Title: Draft Statutory Instrument for the Merchant Shipping (Cargo Ship) (Bilge Alarm) Regulations 2020 on cargo ships of less than 500 gross tons and which are 24 metres or more in length. **Date**: 06/03/2020 **DMA No:** DfTDMA136 **Lead department or agency:** Maritime and Coastguard Agency **Other departments or agencies:** Department for Transport	De Minimis Assessment (DMA) **Stage**: Consultation **Source of intervention**: Domestic **Type of measure**: Secondary
Summary: Rationale and Options	**Contact for enquiries:** Luke Hallett Luke.Hallett@MCGA.gov.uk

Total Net Present Value	Business Net Present Value	Net cost to business per year (EANDCB in 2016 prices)
-£0.9m	-£0.9m	£0.1m

Rationale for intervention and intended outcomes

Currently, cargo ships of less than 500 gross tons and which are 24 metres or more in length are limited in the number of regulations which are applicable to them, as they fall out of International and Domestic conventions such as - Safety Of Life At Sea (SOLAS) which applies to vessels over 500 gross tons, other than the Radio Regulations which is starts from 300 gross tons.

Vessels and crew are being put at higher safety risks, as there is no standard safety guidance which they legally have to follow, due to failure in the Governments regulatory regime resulting in vessels all being maintained to different standards and crew being unaware of the standard.

Therefore, the limited legislation that is required for these criteria of vessel is the following

- International / UK Load Line regulations

Supporting guidance is also available as follows;

- MSN 1752 Load Line regulations
- MGN 425 - risks of crew sleeping aboard “deadships”

Furthermore, the only construction requirements for these vessels is under Classification Society rules. Bilge water detectors and alarms are not mentioned as a requirement. The bilge is the lowest internal portion of the hull of a ship where the bottom curves up to meet the sides, bilge water detectors are stationed here to detect leakages before vessel stability is brought into question.

Therefore, government intervention is needed to start correcting the gap in regulation, which can be seen as a regulatory failure on the part of the Government. Resulting in market failures persisting in the case of these ships when it comes to bilge water detectors. There are two market failures which are present: imperfect information and negative externalities.

Due to the current gap in regulation there exists imperfect information for operators, as operators may not be aware of the full benefits of bilge water detectors, and how much they can reduce the probability of accidents and damages from unknown leakages in the bilge. Most operators will be aware of the costs for installation of bilge water detectors and emergency alarms but not fully aware of the benefits.

Negative externalities arise around the difference in private benefits which operators receive from these bilge water detectors and the social benefits. Operators only receive part of the benefits which these represent, by preventing the loss of a vessel via an incident which is prevented due to the bilge water detector the operator benefits from keeping the vessel. However, this prevention represents a larger benefit to society the loss of a vessel has the potential to result in injury/fatalities, damage to the environment through from the release of pollutants at sea and the clean-up of the wreckage.

Due to operators bearing the full cost of installing bilge water detectors and emergency alarms but not receiving or knowing the full benefits leads to underutilised in the absence of intervention.

By creating the proposed Statutory Instrument (SI) requiring these vessels to fit bilge water detectors and alarms, this will reduce the risk to ships, crew when onboard and the environment to a more tolerable level. While correcting the problem of imperfect information and helping bring down the likelihood of these negative externalities.

Intended outcomes

The policy has one intended outcomes:

i. To reduce the risk of vessel loss and potential loss of life from incidents of unknown flooding in the bilge spaces. By having all Cargo vessels 24m length or greater and less than 500 gross tons to be fitted with Bilge water detectors in engine rooms and other substantial compartments that could threaten the vessel's buoyancy and stability if flooded. These can sound emergency alarms in all accommodation spaces when the central control station is unmanned.

Describe the policy options considered

The "Do nothing" scenario is the baseline against which Options 1 and 2 are assessed. This would not comply with one of the values of the MCA of doing everything within its capacity to ensure the safety of lives at sea as far as possible. As such the do-nothing option is not considered a plausible option to achieve the intended outcomes of this legislation.

"Do nothing" - This would result in the Marine Accident Investigation Branch (MAIB) recommendation not being addressed and in scope vessels not being required to fit bilge water detectors and alarms. This does leave in the regulation of these vessels resulting in the risk for those crew onboard being put at undue risk and may cause reputational loss for the UK's MCA for not implementing safety recommendations.

Option 1 – This would implement and close the outstanding MAIB recommendation by legally requiring any cargo vessels that fall under the criteria of 24m length or greater in length and less than 500 gross tons have fitted and installed bilge water detectors and alarms. This will help alleviate the present market failures (borne from imperfect information and negative externalities in the market) and this will reduce the risk to vessels, crew when onboard and the environment to a more tolerable level. By doing this, it'd also start the process of implementing safety standards for Cargo Ships 24m or more in length and under 500 gross tons which fall between the scopes of existing Codes and international conventions.

