Affairs, Culture & Sports

Mrs Katerina MANOUSSOU-NTELLA
3, Ipparhou Strret
Rhodes 87100
Greece

Phone +30 2241 1030 693
Fax +30 2241 04 3372
Mobile phone: +30 69 42 554 093
e-mail (main): kamanousou@gmail.com

Ministry of Shipping and Aegean

Mr Ioannis SPILANIS
General Secretary of Aegean & Insular Policy
2, Milaras Asias Str
GR 811 Mitilène, Lesvos
Greece

National Technical University of Athens

Prof Nikos BELAVILAS
NTUA, Patission 42 str
10682
Athens
Greece

Phone +30 210 77 23 590
Fax +30 210 77 23 592
Mobile phone: +30 69 77 31 7579
e-mail (main): nbelavil@arch.ntua.gr

IALA

IALA Secretary General

Mr Gary PROSSER
10 rue des Gaudines
78100 Saint-Germain-en-Laye
France

Phone +33 1 34 51 70 01
Fax +33 1 34 51 82 05
e-mail (main): gary.prosser@iala-aism.org

IALA Technical Coordination Manager

Dr. Mike HADLEY
10 rue des Gaudines
78100 Saint Germain en Laye
France

Phone +33 1 34 51 70 01
Fax +33 1 34 51 82 05
Mobile phone: +44 7887 548 227
e-mail (main): mike.hadley@iala-aism.org
e-mail (alternative): advnav@btinternet.com

India

Directorate General of Lighthouses and Lightships

Mr Aswani KUMAR
Director of Ministry of Shipping
'Deep Bhavan'
A-13, Sector 24
India

Directorate General of Lighthouses and Lightships

Mr C.B. SRIVASTAVA
'Deep Bhavan'
A-13, Sector 24
Noida (UP)
India

Malaysia

Light Dues Board

Mr Mohamad Halim AHMED
P O Box 12
42007 Port Klang
Selangor Darul Ehsan
Malaysia

Phone +603 33 46 77 77
Fax +603 31 68 50 20
Mobile phone: +6012 49 10 778
e-mail (main): halim@marine.gov.my

Light Dues Board

Mr Rossid MUSA
P O Box 12
42007 Port Klang
Selangor Darul Ehsan
Malaysia

Phone +603 33 46 77 77
Fax +603 31 65 90 45
Mobile phone: +6019 22 74 228
e-mail (main): rossid@marine.gov.my

Norway

Dalsfjord Museum

Mr Frode PILSKOG
Dalsfjord 607
6133 Lawstad
Norway

Phone +47 950 69 162
e-mail (main): frode@dalsfjord.fyrmuseum.no

Lindesnes Lighthouse Museum

Mr Jo VAN DER EYNDEN
Box 517
4605 Kristiansand
Norway

Phone +47 48 11 16 37
Fax +47 38 07 45 04
Mobile phone: +47 48 11 16 37
e-mail (main): Jovander.Eynden@vaf.no
e-mail (alternative): iej@vaf.no

Lindesnes Lighthouse Museum

Mr Simen PIHL
Lindesnes Lighthouse
N-4521 Lindesnes
Norway

Phone +47 38 25 54 20
Mobile phone: +47 92 21 99 04
e-mail (main): simen@lindesnesfyr.no

Lindesnes Lighthouse Museum

Mr Jan Robert JORE
Lindesnes Lighthouse
N-4521 Lindesnes
Norway

Phone +47 91 37 39 74
Mobile phone: +47 91 37 39 74
e-mail (main): jan.robert@jrj.no

Norwegian Coastal Administration

Ms. Hilde ANDRESEN
Postboks 1502
N° - 6025 Alesund
Norway

Phone + 47 37 01 97 12
Mobile phone: +47 91 60 58 28
e-mail (main): hilde.andresen@kystverket.no

Norwegian Coastal Administration

Mr Fredriksen ARILD
Postboks 1502
6025 Alesund
Norway

Phone +47 3701 9765
Fax +47 3701 9701
e-mail (main): arild.fredriksen@kystverket.no

Norwegian Coastal Administration

Ms Ingvild KRAGSET
P O Box 1502
Norway

Phone +47 70 23 10 71
Mobile phone: +47 9345 3921
e-mail (main): ingvild.kragset@kystverket.no

**Oman,
Sultanate of**

AMNAS

Mr Ali AL KALBANI
Operations and Development Manager
P.O. Box 1677
CPO Seeb, PC 111
Oman, Sultanate of

Phone +968 24510 283
Fax +968 24510 430
Mobile phone: +968 99799 333
e-mail (main): ali.alkabani@amnas-oman.com

**Papua New
Guinea**

Nawae Constructions

Mr Adam HAY
P.O. Box 261
Alotau
Milne Bay Province
Papua New Guinea

Phone +675 6411 233
Fax +675 6411 183
Mobile phone: +675 7338 6434
e-mail (main): ahay@nawae.com.pg
e-mail (alternative): ahay@liaisonltd.com.pg

Sweden

Swedish Lighthouse Society

Mr Esbjorn HILLBERG
Donson Backe 16
S-430 82 Donso
Sweden

Phone +46 31 972 148
Fax +46 31 970 623
e-mail (main): esbjorn@hillberg.com

Swedish Maritime Administration

Mr. Christian LAGERWALL
Ostra Promenaden 7
SE-601 78 Norrköping
Sweden

Phone + 46 10 478 4814
Fax + 46 11 126791
Mobile phone: +46 708 191193
e-mail (main): christian.lagerwall@sjofartsverket.se

The Swedish National Property Board - Statens Fastighetsverk

Mr Anders EYDAL
Fo Mark
403 Goteborg
Sweden

Phone +46 631 13 78 08
e-mail (main): Anders.Eydal@sfv.se

UK

Trinity House

Mr. Ronald BLAKELEY
The Quay
Harwich
Essex CO12 3JW
UK

Phone +44 1255 245 041
Mobile phone: +44 796 771 44 05
e-mail (main): ron.blakeley@thls.org
e-mail (alternative): tracy.dale@thls.org

GLA R&RNAV

Mr Link POWELL
Trinity House
The Quay, Harwich
Essex CO12 3JW
UK

Phone +44 1 255 245 131
Mobile phone: +44 77 48 92 03 59
e-mail (main): link.powell@gla-rnav.org

Northern Lighthouse Board

Mr. Bob McINTOSH
84 George Street
Edinburgh EH2 3DA
Scotland

Phone + 44 1314 73 31 61
Fax + 44 1312 20 20 93
Mobile phone: +44 7831 665 388
e-mail (main): bobm@nlb.org.uk

Northern Lighthouse Board

Mr Andrew MULHERN
84 George Street
Edinburgh EH2 3DA
Scotland

Phone +44 131 473 31 00
Fax +44 131 220 2093
Mobile phone: +44 7836 232 396
e-mail (main): andrewM@nlb.org.uk

Pelangi International Ltd.

