

Best Practices to reduce marine litter from net cuttings waste



Swedish Agency
for Marine and
Water Management





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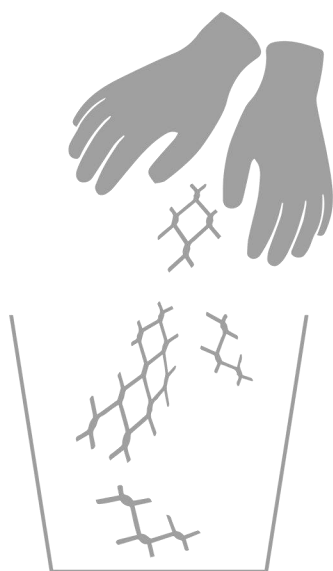
Where do net cuttings originate?

The primary source of net cuttings in the North Sea is from trawl nets that are being repaired on board fishing vessels at sea and on the quayside in port. Sections of net that have been damaged through regular wear and tear or by accident are cut from the net and discarded, through lack of awareness, habit or carelessness. If they are not removed quickly from the deck of the vessel they can be washed overboard by storms, high winds, waves or rainwater, or swept overboard (by design or accident) when the deck is cleaned. If they are not removed from docks and quaysides they can be carried to the sea by wind or runoff water (storm drains or directly over the edge), or swept into the sea during clean-up activities.

Net cuttings can also fall onto the fishing nets on board and be trapped there, dropping into the sea when the net is rolled up on the boat or rolled out during regular fishing activities. They can also fall into the water when nets are transferred from the quay to the boat or when new nets are taken in use, as waste pieces from manufacturing can become trapped in the netting.

The following best practice recommendations and examples have been compiled primarily from the results of the survey undertaken by KIMO of harbours in four European countries and feedback from face to face dialogue with harbour staff and fishers. They demonstrate some of the most simple, practical and inexpensive ways in which fishers and harbour authorities can reduce the number of net cuttings ending up in the sea and consequently reduce the negative impacts caused by this waste to our marine environment and economy.

Best practice examples on board



Targeting cuttings waste at its source is the most effective way to prevent material from becoming marine litter. Most cuttings waste originates directly from mending activities carried out by fishers. It is not realistic to expect fishers to collect every piece of net, rope and cord, however much more can be done by fishers, skippers and crews to limit inputs of cuttings waste to the marine environment. Good practices should be implemented and adopted into daily routines and tailored to conditions on board. Implementation of good waste management practices will ensure that the majority of cuttings are collected and disposed of correctly.

Fishers should be encouraged to practice good waste management by implementing new habits and procedures to facilitate clean up after working on their nets. Fisheries associations, harbour authorities and skippers of vessels all have an important role to play in raising awareness amongst fishers of the consequences of careless disposal of net cuttings and to ensure that all fishers follow correct procedures and use the tools (such as brushes, brooms, tarpaulins) and waste containers provided.

Captains can take the lead by setting standards for their vessel and compelling fishers to adopt behaviours that limit litter from entering the sea. Leadership on a vessel sets the example for fishers and should be used to raise awareness of marine environmental issues and to encourage effective waste management.

Best practice examples on board

Introduction

For any ship, a simple, effective and accessible waste management plan must be in place and must include procedures on handling operational waste produced during fishing activities. For fishing vessels, this should include specific procedures on containing and disposing of net cuttings.



Best practice examples on board

Simple, effective tools

The most effective procedures and tools will be those that are practical, safe, simple, inexpensive, easy to implement and that can be easily adapted to individual fisher's or crew's working environment. These best practices are all based upon a simple idea of using a temporary 'bin' that cuttings can be dropped into instead of dropping them directly onto the deck.

Pockets and pouches can come in many different forms and should be compatible with the fishers' clothing and equipment. The design for a pocket or pouch must fit the fishers' needs and should not get in the way of the mending work. It is up to the individual fisher to try different options and then evaluate which type would best fit into their own work routine.

Pouches can be made easily and inexpensively. The "Fishermen's Kisses" initiative from the Cornish Plastic Pollution Coalition in Cornwall (UK) introduces the idea of a tool belt with a knife holder and a pouch to contain net cuttings. A challenge was issued to local fishers to be creative and come up with designs to collect cuttings that best met their needs.