Option 2 - is to create a new voluntary code for Cargo ships of 24m or more in length and under 500 gross tons. This would help close the current regulatory gap and introduce standards for the entire vessel including the requirement for bilge water detectors and alarms. Presently, this is not a viable option as to produce a fit for purpose code would require extensive external and internal stakeholder engagement which could take up to 14 months to produce while working with sufficient resource, however, currently there is not enough capacity pushing those estimated timelines back. Furthermore, as this would be a voluntary code it would not have any legal standing and therefore some operators/ owners may not adhere to the safety requirements proposed.

Our preferred option is option 1, as this will start to close the regulatory gap, acting as a steppingstone towards a full code for the vessels in scope. Meeting the MAIB's recommendation that this is a priority due to past incidents like the Abigail H, lowering the risk of vessel loss and loss of lives onboard these vessels at sea and remedy the Government failure and associated problems in the present market. This will be reviewed via Post Implementation Review (PIR) after 5 years, as to whether or not it will be merged with option 2 once resource is available to produce a code for Cargo ships 24m or more in length and under 500 gross tons.

Rationale for DMA rating

The proposed policy change is estimated to be low putting it well below the £5 million Equivalent Annual Net Direct Cost to Business (EANDCB) threshold due to the limited size of the current fleet which would be affected[1]. The affected known fleet consists of approximately 425 vessels with the potential that some of these vessels are already partially compliant.

[1] Better regulation Framework - https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/735587/better-regulation-framework-guidance-2018.pdf

The main monetised costs will arise mainly to vessel owners from having to purchase and install the required equipment, being Bilge water detectors for bilge alarm control panel, speakers and necessary wiring.

Benefits are associated with the potential prevention of accidents which could result in fatalities or injury to those onboard occurring in the future. These benefits have not been monetised, however, an illustrative estimate for the possible savings from incident prevention has been made.

Due to the scale of costs and benefits, a proportionate approach has been adopted in appraising the policy options over a 10-year appraisal period (discounted), with most costs being considered transitional, arising within the first year. This approach also demonstrates this policy falls well within the de-minimis threshold through underestimating benefits.

Costs

Each vessel bound by the regulation will need to have bilge water detectors and alarms fitted and installed in their engine room and bilge spaces at a suitable level to ensure early detection of flooding - which could cause severe stability issues. These alarms would also alert those onboard both at the normal operating area and within accommodation compartments by their next mandatory survey which takes place every six months to be certified for service. This would require operators to purchase an alarm system consisting of bilge water detectors, bilge alarm control panel, speakers and necessary wiring. This cost is affected by many factors such as size, age and retro fitting, which we've estimated would cost between £1,250 - £3,750 per vessel. Overall our central cost scenario for all affected vessels is estimated at £1m and could range between £0.5m - £1.5m in our low and high cost scenarios.

Owners will need to familiarise themselves with the new regulation and what is required by them to be compliant, which will take time that out of their day to day operations. To cost this we have assumed the time taken to read through the regulations/guidance chosen a hourly wage from the ONS ASHE data set 2018 that most likely resembles the operators to represent the opportunity cost of reading through the Codes. We've estimated this will cost between £400 - £1300 over the appraisal period varying with the hourly wage and reading speed.

Benefits

The main benefit of this policy is the potential to prevent/avoid future accidents occurring from unexpected flooding onboard vessels due to the difficulty in predicting the occurrences of these types of accidents in the future that could be prevented because most accidents are caused by many factors. So, attributing the prevention to just this policy would be inaccurate, however, we have provided an illustrative example of what this could potentially look like based on the Abigail H which had 4 crew members onboard at the time of the incident. Depending on the number of fatalities this could represent a saving of between £1.7 to £6.8m to society from prevention of these incidents in the future.

It also has the added benefit of starting to close the regulatory gap that these vessels find themselves in.

Overall

In summary the EANDCB of £0.1m putting the cost of the regulation well below the de-minimis threshold.

Will the policy be reviewed? Yes		If applicable, set review date: 2025 (5 years)		
Are these organisations in scope?	**Micro** Yes	**Small** Yes	**Medium** Yes	**Large** Yes

Senior Policy Sign-off:	✓	Date:	18/02/2020
Peer Review Sign-off:	✓	Date:	05/03/2020
Better Regulation Unit Sign-off:	✓	Date:	06/03/2020

Supporting evidence

Background

Current state of vessels

1.1 Currently, vessels which are Under 500gt and 24 metre or more in length are in a limbo state when it comes to regulations which they are required to follow, as they fall out of SOLAS, Work Boat and Fishing Vessels codes. The lack of regulations has led to some notable accidents which potentially could have been avoided if they were to fall under a set of codes. One of the main accidents from the past couple decades is the Abigail H explained below:

Case Study: Abigail H

The Abigail H was built in 1958, as a, 324.73Gt, grab Class IX grab hopper dredger for service in the Humber Estuary and 10nm beyond Spurn Point. The vessel was modified over the period 1999 to 2004 to meet the requirements of Class VIII(A) to allow it to work at different locations around the coast.