Mr Bert FRAME
15 Harvest Drive
South Lowestoft Industrial Estate
Lowestoft, Suffolk NR33 7NJ
UK

Phone +44 1502 588026
Fax +44 1502 588047
e-mail (main): bert.frame@pelangi.co.uk

University of Lincoln

Prof Belinda COLSTON
School of Life Sciences
Brayford Pool
Lincoln LN6 7TS
UK

Phone +44 1522 83 7448
Mobile phone: +44 79 05 99 10 72
e-mail (main): bcolson@lincoln.ac.uk

Groves-Raines Architects Ltd

Dr Stewart STIRLING
Lambs House, Waters Close
Leith, Edinburgh, EH6 6RB
Scotland

Phone +44 131 467 7777
Mobile phone: +44 7940 99 3949
e-mail (main): practice@grovesraines.com

National Museum Scotland

Mr Stuart MCDONALD
Chambers Street
EH1 1JF
Edinburgh
Scotland

Phone +44 131 247 44 80
Mobile phone: +44 7795 391 895
e-mail (main): s.mcdonald@nms.ac.uk

USA

New Dungeness Light Station

Mr Chad KAISER
410 Eunice Street
Sequim, WA 98382
USA

Phone
e-mail (main):

+1 810 923 3711
chadkaiser@hotmail.com

THE FOLLOWING STUDENTS ATTENDED

Foteini Miltiadou	National Technical University of Athens
Sofia-Athina Bartzoka	National Technical University of Athens
Nikos Davaris	National Technical University of Athens
Ioanna Ntina	National Technical University of Athens
Evangelia Christodoulaki	National Technical University of Athens
Stiliani Maniouloudakis	Technological Educational Institute of Piraeus
Foteini Davilla	Aristotle University of Thessaloniki
Aspasia Karozou	Aristotle University of Thessaloniki
Olga Garoufa	Aristotle University of Thessaloniki
Aikaterini Manolopoulou	Aristotle University of Thessaloniki

ANNEX B SEMINAR PROGRAMME

Day 1 – Monday 3 June, 2013

Time		
	AikateriniLaskaridis Foundation	Dress Code: Business dress
1800- 1930	Registration / Refreshments	
1930 - 2130	Welcome / ice break reception	
	Welcome from hosts:	
	AikateriniLaskaridis Foundation	Mrs Marilena Laskaridis, Vice President
	Hellenic Navy, Chief of the General Staff	Vice Admiral Evaggelos Apostolakis HN
	Mayor of Piraeus	Mr. Vasilis Michaloliakos
	Hellenic Ministry of Education and Religious Affairs, Culture and Sport	Evgenia Gatopoulou, arch, Director General for Monuments Restoration, Museums and Technical Projects
	Aristotle University of Thessaloniki (AUTH)	Professor Ioanna Papayianni
	IALA	Gary Prosser, Secretary-General
	Progress summary – IALA Heritage Working Group	Bob McIntosh, Northern Lighthouse Board and Chair of IALA Heritage Working Group
2130	End of Day 1	

Day 2 –Tuesday4 June, 2013

Time		Activity	Presenter	Chair
		Hellenic Maritime Museum	Dress Code: Short sleeves, no jacket or tie	
0830 - 0900		Coffee & Registration		
0900 - 1030		Opening & Technical Session 1 – Case Studies		Bob McIntosh
0900 - 0905		Introduction from the Director of the Hellenic Navy Lighthouse Service	Commodore Konstantinos Manolioudakis HN	
0905 - 0910		Introduction from the President of the Hellenic Maritime Museum	Mrs Anastasia Anagnostopoulou-Paloumbi	
0910 - 0920		Welcome from IALA Secretary-General	Gary Prosser	
0920 - 0935		Setting the scene	Bob McIntosh	
0935 - 0950	1	The lighthouses as a tool for diversification of coastal tourism in Greece	Ioannis Spilanis, Assistant Professor, University of the Aegean, Greece	
0950 - 1005	2	EC Pharos project – Greece	Ioanna Papayianni, Vasiliki Pachta, AUTH, Greece	
1005 – 1020	3	Hellenic Navy Lighthouse Service – Efforts on application of identified solutions on lighthouses	Panos Chiotis, Hellenic Navy Lighthouse Service, Greece	
1020 - 1030		Overview of session and Q and A		
1030 - 1100		Refreshment / coffee break		
1100 - 1230		Technical Session 2 – Case Studies (Continued)		Jo van der Eynden
1100 - 1120	4	Sumburgh Head lighthouse, Scotland	Nicholas Groves-Raines, Director, and Dr J Stewart Stirling, Senior Conservation Consultant, Grove Raines Architects, Scotland	
1120 -1140	5	Didimar Lighthouse	Ali Al Kalbani, Arabian Navigation & Maritime Services LLC (AMNAS), Oman	
1140 - 1200	6	Paternoster Project, Sweden – since the Gothenburg Seminar 2005	Anders Eydal, National Property Board, Sweden	
1200 - 1220	7	Tenaro, Maleas and Dana Poros restorations	Demetris Eftaxiopoulos, Architect on behalf of Aikaterini Laskaridis Foundation, Greece	
1220 - 1230		Overview of session and Q and A		
1230 - 1400		Lunch		

