

KILLING METHODS AND EQUIPMENT IN THE FAROESE PILOT WHALE HUNT

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(Translation from Danish*)

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Abstract

Pilot whales have been hunted for food in the Faroes since the early days of Norse settlement in the Viking age (800-900). Both the methods of hunting and the distribution of the catch are regulated by public authorities. Originally, regulations were primarily concerned with the collection by the authorities of a tax or tythe from the catch. There were strict requirements that each boat and whaling bay was to be properly equipped with the suitable hunting equipment. The whale hunt today is in general carried out in the same way as it has always been done, but there have been significant improvements in the techniques used, as well as in the organisation of the drive and in the regulation of whaling locations. This paper describes the equipment used for driving and securing whales and for slaughtering. The equipment and methods are assessed in terms of current regulations and the results of analyses of killing efficiency are presented, and the extent of loss of wounded and dead whales is also mentioned. The paper also presents a brief overview of regulations and methods for the hunting of other small cetaceans in the Faroes. The hunt in general as well as procedures for the authorisation of whaling bays are described elsewhere.

Introduction

Archaeological evidence from the early Norse settlement of the Faroe Islands c. 1200 years ago, in the form of pilot whale bones found in household remains, indicates that the pilot whale, *Globicephala melas*, has long had a central place in the every day life of Faroe Islanders. The meat and blubber of the pilot whale has provided the islanders with an important part of their staple diet. The blubber, in particular, has been highly valued both as food and for processing into oil, which was used for lighting fuel and other purposes. Parts of the skin of pilot whales were also used for ropes and lines, while stomachs were used as floats, the oesophagus was used for shoes and the penis was dried and cut into strips which were used as sewing thread for skin shoes.

Rights to whales have been regulated by law since medieval times. References are found in early Norwegian legal documents, while the oldest existing legal document with specific reference to the Faroes, the so-called Sheep Letter from 1298, includes rules for rights to, and shares of both stranded whales as well as whales driven ashore.

The pilot whale hunt today is still carried out in largely the same way as in former times. When a school of pilot whales is sighted, boats gather behind the whales and herd them towards a certain location, usually a bay or the bottom of a fjord. This location must be well suited for the purpose, which means that the seabed must gradually slope from the shore out to the deep water. Given such conditions, chances are good that the whales can be driven fully ashore or close enough to the shore that they can be secured and slaughtered from land.

The actual slaughtering method has changed very little throughout the history of the hunt in the Faroes. The main idea has been to secure the whales either directly by hand or with a hook fixed in the whale's outer layer of blubber and muscle, after which the whale is cut across the back of the neck and down to the spinal cord, severing both the main blood supply to the brain as well as the central nervous system. Once this cut is made, the whale lies completely still.

If the conditions for driving and beaching a school were not favourable, a whale spear was used to pierce the whale in the heart. Another function of the whale spear was to prod one of the whales at the back of the school as the whales were being driven in and just before they had reached the shallows. This would cause the whale to panic and swim quickly past the others, thereby leading the rest of the school in a rush to the shore, where the whales would, as a result, strand higher up on the shore and therefore be easier to secure and kill.

Finally, it should be added that if a school of whales could neither be driven ashore nor speared from boats, then the communal hunt would be abandoned and any individual would then be free to try his luck at harpooning single whales, and would then be entitled to keep for himself whatever he could catch.

Although the nature of the pilot whale hunt and the methods used have not changed greatly over the years, there have been significant improvements in the driving procedures, as well as in methods and equipment in recent years. This is due to the banning of the spear and harpoon as whaling equipment, the development and introduction of a new method for securing the whales prior to slaughtering, and the re-evaluation of slaughtering techniques. In addition, all authorised whaling locations have been subject to a thorough reassessment and whaling regulations have been updated in accordance with these changes in practice. The result of these amendments is that official whaling equipment today comprises the traditional whaling hook and the new blowhole hook for securing whales, and the whaling knife for the slaughtering. These changes are described in more detail below.