One of the prizewinning ideas from the initiative was to develop a tarpaulin with cords connected to each corner that act like a drawstring. The tarpaulin is laid out on the ground on the quayside or deck before net mending begins. Cuttings fall onto it and are easily gathered together (by simply pulling the drawstring) and collected for disposal.



Tarpaulin with cords connected to each corner that act like a drawstring

Best practice examples on board

Simple, effective tools

Maëlis Audugé (a student in fishing and environmental management at Le Guilvinec Maritime College in Brittany, France) found that 64% of items identified during a clean up of her local beach were net cuttings. This inspired her to enter the maritime initiative at the "Les aventuriers de la mer" festival in Lorient, where she won the first prize. Her product was 'Le Sacabout' - a pouch that fishers can wear and use to collect cuttings while working on nets.

Other innovative traps to prevent cuttings from the deck of a ship from going overboard include attaching mesh or netting to the places where water washes overboard allowing for water to freely flow but still trapping materials that have fallen on deck. Such a trap could be temporary and attached only while workers are mending nets.



Best practice examples on board

Systematic clean up routines

In a survey¹ carried out by KIMO, fishers stated that they pick up cuttings only after their work on board is completed. If this is the chosen option then it needs to be implemented as a systematic work routine. Cuttings will be littered over the area where the work has been carried out and some cuttings will also fall into and be caught in the netting. An appropriate approach would be to:

- survey the netting and the on board work area after the work is completed in order to remove stray cuttings and remove them before the sweeping activity begins;
- thoroughly sweep the entire work area so that the majority of cuttings are gathered together;
- remove these using the tools provided and place them in a waste container designated for this purpose.

Best practice examples on board

Systematic clean up routines



It is the responsibility of the skipper to ensure that (i) the crew is aware of and follows the procedure and (ii) that the vessel is properly equipped with brooms, shovels, dustpans and bins to facilitate this. Cuttings should never be washed overboard by using buckets of water or water hoses.

Whenever possible, for every vessel, an adequate clean-up routine should be followed and cuttings removed from the deck. If done diligently, fewer cuttings will enter the marine environment. There are no costs associated with this practice other than provision of a broom and a bin and the small amount of time required to sweep the area and properly dispose of the cuttings.

Best practice examples on board

Systematic clean up routines

Stormy weather is a challenge as there is greater likelihood of pieces being washed overboard or blown into the sea. It can also prevent the clean-up activity from taking place due to reasons of crew safety. Some larger vessels have a dedicated area below deck where nets are mended – using these will significantly reduce the likelihood of net cuttings being lost overboard, but lack of space in smaller vessels may mean this is impractical. If repairs must be made on deck in stormy weather, then other best practices (such as using a pouch) for collecting cuttings should be used to reduce losses to the sea.



Best practice examples on board

An enclosed area for net repairs

One of the best ways for fishers to reduce the number of cuttings from entering the marine environment is to carry out net repair work in enclosed areas, where the effects of external factors (such as high winds and waves) can be mitigated.

Although having an enclosed work area on board is the ideal it can be impractical, particularly on smaller vessels where space is limited. In cases where repairs can only be made on deck, other best practice options (for example, using pouches or tarpaulins) should be used. Some larger modern trawlers have a

sufficiently large enclosed space below deck where net repairs can be made. Loss of net cuttings into the sea is far less prevalent from such areas than from an open deck; however, a thorough inspection of the net to remove loose cuttings and regular sweeping of the area should still be included as part of a regular clean-up routine.

On board the trawler RI468 Juli -Ane (built in 2002 in Hvide Sande, Denmark) there are four crew and the ship is MSC certified to fish cod and flatfish. Net repairs take place below deck as depicted in the image on p.15.

Best practice examples on board

**An enclosed area for
net repairs**

On board the
RI468 Juli-Ane,
net mending
takes place
below deck



Best practice examples on board

Effective waste management on board

Waste management should be an active part of planning and carrying out repair work. Before starting work on mending netting, fishers should consider how they will collect and dispose of their waste pieces of net.

Elements to consider when planning waste management of cuttings on board include:

- What type of waste containers are necessary and practical?
- Is there an adequate number of waste containers on board?
- Are they placed such that they can easily be accessed during work?
- Are they properly secured?

Clearly marked containers should facilitate proper waste separation. Choosing the right number and type of containers to suit the size of vessel and the needs of the crew is essential for effective waste management on board.