IALA Seminar on the Preservation of Lighthouse Heritage – Report

Time		Activity	Presenter	Chair
1400 - 1530		Technical Session 3 Building restoration		Ron Blakely
1400 - 1420	8	Historic lighthouses in Greece: Materials, damages and repair	Ioanna Papayianni, Vasiliki Pachta, AUTH, Greece	
1420 - 1440	9	Optimising the internal environment for the long-term conservation of North Foreland lighthouse, England	Belinda Colston, Lincoln University, England	
1440 - 1500	10	Repair to reproduce the Centennial Lighthouse, China	Jun Fu, China MSA	
1500 - 1520	11	Structural and earthquake resistance design of masonry lighthouses	Milton Demesthenous, Frederick University, Cyprus	
1520 - 1530		Overview of session and Q and A		
1530 - 1600		Refreshment / coffee break		
1600 - 1730		Technical Session 4 Building restoration (continued)		Ioanna Papayianni
1600 - 1620	12	Keeping the rain out and the lights on	Ron Blakely, Trinity House, England and Wales	
1620 - 1640	13	The lighthouse on St. Nicholas tower of the town of Rhodes - Restoration project	Katerina Manoussou-Ntella, Hellenic Ministry of Education and Religious Affairs, Culture and Sport, Greece	
1640 - 1700	14	Upgrade Works at North Reef lighthouse 2013	Lyndon O'Grady, Australian Maritime Safety Authority (AMSA)	
1700 - 1720	15	Practical methodology of twin lighthouses restoration	Andriani G. Diagouma, Hellenic Ministry of Education and Religious Affairs, Culture and Sport, Panos Chiotis, Hellenic Navy Lighthouse Service, Greece	
1720 - 1730		Overview of session and Q and A		
1730		End of Technical Programme – Day 2		

IALA Seminar on the Preservation of Lighthouse Heritage – Report

Time	Evening Activity	
	AikateriniLaskaridis Foundation Dress Code: Casual dress	
1930 - 2200	Lighthouses in Literature	
1930 - 1935	Introduction	Aikaterini Laskaridis Foundation
1935 - 1955	The Sparkling Silence of the Literary Lighthouses	Titika Dimitroulia, Assistant Professor, School of French, AUTH
1955 - 2000	Recitation	Katerina Didaskalou, actress
2000 - 2020	The fairies of the lighthouses	Louisa Karapidaki, Art Historian - Archaeologist, Hellenic Folklore Research Centre of the Academy of Athens
2020 - 2025	Recitation	Katerina Didaskalou, actress
2025 - 2055	The Historical Landscape of Lindesnes	Jo van der Eynden, Norwegian Lighthouse Museum
2055 - 2155	Documentary: The Lighthouse Stevensons	Les Wilson, documentary film, Caledonia TV - BBC Scotland

Day 3 – Wednesday 5 June, 2013

Time		Activity	Presenter	Chair
		Hellenic Maritime Museum	Dress Code: Short sleeves, no jacket or tie	
0830 - 0900		Coffee		
0900 - 1030		Technical Session 5 Traditional lenses		Christian Lagerwall
0900 - 0920	16	Cost effective solution to keep historical lenses without mercury bath.	Vincent Roget, Gisman Co. France	
0920 - 0940	17	LED light sources in traditional optics	Link Powell, GLA R&RNav, UK & Ireland	
0940 - 1000	18	Traditional Revolving Optic re-engineered for continued operation without mercury	Jørgen Royal Petersen, Danish Maritime Authority (DMA)	
1000 - 1020	19	Breathing new life into prismatic optics	Bert Frame, Sealite, UK	
1020 - 1030		Overview of session and Q and A		
1030 - 1100		Refreshment / coffee break		
1100 - 1230		Technical Session 6– Traditional Lenses and Historic Lighthouses		Bob McIntosh
1100 -1120	20	Working to keep historic lenses in towers	Chad Kaiser, US Lens Expert	
1120 -1140	21	Conservation & restoration of lenses for display	Stuart McDonald, National Museum of Scotland	
1140 - 1200	22	Project case study – Norway	Hilde Andresen / Arild Fredriksen, Norwegian Coastal Administration	
1200 - 1220	23	Surveying the Greek lighthouse network and its history	Nikos Belavilas, National Technical University of Athens (NTUA), Greece	
1220 - 1230		Overview of session and Q and A		
1230 - 1400		Lunch		
1400 - 1530		Technical Session 7 - Selection criteria for preservation / conservation		Nikos Belavilas,
1400 - 1420	24	An overview of historical lighthouse protection in China	Jun Fu, China MSA	
1420 -1440	25	Criteria for conservation and new uses of historical lighthouses in Greece	Nikos Charkiolakis, Hellenic Ministry of Education and Religious Affairs, Culture and Sport, Greece	
1440 - 1500	26	Historic lighthouses – Selection criteria in Norway	Jo van der Eynden, Norwegian Lighthouse Museum	

IALA Seminar on the Preservation of Lighthouse Heritage – Report

Time		Activity	Presenter	Chair
1500 - 1520	27	The intangible values of built heritage. Could lighthouses acquire a new meaning?	Amalia Androulidakis, Hellenic Ministry of Education and Religious Affairs, Culture and Sport, Greece	
1520 - 1530		Overview of session and Q and A		
1530 - 1600		Refreshment / coffee break		
1600 - 1730		Technical Session 8 – Harmonisation with modern society		Vincent Guigueno
1600 - 1620	28	AtoN from a cultural perspective - Papua New Guinea	Adam Hay, Nawae Construction, Papua New Guinea	
1620 - 1640	29	Integration of historic lighthouses in the life of modern society	Ioanna Papayianni, Vasiliki Pachta, AUTH, Greece	
1640 - 1700	30	Maritime cultural landscape	Jo van der Eynden, Norwegian Lighthouse Museum and Jan Robert Jore, film producer	
1700 - 1720	31	France and lighthouse history: a global heritage?	Vincent Guigueno, former curator of 'Phares' French Maritime Museum, Paris, 2012	
1720 - 1730		Overview of session and Q and A		
1730		End of Technical Programme Day 3		

Time	Evening Activity		
	AikateriniLaskaridis Foundation	Dress Code: Casual dress	
1930 - 2130	Lighthouses in Art		
1930 - 1935	Introduction	Aikaterini Laskaridis Foundation	
1935 - 2005	The lighthouse as a metaphor and a symbol in image arts (painting, photography, film)	Manos Stefanidis, Assistant Professor Faculty of Theatrical Studies, School of Philosophy, University of Athens.	
2005 - 2020	Short film: Gina Dostoyevsky	Vanessa Zouganelis, short film	
2020 - 2025	The work of Gisis Papageorgiou, Yiannis Skoulas and Nikos Benos-Palmer	Aikaterini Laskaridis Foundation	
2025 - 2125	Documentary: Professions of the sea: The hermits of the sea and their stone monuments	Dimitris Anagnostopoulos, documentary film, ERT SA (Greek Television Company SA)	
2125	End of Day 3		