The harpoon

The harpoon (in Faroese skutilin - see Figure 1), which was most often made by the

whalers themselves or by a local smith, is a c. 60 cm long and 8mm thick metal rod with a two-pronged barb at its point. At the other end of the rod there is a funnel-shaped extension in which a c. 2 m long and 4 cm thick wooden stick can be inserted. The wooden stick was attached in such a way that when the harpoon was thrown, the stick came away from the metal rod, which was itself attached to a line and could thus be retrieved.

As mentioned above, the harpoon was only used when other catch options had been abandoned. Its efficiency as a hunting method no doubt varied greatly. It was not commonly used in pilot whale hunts, and nor was it used for any other purposes which would have allowed the development of any great skill in its use.

The idea with the harpoon was to hit a whale within range in the chest area, so that the harpoon lodged between two ribs, with the barb ensuring that it was securely attached. The whale was then hauled as quickly as possible to the boat and killed. The possibilities for an accurate strike were however quite limited. Whales would often be struck in the tail area, making it very difficult to haul them to the boat, both due to the risk of the barb coming loose or the whale damaging the boat with its tail. In addition, a buoy was often attached to the harpoon line at a distance of c. 5 to 10 m. from the harpoon itself. This buoy helped to exhaust the whale and to reduce the tension and pressure of any sudden tugs on the harpoon line. Hunting rifles were sometimes also used in an attempt to kill a harpooned whale. But this method was very dangerous, as there was a considerable risk of misfires and accidents.

With an amendment of the regulations through Executive Order no. 50 from 12 May 1986, the harpoon was formally banned as whaling equipment.

The Faroese Animal Welfare Act of 14 March 1985, which also applies to marine mammals, stipulates the duties of police and veterinary authorities with respect to injured or sick animals, which they must ensure are killed if their suffering would be prolonged by being kept alive. In one recent case when an injured pilot whale was found swimming with its intestines hanging out of the wound, veterinary authorities advised that the harpoon be used to secure the whale, under police supervision, after which it was immediately slaughtered in the traditional manner.

The whaling spear

The whaling spear (in Faroese *hvalváknið*, - see Figure 2), is a c. 40 cm long and 5 cm wide double-edged metal blade, c. 6 mm thick in the centre, and pointed at the top, attached to a c. 2 m long and 4 cm thick wooden pole and equipped with a rope. The spear was used, as mentioned above, in connection with the herding of a school of whales. Just before the school reached the shore, one of the whales in the back of the school was prodded with the spear in order to rush it and the rest of the school with it. This was supposed to ensure that the whales would strand as high up on the shore as possible, where they could then be swiftly slaughtered with knives. As well as this, the spear was also used for killing directly when whales could not be properly beached or where the sea bed conditions were such that whales could not be hauled ashore.

The spear was used to pierce the whale in the heart. But as the spear was often thrown from a distance of several metres, the accuracy of the strike was not always good. This

resulted in many whales being severely wounded and suffering a prolonged death, which in turn could cause a great deal of damage to men and property. The spear wounds also led to the wastage of a large proportion of the blubber from the catch and the meat was quickly spoiled. The spear has been strongly criticised as whaling equipment for many decades. With the amendment of regulations in 1986 it was now only permitted for pilot whaling foremen to use the spear, and this primarily for prodding a whale during the drive rather than as a killing method. With a later amendment to the regulations (executive order no. 55 from 16 May 1995) the spear was banned completely, in accordance with the wishes of whalers themselves.

The whaling hook

The whaling hook (in Faroese sóknarongulin, - see Figure 3) is an iron hook, c. 40 cm long with a c. 15 cm long hook arm. The end of the hooked is pointed and barbed on the underside. The thickness of the hook is c. 20 mm at its thickest, gradually tapering to c. 10mm at its lower end, where there is a ring for the attachment of a c. 20 m. long sisal or hemp rope. Artificial fibres are not permitted for ropes on whaling hooks due to their elasticity and the associated risk of breaking and accidents.

The whaling hook is used to secure the whales. In ideal circumstances where the whales are driven right into the shore, the whaling hook is in most cases redundant since the whales can then be slaughtered without first having to be secured. If the drive is not as effective it will be necessary to secure the whales. This is done with the help of the whaling hook which is driven into the outer layer of blubber and muscle of the whale on the back of the neck or in the thick blubber area of the melon. The whale is then hauled in to the shore where the slaughtering can take place.

