

# CTD-shelter on Polarstern

By Alfred Wegener Institute

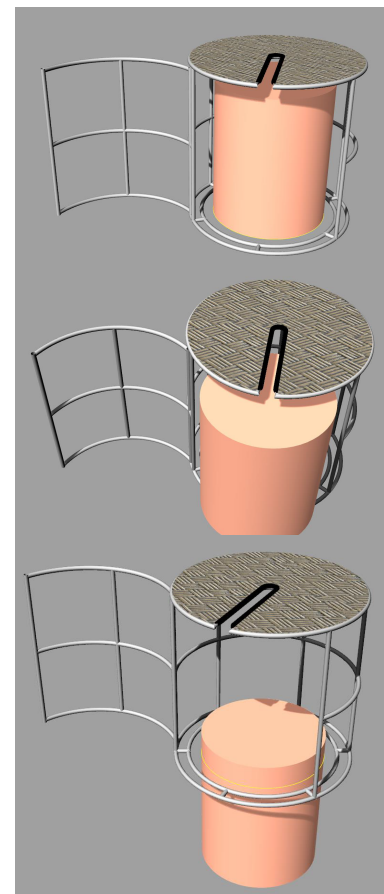
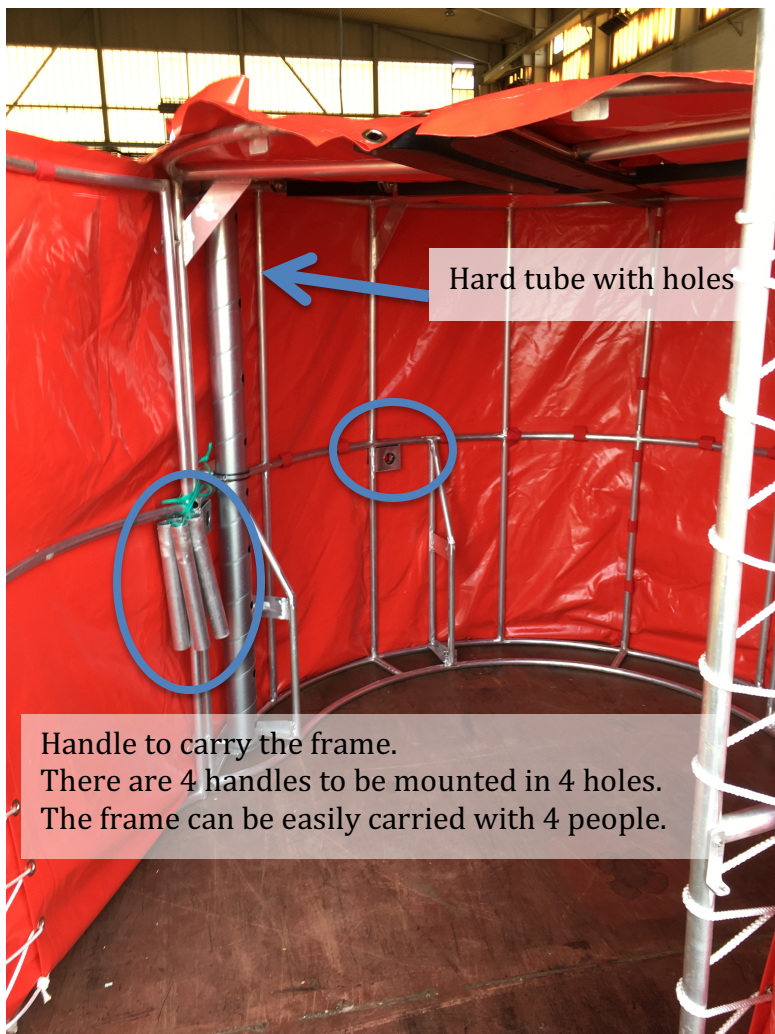
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Last changes 18 09 2019

This documents describes how to use the CTD-shelter. It is a prototype. Comments and feedback for improving the shelter, the procedures and this document are very welcome.