Day 4 – Thursday 6 June, 2013

Time	Activity
	Technical Visit Dress Code: Casual dress
0730 -1800	Technical visit to Lighthouse of Dana – Poros Island
0730 - 0800	Assemble in the port of Piraeus and embarkation
0800 - 0920	Travel by ship to Poros Island
0920 - 0930	Travel by bus to near lighthouse
0930 - 1000	Trail walking to the lighthouse
1000 -1100	Technical visit to lighthouse of Dana
1100 - 1130	Return trail walking
1200 - 1210	Return by bus to Poros
1210 - 1620	Free time / lunch / swimming / tour of Poros Island
1620 - 1635	Assemble in the port of Poros and embarkation
1635 - 1800	Return by ship to Piraeus
1800	Return from Technical Visit
	End of Day 4

Seminar dinner
 2100 – 2400
 Hotel Grande Bretagne, Constitution Square, Athens
 Dress code – Business dress

Day 5 – Friday 7 June, 2013

Time		Activity	Presenter	Chair
		Hellenic Maritime Museum	Dress Code: Short sleeves, no jacket or tie	
0830 - 0900		Coffee		
0900 - 1030		Technical Session 9 Case Studies in Greece		Panos Chiotis
0900 - 0920	32	When the myth enhances the memory	Nikos Benos-Palmer, Professional sculptor in marble, Greece	
0920 - 0940	33	A first report on the lighthouses of the Ionian: Lakka, Panagia, Antipaxoi and Othonoi	Litra Alik, Hellenic Ministry of Education and Religious Affairs, Culture and Sport, Greece	
0940 - 1000	34	Restoration and strengthening of traditional buildings and lighthouses, methods of structural Analysis, experiences and open issues, presentation of characteristic projects	Christos Vachliotis, Domos Consulting Engineers, Greece	
1000 - 1020	35	Lighthouse promotion and restoration as a historical, architectural and single-operating volume. An example using Killinis Lighthouse.	George E. Papandreou, Hellenic Ministry of Education and Religious Affairs, Culture and Sport, Greece Alexandros A. Vasilopoulos, Civil Engineer, Decentralized Administration of Peloponnesus, Western Greece & Ionian Directorate of Technical Inspection, Greece	
1020 - 1030		Overview of session and Q and A		

IALA Seminar on the Preservation of Lighthouse Heritage – Report

Time	Activity	Presenter	Chair
1030 - 1100	Refreshment / Coffee Break		
1100 - 1230	Seminar Conclusions & Closing		Bob McIntosh
1100 - 1200	Seminar Conclusions	Bob McIntosh	
1200 - 1225	Closing remarks:		
	Hellenic Navy Lighthouse Service	Commodore Konstantinos Manioloudakis HN, Director of the Hellenic Navy Lighthouse Service	
	Aristotle University of Thessaloniki	Professor Ioanna Papayianni	
	Hellenic Maritime Museum	Mrs Anastasia Anagnostopoulou-Paloumbi, President of the Hellenic Maritime Museum	
	Aikaterini Laskaridis Foundation	Mrs Marilena Laskaridis, Vice President of the Aikaterini Laskaridis Foundation	
1225 - 1230	Thanks from IALA	Bob McIntosh	
1230 - 1300	Refreshment / coffee break		
1300	End of Seminar		

IALA Seminar on the Preservation of Lighthouse Heritage – Report

Time	Activity
1430 - 2015	Optional Visit to the Acropolis Museum and the Acropolis Dress Code: Casual dress
1400 - 1405	Bus departure from Theoxenia Palace Hotel of Piraeus
1413 - 1415	Bus stop at Savoy Hotel of Piraeus
1418 - 1420	Bus stop at Efplias Hotel of Piraeus
1425 - 1430	Bus stop at Hellenic Maritime Museum
1430 - 1515	Transportation by bus to Acropolis museum
1515 - 1715	Visit Acropolis
1715 - 1730	Transportation by bus to Acropolis
1730 - 1930	Visit Acropolis Museum
1930 - 2015	Return to hotels / disperse to airport

ANNEX C WORKSHOP CONCLUSIONS & RECOMMENDATIONS

The conclusions from the seminar are not presented in any particular order.

	Conclusions
1	An institutional framework with criteria for characterisation of the traditional lighthouse as part of industrial heritage is required.
2	The location of equipment removed from a lighthouse should be researched and recorded.
3	Materials and construction details used in restoration should be recorded for the benefit of future restorers.
4	Repair techniques should, wherever possible, be reversible.
5	Restoration should be monitored closely, in order to be able to judge effectiveness and, if appropriate, learn what not to do in the future.
6	Using original materials is a good working premise but occasionally more modern materials may be an acceptable substitute.
7	When planning restoration, original materials should be analysed to ensure that any new materials are compatible.
8	Cleaning fluids / materials should be analysed for potential harmful effects before being used.
9	Alternative use of lighthouses should be adapted to the needs of the lighthouse and be in sympathy with its heritage value.
10	Access by the public to a restored lighthouse should be encouraged.
11	IALA has a role in sharing heritage experience and bringing together those involved.
12	There are now improved techniques for maintaining optics and the use of mercury can be avoided, therefore ensuring retention of existing, technically efficient equipment in service.
13	A means of putting together a worldwide lighthouse network for consideration by UNESCO should be investigated.
14	The IALA Heritage Working group should investigate the possibility of extending the Norwegian 'Kystreise' initiative.
15	Whilst it is available, efforts should be made to record the knowledge and experience of those working in the lighthouse service.

ANNEX D WELCOME REMARKS FROM MRS MARILENA LASKARIDIS, VICE PRESIDENT, AIKATERINI LASKARIDIS FOUNDATION

Good evening, ladies and gentlemen, distinguished guests, dear friends!

Lighthouses!!! For some unknown reason they invoke the most mysterious, deep rooted and primordial feelings in most of us! And surprisingly, these feelings are emotional and moving in all of the Lighthouses appearances.

From the weather-beaten, storm ridden, tempestuous roaring of the waves over them, to the most peaceful and serene becalmed seas on a nice day, they never fail to move the visitor. Again, whether he passes by on a ship or visits them ashore, their impact on our feelings and senses is never one of boredom.

Their myths and fables are legendary - from Homer's Rhapsodies, throughout the antiquities literature, historians' descriptions to outright mythical stories which trickle through the centuries until today.

Yet invariably, the lighthouses' inner meaning is one of hope. Hope for the sailors to avoid shipwrecking! More liberally they are regarded as cornerstones for everything that's positive and bright in human endeavour!