The whaling hook can also be used from boats in cases where it is not possible to drive whales far enough ashore to allow them to be secured from the shoreline. This requires, however, that the responsible authorities issue a special permit for hooking from boats. The whale is held in against the boat with the whaling hook and towed into the shore, where the rope is passed to someone on the shore, who then pulls the whale up into shallow enough water for it to be slaughtered. In special circumstances it may most efficient and humane to kill whales directly from boats. This also requires special permission from the authorities, but rarely occurs. It is also very dangerous, as the ability to manoeuvre a boat which is towing a whale is greatly reduced and there are therefore increased risks of serious damage to people and property.

Up until a few years ago, the whaling hook was the only option for securing whales and was as such a necessity if whales were to be hunted at all. The actual slaughtering must be considered to begin from the moment the whaling hook is first driven into the blubber of the whale, even though the slaughtering of the whale with the knife does not begin until the whale has been hauled up to the shore. One disadvantage with the whaling hook is that it is most often secured in the neck and head region of the whale where the slaughtering incision is also made, thus making the slaughtering more difficult.

The blowhole hook

Criticism of the traditional whaling hook has led authorities and whalers in the Faroes to discuss its use in more detail. Recognising that the whaling hook as a hunting and securing

tool can cause the whale significant pain, often for extended periods (minutes), attempts have been made to find alternatives. All ideas tested in recent years have come from the whalers themselves.

The first initiative in this area was in 1989, and was based on information from New Zealand, where inner tubes were used as straps or belts placed behind the fin and under the flippers to gently pull stranded whales out to sea again. This method cannot be used in the Faroese hunt, as it is very difficult to get any kind of rope or strap over the fin and under the flippers of a swimming whale. A further development of this idea was to use a steel wire with a locking mechanism to slip over the front end of the whale, something like a lasso, but this did not function satisfactorily. A third alternative was the development of a special clamp to set down over the whale from above in front of the fin, but this did not prove practical either.

In 1993 attention was drawn to yet another invention which a whaler had himself created – a so-called blunt hook or blowhole hook (in Faroese blásturongul – see Figure 4), designed to be inserted into the air sacs of the blowhole. On his own initiative the designer of this new hook had examined the structure of the pilot whale's blowhole opening and had confirmed that in the opening between the layer of blubber and the cranium there is a pocket-like formation or sac on either side. These sacs are well known to whale biologists as the vestibular air sacs.

The vestibular air sacs are connected to the blowhole but have no direct connection into the nasal cavity below the blowhole. The air sacs are formed like tongues with a depth of c. 7-8 cm in the smaller whales and c. 18-20 cm in the largest whales. They are covered with a wrinkled layer of epithelium. The surrounding layer of blubber is very tough and fibrous and will withstand considerable pressure. On dead whales, a powerful tug with this hook has been tested without damaging the surrounding structure. The idea with this hook is to provide equipment with which whales can be secured for slaughtering without wounding the animal.

Some criticism has been raised in other countries concerning this new hook, with claims that its use causes serious lesions and bleeding in the blowhole area and even in the nasal cavity. The structure of the blowhole is such that it is impossible to insert the hook into the nasal cavity proper, but with the right technique it is very easy to insert the hook into the vestibular air sacs. Examinations of whales that have been secured with this hook in connection with the hunt have only revealed slight bleeding, and no lesions either in the epithelium or in the blowhole in general. Moreover, the bleeding observed was so slight that it was only possible to detect it because those whales secured with the blowhole hook had been marked to distinguish them from those secured with the traditional hook.

The blowhole hook has now been tested for some years. 20 hooks were originally produced and distributed to certain whaling locations so that as many as possible would have the opportunity to try it out in practice. Reactions were positive. Since then, another 100 hooks have been produced and these have been distributed all around the islands. The intention is to produce them in much larger numbers so that this hook can eventually replace the traditional iron whaling hook.

