



NAMMCO EXPERT GROUP MEETING TO ASSESS TTD DATA LARGE WHALES
4 – 6 November 2015, Copenhagen, Denmark

DOCUMENT 9

REPORT ON TTD IN ICELANDIC MINKE WHALE HUNT

Killing efficiency in the Icelandic minke whale hunt 2014 and 2015

Report to the Directorate of Fisheries in Iceland, October, 2015

By
Dr. Egil Ole Øen
Wildlife Management Service-Sweden
egiloen@online.no

Background and brief summary of results

Survival time (ST), Time to death (TTD) and Instantaneous death rate (IDR) are terms that are used to measure and quantify the killing efficiency or standard of killing methods and practices used in whaling operations (Øen 1995). Sampling and analysis of ST and TTD data in a standardised manner make it possible to compare the killing efficiency of different hunting practices and hunting gears and also measure the impact of developments, changes in hunting practices and training of hunters etc.

A NAMMCO Expert Group Meeting in 2010 to assess TTD data and results from whale hunts (NAMMCO 2010) recommended sampling of TTD data from several hunts, including the Icelandic hunt of minke whales (*Balaenoptera acutorostrata*) with the aim to compare and evaluate the results of killing efficiency of hunting methods used in Iceland with the results from other countries and hunts, and identify possible improvements of the hunt. NAMMCO recommended that data of TTD should be collected and analysed with covariates (animal size, shooting distance and angle of harpoon cannon shot, hit region and detonation area) like it had been done in Norway during 1981-2002 (Øen 1995, 2003).

To follow up these recommendations the Directorate of Fisheries in Iceland engaged the author of this report to organize the sampling of TTD data from the Icelandic minke whale hunt in 2014 and 2015 and also to process and organise the analysis of the data in compliance with the NAMMCO recommendations.

TTD data collected from the hunt in 2014 was 1 minke whale and 12 minke whales in 2015 hunted by the same vessels. The result was 9 whales (69%) killed instantly. The average killing time for all whales was 2 min and the median time for the four whales that did not die instantly was 4 min. The longest survival time was 13 min.

Data collection and results from the 2014 and 2015 hunting seasons

Data sampling

An experienced Norwegian veterinary officer well trained for TTD data collection after several seasons in the Norwegian minke whale hunt, was engaged to collect the TTD data during the two seasons using the data-sampling scheme that had been used for collection of TTD data for minke whales in Norway (Øen 1995, 2006). In addition to TTD, the behaviour of the whale after being shot, data on whale length, estimated range of shooting, the angle between the shot direction and the whale's long axis, the impact point on the whale, the detonation site, necropsy finds, grenade function and possible reshooting should be recorded.

The post mortem examination of the whales was carried out when the whales were processed on land.

Criteria of death

The time from a strike to the animal's death was recorded by using stop-watch. The time of death was recorded as recommended by The International Whaling Commission (IWC 1980), which is the moment at which cessation of flipper movement, relaxation of the mandible, or sinking without any active movement occur. Using these criteria a proportion of animals will be recorded as being sensible or alive when they most likely are unconscious or dead (Knudsen 2005).

In addition to these behaviour signs of death the recorded TTD should be verified through the findings of organ damage demonstrated at the autopsy. Shooting range and angle of the shot relative to the animal's long axis were estimated without instrumental aid.

Results

Due to weather condition in 2014, only one whale was killed when the inspector was on board. In 2015 the inspector collected data for 12 minke whales. No whales were reported lost.

The whales were killed with 50 mm Kongsberg harpoon canon and Whale Grenade-99 with 30g of pressed penthrite. Nine (69%) of the 13 minke whales were reported instantly dead after detonation of the grenade in the thoracic region. Eight of these were shot from the recommended side position (45° - 135° - relative to the animal's long axis) and one from a narrower angle from behind (135° - 180° - relative to the animal's long axis). Three of the whales that did not die instantly were hit behind the abdomen. For one whale hit in the thorax the grenade failed to detonate. This whale would probably have died instantly or very fast if the trigger line had not been cut. The average TTD was 2 min and the median survival time for the four whales that did not die instantly was 4 min. The longest survival time was 13 min.

