IALA GUIDELINE

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THEFT AND VANDALISM DETERRENTS

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DOCUMENT REVISION

Revisions to this document are to be noted in the table prior to the issue of a revised document.

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1. SCOPE

The scope of this document is to provide information on theft and vandalism at Marine Aids to Navigation (AtoN) sites, which is an issue affecting many countries and regions.

2. AIM

The aims of this guideline are:

1 Provide a definition and examples of theft and vandalism in the context of an AtoN site.

2 Provide details of the detrimental effects of theft and vandalism at an AtoN site.

3 To provide information on previous experiences faced by authorities or organizations that deal with theft and vandalism issues. Details of methods that have proven successful in deterring or decreasing theft and vandalism are provided.

3. INTRODUCTION

Theft in the context of this guideline can be defined as the act of stealing or the wrongful taking and carrying away of any element, component or piece of equipment from an AtoN site.

Vandalism can be defined as an action involving deliberate destruction or damage to an AtoN. Unreported damage to floating or fixed AtoN caused by passing vessels may also be considered in this category.

Theft and vandalism is an issue that generally affects many countries around the world but is more prevalent in some regions. The type, extent and severity of theft and vandalism may vary greatly but generally results in a decrease in the availability of an AtoN, in some cases to the point the AtoN is no longer operational or functional. As AtoN often mark hazards and assist with navigational safety, this raises serious implications for shipping safety and protection of the marine environment.

Theft is principally associated with the removal of AtoN equipment or power supplies (particularly solar panels and batteries), whereas vandalism would normally be associated with either deliberate or unprovoked malicious damage to the AtoN equipment or the AtoN site.

The cost of repairing or reinstating stolen or damaged AtoN or AtoN sites is a major issue, highlighting the need for effective theft and vandalism deterrents.

Damage to AtoN on buoys is often caused by fishing vessels tying up to the buoy as AtoN buoys are a good environment for fish to congregate. Damage to the AtoN equipment can be caused by impact from the vessel or theft. The Buoy may be even dragged out of position.

A theft or vandalism deterrent can be defined as a device, object or method that prevents or minimizes the chances of theft or vandalism of AtoN components.

Due to its opportune nature, it is difficult to predict the likelihood of theft or vandalism at a particular site unless it is an issue experienced regularly in that area.

The identification of the appropriate deterrents should be something an authority or organization can identify through assessment and evaluation of historical information.

Effectively implemented, theft and vandalism deterrents can be a valuable tool for cost saving and improving AtoN availability.