Best practice examples on board

Effective waste management on board

Amongst the examples identified in the survey were:

- a central collection bin and dedicated containers to collect cuttings while working;
- used plastic fish boxes, baskets or pails (a great way to reuse containers that would otherwise be waste);
- a big bag, used to collect Fishing for Litter waste, can also be used to contain cuttings from sweeping the deck after work;
- where net cuttings can be recycled at port with other net waste, then a dedicated container should be used.

It is the skipper's responsibility to assess the needs of the workers and evaluate how many and what types of containers are needed. The number of containers should match the needs of the ship. There should not be too few on board, as the crew should have relatively easy access to a waste container close to the areas where waste is produced. The crew must be made aware of the containers, the type of waste that is accepted there and, most importantly, that it is incumbent on them to use them.

Best practice examples on board

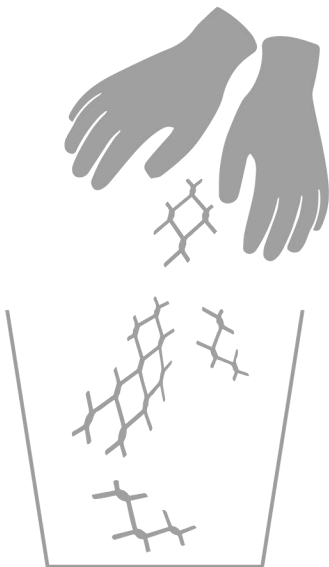
Effective waste management on board

Placement of containers is critical when cuttings work is being done. Workers mending nets tend to stand upright or sit in place and cut and drop pieces as they work. A temporary container that can be placed next to or within arm's reach of a worker is the best solution. The cuttings should be transferred from the mobile containers to a main or "fixed" waste container when the remaining cuttings are swept up during final clean up.



Some thought should be given to securing both temporary and fixed containers so that they are not swept or blown overboard and become marine litter. Strapping containers down to the deck or tying them to the boat's construction, or using screws or clamps are all options. It is also important that containers are covered (by lids or nets) such that litter is not blown into the sea.

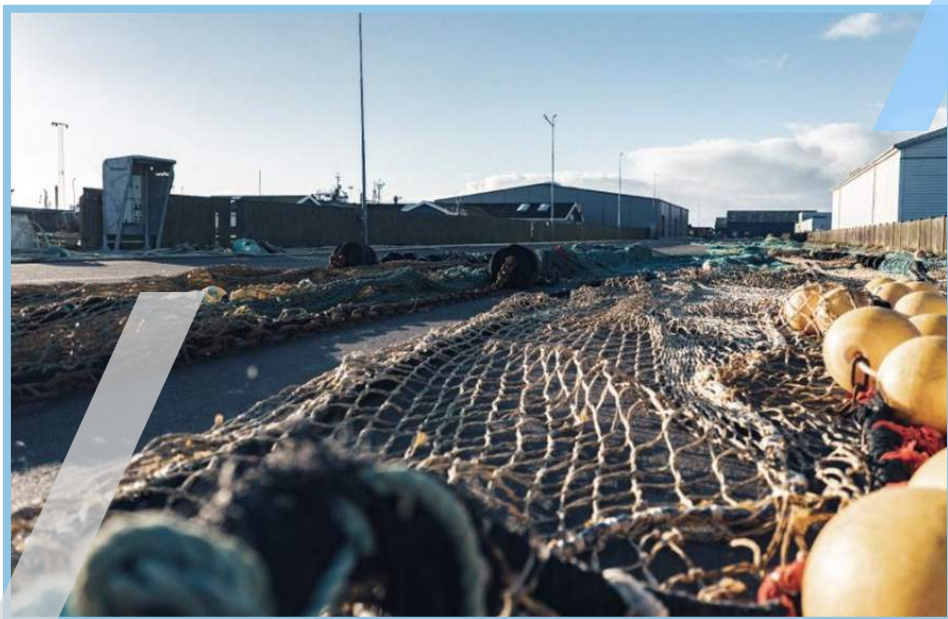
Best practice examples in port



Best practice examples in port

Introduction

Repairs are typically carried out on the quayside as nets are rolled out, examined for damage and repaired. Rope, cord and net are either untied or cut and bound together using new materials. Often, the damaged or cut pieces are dropped on the ground or quayside. Conditions between harbours vary considerably, based on their size, usage, number of staff and material resources so best practice solutions must be adapted to fit each individual harbour. Implementation of a robust, accessible waste management plan will increase awareness and promote good waste management behaviours amongst fishers and harbour staff. Dialogue and cooperation between harbour authorities and fishers is essential to identify effective solutions to reduce net cuttings from harbours leaking into the marine environment.