On the 1st November 2008 an unknown leak in the engine room of the 50-year-old vessel caused the vessel to flood and founder whilst alongside in the port of Heysham. The sleeping crew were not alerted to the danger as the vessel rolled to port, which was stopped due to the machinery and mast contacting against the quay side. If the vessel had rolled to starboard the result would have been catastrophic for the crew and vessel.

1.2 As they fall out of the previously mentioned codes, there is currently no requirement for the vessel to have bilge water detectors and alarms fitted. The bilge level was checked by the Engine room Fitter prior to leaving the engine room which was at an acceptable level.

1.3 The vessel was built according to the regulations at the time of build and therefore, was not required to install bilge water detectors or alarms as a standard. Due to the lack of detectors placed in the bilge and alarms in accommodation spaces, lead to an unknown leak persisting to the point of irreversibility due to crew not knowing with sufficient time to rectify the problem.

1.4 Due to this incident the MAIB investigated the cause and provided several recommendations, one being to the Maritime and Coastguard Agency (MCA) under recommendation 2009/141 – *Introduce a mandatory requirement, for all vessels greater than 24m length and less than 500 gross tons, for the fitting of Bilge alarms in engine rooms and other substantial compartments that could threaten the vessel's buoyancy and stability if flooded. These, and any other emergency alarms should sound in all accommodation spaces when the central control station is unmanned. In addition to functioning in the vessel's normal operational modes, alarms should be capable of operating when the main power supplies are shut down and be able to wake sleeping crew in enough time for them to react appropriately.*

1.5 To remedy this situation, the Government is looking to set out regulations requiring vessels of this type to fit bilge water detectors and alarms in dry spaces, that after a short delay at the main operating position can alert the accommodation space to awake unsuspecting crew. This regulation would start to close the regulatory gap in which these vessels find themselves and will reduce the risk to vessels, crew when onboard and the environment to a more tolerable level.

Rationale for Intervention and Intended Objectives

2.1 Safety is the overarching rationale for the new regulation being implemented, with respect to the safety of passengers and crew onboard. Currently, there is a gap in the regulations for Cargo Ships which are 24 metres or greater in length and under 500GT y to follow. Theses gaps put the crew onboard these vessels at undue risk under certain circumstances, which has resulted in the Abigail H accident previously mentioned.

2.2 This gap in regulation can be seen as a regulatory failure on the part of the Government which has led to market failures persisting in the case of these vessels. There are two market failures which are present: imperfect information and negative externalities.

2.3 Operators may not be aware of the full benefits of bilge water detectors, and how much they can reduce the probability of accidents and damages from unknown leakages in the bilge. Most operators will likely be aware of the costs for installation of bilge water detectors and emergency alarms but not fully aware of the benefits.

2.4 Negative externalities arise around the difference in private benefits which operators receive from these bilge water detectors and alarms and the social benefits. Operators only receive part of the benefits which these represent, by preventing the loss of a vessel via an incident which is prevented due to the bilge water detector - the operator benefits from keeping the vessel. However, this prevention represents a larger benefit to society through reducing injury, fatalities, damage to the environment through from the release of pollutants at sea and the clean-up of the wreckage.

2.5 Operators bare the full cost of installing bilge water detectors and emergency alarms but do not receive or know the full benefits which leads to underutilised detector and alarm installation in the absence of intervention.

2.6 Current guidance exists where bilge water detectors and alarms are referred to, which are as follows; MGN 280 (M) – Small Vessels in Commercial Use for Sports or Pleasure, Workboats and Pilot Boats- Alternative construction standards, WB code section 10.5, Blue Code section 10.3, Yellow Code 10.3.1, Red code 10.1.3 and also within the High Speed Craft (HSC) code section 11.4.1.2.4. However, none of these regulations affect the vessels in question.

2.7 By extending the requirements for bilge water detectors and alarms to be implemented to cargo ships of less than 500 gross tons and which are 24 metres or more in length, it will start to fill the regulatory gap which these vessels find themselves in. Currently falling outside of the main international regulations like SOLAS and code of practice for domestic vessels such as the Work Boats and Fishing Vessels.