Figure 1 Examples of damage, theft and gunfire to AtoN

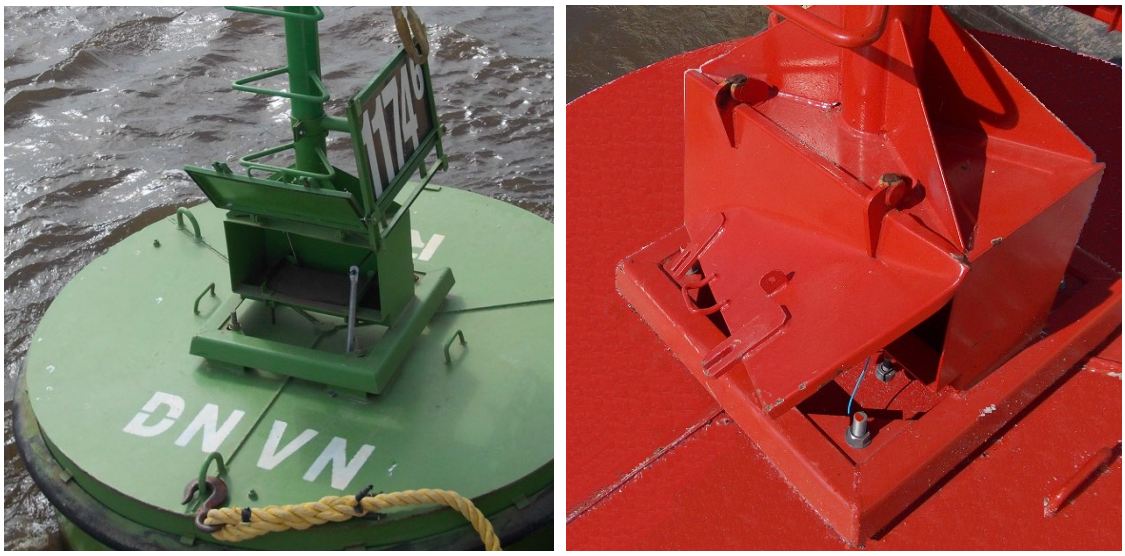

Figure 2 Examples of theft from steel battery boxes

4. METHODS FOR DEALING WITH THEFT AND VANDALISM

The exact method of deterring theft and vandalism will be designed or chosen to suit a specific location. However, if it is possible to address the root cause of the theft and vandalism this will provide a long time solution to the problem.

There are many different methods of deterring theft and vandalism.

1 Incorporation of site security and theft prevention in the initial design process.

2 Retrofitting features to prevent site access or component theft.

3 The education and engagement of communities in the function and importance of the AtoN to navigation and the local environment.

4.1. CONTROL OF ACCESS

1 Theft on an AtoN site is only possible if the criminal can access the site or structure.

2 Methods to restrict access to AtoN sites and structures include the following:

a Site:

i Perimeter fencing of the site; used at lighthouses beacons and meteorological stations.
ii Locking arrangements. Special padlocks and tamper proof fasteners.
iii Security personnel, at sites close to ports or cities.
iv Alarming systems; sound, flashing lights and remote alarms.

b Ladders:

i Gates;
ii Removable ladders.

c Structural components:

i Spikes or anti climb devices fitted to limit climbing.

Figure 3 Example of meteorological station protected by a fence

Figure 4 Example of special device to lock super-structure

4.2. DESIGN

Theft and vandalism deterrents should be included into the initial design of an AtoN. Identification of appropriate measures should be included in the design at a very early stage. This will then avoid the costs associated with structural or design alterations at a later stage. This should effectively prevent the theft and vandalism issues right from the start. The design process should ensure that the installation of the deterrents is not detrimental to the performance of the AtoN.

Many different approaches may be considered at the design stage, depending on the site and type of AtoN and may include:

- The incorporation of security fences or other methods of preventing unauthorized access to the site.
- Installing lanterns and power supplies as high and securely mounted as possible and ensuring the structure is difficult to climb.

  However, the access for maintenance must be considered.
- Designing battery storage to be as inconspicuous as possible.
- At the design stage of an AtoN system consideration should be given to the use of modern self-contained lights with integral solar systems that have no other applications that may be attractive to criminals.

  This can be a first step in discouraging theft.
- The consideration of a 6-volt system where the low volt components are less attractive to criminals.
- Use of tamper proof screws and fixings that will require specialist tools for their removal.
- Use of protective coverings or glass over solar panels, however it must be noted that this will reduce the solar performance.
- Review the implications of installing theft and vandalism deterrents on maintenance procedures and access for staff.
- Designing buoys to prevent unauthorized access may be considered but is particularly difficult to accomplish.