Best practice examples in port

Designated areas for mending trawl nets

Maintenance of trawl nets requires a large area in port where the netting can be spread out, examined and repaired. Reserving areas for net mending is principally a service for fishers, and harbours may designate certain areas along or away from the quayside for this function. In combination with other practices, this can be an effective measure to manage waste from net cuttings. Instead of having cuttings scattered all over the port, they are limited to the designated areas where they are contained and may be more easily collected and disposed of. Signage, appropriate containers and collection methods should be adapted to the activity level and the particular requirements of the area. Fishers should be strongly encouraged to use these areas appropriately. Barriers can also be used at the borders of the designated area to prevent stray cuttings and other waste materials from being blown or washed out to sea.

An example is from the Danish port of Thyborøn. The port has set aside an area away from the quay for stretching out trawl nets for the purpose of inspection and mending. The area is surrounded by mounds of earth that have been piled up along its edges which acts as a natural barrier. Harbour staff clean the work area regularly.

Designation of special areas for mending nets may limit other activities and is unlikely to be possible in all harbours, particularly in smaller ones where staff must manage multiple demands for limited space. However, where possible, setting aside a suitable area for net repair should be considered within a harbour's waste management plan. Using an existing area of quayside is the least expensive option. Creating new areas for the purpose are likely to have larger costs associated with their establishment, but they can be designed to ensure a near zero leakage of waste into the sea.

Best practice examples in port

Raised borders at the quayside

Dedicated net mending area at port of Thyborøn, Denmark



Establishing a barrier between the quay and the sea is an effective way to hold materials back from washing or blowing into the water. Some harbours have added a raised concrete edge on their quayside of about 10 cm. This edge allows for a natural step onto the docked boats along the quay and also serves as a barrier to prevent accidental losses both of net cuttings and of other waste items.

The harbour must consider the situation of the raised edge, including ensuring the integrity of existing quayside drainage channels. A concrete barrier along the entire quayside could be a costly investment but would need minimal maintenance once in place and would be one of the most effective measures for harbours to prevent net cuttings from becoming marine litter.

Best practice examples in port

Raised borders at the quayside

This example is from the port of Thyborøn Denmark, where the raised concrete stops cuttings from washing into the sea



Example of a quayside without a raised border where cuttings are more easily washed to sea

Best practice examples in port

Dedicated containers and accessible cleaning equipment

Passive methods can encourage fishers to collect and dispose of their waste responsibly. Harbour authorities should make containers available, and place them at a practical distance in the areas where net repairs are being carried out. This creates a clear signal that they should be used. Clear signage on the containers will also increase the likelihood that net cuttings will be disposed of there. Fishers must familiarise themselves with the harbour's waste management system and dispose of waste appropriately.

A best practice for harbours is to have a system in place that enables fishers to borrow equipment to clean up after themselves. A large box or shed (or even an old shipping container) should be placed close to the net repair area and stocked with brooms, dustpans, shovels and pails for fishers to use. Pails or small containers (such as discarded fish boxes) can be used temporarily to put cuttings in as fishers are working on nets, and emptied into the designated containers when mending work is completed. Brooms and shovels can be used to sweep up remaining cuttings that were dropped onto the ground during the mending work.

This method is quite inexpensive but it requires self-discipline on the part of fishers. Harbour authorities should make concrete efforts to encourage the use of these materials, both in dialogue with the fishers and fishery associations and through "nudging" with clear signage and instructions.

An example where this has worked well is the Swedish harbour of Öckerö, which has an equipment building where fishers can borrow tools that can help them with clean-up activities on the quay.

