

Occupational hazards for fishermen in the workplace in Polish coastal and beach fishing – a point of view

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ABSTRACT

The work of marine fishermen is considered one of the most dangerous and life-threatening professions all over the world. There are some common features of the fishing occupation, such as: exposure to cold, wind, rough seas, substantial participation of physical effort, frequency of injuries during work, unpredictability and abruptness of threats, equipment failure, everyday psychological stress, and constant economic pressure. At the same time, the specificity and variety of hazards, depending significantly on geographical-climate and cultural factors, makes the dissimilarity of problems and solutions substantial in different sectors of fishing. The present article is a review of the problems of Polish coastal fishermen, referring to some local particularities within this extremely difficult profession requiring special predispositions.

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Key words: particularities of coastal fishing and techniques, risk factors, health hazards

INTRODUCTION

The present article is a continuation of our previous publication: “Assessment of the European Guide for Risk Prevention in Small Fishing Vessels. Guide Applicability in Polish Coastal Fishing” which appeared in the IMH VOL. 63/4/2011 [1]. The evaluation of The European Guide [2] inspired us to review the problems of Polish coastal fishermen more thoroughly, referring to some local particularities within this demanding profession requiring special predispositions.

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of problems and solutions substantial in different sectors of fishery [3]. The difference also appears between such distant regions as Alaska or South-East Asia and much closer fisheries such as in the Mediterranean, North Sea, or Baltic Sea. The distinct work characteristics and exposure to risk factors also depends significantly on the size of the fishing units and the kind of catch [4].

Polish fishermen have access to one fishing area - the Baltic Sea, with a shoreline of 843 kilometres [5]. The boats in the Polish fishing industry are divided into the following categories of registered units: (1) 3–8 m – 252 units; (2) 8–12 m – 289 units; and (3) 12–15 m – 43 units [6]. The specificity of Polish sea fishing is work on small boats, those up to 15 metres. This occupation is also specific due to its generational transfer, repeatedly handed down from father to son, inside small family businesses.

Focusing on the geographic and climatic conditions, the work of Polish fishermen is carried out most of the year in difficult or sometimes even extreme

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conditions. This concerns mainly the so-called “beach fishing”. The average temperature in Poland is 7–9 Celsius Degrees: the average temperature in the summer is between 16.5 and 20 °C [5], and in the winter, in extreme cases, it can even reach 30 degrees below zero (twojapogoda.pl). Added to this is heavy rain – 600 mm a year – and the fact that the Polish coast is very often haunted by winds (winter, spring, and autumn are the periods in which there are storms) [5].

Combined climatic and technical conditions are not favourable for activity on the water and in the open space, creating very difficult, dangerous conditions requiring physical effort, and which are burdensome to the human body and human psyche. Fishing crews are constantly exposed to heavy physical stress and strain while working, and the risk of death is very high [7].

CHARACTERISTICS OF POLISH FISHERMEN

The work of Polish fishermen requires not only catching the fish but also their initial processing. The tasks and work activities vary, depending on the job position, the size of the vessel (boats, fishing boats, trawlers, processing), and the distance from the base.

In coastal fishing boats, as described in the article, the small units, with crews consisting of 1–4 members, operations performed by individual fishermen include the whole fishing process (such as gutting, sorting, preserving, and freezing the fish) [4]. The highest position on the fishing vessels in the Baltic Sea is the skipper – the commander of the fishing unit. He is superior to all employees on the cutter or fishing boat, and also a representative of the owner (owner entity). The skipper is responsible for all individual and crew safety. He personally supervises the navigation system (navigation) at the exit and entrance of the unit to the port and at sea, even during the toughest weather conditions. He also operates the radio equipment and telecommunications if available [8].

The physical health requirements toward fishermen are regulated by the ILO/WHO guidelines [9] concerning obligatory assessment of fitness to work, carried out every 1–2 years dependent on the worker's age.