Figure 5 Examples of beacon protected access

Figure 6 Examples of security and signage

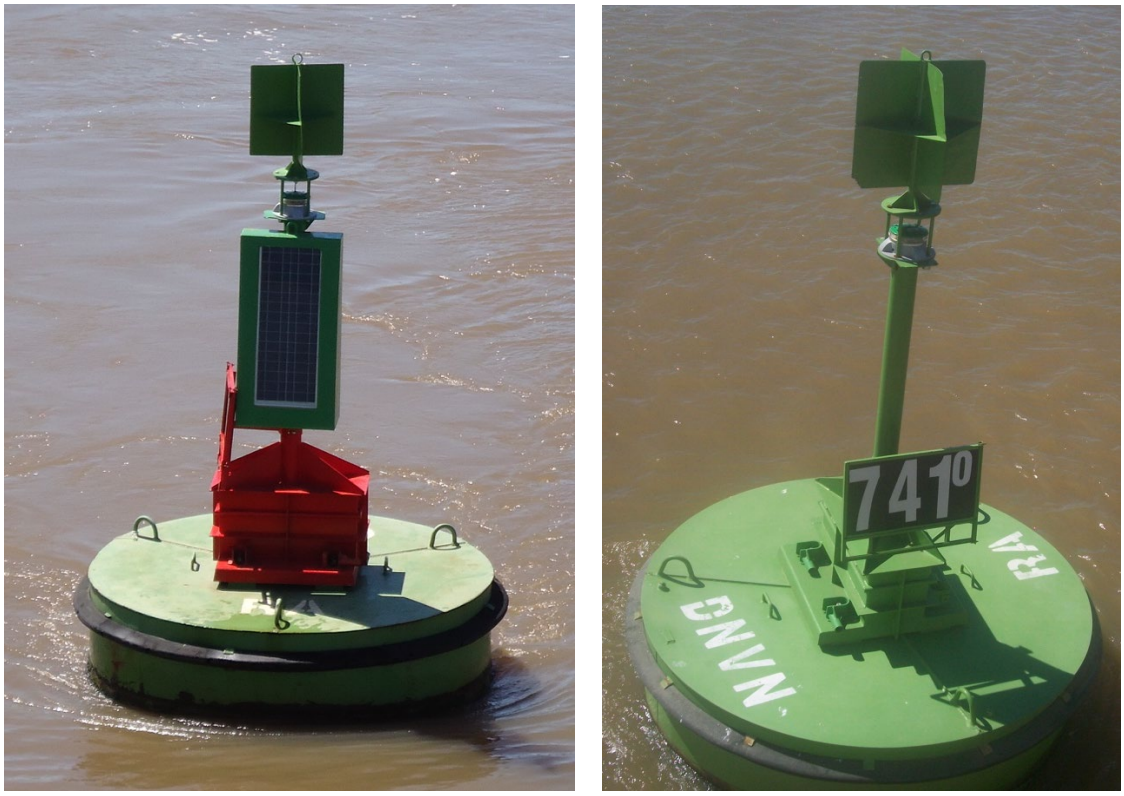

Figure 7 Example buoys with robust steel battery boxes and solar panel.

Figure 8 Buoy super-structures with solar panel protected by an impact resistant glass inside a steel box.

4.3. REMOTE MONITORING, SURVEILLANCE AND SIGNAGE

The increasing availability and development of remote monitoring technology provides an option to monitor remote sites. It will be possible to identify situations where an AtoN stops operating, although it would not be possible to identify if the cause of that outage is theft or vandalism.

The main value will be the notification of the need to respond, rectify and investigate.

The use of video surveillance is another method of deterring and monitoring theft and vandalism. This is more suitable for areas where an adequate response is available when surveillance identifies a situation involving theft or vandalism.

The effectiveness of these deterrents may be enhanced through the incorporation of security and warning signage that advertises the presence of such systems, and possibly also the penalties associated with theft, vandalism and unauthorized access.

Warning signage on its own provides a very basic level of deterring unauthorized access. If utilized as the sole deterrent method, it relies on the inherent goodwill of a would-be trespasser. Signage could include:

- Owner of AtoN
- Purpose of AtoN – benefit to mariner – “damage it today but you may need it tomorrow”.
- Law applicable
- Penalties
- Site hazards
- Approach areas
- Graphical symbols

Figure 9 Examples of signage

4.4. SELECTION OF APPROPRIATE ATON EQUIPMENT

One of the primary targets of theft and vandalism are power supply components such batteries and solar panels which have a high resale value or can be easily re-used in other applications.