Best practice examples in port

**Dedicated containers
and accessible
cleaning equipment**



The equipment building at the Swedish harbour of Öckerö, where fishers can borrow tools that can help them with clean-up activities on the quay

When bins and cleaning equipment are not situated close to net repair areas, waste is more likely to be left on the quayside

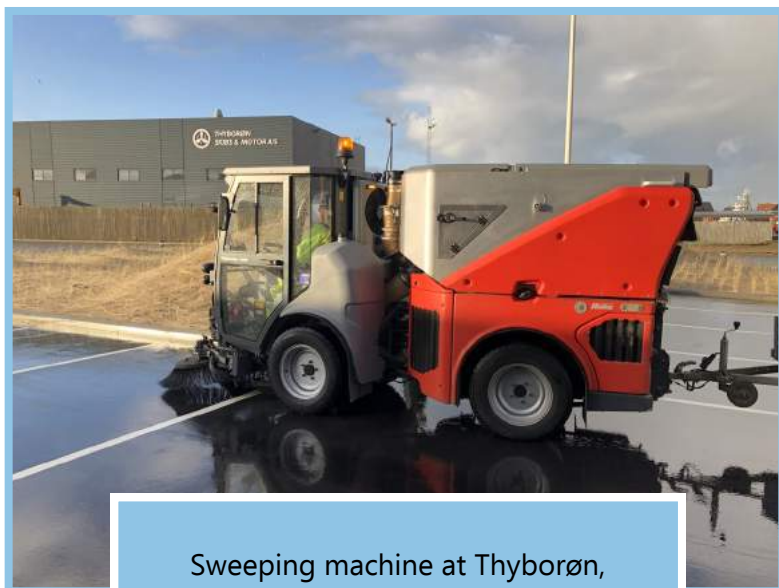


Best practice examples in port

Frequent inspection and cleaning of the quayside

Regular patrols of the quayside can help to pinpoint areas that need attention. This inspection could be set into a routine and adjusted to work areas where cuttings are more frequent and require more focus. Cleaning can also be adjusted and, where possible, timed to the fishers' schedules, so that it could take place as soon as possible after the mending work is done.

Some harbours have invested in sweeping machines (street sweepers/sidewalk sweepers) that can cover larger areas more quickly. These machines typically have one operator and are driven along the quay. Items are swept up by automatic brushes at the front and into a container in the machine.



Sweeping machine at Thyborøn,
Denmark

Best practice examples in port

Frequent inspection and cleaning of the quayside

The port of Lerwick in the Shetland Islands, UK, has a backpack vacuum cleaner (pictured right) that can be operated by one person. Walking along the quay, the operator vacuums up any cuttings lying on the ground into a bag or container.

These methods are moderately expensive as the harbour must invest in a machine and pay for an operator. However, they are highly effective as the pieces of net and rope cuttings are collected quickly and efficiently.



A look inside the drum of
Lerwick Harbour's backpack
vacuum cleaner



Best practice examples in port

Inclusion of net cuttings waste in port waste management plans

European harbours are required to implement robust waste management plans as outlined in Directive 2019/883/EU of the European Parliament and of the Council of 17 April 2019 on port reception facilities for the delivery of waste from ships. Requirements for waste reception and handling plans are described in Annex 1 of the document.

The specific inclusion of net cuttings waste in harbour authorities' waste management plans could mean much more focus and awareness on this waste resulting in stronger efforts to keep it from entering the sea.

The following is an excerpt from the waste management plan for the port of Lerwick (UK):

This plan describes how Lerwick Port Authority (LPA) complies with this and other relevant legislation and guidelines. The overall aim of the Plan is to assist in the reduction of the quantity of all types of wastes entering the sea. Continued development and implementation of the Plan demonstrates the Authority's ongoing commitment to controlling and managing waste from ships in order to ensure a cleaner environment at sea and within the Port.

Waste produced from maintenance work on the quayside is not specifically highlighted in this plan as the emphasis is on ship generated waste. (Maintenance waste is mentioned but in this context relates to operational or ship generated waste and not waste from work at port.) The port authority does provide skips and bins that can be used on the quay by seafarers for domestic and operational waste – these are monitored and emptied as required – but there is no specific information, advice or guidance about disposal of net cuttings waste.

Best practice examples in port

Inclusion of net cuttings waste in port waste management plans

A number of Dutch harbours have taken a different approach. They use information posters with common pictographic images to depict different waste streams at the harbours as a part of their waste management plans, including net waste which they define as nets/parts of nets that are no longer used. Each harbour has created a short summary of the waste streams with a good description and a picture of which containers can be used for this waste or where the waste can be placed.