2.8 The proposed SI will ensure that crew are alerted by the bilge alarm, with sufficient time to react to the situation and take necessary action to mitigate the situation before it becomes an emergency. As well as, allowing enough time to safely disembark the vessel if rectifying action has failed. This will help to close the informational gap operators find themselves in reducing the risk to those ships, crew onboard and the environment to a more tolerable level.

2.9 By introducing the requirement for Bilge water detectors and alarms, it should reduce the frequency of incidents caused by unknown flooding, or small ingress of water causing stability issues for the vessel creating a potential for capsizing, therefore reducing the risk of loss of life or ship, injury from these as well as reduced pollution risks.

Policy objectives

2.10 The policy objectives are to:

- Start to close the regulatory gap that owners/operators of cargo ships of less than 500 gross tons and which are 24 metres or more in length find themselves in.
- Ensure that all cargo ships that fall under the criteria of Under 500GT and which are 24 metres or more in length are legally obliged to have bilge water detectors and alarms fitted and installed.
- Vessels which have accommodation spaces onboard, be equipped so that these spaces are alerted to danger when the control position is unmanned.
- To reduce the risk of vessel loss and potential loss of life from incidents of unknown flooding in the bilge spaces.

Options Appraisal

"Do Nothing"

3.1 This would result in the MAIB recommendation not being addressed and in-scope vessels not being required to fit bilge water detectors and alarms. This will leave a safety gap in the regulation of these vessels and could lead to vessel loss, loss of life and a reputational loss for not implementing safety recommendations.

Options 1 - Create new Statutory instrument

3.2 This would implement and close the outstanding MAIB recommendation by legally requiring any cargo vessels that fall under the previously mentioned criteria to have fitted and installed bilge water detectors and alarms. This will help alleviate the present market failures and reduce the potential risk faced to ships, crew and the environment down to a more tolerable level. By doing this, it would also start the process of implementing safety standards for cargo ships of less than 500 gross tons and which are 24 metres or more in length which fall between the scopes of current legislation.

Option 2 – Create new vessel codes for cargo ships of less than 500 gross tons and which are 24 metres or more in length

3.3 This option would create a new voluntary code for cargo ships of less than 500 gross tons and which are 24 metres or more in length. This would help close the current regulatory gap and introduce standards for the entire ship including the requirement for bilge water detectors and alarms. Presently, this is not a viable option as to produce a fit for purpose code would require extensive external and internal stakeholder engagement which could take up to 14 months to produce while working with sufficient resource, however, currently there is not enough capacity, pushing those estimated timelines back. Furthermore, as this would be a voluntary code it would not have any legal standing and therefore some operators/ owners may not adhere to the safety requirements proposed.

Preferred Option

3.4 Our preferred option is option 1, as this will start to close the regulatory gap, acting as a steppingstone towards a full code for the vessels in scope. Meeting the MAIB's recommendation that this is a priority due to past incidents like the Abigail H, lowering the risk to vessels and crews lives onboard these vessels at sea and remedy the Government failure and associated problems in the present market. This will be reviewed via PIR after 5 years, as to whether or not it will be merged with option 2 once resource is available to produce a code for cargo ships of less than 500 gross tons and which are 24 metres or more in length.

Analytical Overview

3.5 We have undertaken both a qualitative and quantitative assessment of the costs and benefits that the proposed policy options could have across industry i.e. current Cargo Ships that fall under the previously mentioned criteria. All costs and benefits are assessed here relative to the "Do Nothing" counterfactual.

3.6 The costs include the cost of compliance a bilge detector and alarm for those ships that do not currently have one fitted, the cost of fitting and installing the equipment but also the cost of firms in familiarising with the regulations. Benefits include the potential avoided loss of life and ship from an incident.

3.7 Throughout our analysis we've encountered data gaps and uncertainty around the data that we've managed to obtain. To mitigate these risks, we have used assumptions and sensitivity analysis where needed.

3.8 We will be using the standard 10- year appraisal period for costs and benefits, all costs are mainly transitional in nature with no ongoing costs being identified at this point. This will mean all costs will be faced within the first year of the regulation, as the potential costs arising after this period are negligible if any exist. Consistent with HM Treasury Green book[2], we have applied a 3.5% per annum discount rate, unless otherwise stated.

3.9 All figures are presented in 2019 prices and 2019 present values, except for the Direct impact on business (Equivalent Annual), which is presented in the 2016 price and 2017 present value to be consistent with previous business impact targets.

3.10 Through our consultation we will seek to refine all estimates. We have currently assumed a one-year transitional period whereby all subjected ships will need to be compliant. We are consulting over what period is viable to allow these ships the time to conduct the necessary modifications to comply and will adjust the transitional period as necessary for the final DMA.