FISHING TECHNIQUES IN POLAND

THE WORKING ENVIRONMENT OF POLISH FISHERMEN AND ITS HEALTH CONSEQUENCES

The climate, geography, and specificity of fishing on the Polish coast enforce the characteristics of

the work environment, its organization, and social conditions [10]. The fishermen work on the vessel, which remains for long periods of time on the open sea some distance from the mainland, offering more comfortable living facilities. Fishing boats or cutters, to a considerable extent, offer less favourable working and living conditions. The work on fishing boats is performed standing in uncomfortable positions, on a slippery deck – regardless of weather conditions, and very often in the cold [8]. Water flooding during storms and at high tide, as well as high humidity, are continuing threats to the health and lives of the fishermen. Operating heavy equipment and fishing in these conditions often leads to injuries caused by mechanical factors, as well as musculo-skeletal disorders. Pulling the fishing nets out of the water can pose a risk of hand injuries, especially the fingers, as well as bruises or frostbite [11]. Some species of thorny fish sorted by fishermen on board may also cause injuries. A great threat is posed by allergic skin diseases caused by direct contact with sea flora and fauna – fish, jellyfish, molluscs, etc. The indicated factors, together with strain and stress, can lead to common occupational diseases of sea fishermen, such as MSD and traumas, diseases of the digestive tract allergies, psychoneurosis, and addictions. Exposing the body to cold or sun and seawater also increases the risk of detrimental changes in skin: discoloration, calluses classified as precancerous, and cancers as a result of UVA/UVB exposure [4]. The main risk of life loss is drowning or hypothermia – hibernation after falling off the boat or sinking [12].

ORGANIZATION OF THE FISHERMAN'S WORK

The work of fishermen takes place day and night, even on public holidays or statutory free days from work. In small-scale fisheries in the Baltic, the work is primarily seasonal. The number of departures depends on the season, weather, and abundance of fish. For example, flounders are caught mainly from October to December and the cod season falls on January. April, July, and August are earmarked for boat repairs. The time of fishing lasts from 12 to 18 hours, and it is mainly irregular, as the skipper regulates it himself. Unlike other seafarers, coastal fishermen have frequent contact with the land and family.

The work of sea fishermen is highly specialized, reproducible, routine, and monotonous. The smaller the boat, the lower the possibilities of specialization. On small boats and cutters, each member of the crew must be able to perform all professional activities.

The basic rule of fisherman's work is teamwork. It requires good communication with colleagues and the ability to work often in poor conditions outside, which often leads to nervous tension.

The results of catch landing projects directly to the crew's earnings, which are dependent on many factors that are often difficult to predict – the weather, sea conditions (storms), the abundance of fish, etc. All of these factors can expose fishermen to constant economical and personal difficulties, risks, and stress [8].

PRINCIPAL METHODS OF NET FISHING IN BALTIC AREAS

To more thoroughly illustrate the work characteristic of the Polish fishermen, we present a technical illustration of the fishing environment, techniques, and equipment used in the Baltic Sea area, so that the reader might better understand what the fishermen have to cope with in their everyday work.

ACTIVE FISHING GEAR— TOWED EQUIPMENT

Trawl and pair nets (bottom and pelagic) – in the process of fishing are towed astern of one or two ships.

Trawls and pair nets are similar in construction and have a conical shape. They are made of net fabric mounted on external lines. The principle of their operation consists in filtering through net eyes masses of water that go in through the front open part of the net; the end part of the net captures fish of allowed size.