A lighthouse of hope, a lighthouse of brave examples or a lighthouse of knowledge, culture and education, to name but a few.

These latter metaphors are the ones we like best in our Foundation. They combine a genuinely honest interest in these historical and beautiful monuments, with an inspiration about the cultural, educational and social work undertaken in our Foundation.

Much as the lighthouses are found in remote places, and so does our own educational work, in which we take immense pride, taking us to Greece's most remote villages to build lighthouses of knowledge, education and simple human dignity, perseverance and endeavour!

We are very proud in cooperating with IALA, the Lighthouses Authority of the Hellenic Navy, the Aristotle University of Thessaloniki, and the Maritime Museum of Greece with which we pursue together the noble goal of furthering Greece's Maritime and Naval tradition – we are grateful for their cooperation and support!

Last year, HRH Princess Anne, the Patron of Trinity House visited us and expressed much interest in our work related to the preservation and restoration, as well as the documentation of the stone built lighthouses in our country.

Today, we are delighted to host all of you who share the same passion (and much of the responsibilities) of restoring, preserving and enhancing the cultural and educational importance of these wonderful reminders of the past.

Let us all work together towards this most desirable and noble goal!

I hope you will enjoy the proceedings of this symposium and your stay in Greece!

**ANNEX E WELCOME FROM VICE ADMIRAL EVAGGELOS APOSTOLAKIS HN,
HELLENIC NAVY, CHIEF OF THE GENERAL STAFF**

International Association Lighthouse Authorities representatives, esteemed guests, Ladies and Gentlemen,

It gives me great pleasure to welcome you in Athens for the summit of Preservation of Lighthouse Heritage 2013. We will make every effort to make your stay in our Country memorable.

Some may argue that lighthouses are obsolete and 'ghosts' of the past. Further, that lighthouses are only good for movie makers and are of no need in the era of modern navigation of GPS and the plethora of navigation safety aids.

However, those tend to forget that lighthouses are marking a nation's maritime history. Greece, as a maritime nation that respects its reputation and maritime culture, considers its lighthouses simply as part of its identity.

So, it's of no argue that for Greece and the Hellenic Navy lighthouses are just part of maritime self-esteem, tradition and culture.

Traditional stone lighthouses constitute a unique chapter in the history of the Hellenic Lighthouse Network and legacy. Nowadays, after years and many efforts, one hundred and forty - one lighthouses have been registered as traditional stone lighthouses out of which fifty - eight are occupied or supervised by traditional lighthouse keepers responsible for tending and caring for them.

Most of the stone lighthouses were manufactured in the late 19th and early 20th century and are significant historical monuments of special architectural construction. Despite their age and the historical context, they still continue to serve the development and safety of navigation.

Historical lighthouses are much more than simple points of reference for mariners; they are part of the modern Hellenic history.

To that context, Greek Government has, so far, issued preservation orders to protect forty - six of the historical lighthouses, registered as Preserved Modern Historical Monuments.

A great effort is also underway from the Hellenic Navy Lighthouse Service for maintaining more than fifty - eight lighthouses amid budget cuts.

Furthermore, sustained efforts of the Hellenic Navy Lighthouse Service has resulted in the reconstruction and preservation of almost fourteen historical stone lighthouses through European, public funding.

Ladies and gentlemen,

Greece is a maritime nation with a key strategic location. The Hellenic Navy is an important factor in the wider area of the eastern Mediterranean. We promote security and stability in the region and favour collaboration with our friends and allies.

Therefore, we are very happy to have you all here with us for this important event.

Special thanks go to our sponsors for this Summit:

The Hellenic Maritime Museum, which has exhibited great devotion and dedication to preserve our cultural and maritime heritage.

Aikaterini Laskaridi Foundation that has supported us through the years, with gestures as privately financing and sponsoring the complete renovation and restoration of three stone lighthouses in Poros, Cape Tenaron and Cape Maleas.

Last but not least, the Aristotle University of Thessaloniki that offered a number of significant exhibits for this event.

After 12 years since the last time that Hellenic Navy Lighthouse Service hosted the tenth IALA summit in Spetses, a lot has been done to improve the common awareness and communicate the necessity to preserve the lighthouse heritage.

Let this summit make possible the global competent bodies to sense the urgency of taking robust actions in preserving the Lighthouse Heritage.

On behalf of Greece and the Hellenic Navy I wish you an enjoyable and prosperous stay in Athens.

**ANNEX F WELCOME FROM MR. VASILIS MICHALOLIAKOS MAYOR OF
PIRAEUS**

Your Eminence,

Honourable Chief of the Navy,

Mr President of the Aikaterini Laskaridis Foundation

Dear friends,

It is my distinct pleasure and honor to welcome the International Seminar on the 'Preservation of Lighthouse Heritage' taking place here in our National Harbor. A harbour aiming to become a beacon for development, culture and progress in Greece, in the new era.

Furthermore I am happy for yet another reason. As Secretary of Defense I had the honor of working with Mr. Laskaridis noting his passion for culture and lighthouses.

In fact I witnessed his initiatives for the reconstruction of several lighthouses including the Lighthouse in Tainaro, which is located in my homeland. Moreover he achieved his goals with his own private resources saving the Greek state from spending its own money.

I believe that in the near future along with the Aikaterini Laskaridis Foundation and our glorious Navy we will be able to coordinate new initiatives and actions here in Piraeus for our Culture and Maritime.

Dear friends,

The lighthouses throughout the ages were beacons for safe navigation and signs of hope for hundreds of thousands of sailors as well as point of reference for cities and cultures.

I think lighthouses in the modern era should be rescued, they can be used for many different cultural purposes but most of all emit a new bright light: the light of Culture and Seamanship.

Hoping that the beacon we lit up today here in Piraeus will send out a message of hope and optimism in the world, I welcome you to our city.

ANNEX G WELCOME FROM PROFESSOR IOANNA PAPAYIANNI, ARISTOTLE UNIVERSITY OF THESSALONIKI (AUTH)

WELCOME SESSION

Dear Mayor,

Dear representatives of the Hellenic Authorities,

Dear Secretary General of IALA,

Dear President of Aikaterini Laskaridis Foundation,

Dear friends and Students,

We are here to celebrate the inauguration of the exhibition “Historic Lighthouses: from the past to the future” and the Seminar on the Preservation of Lighthouse Heritage.