Although the Dutch waste management plans do not specifically mention net cuttings these are included

under 'net waste', along with discarded nets, rope and dolly rope. Waste management plans from other harbours in this survey were examined and mainly describe an overall strategy for waste management for waste landed and the location and types of bins at the harbour.

Harbours should consider the specific inclusion of net cuttings waste in future revisions of their waste management strategies and plans. A small amount of additional work in terms of provision of information and signage could see a significant impact on the volume of cuttings being lost from the quayside.

Best practice examples in port

Inclusion of net cuttings waste in port waste management plans

SYMBOOL	SOORT AFVAL
	FISHING FOR LITTER (KIMO)
	ANNEX V Huishoudelijk afval
	OUDE NETTEN (net afval)
	PLUIS
	ANNEX I Oliehoudend afval
	ANNEX V KGA

Dutch harbours use information posters to depict different waste streams at the harbours as a part of their waste management plans, including net waste

Best practices examples in port

Clear information and signage

Information needs to be simple and clear in order to promote effective waste management at the harbour. Fishers need to understand where it is possible to deliver waste and what each harbour's requirements are for sorting of waste. Fishers using European harbours come from many countries and speak a variety of languages. They may not always understand the instructions or be familiar with local customs to sorting waste. If they become confused by the information or lack thereof, then the possibility of error or negligence will be greater.

Through comprehensive signage it should be made clear which container net cuttings should be put into or if they can be recycled with other net waste. It should also be clearly communicated that the responsibility for picking up cuttings and placing them in a bin is the responsibility of the one who produces the waste.

Photographs, images, drawings and pictograms on bins and containers can clearly indicate where different types of waste can be disposed of. Equally important could be signage showing the direction and/or placement of relevant waste receptacles.

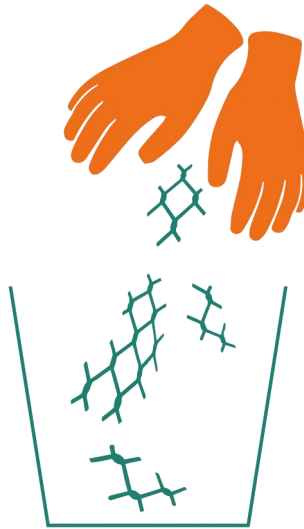
In Dutch harbours, this simple image indicates containers where net waste is acceptable:



Best practices examples in port

Clear information and signage

This logo developed by KIMO for this study is simple, clear and suitable for use in any port:



Good signage requires very little expense or effort to implement, although some thought should go into ensuring the correct placement of signs. Ultimately, the effectiveness of this best practice depends upon the receiver's ability to understand the signage and own initiative to follow directions, such that the bins are used correctly.

Dutch harbours use a combination of monitoring and enforcement of port rules. Where other best practices rely on cooperation and positive reinforcement, this best practice imposes a penalty on polluters.

When the harbour authorities notice that litter has not been cleaned up, they will point this out to the fishers that are responsible. Fishing boats that leave behind their waste are called back to port in order to clean it up and can be fined for not adhering to the harbour's waste management rules. It is not known how often this method is used when it concerns cuttings left at the harbour.

This can be highly effective because actions that lead to pollution have a consequence. There is direct cause and effect and the waste is more likely to be cleaned up before it enters the sea. The offender is made aware that this behaviour is unacceptable and may be less likely to repeat it. Where examples are made and sanctions imposed, other fishers are less likely to adopt the same behaviour. However, if penalties are not enforced in other harbours, attitudes of these fishers may not change.

Disadvantages of this practice could be "bad feeling" that arises between the harbour authorities and fishers. This is negative reinforcement and if the fishers are not being engaged or made to care about the issue, then they may be likely to dispose of waste in other places, even directly into the sea. In general, positive reinforcement through campaigns focusing on awareness raising, information and recognition/reward is likely to be more effective.



Best practices examples in port

Awareness campaigns

Campaigns targeting fishers can be a good way to reduce the numbers of cuttings lost to sea. An awareness campaign is defined as a sustained passive method that provides information or conveys a message in order to educate a certain group about an issue or cause. A campaign does not necessarily change behaviour, but it can make the receiver aware that there is a problem and encourage them to think about the issue. In any case, the awareness campaign must have information that is relevant to the fishers and be presented in such a way that current behaviours are more likely to be changed.