PASSIVE GEAR USED BY SMALL COASTAL UNITS – SELECTIVE EQUIPMENT

Bottom and drift nets

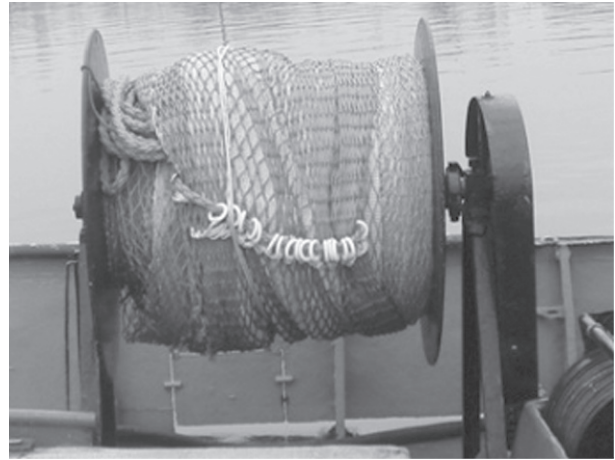
Bottom nets (Figure 2) are used to catch fish such as cod and flounder. The nets remain near the bottom of the sea. This kind of gear is categorized as selective equipment used for catching a specific type and size of fish. Any fish of smaller size and young age will easily swim through the nets.

Drift nets (Figure 3) are used to catch such fish as salmon, herring and bull-trout. The nets float at the surface of the water. They are also selective equipment used to catch the specific type of fish.

Fishing with this kind of gear can be very harmful to the spine. It also is a very dangerous regarding the risk of falling overboard while pulling the net out of the water.

Traps and hooks

Traps are types of baskets connected by nets. The nets form a fence creating a bypass for the fish. Forced to go around the "fence" the fish get caught



Trawl drum (photo: Maria Jelewska)

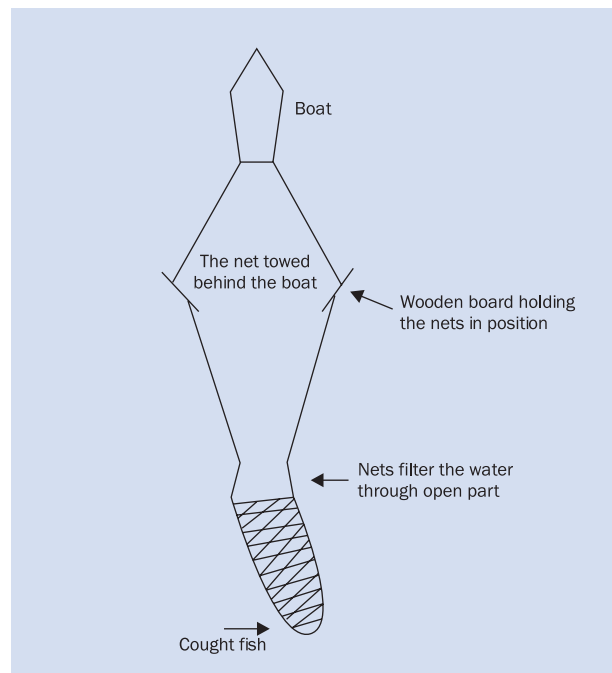


Figure 1. The diagram represents the system of trawling (author: Marta Grubman-Nowak)

in the basket where they remain alive until the fishermen pulls the traps out of water (Figure 4).

The risks during these actions are similar to those connected with bottom and drift nets. The fishermen should always be careful not to fall out of the boat. The main precaution should always be the floating gear.

The construction of hook-traps is very simple. Lines of 1.5–2 metre length are hung in the water with hooks attached to them. They are used to catch predatory fish – such as eel, salmon, and perch. One line has about 1000 hooks. Bait (usually tubis or sprat) is hung by the fishermen on each hook (usually by hand)

