

Development of rescue PFDs - A historical overview -

The article below was written and published in November 2005 by Horst Fürsattel from [°hf Kajaksport](#), manufacturer of the °hf range of whitewater safety equipment. Horst has been involved with the development of kayaking safety gear since the early 1980's (possibly even before that) and his company was (and still is) on the forefront of the development and production of safety equipment for paddlers. Although this article (translated from the German original) is now several years old its content is still very much valid and we encourage you to have a read and think about how you yourself use your rescue PFD and tow system.

Stay safe on the river,

Andi Uhl



PFDs (personal floatation devices) with integrated rescue chest harness

Nowadays, chest harness and cowtail are used for totally different purposes as originally intended during their development and initial practical uses.

Plenty of misunderstandings and near-accidents have been documented and it is time to sort information and draw some consequences. How could this situation arise? A view at the history of the development of this equipment provides an explanation:



WW-GURTWESTE

Erstmals ist eine auftriebsstarke Kajakweste mit einem Brustgurt kombiniert. Der fest integrierte Gurt (mit Schulterträgern), verrutscht nicht und öffnet sich nicht selbsttätig. Leichtes An- und Ausziehen! Dennoch ist im Notfall das System mit einem Handgriff – auch unter Zug – abzuwerfen.

The invention of the safety vest

The first whitewater PFD with chest harness came on the market in 1981. It was designed by a group (*) of AKC ([Alpiner Kajak Club](#)) members and was distributed by Schlegel Paddles.

The first picture of a PFD with integrated chest harness was published in September 1981 in the Schlegel Paddle catalogue, the paddler is Peter Lintner who is still a very active whitewater paddler (see [www.bundle.de!](http://www.bundle.de/))

A short time prior some modified climbing harnesses appeared which were worn over a normal buoyancy aid. However, those designs did not allow a safety release under load.

The Schlegel-Vest pictured above was upgraded a year later with a carabiner pocket and a towline. This was the advent of the "Multi-Safe",

the first PFD with chest harness and integrated towline.

The first "Multisafe"

The towline's intended purpose was to tow a swimmer (who is too exhausted to hold on to a rescuer's kayak in a fast moving, big water river) to shore quickly. This was practiced in groups and rescue techniques were soon improved. Within a year the first incident happened which resulted in a successful rescue.

However, to secure a helper in the water during a "life-bait rescue" the small plastic buckle of the first generation of vests turned out to be too weak. Even with relatively low forces pulling on a rope the belt slipped back through the buckle and the rescuer was not safe anymore.



At the same time ϕ hf manufactured a number of rescue harnesses which could be worn on top of a normal PFD. Fitted with a quick release system they could be removed one-handed if a dangerous situation arose. Those harnesses had much stronger buckles and also featured a back-bar already.

In 1986 the ϕ hf "Cordura Classic" came on the market. It was the first whitewater PFD in pull-over style, the first whitewater PFD made from Cordura® outer fabric, and the first whitewater PFD with quick release buckle and steel back-bar on the chest harness.

The strength of the Cordura Classic's chest harness was far in excess of the breaking strength of standard throw ropes.

For the first time ever all elements in the chain rope / carabiner / chest harness were in excess of 500 daN [Force of 1 deka Newton (daN) equivalent to approx. 1kg mass] breaking strength.



Cordura-Classic 1986

The idea of a chest harness with back-bar was taken on by other manufacturers in the years after and is still state of the art today. In comparison to standard PFDs without the chest harness those new models offered much more opportunities during a rescue. Nevertheless, all paddlers were also aware of the weaknesses of the new system:

- ⚡ The quick release buckle can open accidentally
- ⚡ The quick release can be blocked in an emergency (i.e. if a paddler is wedged with the chest against a rock and is unable to open the buckle)
- ⚡ Friction can be too high, even with open buckle the belt is not released

- ≠ Separation doesn't work despite open buckle, i.e. if the rescuer (during life-bait rescue) gets tangled up in their own rope
- ≠ Release only works if the free end of the belt is not too long, etc.