Application and Potential number of Ships affected

3.11 The application of this SI will be for the following ships;

i. United Kingdom cargo ships of less than 500 gross tons and over 24 meters in length (wherever they may be); and

ii. non-United Kingdom cargo ships of less than 500 gross tons and over 24 meters in length, while they are within United Kingdom waters.

A "cargo ship" for the purposes of The Merchant Shipping (Cargo Ship) (Bilge Alarm) Regulations 2020 means a mechanically propelled ship that is not a passenger ship, warship, fishing vessel or pleasure vessel; further clarity on those terms is provided in regulation 2.

3.12 The total number of UK flagged Ships that are affected by introducing these regulations is approximately 425, this information has been obtained from UK Ships Registry (RSS) for the domestic fleet within the targeted criteria, of which Ships have been included and excluded can be found in Annex 1 of this document. We do not count any non-UK flagged throughout our calculations as these costs would not be borne by UK businesses.

At this time, we cannot tell how many Ships already bilge water detectors and alarms have installed under an individual voluntary basis, that fall in line with the regulation, however, it is expected that some Ships may be partially compliant. Based on MCA policy experts we have assumed a compliance rate of 10% of Ships which could potentially already be in compliance in our central scenario. Due to the uncertainty's around this, we have carried out sensitivity analysis to produce a range showing a low and high case scenario with the compliance rate decreased and increased by 50% in the High and low respectively. We look to test these assumptions at consultation.

- **High case scenario**, 5% compliance rate (ships with alarms)
- **Central case scenario**, 10% compliance rate (ships with alarms)
- **Low case scenario**, 15% compliance rate (ships with alarms)

Table 1 – Summary of ships affected by new regulations

	Low	***Central***	***High***

[2] HM Treasury Green book - https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent

No. of affected ships	384	398	411

MCA estimates based on UKSR data[3]

Q1. We ask consultees to provide evidence on the assumed compliance rate of 10%, does this realistically reflect the industry? Does your vessel have bilge water detectors and alarms installed?

Monetised costs

This section looks at the monetised costs of our preferred policy option against our counterfactual of a "Do Nothing" scenario. There are two monetised costs benefits that have been identified;

- Installation of bilge detectors and alarms
- Familiarisation costs

Installation of bilge water detectors and alarms

3.13 Each ships falling under the regulation will need to have bilge water detectors and an alarm system fitted and installed in their bilge and engine room spaces at a suitable level as to ensure ships stability and indicate early warning of flooding, which can alert those onboard at the normal area of operation and then in accommodation compartments within a year of these regulations coming into force. Installation will be checked during annual general inspections. This would require operators to purchase an alarm system consisting of bilge detectors and associated alarms, bilge alarm control panel, speakers and necessary wiring. The installation could be performed by their own crew or by outside labour.

3.14 Currently, there is a lack of data available that could provide an accurate estimate of the cost's operators would face when making changes to become compliant with the regulation, as each ship is bespoke, and would all require different amounts of work.

3.15 This is due to a number of factors; size and length of the ships as large ships will have more bilge compartments that require alarms to be installed, length of cable and the piercing of bulkheads that could require fire protection and retro fitting to accommodate the equipment. All these factors could see each ship facing a different cost.

3.16 Some ships may require less work to become compliant, as some owners may have installed these already as a precautionary measure.

3.17 Other ships within scope do not have accommodation spaces, which would reduce the overall cost for these ships installing bilge water detectors and alarms, as the fitting would be a bilge water detector and alarm being fitted in the bilge space and a panel installed in the normal operating area, I.e. the wheel house.

3.18 To present an indicative estimate, we've assumed that the cost to ships could be £2,500 in our central cost scenario for the purchase and installation of the necessary equipment, this assumption is based on MCA judgment. We look to test this assumption at consultation.

3.19 As not all ships will require the same amount of work and alarms, we've adopted sensitivity analysis to take into account the varied costs that operators could face while purchasing and installing their bilge water detectors and alarms. With our high and low-cost scenarios being 50% either way of our central cost assumption. These scenarios should account for the variation in number of alarms between large and small Ships, as the alarm itself only imposes a marginal cost with the majority of the costs attributed to labour and retrofitting.

[3] The figures used in relation to the number of affected vessels meeting the criteria were collated from the MCA's UK ship register (UKSR) Database. The data was correct as of November 2019.

3.20 We've not taken into account the loss of revenue some ships may face from installation if day to day business would need to cease due to the highly variable amount each ship could face (opportunity cost). This cost could be avoided via installation happening while on down time from their activities, we look to collect more evidence at consultation.