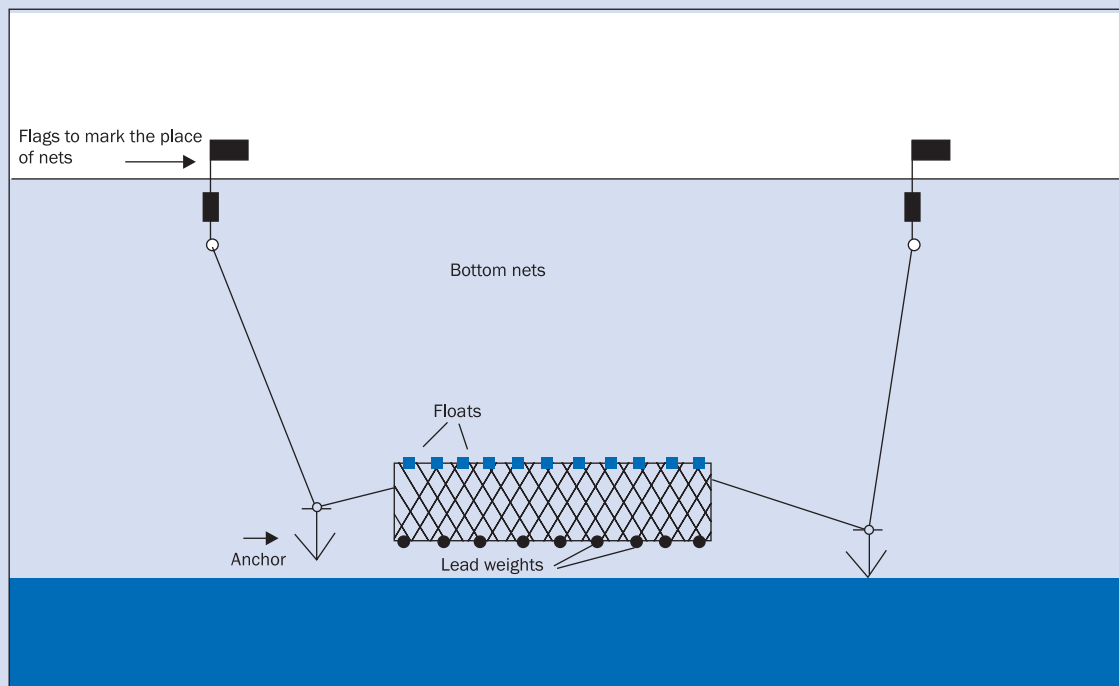


Figure 2. Bottom nets (author: Marta Grubman-Nowak)