Our presence manifest that the interest of the International society for historic lighthouses continue to fascinate the soul, because the light piercing the darkness in the sea, symbolize the human will for sharing new experiences and better life.

Many values are included in the simple stone towers of Lighthouses: historical, architectural, technological, artistic, symbolic. They are also closely connected with the life of local communities.

As you know, Lighthouses suffer from the synergy of the seawaves and winds which destroy the materials and foundation of the Lighthouse buildings. The access and rehabilitation of them is urgent and costly.

In the Exhibition and the published catalogue of it, which are the deliverables of EC-PHAROS project coordinated by Aristotle University, a holistic process for the preservation of Lighthouses considered as part of cultural heritage is presented.

At the end of the seminar we hope to propose tools for making the preservation of historic lighthouses cost effective and the integrating of them in modern society successful.

Thank you

CLOSING SESSION

I would like to thank Bob McIntosh and Mike Hadley, all lecturers and participants for making this seminar successful.

I am very satisfied with the conclusions extracted and I hope significant progress steps to be made in the near future. I much appreciated the concluding item concerning the need for monitoring that I had also pointed out on my lecture.

It's the only way to learn from our mistakes and it is feasible. We can create simple survey sheets for lighthouse buildings, which can be completed by the lighthouse keepers and stored in a relevant archive. We will make an effort to this direction.

From my side, representing AUTH, we will continue supporting any activity aiming at putting the preservation of historic lighthouses on a scientific basis and disseminating knowledge about them.

ANNEX H PROGRESS SUMMARY, BOB MCINTOSH, NORTHERN LIGHTHOUSE BOARD AND CHAIR OF IALA HERITAGE WORKING GROUP

Good evening Ladies and Gentlemen,

I am here today in my role as Chair of IALA's working group on Heritage and Conservation matters relating to Historic Lighthouses and other Aids to Navigation and Equipment. I have been involved in the work of this group now for about 13 years since I first attended a meeting hosted by the Northern Lighthouse Board in Scotland in 1999.

The work of the group has always been centred around providing guidance to IALA members on matters relating to the Historic Lighthouses within their estate. At an early stage the group tried to define a Lighthouse with criteria such as 'designed as a manned station', 'consist of several buildings', 'height of greater than 10m', 'a range of greater than 15 miles' and 'used for general navigation'. In addition to these a Historic Lighthouse would be classified using criteria such as 'Age', 'Engineering and Technical Achievement due to its location or age', 'Architectural, national or Local interest' and 'Archaeological importance'. An Historic Lighthouse was not required to satisfy all these criteria but a significant number was appropriate.

The topics covered by the Working Group over the years have been wide ranging.

Alternative Use was a phrase which came up many times but this was later changed to Complimentary Use to reflect the groups feelings that any alternative use should be carefully considered and selected to reflect the Heritage value of the Lighthouse, possibly unlike these options.

The use of redundant Lightkeeper's houses on mainland sites in particular has proved to be some of the most successful re-use of lighthouse authority property. In most cases it is likely that modernisation of the properties will be required with the ongoing cost of maintenance of the buildings but some authorities have found this a suitable means of raising funding to allow the overall costs of the Aid to Navigation to be reduced.

There may be possible conflicts on a site caused by alternative use particularly if the authority has not been careful enough in any disposals or is unable to enforce conditions which were attached to the disposal, often after the property has been sold on by the original purchaser. Even contracts for a lease can often be difficult to enforce without lengthy and costly cases in the courts. In some ways the main reason for the use of the word complementary is to try and ensure compatibility between the AtoN and the other users. In Spain for example they have produced a list of controls in relation to items such as posters, painting, lighting, car parking etc.

Another suitable type of complementary use can be linking it with the tradition of allowing public access to lighthouse properties and in particular the lighthouse towers. In Scotland, as in many countries, there has been a long tradition of the Lightkeepers being allowed to show members of the public around the lighthouse and the station and explaining how the light, fog signal etc. operates. Although there was a significant demand from the general public, providing access to lighthouses after automation was difficult with staff not based at the lighthouses.

However local groups who were sufficiently organised to provide staff and take on the role as tour guide have allowed our organisation to satisfy the public demands at selected sites with a suitable contract and without the need to provide staffing other than for occasional visits and checks.

As well as these groups providing assistance with public access they have also shown interest in combining it with a visitors centre, small museum or exhibition area. At the moment we have 4 sites which have significant public access and one also has a small museum with a café, another has visitor centre with links to the Royal Society for Protection of Birds (RSPB) and have very recently opened an exhibition area including redundant fog signal engine room and two stores converted to exhibition areas relating to the history of the lighthouse and its Lightkeepers in particular.

Our guidelines which were published as part of the IALA Lighthouse Conservation Manual and subsequently others published separately have covered advice on many aspects of these topics for example making a visit safe, attractive and interesting or legal issues, agreements and

business plans for complementary use as well as others on National Conservation Plan and the Management of Surplus Lighthouse Property. Details of these guidelines can be found on the IALA website.

We are here today of course to start the proceedings of this third IALA Heritage Seminar and the group feels that the main objectives are to:

- Share expertise;
- Exchange information;
- Learn from the experiences of others, what to do or what not to do!

Public support for Historic Lighthouses is worldwide, and many authorities continue to use them to present their public image. The managing director of one of the supporters of the Seminar in Gothenburg told us that although his company produced several hundred million euros of exports for Sweden, he never received the level of positive publicity that came from his offer to use some of his spare capacity to assist with the project to refurbish the Pater Noster Lighthouse.

We therefore hope that you will help us to achieve these objectives for this week's seminar but also take forward the aspirations of the Working group to protect these icons that are Historic Lighthouses and to ensure that they will survive to allow future generations to appreciate their significance.

**ANNEX I INTRODUCTION FROM THE DIRECTOR OF THE HELLENIC NAVY
LIGHTHOUSE SERVICE, COMMODORE KONSTANTINOS
MANOLILOUDAKIS HN**

Mr. Commander of the Hellenic Navy Logistics command, Mr. Secretary General of the International Association of Marine Aids to Navigation and Lighthouse Authorities, Mrs. Professor representative of the “Aristotle” University Of Thessaloniki, Mrs. President of the Hellenic Maritime Museum, ladies and gentlemen delegates. I welcome you, with great pleasure to the Athens Seminar of IALA “Preservation of the Lighthouse Heritage”.

You are in Greece in a really nice season and I wish you a pleasant stay and great success to the Seminar. I hope that this seminar as well as your visit to the restored Dana Lighthouse of Poros Island will be the reason to visit Greece again for many more days.