3.21 These costs would all be faced within the first year of the appraisal period and have been costed appropriately.

- **High case scenario**, £3,750 * 411 Ships
- **Central case scenario**, £2,500 * 398 Ships
- **Low case scenario**, £1,250 * 384 Ships

Total Cost = Cost of installation * number of Ships affected

Table 2 – Summary of bilge water detectors and alarms installation costs (Undiscounted)

	Low	***Central***	***High***
No of affected Ships	384	398	411
Cost per Ships	£1,250	£2,500	£3,750
Total	£0.5m	£1m	£1.5m

MCA estimates based on UKSR data (Totals rounded so may not sum)

Under our central scenario the overall cost for purchase and installation of the required equipment is estimated to be £1m, this could range between £0.5m and £1.5m in our low and high-cost scenarios respectively depending on the work required.

3.22 Overall our best estimate for the total installation costs is £1m for all affected ships.

Q2. We ask consultees to provide evidence on the following points:

- Operators, please indicate if these costs are realistic to what has/would be faced
- Installers, please provide an estimation of installation cost for a vessel and provide a breakdown of costs?
- Will this require penetration of bulkheads or through fire protection boundaries?
- How long would installation take? Would the installation of equipment require your day to day business cease? If so, how much revenue could be lost?

Familiarisation costs

3.23 Ship masters, owners and operators will need to read and familiarise themselves with new regulation. There is a cost attached to this as it takes time that could be employed elsewhere (opportunity cost). The time taken and cost for ship masters to read these regulations required are calculated using the Gross Hourly Earnings data sourced from the 2018 Annual Survey of Hours and Earnings (ASHE) [4], data set. The 'Managers and directors in transport and logistics' code was used which is assumed to be a reliable source of information.

3.24 A range of hourly labour costs and time taken to read the amendments have been taken into account to acknowledge the different salaries and reading speeds of the ship masters. This is all represented by the low, central and high case scenarios of what the total familiarisation costs could be. It has been assumed there is only one ship master/owner or operator per ship which will be the only one to have read the policy change in full, for the purpose of the calculations.

[4] https://www.ons.gov.uk/releases/analysesbasedonannualsurveyofhoursandearningsprovisional2018andrevised2017 - Table 14.5a Hourly pay - Gross (£) - For all employee jobs: United Kingdom, 2018 Managers and directors in transport and logistics job

3.25 The time taken for ship masters to familiarise themselves with the regulation is assumed to be approximately 7 minutes in our central scenario. This assumption is based upon the length of the regulation document being 5 pages (approximately 1700 words) with an assumed average reading speed of 250 words per minute as operators would already be familiar with the subject matter. The reading time is varied by 30% either way in our low and high cost scenarios as reading speeds should not vary by much.

3.26 With the mean wage taken from the Managers and directors in transport and logistics 'salary in the ASHE data set in our central scenario, taking the 30th and 80th percentile for the low and high case scenarios respectively. These cost ranges and assumptions will be tested at consultation.

- **High case scenario**, 9 minutes to read and 30 percentile wage on 411 ships
- **Central case scenario**, 7 minutes to read and mean wage on 398 ships
- **Low case scenario**, 5 minutes to read and 80 percentile wage on 384 ships

Total cost = (time to read * hourly wage rate) * number of ships affected

Table 3 – Total familiarisation costs (Undiscounted)

	Low	***Central***	***High***
Time to familiarise minutes	5	7	9
Hourly Labour cost	£12.33	£17.17	£21.34
Number of Ships affected	384	398	411
Total cost	£400	£800	£1,300

MCA estimates based on ONS data (Totals rounded so may not sum)

3.27 Under our central cost scenario, the cost to industry to familiarise themselves with the new regulations is estimated to cost £800. Ranging between £400 to £1,300 in our low and high cost scenarios respectively.

Q3. We ask consultees to provide evidence on the time and total costs it would take to familiarise yourselves with these changes? Are the assumptions used realistic?

Non - monetised benefits

3.28 This section looks at the non-monetised benefits of our preferred policy option against our counterfactual of a "Do Nothing" scenario. There are two non-monetised benefits that have been identified.

Avoidance of incident

3.29 The key benefit of this regulation is reducing the risk of incidents caused by unknown flooding, or small entrance of water causing stability issues for the ship and potential capsizing, therefore reducing the risk of loss of life and or injury from water ingress events in the future. This will also have cost saving implications for the marine environment. It's hard to predict the number of incidents that could be prevented in the future and the number of lives saved as a result of this regulation, since it's incidents are dependent on a lot of different factors such as behaviour, weather, activity, category of water and changes within industry itself. There is also limited evidence to draw upon to help back this up, which would make any benefits difficult in solely attribute to this regulation alone.

3.30 Due to these factors and the low impact of this regulation, we've taken a proportionate approach and produced an illustrative example of the savings associated with crew fatalities, however, have not estimated the cost savings to the environment due to the benefits being difficult to quantify.