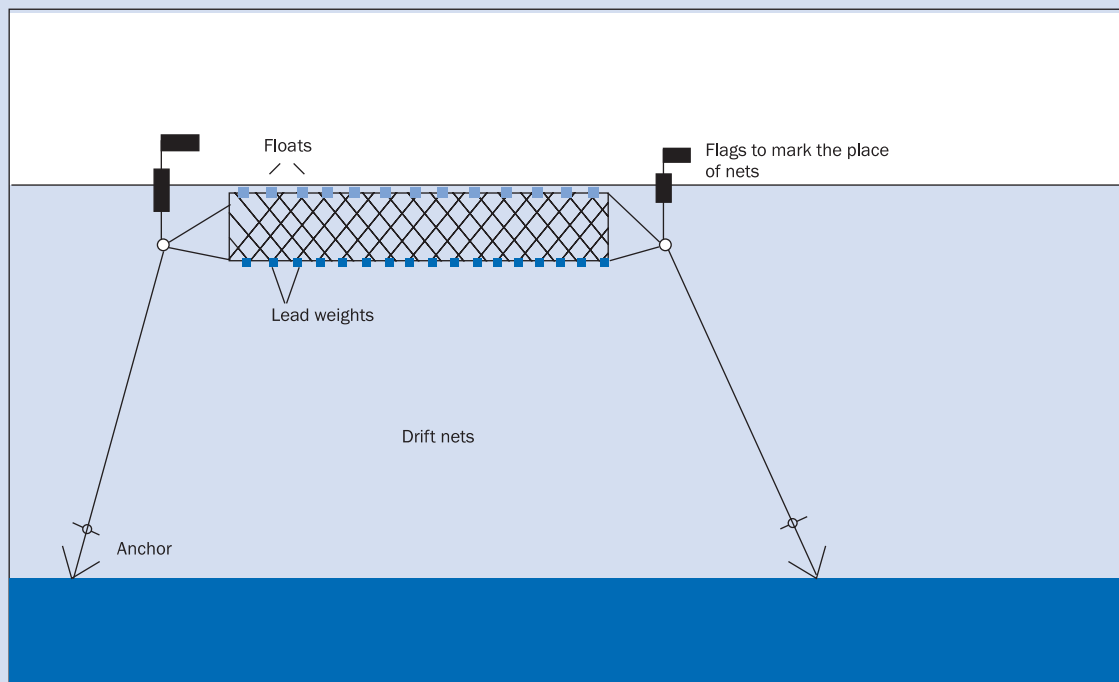


Figure 3. Drift nets (author: Marta Grubman-Nowak)



The risk of falling overboard (author: Mirosław Daniluk)

Using the hooks is an extremely dangerous technique of fishing. While putting on and taking off the bait the hook can stab the hand or arm. The hook can pierce through muscle or even bone. Some fishermen build a special hoist that detaches the hooks from the caught fish, to protect themselves.

SPECIFICITY OF THE BALTIC SEA AND EQUIPMENT FAILURE

Due to the significant number of fishermen operating in small and shallow areas, the main factor that

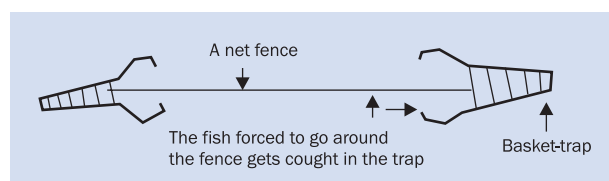


Figure 4. Traps (top view) (author: Marta Grubman-Nowak)

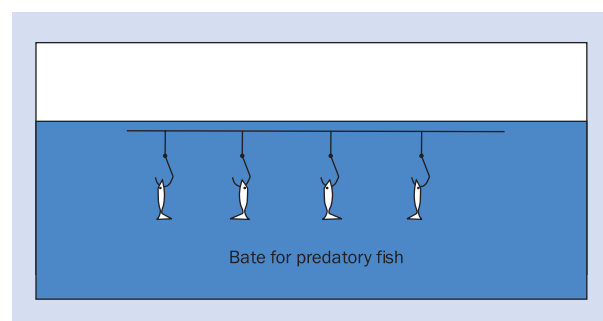


Figure 6. Hooks (author: Marta Grubman-Nowak)