Preliminary use of the hook in a number of hunts so far has shown that whales are easy to handle and steer into the shoreline with this hook, and they do not display any particular

resistance. Preliminary testing does indicate, however, that it is necessary for the whales to be driven well into shore in order for this hook to be used. It would not be possible to use this hook from a boat. With the traditional whaling hook, which does not demand the same precision of placement, whales can more easily be secured in deeper water or from a boat. With improvements to seabed topography in some whaling locations, it has now become far less common for the use of the traditional hook to be permitted from boats. If this trend continues, there is every indication that the blowhole hook will eventually replace the traditional whaling hook.

With the latest amendments to the whaling regulations as adopted in Executive Order no. 46 from 8 April 1998, the blowhole hook has now been formally recognised as a part of the standard whaling equipment.

The whaling knife

The traditional method of slaughtering pilot whales has been to sever the spinal cord with a cut across the back of the neck of the animal between the head and the neck, or as is the common guide - a hand's breadth behind the blowhole. For this the whaling knife – (in Faroese *grindaknívur* - see Figure 5) is used, which in older times was made by local smiths. The greasy layer of blubber and the quantities of blood involved with this method meant that the knife handle had to be shaped in such a way as to ensure that one could maintain a firm grip. This is the reason for the development of the tradition for decorating the knife handle and the sheath with intricate designs of metal and bone inlaid in the wood, which are often done by the whalers themselves. There are no specific formal requirements with respect to the whaling knife; but in most cases the length of the blade is between 16 and 19 cm. This method of slaughtering was considered as safe and effective. The severing of the spinal cord caused a very powerful muscular spasm throughout the body of the whale, after which it lay quite still due to total paralysis.

Terms for this method of killing a whale are also commonly used metaphorically in Faroese. The terms *mønusting* (i.e. the spinal cut) and *mønubrest* (i.e. the spinal spasm) are used to describe a final, decisive action or its final, decisive result.

In the mid 1980s, political authorities in the Faroes decided that the regulations for pilot whaling, which had last been amended in 1955, should be reviewed by an expert committee which would make recommendations for any necessary amendments. This resulted in a revised executive order on pilot whaling, which came into effect in 1986. After analysing the traditional slaughtering methods it was concluded that the spinal cut was not the best way to slaughter a mammal. Instead it was recommended that the whales should be slaughtered by first having their carotid arteries severed, as in kosher butchering. For most experts without a specialist knowledge of the intricacies of blood circulation in whales, this would seem plausible. The method was tested and was found to be possible in practice. However, the duration of the slaughter was too long using this method and the whalers themselves did not feel comfortable with it and found it difficult to accept the increased suffering this caused the whales. As a result, they chose to supplement this method with the continued use of the traditional spinal cut.

Along with this actual change in methodology, other slaughtering methods were considered. The use of rifles was eliminated as an option at once due to the danger of accidents, especially given the fact that there can be up to several hundred people on the

shore and in boats during a whale drive. The use of a bolt pistol to slaughter whales was also considered, but the distance from the surface of the skin to the brain is so large that this is only a feasible method for the very smallest whales. Tests have indicated that the bolt pistol can damage the brain, but this method was not found acceptable due to the extremely powerful muscular spasms which followed. These spasms were so violent that there was a great danger of personal injury to the people in the vicinity.

In 1992 attention was drawn to the fact that in whales and other marine mammals, the blood supply to the brain does not function in exactly the same way as in land mammals. In land mammals the brain is supplied with blood primarily through the main carotid arteries and to a lesser and varied extent from the two vertebral arteries which enter the brain through the foramen magnum. Severing the carotid arteries in land mammals therefore cuts the main blood supply to the brain.

In marine mammals such as whales and seals, the carotid arteries are rudimentary and do not contribute significantly to the brain's blood supply. Instead, a special reservoir or network of blood vessels has evolved under the thoracic and cervical vertebra. This network continues into the spinal canal and branches off as a sponge-like mass around the spine and up to the brain and back, functioning as a blood reservoir from which the brain is supplied with oxygen-rich blood during diving.

On the basis of this new knowledge, slaughtering methods in the pilot whale hunt were once again reviewed. The traditional method using the spinal cut was reconfirmed and reintroduced as the superior method. Scientific evidence actually established that the age-old traditional method was in fact more effective than had originally been thought. In addition to paralysing and therefore immobilising the whale with the spinal cut, the same cut also severs the major blood supply to the brain, thus causing a rapid loss of consciousness due to lack of oxygen.