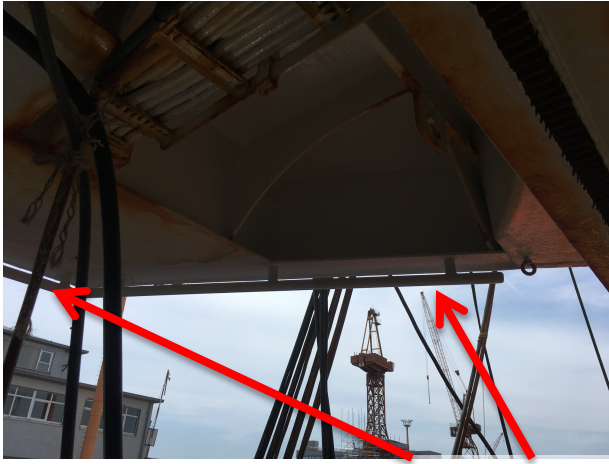
This shelter was design to protect the CTD sensors and water samples in cold conditions. The shelter consists of a frame and a red cover. There is an extra extension for Nets and LOKI. For CTD casts the extension is not needed.

The idea is to have the CTD in the shelter while it is moved from the entrance of the Abfüllraum to the surface of the water, and on the way back from the surface to the entrance of the Abfüllraum. The shelter itself is not supposed to go into the water. It will be mounted to a crane to separately lift it. Maybe you can get it back on board during the cast (that was still under discussion when Polarstern left and has to be tested and communicated with the crew).

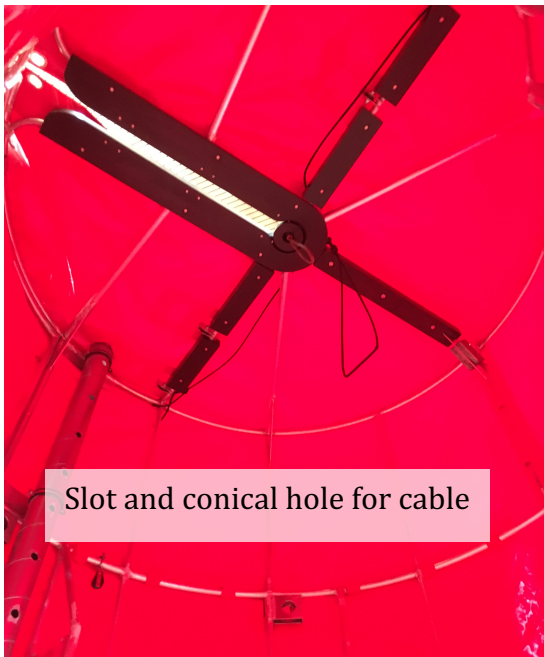


The shelter will be heated with warm air blown into the frame via two flexible tubes. The tubes will be attached at the top of the frame and bring the warm air into two hard tubes inside of the frame. These tubes have several holes to distribute the warm air inside the frame.

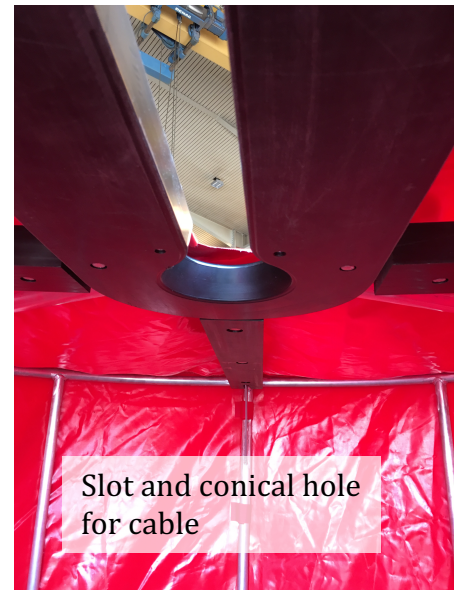
The shelter is too big to get it into the Abfüllraum, which is why there is a newly installed rail system to attach a curtain in front of the Abfüllraum.



Rail to attach the curtain



The top of the shelter has a slot to bring the CTD cable to the centre. In the centre is a conical hole. A cone fitting into the conical hole needs to be mounted to the CTD-cable. Lifting the CTD will then automatically centre the shelter and lift the CTD with the shelter on top.