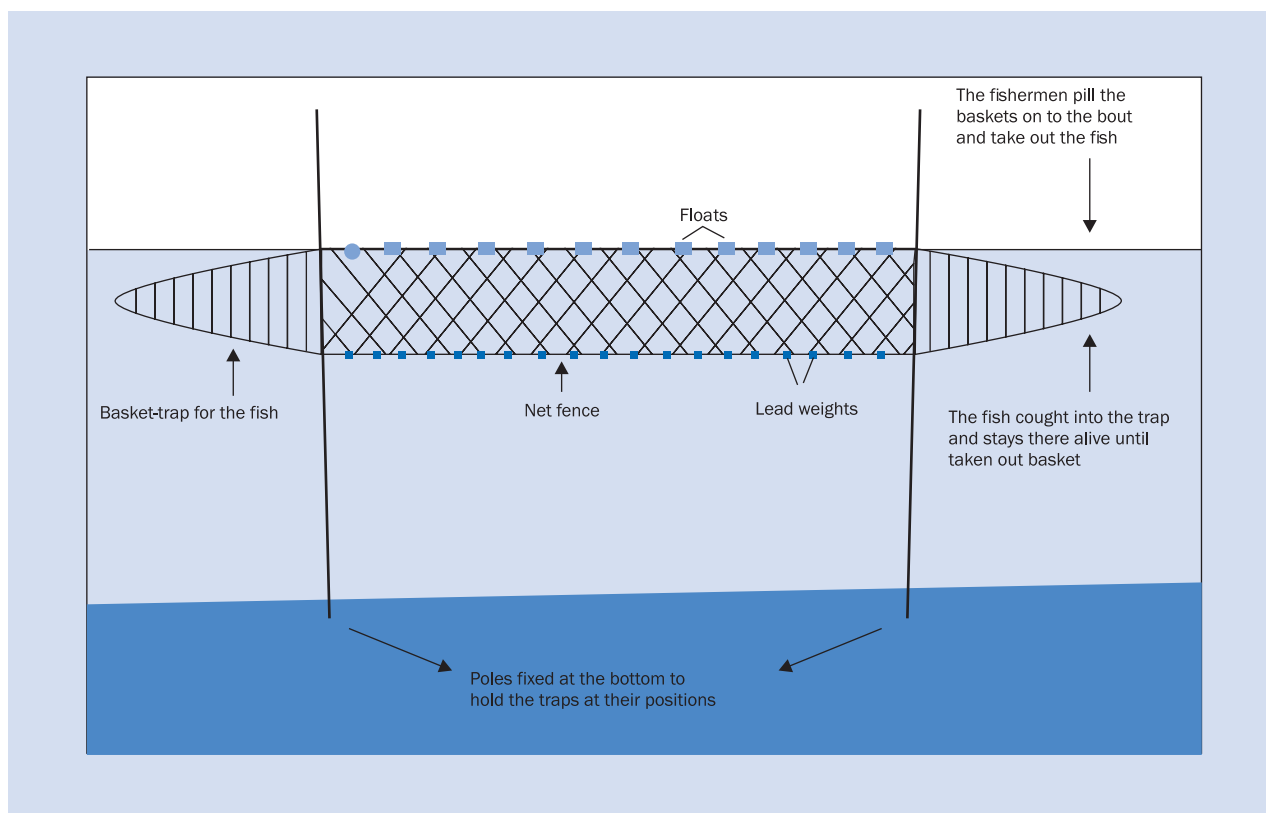


Figure 5. Traps (side view) (author: Marta Grubman-Nowak)

creates a risk to fishing vessels and the marine environment is the necessity of manoeuvring in bad weather conditions, additionally burdened with fishing gear. Another threat for the propulsion systems of fishing craft, directly connected with fishing operations, is fishing gear torn by bottom hooks, lost in the sea, or abandoned.

The Baltic Sea is specific as some areas of its bottom are abound with huge stones left by glaciation; moreover, in many parts of the Baltic Sea the seabed hides thousands of wrecks of vessels, warships and airplanes, and sunken containers with ammunition and gasses – the consequence of two world wars. Some craft have sunk due to storms or navigational errors. To protect themselves fishermen create special maps of some of the remains and obstacles on the seabed [13].

SPECIFICITY OF MOORING AND CATCH LANDING BY SMALL BEACH UNITS

Mooring the boats

The boats are pulled directly onto the beach by a specific mechanism of lines. The lines are connected between an electric hoist on the beach and around a concrete pillar in the water. The mechanism can pull the boat into and out of the water. After pulling the boat into the water a member of the crew has to detach the line from the bow out of the boat. To pull the boat on the beach a member of crew has to go into the water and attach the line to the bow. The boats stand freely on the beach due to a special shaped bottom and special skids on both sides of the boat.



The concrete pillar (author: Mirosław Daniluk)