Times-to-death

Efforts have always been made to ensure whales are killed as quickly as possible. In a number of whale drives, times-to-death have been recorded by noting when the killing begins and when it is finished. These data are combined and presented as an overview in Table 1, which provides information on total duration of the killing stage of a number of whale hunts (rather than the times-to-death of individual animals, see further below). If the duration is brief, this would indicate that the drive and hunt have been well organised. A longer duration does not, however, necessarily mean that the drive and slaughter were not successful. The number of whales in the school will have an influence on the total duration of the slaughter. Another essential factor is whether there are enough people involved in carrying out the work. This is not always the case.

Initiatives have been taken by administrative and veterinary authorities in the Faroes to examine times-to-death for individual whales more closely, with the aim of establishing some objective criteria for evaluating the efficiency of slaughtering methods. These examinations were carried out after the thorough briefing of the people involved in collecting the data. They were equipped with stop watches and standard forms for registering results, as well as plastic markers for marking individual whales examined for later identification and data verification. Another reason for identifying these whales was also to distinguish those whales with which the blowhole hook had been used, so as also

to be able to assess its effects on the blowhole.

The slaughtering can be divided into two stages. The first phase is from the moment the whale is first secured with the traditional iron whaling hook until the first incision of the spinal cut is made, at which point the second phase of the slaughtering begins. This phase has also been recorded in connection with the use of the blowhole hook, even though the whale is not wounded by this hook, in order to also examine the times involved in the use of this hook.

When the traditional whaling hook is used to secure the whale, the total time-to-death is the sum of the first and second phases. When the blowhole hook is used, the total time-to-death is the second phase only (the severing of the spinal cord with the knife), as the whales are not wounded with the blowhole hook. The division into these two phases is useful for such an evaluation. The distinctions between the different stages are well-defined and easy to observe and record. Similarly, the time of the final severing of the spinal cord – the end of the second phase of the slaughtering, is also easily noted by the characteristic immediate and violent muscle spasms, followed by total paralysis.

In the period from 1995 to 1998, data on times-to-death were collected from several whaling locations. With the use of the traditional whaling hook, the average total time-to-death taken in the 199 whales recorded was 65.4 seconds, with a range of 8.0 to 290 seconds, and with 50% of whales killed in 55.3 seconds. With the use of the blowhole hook, recorded with a total of 52 whales, the average time-to-death was 29.2 seconds, with a range of 6 to 211 seconds, and with 50% of whales killed in 20.0 seconds. These results are shown in Tables 2 and 3 and Figures 6 and 7.

Given the circumstances of the pilot whale hunt, the traditional whaling knife is the safest and most effective equipment with which to kill the whales. However, as the slaughter is done manually it cannot, by definition, be instantaneous, which is the ideal in all forms of slaughter, including traditional slaughterhouse methods as well as hunting.

The pilot whale hunt in Faroes is a form of hunting. The best possible slaughtering techniques will therefore also be conditional upon the environment in which the hunt takes place and the requirements for the safety of those who take part. The development of the new blowhole hook has shown that it is possible to catch and secure a whale without wounding it. With the new knowledge concerning the nature of the blood supply to the brain in pilot whales, it can also be confirmed that the traditional method of slaughtering using the whaling knife results in the loss of consciousness in only a few seconds after the spinal cord and surrounding blood vessels have been severed.

Driving and slaughtering techniques will be maintained and monitored by ensuring continued regular discussions on the methodology and organisation of the pilot whale hunt, and by examining areas of potential further improvement and specific factors contributing to longer times-to-death (cf. Figures 6 and 7), such as, for example, the physical conditions, organisation of the drive and the number and skill of participants on the shore.