The size of the whales varied from 6.2 to 8.1 m. Shooting distance varied from 20 to 60 m with an average shooting distance of 45m.

Comments and conclusions

Too strong conclusions regarding the killing efficiency in the Icelandic minke whale hunt It should not be drawn from the limited set of data from the two hunting seasons. The data show an IDR of 69%. The average TTD was 2 min. This is a lower IDR and a higher TTD than registered in the Norwegian hunt (Øen 2003, 2015) where the values are 82% and 1 min, respectively. However, as the total number of samples is only 13, each whale will count for about 7-8% and one single whale can therefore easily tip the balance considerably in a positive or negative direction.

Detonation in the thoracic cavity, detonation near the spinal column in the thoracic part of the body and at the neck and brain results in 100% instant death (Øen 2003, 2006). The detonation of penthrite causes massive bleedings, damages and injuries to vital organs like heart, lungs, major blood vessels and central nervous system (CNS). Studies of minke whale brains from whales killed with penthrite grenades (Knudsen and Øen, 2003) show that the detonation in thorax and neighbouring regions like the rostral part of abdomen creates fatal haemorrhages (bleedings) as far away from the detonation site as in the spinal column and the basis and cortex of the brain. This effect is in all probability caused by the extremely high, undulating pressure/shock waves that spread out through the body and to the brain through natural openings like the spinal column, large vessels and brain nerves openings in the skull.

The angle of the shot relative to the animal's long axis has a significant influence on TTD and IDR. Grenades that are directed at the thorax from the recommended side position of about 45°-135° relative to the animals long axis can result in 92% instant kills while shots directed in narrower angles from front or from behind results in only 70%, instant kills. The results for shots directed parallel to the body are even lower (63%) (Øen 2015).

Shots from a narrow angle at the body of a moving target will significantly increase the risk of hits and detonations outside vital areas. The risk of stray shots and wounding without killing the animal is considerable. This type of shooting seems to be the main reason for the longer survival times. It is well known also from hunting of terrestrial large games that firing the first rifle shot from the front with some exceptions should be avoided. Firing from back should never be permitted except for the felling of wounded animals (Øen 1995).

To day malfunction or misfire of the Norwegian penthrite grenade is very unusual much due to continuous modification of components that have showed weaknesses and a close surveillance and quality control of the production. However, if the harpoon does not penetrate deep enough (65-70 cm) to trigger the detonation the grenade will not be set off. The high quality of the grenade together with the introduction and use of the NAMMCO handbook "NAMMCO Instruction manual for the maintenance and use of weaponry and equipment deployed in hunting of baleen whales in NAMMCO member countries" should make a potential for further improvements of IDR and TTD if all gunners show a bit more patience and wait until the animal is in the recommended side position before the gun is fired.

References

IWC: 1980. International Whaling Commission. Report of The Workshop on Humane Killing Techniques for Whales, Cambridge.

Knudsen SK and EO Øen. 2003. Blast-induced neurotrauma in whales. *Neuroscience Research* ,46, 377-386.

Knudsen SK, 2005. A review of the criteria used to assess insensibility and death in hunted whales compared to other species. *The Veterinary Journal* 169 (2005) 42 – 59.

North Atlantic Marine Mammal Commission. 2010. Report of the NAMMCO Expert Group Meeting on Assessment of Whale Killing Methods.

North Atlantic Marine Mammal Commission. 2014. Instruction manual for the maintenance and use of weaponry and equipment deployed in hunting of baleen whales in NAMMCO member countries.

Øen EO. 1995. Killing methods for minke and bowhead whales. Dissertation presented for the degree of Doctor Medicinae Veterinariae. Norwegian College of Veterinary Medicine, Oslo, Norway. Also: IWC report IWC/47/WK8.

Øen EO. 2003. Improvements in hunting and killing methods for minke whales in Norway 1981 – 2003. Rep. Int. Whal. Commn. IWC/55/WK 17.

Øen EO, 2006. Norwegian minke whaling. Research to improve hunting and killing methods for minke whales in Norway. Rep. Int. Whal. Commn., IWC/58/WKM&AWI 25.

Øen EO, 2015. The Norwegian minke whale hunt 2011 and 2012. Report of killing efficiency in the hunt. Rep. Directorate of Fisheries. October 2015.