Electric hoist

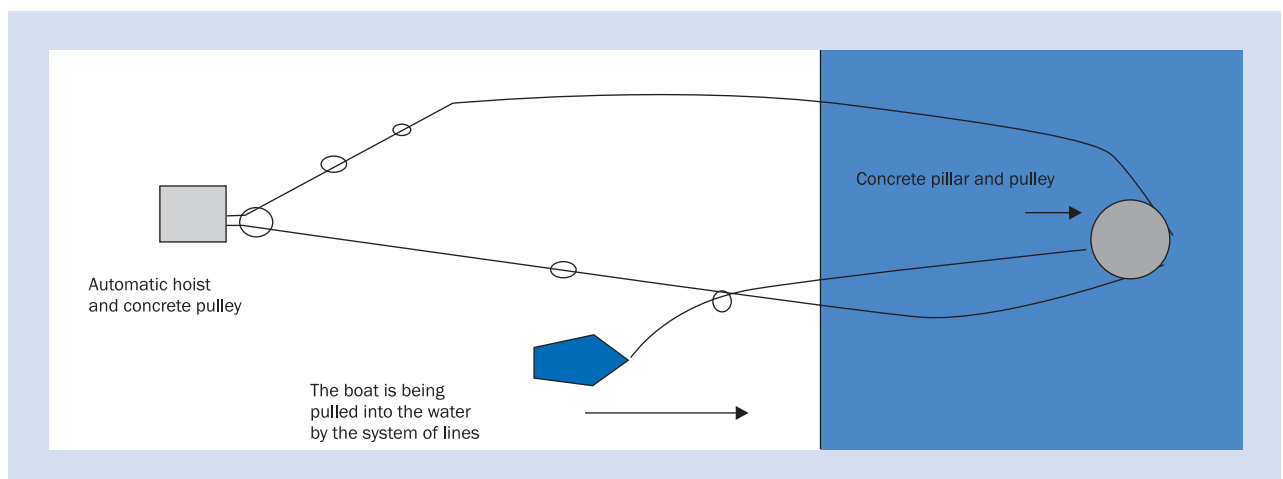


Figure 7. System of pulling the boat onto/off of the beach (author: Marta Grubman-Nowak)



Mooring on the beach (photos: Mirosław Daniluk)



Cod landing (photos: Mirosław Daniluk)



Herring landing (photos: Mirosław Daniluk)

The attachment and detachment is very dangerous and depends on the weather conditions. High waves can cause crewmembers to fall into the water and drown, and cold temperatures can cause hypothermia and frostbite.

The techniques of landing the catch on the beach – based on the type of fish

The catch is picked up directly on the beach from the boat by the client or armature.

Fish such as cod are gutted directly after taking out from the water to the boat and are stored in cases. Herring is taken out on the beach from the nets by the fishermen's families, put into cases, washed in the sea from the sand, and then picked up from the beach by the clients.

PHYSICAL AND PSYCHOLOGICAL HEALTH OF FISHERMEN IN POLAND

The work of fishermen is one of the most specifically burdening, overloading, and dangerous professions all over the world [14]. It requires great strength and physical fitness, and very good physical health. The activity of the professional fisherman takes place in very difficult conditions, often struggling with the marine elements (strong wind, high tide), and great effort of the body and muscles [4]. In this situation, a strong body structure, high efficiency of the muscles, respiratory, and circulatory system, and good eyesight and hearing are essential.

It is required that the fisherman has a good psychological resistance, which allows him to deal with the problems and imminent danger. He must be prepared for long-term physical effort in the adverse conditions of the marine environment. At the same time, he should be ready to work very quickly, because when the catch is successful, fishing hauls are carried out continuously – no matter what time of day or night.

Working on board and throwing flickering or drawing nets, often taking place in strong winds and high storm, requires courage and patience. Furthermore, such predispositions as sense of balance, agility of limbs, hands, and fingers are needed. Fishermen must have good perception, the ability to logically associate facts, reflection, self-reliance, and be able to confidently switch over from one activity to another. The fisherman must always control his emotions and skilfully interact with other members of the crew, despite the difficult situations. Such characteristics and predispositions enable the fisherman to make quick and accurate decisions in emergency situations [8]. It affects not only the work execution but also the health and the quality of working life.

The basic condition to become a fisherman is completion of the relevant maritime course organized by the marine offices and receiving a diploma. Candidate for sea fisherman must also [15]:

- complete courses in first-aid, hygiene, fire, and safety;
- undergo all medical examinations;
- receive a health certificate for seafarers.

