

Working areas

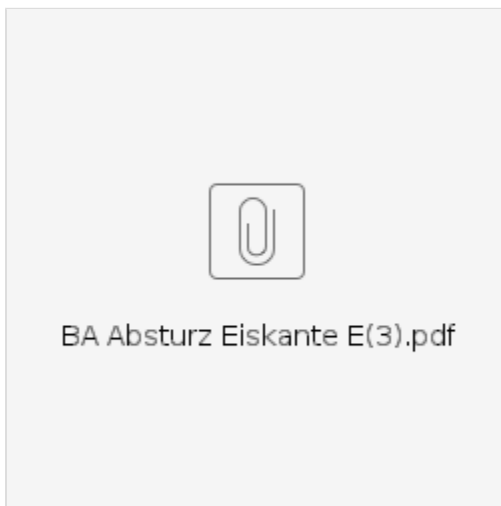
While working in the field respectively on the ice coverage according to work safety several different situations have to be considered.

- Working with the risk of falling 2m or more
- Working on ice edges
- Working in or close to melt water ponds
- Working on ice holes in general
- Working on the ice hole next to the vessel
- Working on Ridges
- Working with / on Boats
- Working with / on Masts
- Tents/shelters
- Lab containers on forward weather deck

For further information regarding the above mentioned topics please see below.

- working with the risk of falling 2m or more

When there is a general risk of falling 2 m down or more you need to follow the operating instructions:



- Working in or close to melt water ponds

Melt water ponds can significantly differ from each other. Some are quite shallow and the ice below is solid, others can be deeper and/or the underlaying ice is fragile, slushy and soft. Some even have an opening to the open water below.

Before entering a melt water pond several safety measures have to be carried out:

- Check the stability of the ice and the water depth inside the pond by using a stable stick before stepping into it.
- While working in a pond a survival suit is obligatory to prevent you from getting wet and to give you stability in case you slip, stumble or break through the ice.
- If the water is so shallow that rubber boots are high enough to avoid ingress of water, the flotation suit in combination with rubber boots is sufficient.
- When the ice surface in the pond is fragile and instable or the pond goes through the floe from top to bottom, a safety harness needs to be connected to the person additionally to the survival suit. Make sure you have the rope properly attached to an ice screw at a solid holding spot. In case you slip or the ice collapses you can use the rope to pull yourself back out or let others pull you.
- It might be appropriate to wear shoe-spikes as the surface inside the pond might be very slippery, steep and uneven.

- Working on ice edges

When working in 2 meters or less distance from the ice edge everyone needs to secure him or herself by appropriate safety measures.

If the edge is higher than 1m (independent if you can fall into water or on massive ice) you have to use antifall-guard such as safety harness, rope and ice screw. On edges higher than 2m you need to wear an appropriate helmet, which will be available on board.

Securing is necessary to prevent persons from falling down the edge, either on massive ice or into the water and/or being drifting away by wind or current.

When more persons are working together, everybody needs its own safety equipment and it is obligatory that everybody has his/her own ice screw as a fixpoint. -The fixpoints should be at right angles to the working spot on the-edge to have a proper withhold effect.

It is not necessary to wear a survival suit when working secured at the ice edge. A flotation suit is sufficient to supply buoyancy in case someone fell despite wearing the antifall-guard. Always make sure that the securing rope has a proper tension to effectively prevent you from falling over the edge. It has to be fixed at your back to not hamper you during your work. A loose rope or a not completely fixed screw does not have an adequate securing effect.

- Working on ice holes in general

Work on ice holes requires different safety measures depending on the size of the hole and the work which is carried out.

- If the size of ice holes for your work does not exceed a diameter of approx. 1,5 m it is generally not necessary to use a safety harness and rope for securing assumed that you are **not** working alone. Due to the limited diameter it is unlikely to fall completely into the water. Additionally, there is no risk of falling into the water with high energy and to submerge because the water level inside the whole is always close to the ice edge.