The sea has always offered people food and particularly easy prospects for transport and later for the growth of trade. When people began to explore and conquer it, they realized the necessity of appointing certain marks on the coasts which would assist both safe navigation and their safe return home. These were natural marks on the coasts such as capes, hills, rocks, monuments and fire on towers. The light in the night and the smoke during the day were visible from a great distance. And thus ,the torch/lighthouse was created.

According to mythology, the ancient seafaring peoples of the Eastern Mediterranean Sea such as the Phoenicians, Cretan- Aegeans/Greeks and the Egyptians on the banks of the Nile used torches, as aids to navigation.

This has continued until today. A huge network of lighthouses and torches has been developed which regardless the technological developments is still serving seafarers.

Greece, right after its liberation and its organization into a state entity, not only continued the operation of the Lighthouses and torches received by the Ottoman state but also installed new ones, where required, according to its financial capabilities. So, the first "Light Aid to Night Navigation" is the Torch on the "Tramountana" quay in the harbor of Aegina island.

The next two lighthouses in the harbors of Spetses and Kea Islands were built by private initiative according to the oral tradition.

According to Gisis Papageorgiou's book "Greek lighthouses", the first legislative care of the newly established Hellenic state was included in the Royal Decree of December 16th 1834 "On the Organization of the Port Authorities", according to which the proper operation of the lighthouses was assigned to the local port authorities

Authorised for the construction of the Lighthouse buildings was «the Secretariat of Interior Affairs", forerunner of the "Ministry of Interior Affairs", which was also responsible for the construction of any state building.

In 1852 an organized service of "lighthouses and torches" was formed for the installation, maintenance and operation of the lighthouses' network under the responsibility of the Ministry of Naval Affairs. Later on, after the annexation of the Dodecanese in Greece in 1945, the Hellenic Navy, as successor to the Ministry of Naval Affairs, undertook the task of maintaining the lighthouse network which extends from Lemnos island, Agios Efstratios islet to Megisti islet in Castelorizo and from Gavdos island to Othoni islet.

Unfortunately, during the Second World War many lighthouses along with the dwellings of the lighthouse keepers had been destroyed by the German occupation forces in their attempt to block the action of national and allied resistance groups that were coming from the Middle East. In the coming years after the liberation, due to the economic hardship, it was difficult for the Greek state to allocate the necessary funds to restore all of the about 200 stone lighthouses.

The above, combined with the view of some technocrats that "the lighthouses were no longer useful and necessary for the navigation" made the preservation of the lighthouses difficult and left it in a few idealists and lovers of tradition.

All these years the Hellenic Navy has made a huge effort ,without help from anyone, to restore and maintain the extremely beautiful stone lighthouses and torches using amounts from its operating budget.

During the last years the effort for their maintenance, rehabilitation and rescue is being assisted by distinguished Greek people.

Furthermore,efforts are being made to include the maintenance of the lighthouses in "The European Programs for the protection of the cultural heritage " since the lighthouses, are the jewels of the Hellenic and European tradition.

The Hellenic Navy, in an attempt to make the restored stone lighthouses inhabited as much time as possible, allots them to its staff for holidays in return for a small fee.

**ANNEX J INTRODUCTION FROM THE PRESIDENT OF THE HELLENIC
MARITIME MUSEUM, MRS ANASTASIA ANAGNOSTOPOULOU-
PALOUMBI**

Honourable ladies and Gentlemen, Members of International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA).

On behalf of the Board of Directors I welcome you to the Hellenic Maritime Museum.

We are very pleased and honoured to host in our premises the proceedings of IALA's third international seminar on the subject of preservation of traditional lighthouses.

In a changing world, the old lighthouses around the seas of the globe tend to be decommissioned. IALA is an organization of international prestige and scope and the fact that old beacons are in the range of its actions, demonstrates the enduring value of these buildings and mechanisms, as monuments of humanity's technological and maritime achievements.

Greece with its extended coastline has one of the longest dense and more organized lighthouse networks in the world. The work of the Hellenic Lighthouse Service employees is really extensive attending for its ordinary function and its continuous renovation.

Many of the lighthouses in the Hellenic seas, proud stone buildings of the 19th and the beginning of the 20th century are closing their life of function and hence, unavoidably get abandoned. The towers and the old mechanisms are threatened from the implacable time ruin. This destructive course the last approximate 20 years is reversed thanks to the systematic action of the scientific and state institutions, eminent civilians and of course the Hellenic Lighthouse Service.

The Hellenic Maritime Museum as the country's official cultural institution which has among its objectives the preservation and projection of the Hellenic maritime culture has included in its permanent exhibition some rare examples of old lighthouse mechanisms, showing to its visitors the cultural value of these monuments of the modern Hellenic maritime history and tradition.

We thus approve and support, as much as we can, the actions that have as scope the protection and preservation of these elegant monuments and have become the proud witnesses of the Hellenic seas to the international navigation during last century.

Given the above we'll attend with special interest the outcomes of your scientific seminar that begins today.

I wish you a productive and fruitful seminar, which I hope will be combined with an enjoyable recreational experience of the beautiful and sunny Greece.

Thank you.

ANNEX K SCRIPT OF PRESENTATION BY STUDENTS FROM THE NATIONAL TECHNICAL UNIVERSITY OF ATHENS

1 INTRODUCTION

Good afternoon ladies and gentlemen,

We are a group of six students of architecture and engineering at the National Technical University of Athens. Last summer we visited the island of Andros, in the Cyclades, for our vacation. One day we decided to have a walk to the hill of Castri where the lighthouse of Gavrio stands since 1874.

The lighthouse with the number 8022 was standing there abandoned and almost destroyed by the time and the aggressive climate of the region. We couldn't help but wonder if this historic building could revive.

Trying to find more information about the lighthouse, we got in touch with the Lighthouse Service of the Hellenic Navy, and in particular with Mr. Panos Chiotis, who was very willing to help us. A month later, we visited again Andros and we started voluntarily our study for the restoration of the lighthouse.

Today, we will briefly present you the building, its main failures and some of the actions proposed for the restoration.

2 HISTORY

The lighthouse of Gavrio was constructed in 1874 in the northwestern part of Andros island, called Castri, by the "Administration Generale des Phares de l'empire Otoman".