Taking a job as a skipper requires several years of apprenticeship in the craft and graduating from a special navigation course, after which he receives the appropriate certificate [15].

The healthy marine fisherman is required to have:

- efficiency of the locomotor system;
- Efficiency of the sense organs (hearing, vision, balance) and the nervous system;
- cardiovascular fitness;
- capacity of the musculoskeletal system;
- good mental condition and lack of addictions.

This is assessed by a competent doctor during a periodic examination, performed every 1–2 years, dependent on the age of the employee [9].

THE HAZARDS OF THE WORK OF POLISH FISHERMEN

The most dangerous diseases for marine fishermen are those of the circulatory system. Studies show that the number of deaths from cardiovascular disease increased each year between 1970–2000, but is now showing a tendency to fall in national statistics [10]. This includes such diseases as coronary heart disease and high blood pressure. The result of ischaemic heart disease may be a heart attack and sudden cardiac death.

Risk factors for cardiovascular disease can be divided into non-modifiable and modifiable [17]. Non-

-modifiable factors, those that we cannot control, are: age (the risk increases in men 40–55 years of age), male gender, and family history (genetics) (the risk increases if heart attack, stroke, or sudden death occurred in the father or brother before the 55th year of age, or sister or mother before the 65th year of age). As modifiable factors - those which a person has an impact on – we consider: hypertension, smoking, lipid disorders, diabetes, overweight and obesity, and alcohol abuse.

The occupational risk factors for cardiovascular diseases include: excessive physical activity, shift work – disruption of the biological rhythm, psychosocial factors such as stress, excessive workload, significant professional responsibility, interpersonal conflicts, and fear of loss of job or responsibility for the health and lives of others [18]. All these elements present in the work of a fisherman can be detrimental to the cardiovascular system.

Also highly threatening for the fishermen's health are such ailments as:

- muscular-skeletal injuries, degenerative arthritis;
- general infections due to adverse climate and dermatitis due to frequent injuries of the skin;
- eye injuries.

INDICATIONS FOR COSTAL FISHERMEN TO IMPROVE THEIR HEALTH CONDITIONS AND WORKING CONDITIONS DEPEND ON [17]:

- modification of the diet. The daily demand for men aged 21–64 years who perform heavy physical work is 3500–4500 calories a day;
- active resting in free time from work and rational after piecework or night shift;
- avoiding conflict situations causing emotional tension;
- taking up work within the scope of their abilities;
- limiting or eliminating all risk factors related to the working environment;
- control of blood pressure;
- quitting smoking, limiting alcohol intake ashore, and observing alcohol abstinence while working at sea. Unfortunately, there are still situations in which the fishermen consume alcohol at work, or directly before boarding the boat [16].

The postulates of the fishermen who participated in evaluation of the Guide; how to improve their health and working conditions:

- raising the professional qualifications and self-awareness of risks;
- improvement of the technical conditions of the boats, equipment, and supplies;

- usage of appropriate floatable and thermo-protecting work clothing and footwear;
- usage of goggles and masks to protect face and eyes;
- the introduction of mandatory vaccinations against tetanus;
- introduction of laminated and immediately available instructions for safe behaviour on the boat;
- introduction of laminated instructions for first-aid;
- introduction of training for young fishermen, conducted in a pool and simulating difficult situations (such as jumping into the water in rubber boots).

CONCLUSIONS

- The profile, characteristics, and particularities of the work of Baltic coastal fishermen demand special attention.
- Improvement of their occupational health, safety, and quality of life require close cooperation with medical staff and marine administrations.

SPECIAL THANKS

We would like to thank all the people participating in our project for their valuable comments, based on many years of experience in Polish fishing, the fishermen, especially Mr Mirosław Daniluk for his personal engagement and help, and the Chairman and Secretary of the Association of Fishermen of the Sea in Poland.

For more photographs and videos about Polish coastal fishing you can visit the website:

<https://plus.google.com/u/0/photos/107992666113411247643/albums>.

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