In this context the main risk for falling into the water is by slipping or becoming unbalanced during work. If this happens, the flotation suit will keep the person afloat. By means of ice picks and helping hands of others nearby it is possible to quickly pull the person out of the water. If the casualty became unconscious, it is always possible for those around to reach the person due to the limited diameter of the hole.

On ice holes bigger than 1,5m in diameter, or any size of holes when bending over to handle equipment or else and when strong currents are observed, securing by safety harness, rope and ice screw is necessary. In general work on ice holes is not allowed to be done alone.

- Be aware that melt water ponds or ice holes can change their characteristics by and by. Edges and surfaces which were stable enough for your work on one day can be instable and fragile the next day, especially in contact with salt water or due to changing weather conditions. Make sure that you check stability and water depth again each time/day you return to the pond/hole and do not rely on your last day's check-results.

- Work **next to** melt water ponds requires the same safety standards as work on ice holes in general.

- Working on the ice hole next to the vessel

When working at the CTD hole next to the vessel, you have to secure yourself with a harness. There is a securing rope running around the hole where you can hook into. If crane operation is going on, you have to wear a helmet. In case somebody fell into the hole, there is a ladder attached to the ice close by which can be lowered into the hole. If the ice hole is not in use, the wooden lit will be placed on it.

- Working with / on Masts

Different types of masts will be used for research on the floe. Mounting and dismantling of equipment might be necessary several times throughout the project, which will be done in different ways depending on the mast.

- Mobile and/or foldable masts can be handled from the ground, which means that there are no special requirements regarding work safety.

Fixed masts that need to be climbed for services / work require certain safety measures for working aloft. Only trained and certified personnel is allowed to climb these masts with appropriate safety gear.

- If the casualty was in the water for more than a very few minutes, always consider the possibility of hypothermia and act accordingly. The flotation suit will give some thermal protection against the cold water, but in combination with a potential shock, the casualty should be handled with care and needs attentive monitoring. In case you are not able to get the casualty out of the water by yourself, call for help via radio and act according to the emergency procedures.

- If strong currents are observed, make sure to secure yourself correctly in terms of the holding point. This means that the ice screw should be placed in the direction where the current is coming from (hier vielleicht besser: against the current direction – wenn ich das richtig verstanden habe) to enable the safety rope to tighten in case you are drifting away.

- When you are using saws to cut ice holes be aware that ice is quite heavy and it might be difficult to remove the floating ice blocks from your hole. It might be helpful first to fix an ice screw in the ice and then cut around this to have a proper handle to take out the block.

- If you cut holes in the ice for your work it is recommended to cut them in a triangular shape. On one hand this reduces the open surface and on the other hand this gives you a better access to the whole (in case you have to bend over for lowering or recovering any devices). Furthermore in case of emergency a triangular shape enables you to have a better grasp to and a more easy recovery of the casualty.

- Working on Ridges

Ridges can be several meters high and can possibly have crevasses formed by various ice floes which were pushed together, turned and lifted. Due to the several layers of ice floes in ridges it is difficult to estimate the depth of cracks and crevasses in advance.

If you need to work on ridges follow the following safety provisions:

- assure yourself of the stability and carrying capacity of the areas you are stepping on, as there might be fragile parts that are less solid compared to the regular surrounding ice coverage.

- make sure to find a proper and stable position, especially when you have to use heavy tools such as corers or saws.

- if there is a risk of falling from the ridge higher than 1 m or falling into a crevasse nearby, independent of its depth, you have to secure yourself by means of antifall-guard such as safety harness, rope and ice screw. On ridges higher than 2m you need to wear an appropriate helmet, which will be available on board.

- formation of ridges can result in lowering and flooding of adjacent parts of the floe, therefore you have to explore the flat parts at the sides of a crack before stepping on them because they can be wet and soft

- tents/shelters

The interior of tents and shelters must always be well organized to ensure safe work. Flying cables and devices have to be arranged in a proper way to provide clear walking and working areas. Safety equipment like fire extinguisher, fire blanket, hooks, first aid equipment must be stored in an easily and quickly accessible way. Tents or huts are not polar bear proof.