Information gathered from KIMO's survey of harbours and fishers² show that both groups feel very strongly that

awareness campaigns would be an effective way to reduce cuttings. Posters in harbours and information on social media are considered good ways to convey these messages. Harbours were fully supportive of helping to promote and communicate an information campaign (such as through fishers' magazines and journals) both via existing networks between harbours and fishers and through peer-to-peer networking. Direct engagement with crews via the captain and word of mouth from other fishers were felt to be effective ways to communicate a message. Having captains and fishers adopt a campaign and communicate good examples of best practices within their community is likely to lead to a positive outcome.

Best practices examples in port

Awareness campaigns

The organizations Friends of the Earth in Germany³ (BUND) and Seas at Risk⁴ developed a campaign in the form of a comic book that was the output from a competition called "Nothing Overboard". The comic book was used to raise awareness among seafarers about litter being dumped into the sea as part of their "Waste reduction in the North and Baltic Sea" campaign. The messages were communicated only through images without any underlying text.

The Cornish Plastic Pollution Coalition has a net cuttings campaign featuring a visual display of thousands of cuttings found on beaches in Cornwall over the span of a few months. (see photo on p.37)

KIMO has developed materials for an awareness campaign to address and influence fishers' behaviours by reminding them to collect their net and rope cuttings waste and to dispose of it properly. These comprise a simple, clear logo (p.32) that can be replicated and used to indicate where cuttings waste should be disposed of, and a series of simple information posters that can be displayed in harbours and on board fishing vessels. The campaign uses an eye catching and relatable character whose actions educate fishers that cuttings should be picked up and binned. (see illustration on p.37)

Best practices examples in port

Awareness campaigns



- Wearing pouches or pockets to temporarily contain cuttings
- Systematic sweeping of work areas to remove cuttings
- Using enclosed areas where repairs of nets can be made
- Using tarpaulins or traps to stop cuttings from becoming marine litter
- Avoid repairing nets in stormy weather whenever possible
- Waste management planning of containers and bins on board the fishing vessel
- Captains leadership role in effective waste management
- Keeping a log of repairs and disposal of cuttings
- Incentives for implementing good practices
- Choosing nets made from more durable and recyclable materials

- Establish a raised border at the quayside
- Designate dedicated areas for repairing of nets and trawls at the port
- Dedicated containers for cuttings waste
- Clear signage for disposing net cuttings
- Fishers' access to cleaning equipment such as brooms, dustpans, containers
- Frequent inspection and cleaning of the quayside
- Net cuttings included in harbour waste management plans
- Initiating awareness campaigns including the effects on the fish population of ingestion of the plastic from net cuttings
- Following the 'Polluter pays' principle for cuttings left on the quay

End notes

p.11

¹ KIMO International (2020) "Net cuttings waste from fishing in the North-East Atlantic: best practices for mitigation".

p.35

² KIMO International (2020) "Net cuttings waste from fishing in the North-East Atlantic: best practices for mitigation".

p.36

³ *Friends of the Earth Germany* (BUND) is a German non-governmental organization (NGO) dedicated to preserving nature and protecting the environment

p.36

⁴ *Seas at Risk* is an umbrella organisation of environmental NGO from across Europe that promotes ambitious policies for marine protection at European and International level

Image Credits

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pp. 5,19, 32: Logos, KIMO International

p.7: Screenshot, Source: <https://www.youtube.com/watch?v=JQhCwS66Eq4>

pp. 9, 37: Screenshots, Source: Fishermen's kisses – Cornish Plastic Pollution Coalition, <https://www.youtube.com/watch?v=kwa5Jyra7Fc>

p. 10: Photo, Source: Ouest France, <https://www.ouest-france.fr/bretagne/guilvinec-29730/le-guilvinec-le-sacabout-la-belle-idee-de-maelisse-auduge-6601157>

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pp.18, 20, 26 Photos, Thyborøn Havn – Jesper Holt Jensen

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p. 23: Photos, KIMO Denmark - Ryan d'Arcy Metcalfe

p. 25 (top): Photo, Öckerö harbour - Harbourmaster

p.25 (bottom): Photo, KIMO Netherlands and Belgium - J.J. Midavaine

p.27: Photos, Lerwick Port Authority

pp.30, 31: Graphic, Green Deal Fisheries for a Clean Sea

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