One of the new stipulations in the revised pilot whaling regulations from 1986 was that whales which were not stranded should be driven out to sea again. With the banning of the harpoon and spear this is now a real possibility, (although rarely necessary), as the

incidence of wounded animals in a hunt has greatly decreased. Injuries cannot be completely avoided, however, as the whales swim among many boats during a drive, there is always the risk of collision or injury from a propeller. Such incidences are also reflected in insurance claims for damages to property in connection with a hunt. The number of such claims is decreasing, while the value of damages claimed is increasing, which reflects the increasing value of boats and other equipment.

In former times it was the custom that when the hunt was over, a number of men were appointed to fish up whale carcasses. Using a harpoon attached to a rod, the seabed would be dragged in search of any remaining animals which may have sunk to the bottom, and which would then be divided together with the rest of the catch. With improved conditions in whaling bays today, almost all whales are secured and drawn ashore during the hunt. It is seldom necessary to drag the seabed for lost whales, and the loss of wounded and dead animals is rare.

Hunting of other small cetaceans

According to Faroese legislation it is also permitted to hunt certain species of small cetaceans other than pilot whales. These include: bottlenose dolphin (*Tursiops truncatus*); Atlantic white-beaked dolphin (*Lagenorhynchus albirostris*); Atlantic white-sided dolphin (*Lagenorhynchus acutus*); and harbour porpoise (*Phocaena phocaena*).

The hunting of these dolphin species, with the exception of harbour porpoises, is done in the same way as the pilot whale hunt. It is not uncommon for these species to occur and be caught together with a school of pilot whales, or in separate schools. The regulations stipulate that they shall be driven into the same authorised locations and killed according to the same methods and procedures which apply to the pilot whale hunt. The division of the catch is also regulated, but the regulations are not as detailed as for the division of a catch of pilot whales.

There are also specific regulations for the hunting of harbour porpoise. Harbour porpoises are killed with shotguns and numbers taken must be reported to the relevant district sheriff. According to statistics, the number of harbour porpoises shot on an annual basis is very low - from 0 to 10 animals.

Other than these species, there has since early times in the Faroes been a tradition for a very limited catch of bottlenose whales (*Hyperoodon ampullatus*). This catch has been largely confined to two villages, Hvalba and Sandvík, on the southern island of Suðuroy, where it has been a more or less regular event to kill the 2 or 3 bottlenose whales a year that strand there or are found close to shore in these villages. For the last few years, only animals which have become stranded themselves have been killed. The method used is the same for pilot whales. The division of the catch of a bottlenose is no longer regulated by law, but the common practice for the division of the meat and blubber remains the same for the few animals which are killed.

Commercial whaling for larger whale species (fin and minke whales) in the Faroese has not been carried out since 1984, but was conducted from land stations in the Faroes on and off for some 100 years. Hunting methods (harpoon grenades) were the same as those used in other North Atlantic whaling nations

	02-10 min	11-20 min	21-30 min	31-40 min	41-50 min	51-60 min
Number of hunts	26	12	4	3	1	1
Percent of total	55%	26%	9%	6%	2%	2%

Table 1: Duration of slaughter of entire school in 47 pilot whale hunts in the period 1995-1998

	a) Securing (using traditional whaling hook)	b) Slaughtering (spinal cut with whaling knife)	c) Total Time-to-D
Average	29,3	36.1	65.4
Minimum	0	3.5	8.0
Maximum	132	195	290
Median	23.9	25.2	55.3

Table 2. Total times-to-death in seconds (c)), divided according to securing (a) and slaughtering (b) times, recorded for 199 pilot whales with which the traditional whaling hook was used to secure before slaughter (see also Figure 6).

	a) Securing (using blunt, "blowhole" hook)	b) Slaughtering (spinal cut with whaling knife)	c) Total Time-to D
Average	20.1	29.2	29.2
Minimum	3	6	6
Maximum	90	211	211
Median	14.7	20.0	20.0

Table 3. Total times-to-death in seconds (b) and (c) recorded for 52 whales with which

the blowhole hook was used to secure whales prior to slaughter (a) (see also Figure 7).

Figure Legend

1. Harpoon (hand-held) – (Faroese *skutil*)
2. Whaling spear – (Faroese *hvalvákn*)
3. Traditional iron whaling hook – (Faroese *sóknarongul*)
4. Blowhole hook – (Faroese *blásturkrókur*)
5. Whaling knife – (Faroese *grindaknívur*)
6. Times-to-death in Faroese pilot whale hunts in which the traditional whaling hook was used.
7. Times-to-death in Faroese pilot whale hunts in which the blowhole hook was used .