3.31 To illustrate the possible cost savings around an incident of this nature, it has been assumed that within 10 years of this policy being implemented, one incident similar to the Abigail H which had potential for loss of life will be prevented from a fatal accident, as a result of this regulation. The

Abigail H had 4 crew onboard at the time of the incident, with all four surviving. Sensitivities have been used to capture the uncertainty around the number of fatalities when an accident does occur to give a high, central and low estimate.

3.32 Uncertainty exists over the average value for the prevention of a fatal maritime accident. There is also uncertainty with the likelihood of accidents occurring such as a person drowning. The statistic used for the value of one life reflects the total cost of fatal injuries for one person which was displayed in the Health and Safety Executive (HSE) study of 'Costs to Society per case- average appraisal value estimate (£ in 2016 prices). This has been uplifted to £2019 prices for comparison and consistency with other calculations carried out[5]. A risk of using this data is that it may be out of date if, for example, assumptions/costings used in the study may have changed since its release.

- **High case scenario**: Incident occurs with all four fatalities
- **Central case scenario**: Incident occurs with 2 fatalities
- **Low case scenario**: Incident occurs with 1 fatality

Total saving = Number of fatalities * Value of life

Table 4 – Total incident savings (Undiscounted)

£m	***Low***		***Central***		***High***	
Crew onboard		4		4		4
Number of fatalities		1		2		4
Value of life	£	1.7	£	1.7	£	1.7
Total	£	1.7	£	3.4	£	6.8

MCA estimates based on HSE values (Totals rounded so may not sum)

3.33 In our central scenario where there are 2 fatalities due to a lack of alarm and notification to crew onboard, it would see a cost of £3.4m to society in the appraisal period. This could range between £1.7 to £6.8m in our low and high scenarios, respectively, depending on the number of fatalities which are influenced by the factors mentioned before.

Break-even analysis

3.34 As the benefits are difficult to quantify from this regulation and monetise with any form of accuracy at this time, we've carried out break-even analysis to illustrate the cost each ship would need to face to meet the benefit of saving one life over the 10-year appraisal period.

3.35 Assuming no compliance with this regulation already exists currently from the vessels in scope, each one of the 425 ships would need to face £4000 in costs for installations and the opportunity cost familiarisation to break-even with saving just one life.

Risks and Assumptions

3.36 Throughout our costs and benefits we've needed to make assumptions due to a lack of applicable data; these assumptions have a lot of uncertainty around them as they are dependent on many factors. To take into account this uncertainty, we've employed sensitivity testing for many assumptions used throughout to present a range of different possible cost and benefit impacts that could arise, which will all be checked at consultation.

Number of Ships affected

[5] Source: Health and Safety Executive (HSE) study of 'Costs to Society per case- average appraisal value estimate in £2016 inflated to £2019. Table 1 showing rounded total cost of fatal injuries
http://www.hse.gov.uk/economics/eauappraisal.htm

3.37 It is difficult to obtain the number of ships that would be affected by this regulation, as the MCA ship registry does not keep track of bilge water detectors and alarms installed, so the costs being shown are most likely overestimates, as not all Ships will be uncompliant at the time the new regulation comes into force. Sensitivity analysis has been used to mitigate this uncertainty and provide a range of affected ships, to reflect the uncertainty around this variable.

Cost to Ships

3.38 Currently, there is a lack of data available that could provide an accurate estimate of the cost's operators would face when making changes to become compliant with the regulation, as each ship is bespoke, and would all require different amounts of work. There is also no data currently being collected around the number of bilge water alarms onboard ships. An assumption on the average cost a ship could face has been made based on expert MCA judgment, with sensitivity analysis in place to account for the uncertainty.

Wider Considerations

UK reputation

3.39 Failure to apply an MAIB recommendation would be poor practice on behalf of the MCA and this would cause doubt on the MCA's ability to implement safety recommendations possibly damaging the UK's reputation.

Small and Micro Businesses

3.40 As this would apply to all Cargo ships which fall under the criteria, it would affect all businesses which operate these ships. This regulation does not pose any risk to disproportionately affect any businesses, specifically small and micro. As the cost will be proportionate to the ship, which is owned, with larger ships being owned by larger operators and the cost of bilge water alarms only marginally increasing with the number.

Business Impact and DMA Classification

3.41 Summary of total costs and benefits for Option 1 against our counterfactual are shown below:

Table 4 – Summary of costs (Undiscounted)

	Low	***Best estimate***	***High***
Installation costs	£0.5m	£1m	£1.5m
familiarisation costs	£400	£800	£1300
Overall Costs	£0.5m	£1m	£1.5m

MCA estimates (Totals rounded so may not sum)

3.42 Our best estimate of the total costs of this regulation in the first year is £1m, this puts it well below the DMA threshold of 5m annual net cost/benefit even if we consider the high cost scenario. This is holds true without the benefits being included. If we included the illustrative benefits that could occur from prevention of future accidents similar to that of Abigail H then the benefits would cover the costs within the appraisal period, with a cost – benefit ratio of 3.4.