As a result of continued training and use of the new technique it became clear to everyone in 1984 that it is NOT suitable for gear recovery. Therefore there was no explicit caution back then to refrain from gear rescue and recovery with those systems. A boat on the carabiner, then a roll while the rope gets tangled around the paddler's neck, and a strong pull from the gear in each wave - nobody wanted to take a risk like this [for only equipment].



The AKC brochure Kanu Gefahren ("Kayaking Dangers") from 1984, the undisputed classic in river safety, discussed in depth swimmer rescues, but nothing is mentioned about gear recovery with the tow line. The °hf-catalogue (pictured above the boat-mounted tow line, 1987) also always refers to swimmer rescue only.

Comfort before Common Sense

Of course, kayak instructors and trip leaders recognised very quickly the opportunity to use chest harness and cowtail to recover capsized boats and pull them to dry land with ease. In harmless situations this was also tolerated, at least if it was an experienced expert during kayak instruction on easy, open rivers.

In the end, however, the wrong example set by experts back then is the reason for today's problems: The next generation of paddlers got to know chest harness and cowtail mainly as a tool for gear recovery and subsequently started using this technique themselves. The original purpose of the towline falls more and more into oblivion. This is also shown with another example, the kayak carabiner:

Kayak-Carabiner

During training with the tow line in moving water it very quickly became clear that a standard climbing carabiner is very difficult to clip on to an exhausted swimmer.



This coincided with the fact that rock climbers (it was the beginning of the free-climbing era) were also searching for a new type of carabiner. In cooperation with Kong, °hf introduced the first kayak carabiner to the market in 1988. This design, with a catching "nose", allowed much easier clipping in.

However, the demand for this carabiner dropped rapidly when a Paddle Carabiner appeared on the market. The paddle carabiner is large enough to fit around a paddle shaft. It wasn't an issue anymore that the new

paddle carabiner was showing the same [clip-in] problem as the old climbing carabiners in case of a swimmer rescue. When purchasing a carabiner, kayakers were more focused on towing a paddle than on its suitability during an emergency.

(Since 1988 hf cowtails have been supplied with the "catch-nose" kayak carabiner but kayak dealers report frequently that their customers often swap the original carabiner with a paddle carabiner while still in the shop).

What now?

The weaknesses and dangers of the chest harness on a rescue PFD were known some 20 years ago but in all those years no better solution has been developed. In contrary - the risks remain unchanged but the knowledge about those risks seem to disappear more and more from paddlers' minds. Therefore, as manufacturer of this equipment, I would like again to emphasise the risks with this equipment:

The combination chest harness/cowtail was not designed for gear recovery. If it is used for this purpose after all then I want to point out (see above) the specific risks. If someone uses chest harness/cowtail for gear recovery despite these cautions then they also accept responsibility for this decision. The manufacturer is not liable for incidents arising from gear recovery.

Today, the quick release buckle with back-bar is recognised standard. Chest harnesses with this system offer trained paddlers additional options for swimmer rescue. If they want to use these options they need to receive training from an experienced expert first. The risks involved with those techniques need to be explained and understood. Practical exercises under competent supervision are also an important part of such training.

Attaching cowtails, ropes or similar constructions without this prior training can cause life threatening incidents and should therefore be omitted.

Please also forward this information to your paddling friends - Thanks very much!

If it is possible to avoid dangerous situations with this information and maintain everyone's fun in the boat then this essay fulfilled its purpose. Spaß am Kanufahren für alle zu erhalten, dann ist das Ziel erreicht. With those lines I would like to play my part.

See you on the river!

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hf Kajaksport
(November 2005)



Useful additional information:

Palm Chest Harness Info (PDF) [click here](#)

Palm Towline Info (PDF) [click here](#)

Druck-Version dieses Artikels (PDF) [hier klicken](#)

(*) Fredi Höll, Ingo Kiewel, Werner Hönig, Volker Hartwich, Holger Machatschek

Reprint of this page in the name of river safety is emphatically desired but only complete without any omissions and with reference: "Horst Fürsattel, www.hf-kajaksport.de"