Figur 1. Harpun (Skutil)



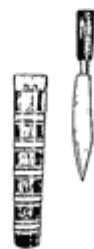
Figur 2. Hvalspyd (Hvalvákn)



Figur 3. Hvalkrog
(Sóknarongul)



Figur 4. Stump krog
(Blásturongul)



Figur 5. Grindaknív
(Grindaknívur)

Tekningar: Astrid Andreasen, Føroya Náttúrufrøðingur, FO-100 Tórshavn

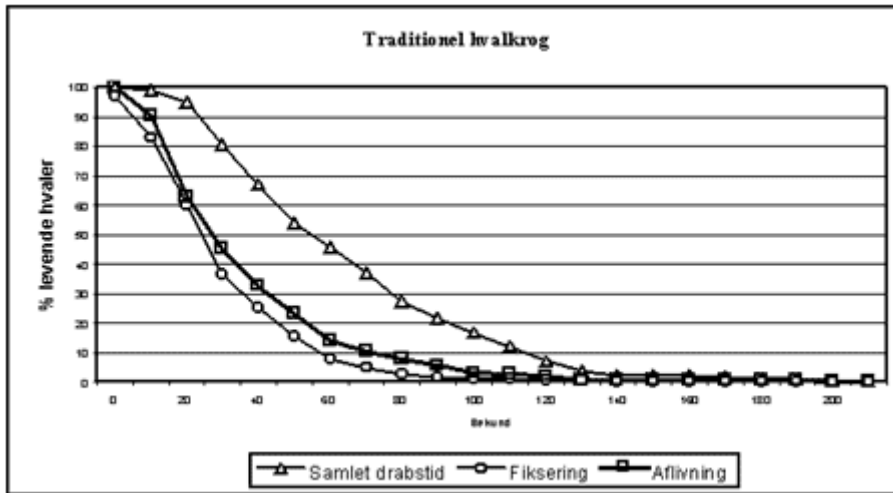


Figure 6. Times-to-death in Faroese pilot whale hunts in which the traditional whaling hook was used . Key to symbols: O - O: The time from which the whale is secured with the whaling hook until the first incision of the whaling knife ; □ - □ : Slaughtering with the knife; Δ - Δ: Total time-to-death, (cf. Table 2). Vertical axis: % of living whales; Horizontal axis: Seconds

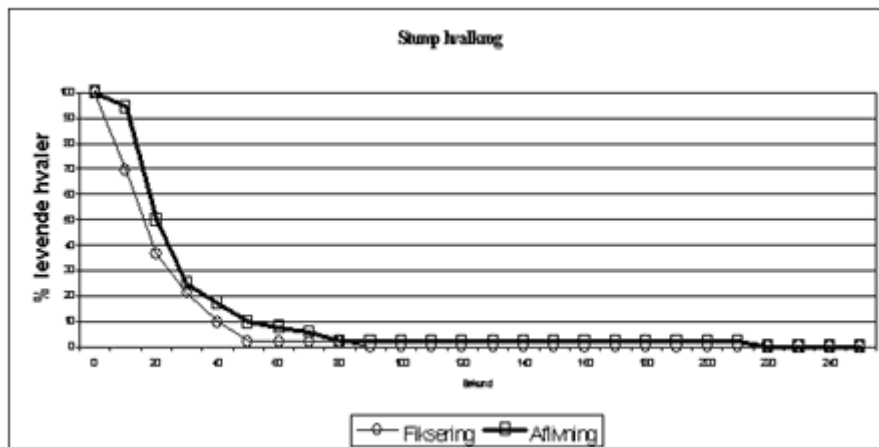


Figure 7. Times-to-death in Faroese pilot whale hunts in which the blowhole hook was used . Key to symbols: O - O: The time from which the whale is first secured with the blowhole hook until the first incision of the whaling knife; □ - □: Total time-to-death (cf. Table 3). Vertical axis: % living whales; Horizontal axis: Seconds