3.43 The regulation under consideration is also uncontentious and non-controversial, as this will only have a small monetary impact on industry and start to close the regulation gap which these operators find themselves in. For these reasons, it is deemed proportionate for a de-minimis assessment to be carried out at consultation stage with it being exempt from the BIT, all costs and benefits will be tested at consultation to gauge whether they truly reflect reality.

Consultation questions

3.44 During the consultation phase of this legislation we ask that consultees provide wherever possible estimates of the costs and benefits of this policy. Although this assessment contains many estimates of the potential costs that industry could be faced with, there is still large evidence gaps that exist which have been filled with assumptions. Primarily evidence is required in areas such as;

- Is the assumed compliance rate of 10% reflect reality? Does your ship have bilge water detectors and alarms installed?
- Operators, please indicate if these costs are realistic to what has/would be faced
- Installers, please provide an estimation of installation cost for a ship and provide a breakdown of costs?
- Will installation require penetration of bulkheads or through fire protection boundaries?
- How long would installation take? Would the installation of equipment require your day to day business cease? If so, how much revenue could be lost?
- To provide evidence on the time and total costs the familiarisation of these changes would have for you?

We also ask consultees for any additional evidence relating to any perceived costs or benefits that have not been taken into account in this de minimis assessment.

Post-Implementation Review Plan

1. **Review status: Please classify with an 'x' and provide any explanations below.**

	Sunset clause		Other review clause	X	Political commitment		Other reason		No plan to review

2. **Expected review date** (month and year, xx/xx):

1	1	/	2	5

3. Rationale for PIR approach:

Level of evidence and resourcing that will be adopted for this PIR): **Low**

The PIR will be an administrative exercise to evaluate whether the regulation is still relevant to industry in the long run at the time of review. Helping aid in the decision of whether a voluntary code (option 2) is a better option, being less onerous on businesses or could be absorbed into option 2 if deemed appropriate. If the code is voluntary, then it would be noted that the previous statutory requirement for bilge alarms is still mandatory if the decision is to keep the regulation in place.

As this regulation is assumed to have a low-cost impact on industry with it being difficult to separate and quantify the benefits, it's deemed proportionate to only conduct a low level of evidence gathering during the PIR exercise.

Due to the difficulty in quantifying benefits with the prevention of incidents and accidents from unknown leaks in the bilge from other regulations which also look to provide this protection, we'd only look to evaluate the cost impacts on industry bore by this regulation and industry options on the implementation.

The data which will be sought:

- Cost estimations from period of installation and continued evidence from new ships which fall into the scope of the regulation
- Opinions on implementation of regulation and usefulness of installation bilge alarms

This data would be collected via consultation and surveys with industry.

Annex 1 (Criteria of affected Ships):

By using the definition of which will apply to the regulations, it allows us to identify ships which will fall under this proposal, “cargo ship” has the same meaning as provided in The Merchant Shipping (Cargo Ship Construction) Regulations 1997(b). Therefore, "cargo ship" means a mechanically propelled ship which is not a passenger ship, troop ship, pleasure vessels or fishing vessels.

The below table are all Ships considered to fall within or outside of the definition.

Included within forecast

Buoy & Lighthouse Tender
Cargo
Commercial Vessel
Crane Ship
Dredger
Diving Support Vessel
Dive Tender
Hopper
Landing Craft
Lighter
Multipurpose Twin Screw
Mooring Vessel
Motorship Twin Screw
Oil Barge
Ore/Bulk/Oil Carrier
Offshore Support
Oil Tanker
Patrol Launch
Pontoon
Research Ship
Ro Ro Cargo Ferry
Ro Ro Ship
Self-Propelled Barge
Museum (Historic Ship)
Tug
Utility Vessel
Workboat
Special Service Standby Vessel
Survey Vessel
Training Vessel

Excluded from forecast,

Barge
Catamaran
Commercial Yacht
Cargo/Passenger Ferry
Floating Dock
Hovercraft
High Speed Catamaran
Jack up Platform (non-self-propelled)
Launch
Passenger Ship
Passenger Car Ferry
Passenger Cruise vessel
Pleasure Vessel
Passenger Ro Ro Cargo Ferry
Passenger Ferry
River Cruiser
Ro Ro Passenger
Sail Training vessel
Water Cruiser
Pleasure Yacht
Yacht in Commercial Use