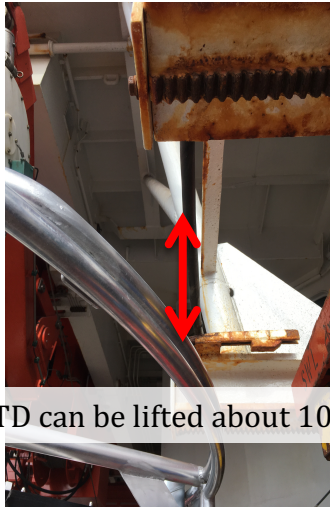
### Deploying the CTD

Close the curtain. Move the CTD out and set it down in between the curtain and the Abfüllraum. Disconnect the Laufkatze (crane) and place the shelter manually over the CTD. Attach the Laufkatze, close the shelter, open the curtain and move the CTD out. Disconnect the Laufkatze and move it back. Stay outside and make sure that the CTD is lifted very carefully not to crash into the crane rails. The CTD can be lifted about 10cm, than it has to be moved over the side of Polarstern (see pictures on the next page).

You might want to attach a rope at each side to keep the rosette and shelter oriented towards you. All this has never been tested so you need to figure it out together with the crew. If you have something to add to this document please do so and let me know.

### Recovery

During recovery you want to protect the sensors and the water in the samplers from freezing. It is crucial to get the CTD into the shelter just above the water surface. When the CTD is inside, lift the CTD and frame just above deck level and then on deck. Remember to pay attention to the rails of the Laufkatze and move the CTD carefully below the rails. Move the Laufkatze out, attach it to the CTD, lift the CTD and move it behind the curtain. Make sure that it is warm enough behind the curtain. Open the shelter and remove it. Bring the CTD into the Abfüllraum and proceed as usual.



CTD can be lifted about 10cm



For Nets and Loki

To protect the Nets and LOKI an extension can be connected to the shelter. When the samples have been pulled up inside the extension and secured on board, it might be easier to lift the extension before getting the shelter on deck.

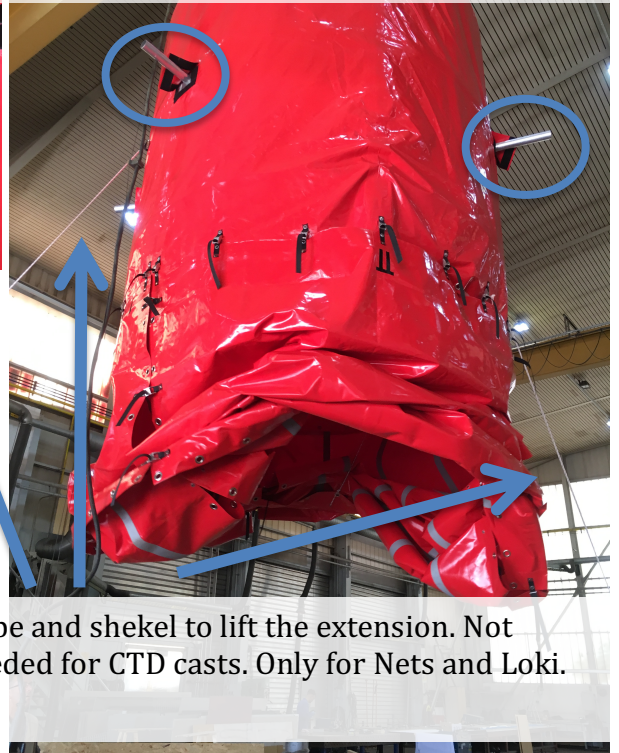
To lift the extension you can use a rope running from the outside, through the shekel, to the inside of the frame, down to the end of the extension. Attach the rope to the hole with the star at the lower end of the extension.



Hole with star



Handel to carry the frame. Remove handles during deployment! The picture is from a test.



Rope and shekel to lift the extension. Not needed for CTD casts. Only for Nets and Loki.

You might also want to test having the rope running from the outside, through the shekel, but staying outside of the shelter as shown in the

picture. I don't remember what worked best.



Pins to connect the three pieces of the ring

Handle to carry the frame

There is a ring, which can be mounted to the lower end of the extension to give it some stiffness. The ring is divided into 3 pieces that can be connected using 3 pins.