In 1941, it was destroyed by the Germans and it worked again around 1945. Documents and reports of 1947 found in the files of the Lighthouse Service testify the poor condition of the building yet in that period.

In 1953 the light became automatic and was placed on a concrete base above the building tower. Various historical sources report that the addition of the second floor and the construction of the small house took place in the 50s. Today, the light is placed on a metal structure just in front of the building.

3 FEATURES

The building of the lighthouse has a rectangular shape, with dimensions 5x4m, with an area of 11 square metres per level. It consists of two levels, the ground floor and one more floor, while the total height from the ground level reaches 8 metres.

The stonework is the bearing structure of the building while the edges are supported and highlighted with chiselled rectangular cornerstones. The stonework of the first phase of the building, the ground floor, consists of semi-chiselled stones, at least externally, while internally is covered with plaster. The four openings at this level are arched. However, the stonework of the second floor consists of rough local stone, while almost entirely is not covered by render and openings are rectangular.

4 THE TOWER

The tower is located on the south side of the building and it protrudes from its outline by about 65 centimetres. The cross section is rectangular up to a height of 3.80 metres, while continuing with a round cross-section with diameter 1.26 m. up to a height of 8 meters. The stonework of the tower consists of carved stones, similar to the cornerstones.

The staircase leading to the metal cage of the old luminaire is exterior, made of marble stone and climbs around the outer wall of the tower giving a great plasticity to the building.

The building of the lighthouse is generally in good condition. It seems strained by time and aging of materials, to which contribute also the climate of the region and the immediate vicinity with the sea, because of the salt, humidity etc.

One of the main problems is the partial roof collapse, from which remain only a few wooden timbers, broken and in bad condition. Generally the stonework does not have critical and deep cracks, but a few surface linear cracks on the masonry. The main consequence of the humidity that has to be conformed is the general leaching of the mortar in all the stonework. There is also a notable disorganization and detachment of several stones located on the foundation. There is lack of all the window frames and of the internal wooden staircase that offered the connection between the ground and the upper floor. Furthermore, we found only a few collapsing wooden timbers of the upper floor and no more elements of the wooden flooring. The auxiliary building has a notable collapse of its eastern wall and the roof is also missing.

5 PRINCIPLES AND OBJECTIVES

The proposed interventions are documented based on the promotion and preservation of the original morphological, technological, architectural and historic value of the monument. For this reason, the proposal maintains the existing structural elements that are sanitized and amplified with as milder interventions as possible. Goal is that all operations to the extent are mild and reversible, while the morphological characteristics will be maintained in their entirety.

The masonry will be cleaned of all the loose mortars and the loose stones will be removed and replaced of healthy ones. Deep mortar is proposed for all the stonework and especially to the parts that the stone disorganization is more intense, like at the east part of the foundation. Injection material will be used where necessary for the stonework, compatible to the existing elements. A new roof slab will be constructed, based on hoarding like the original and consisted of different material layers in order to avoid humidity. New wooden window and doorframes will be placed and a wooden staircase will be constructed where the former one was.

The auxiliary building will be reconstructed, hosting secondary functions. If necessary, a drainage ditch will surround the building.

6 CONCLUSION

After the restoration, the building will be able to host up to four people and can be reused as a residence, as a shelter, a hostel, for public or private use, depending on what the Lighthouse Service will finally decide.

The lighthouse, at the top of the hill Castri, being a landmark of the port and the island, will constitute a walk destination for the residents and the tourists.

For us, it is the first project we work voluntarily on, that will probably have the opportunity to be realised, after all our university works and studies. During the last 8 months we learned a lot of things, discussing with our professors, other students, with people from the Lighthouse Service, from the Greek Ministry of Culture and with residents of Andros Island.

It was a great opportunity to learn about the big lighthouse network and its importance for the sailors and the Greek navigation, that we were completely unaware of.

For that reason we need to thank the Hellenic Navy, Mr.Chiotis and all the people who contributed with their help and knowledge. It was a great pleasure and honour for us to participate in this seminar the last days and we have to thank Aikaterini Laskaridis Foundation and of course you all for the knowledge you shared with us.

<http://www.faros8022.blogspot.gr>

**ANNEX L FAREWELL SPEECH OF THE DIRECTOR OF THE HELENIC NAVY
LIGHTHOUSE SERVICE, COMMODORE KONSTANTINOS
MANIOLOUDAKIS HN**

Mr. Admiral I. Maistros, Commander of the Hellenic Naval Academy , Mr. Ron Blakely, Mr Bob McIntosh, Mrs. Professor Ioanna Papayiannis, representative of the “Aristotle” University of Thessaloniki, Mrs. I. Paloumpis President of the Hellenic Maritime Museum, Mrs. M. Laskaridis Vice President of the “Aikaterini Laskaridis “ Foundation, ladies and gentlemen delegates. I would like to thank you for your participation in the IALA Seminar “Preservation of the Lighthouse Heritage” .

I hope you had a good time. I think that the seminar was successful and the views that were heard from the speakers will give rise to further speculation.

I am fully convinced that the opinions which were exchanged as well as the presentation of the methods for the maintenance of the buildings and the mechanisms of the lighthouses will give the opportunity for further collaboration among those who were involved in the seminar.

I ,personally, heard a lot of interesting methods for the maintenance of the mechanisms which take special care both for the protection of the environment and the personnel that maintains the lighthouses.

Finally, the opinions which were heard about the utilization of the lighthouses will constitute elements for further thinking now that in my country are ongoing discussions on changes of the legal status.

In particular, I would like to focus on the presentation made by the young students of architecture who with enthusiasm and personal effort studied and organized the restoration of the lighthouse in Andros island. This effort and these images I would like you to take with you when leaving Greece because these young architects express the real Greece and not the one that has been presented through the newspapers and televisions all around the world for the past three years .

I wish a pleasant stay in Greece to those of you who will continue your holidays and we will be available if you need any help and good return home to the rest of you.

Finally, I would like to thank my partners from the Lighthouse Service and the Translation Team of the National Defence General Staff for their contribution to the preparation and the conduct of the seminar.

And now I would like to offer the emblem of the Lighthouse Service to Mr Mike Hadley, Mr Bob McIntosh, Mrs. Professor Ioanna Papayiannis, representative of the “Aristotle” University of Thessaloniki, Mrs. I Paloumpis, President of the Hellenic Maritime Museum, Mrs. Marilena Laskaridis, Vice President of “Aikaterini Laskaridis “ Foundation, for their contribution to the successful conduct of the seminar.