The use of self-contained lanterns, i.e., lanterns that have in built batteries and solar panels may prove a far less enticing target than having standalone batteries and panels that are conspicuous, modular and therefore can be easily removed.

These self-contained lanterns are only available for short or medium range applications and as such it will be necessary to ensure they meet the requirements for that site.

Figure 10 Examples of Use of Self-Contained Lanterns

4.5. THEFT DETERRENT DEVICES

The use of retrofitted engineering solutions for the prevention of theft may be required at sites where self-contained lanterns may not provide the required range and also where remote monitoring or other methods of surveillance and notification of theft are not possible.

Figure 11 Examples of engineered methods of theft deterrents, including fabricated stainless steel security frames for batteries, solar panels and lanterns.

Figure 12 Examples of AtoN where mechanical protection has failed.

4.6. COMMUNITY ENGAGEMENT AND PUBLIC AWARENESS

The proximity of an AtoN to nearby communities, towns, cities or other developments is often one of the largest theft and vandalism drivers.

Education and awareness are important aspects to ensure communities and local users understand the purpose of the AtoN to maritime safety and the potential impact of it being not operational. The potential financial, safety and environmental impacts of a maritime incident should be communicated to the local population and users.

There are many factors related to this social aspect of theft and vandalism including but not limited to:

- Remoteness and location of site
- Lack of surveillance or presence of functional law and order
- The level of socio economic development or other economic developmental pressures
- Population pressures

Figure 13 Example of public presentation of the importance of local aids to navigation system.

4.7. AIS MONITORING

As mentioned previously, there may be unreported damage from vessels colliding with buoys and beacons.

Such events can be investigated if there is AIS surveillance of the waterway. The offending vessel can be identified providing it is fitted with an AIS transponder.

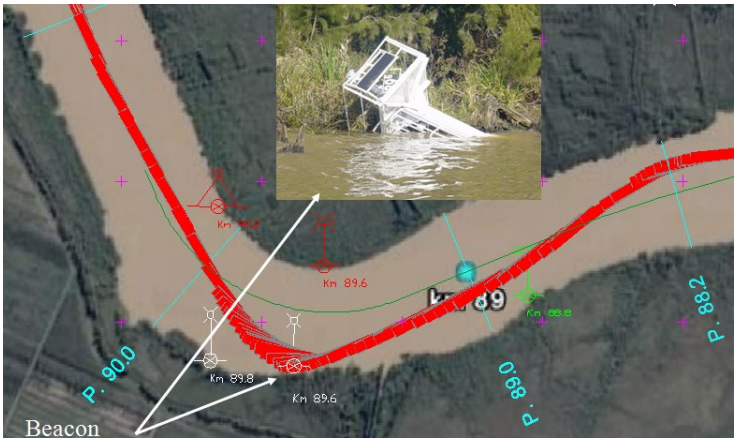

Figure 14 The picture shows the AIS track of a vessel on an electronic chart display. The inset picture shows the damaged beacon at the collision point.

5. COSTS ASSOCIATED WITH THEFT AND VANDALISM

The cost of repairing or reinstating stolen or damaged AtoN or AtoN sites will be a major consideration that highlights the need for effective theft and vandalism deterrents.

The protective structure and devices will themselves require maintaining and will thus increase the time and the cost of future maintenance of the AtoN. In the case of buoys, the protection of batteries and solar panels may require the change to a larger buoy body with consequential increases in capital costs and future maintenance costs.

6. DEFINITIONS

The definitions of terms used in this Guideline can be found in the *International Dictionary of Marine Aids to Navigation* (IALA Dictionary) at http://www.iala-aism.org/wiki/dictionary and were checked as correct at the time of going to print. Where conflict arises, the IALA Dictionary should be considered as the authoritative source of definitions used in IALA documents.