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Q: What is a parachute diaper?

A: No, it's not something to help prevent pilots from soiling themselves during a bailout. Rather, a parachute diaper is a simple piece of material that ensures your parachute opens properly and helps prevent injuries during deployment.

When you hear the word diaper, you probably think of something wrapped around a baby's bottom. Similarly, a parachute diaper is wrapped around the bottom, or skirt, of your parachute where the lines are attached and keeps all the "crap" contained during certain critical stages of the parachute's deployment.

While an emergency parachute deployment looks like a blur, it is actually a carefully engineered series of events that takes place within three seconds of pulling the ripcord.

To appreciate the diaper, let's go back in history and see how parachutes worked before the diaper came into use. The lines of the parachute were neatly stowed in the container with rubber bands (see photo 1), and the parachute was folded and packed on top of the lines. When the ripcord was pulled, a small spring-loaded drogue (pilot chute) extracted the parachute from the container. As soon as the parachute was all the way out of the container, it opened and began decelerating. But the lines were still coming out of the container as you hurtled toward the earth at full speed.

When you reached the end of those lines (called "line stretch" in parachute talk), you got a rather violent opening shock as the fully inflated parachute above you acts like an anchor. The lines go slack as you snap around like a rag doll at the end of a rubber band. This could easily cause a type of malfunction called a "line over," where some lines would flip over the top of the parachute. Because this condition sometimes made the parachute look like a bra, it was also known as a "Mae West." If you're too young to know who Mae West was, Google her. This malfunction often broke lines, ripped the parachute material, caused your parachute to spin violently, or all of the above.

In addition to the line over, there was the real possibility of becoming entangled with the lines if you were tumbling during the parachute's deployment. Tumbling in a bailout is a likely scenario, since most pilots are not trained skydivers and an out-of-control or burning airplane is very different from the stable,

controlled environment at a skydiving drop zone. Entangling with the lines could prevent the parachute from opening and have catastrophic results.

Around 1970 some brilliant person came up with the idea of the partial-stow diaper (see photo 2). Wrapped around the skirt of the parachute, this was a small piece of material that would not allow it to inflate until reaching line stretch, at which point the lines holding the diaper closed (called locking stows) were released (see photo 3). Photo 4 shows the diaper fully open, allowing the parachute to inflate. All manufacturers of pilot emergency parachutes quickly adopted the partial-stow diaper.

What a marvelous improvement. Not only did it almost entirely eliminate the line-over malfunction, but it also eliminated that first violent opening shock. Now, you got nailed only once and it was a lot less severe.

But since only part of the lines were stowed on the diaper, there was still the danger of becoming entangled with the lines. Enter the full-stow diaper. In the late 1970s someone came up with another great idea. By adding more rubber bands, almost all of the suspension lines could be stowed on the diaper (see photo 5) and not in the container. Now, when you pull the ripcord and the parachute is coming out of the container, it takes all but about a foot of the suspension lines with it. If you do get entangled with the lines, it should only be with those lines closest to your body and hopefully should not prevent the parachute from opening.

Today, all but one manufacturer of pilot emergency parachutes use the full stow diaper system. While both partial and full stow diapers work very well, I personally prefer a full stow diaper. It helps eliminate one more risk and prevents a bad day from getting worse.

Now that you understand how a diaper works, you can appreciate the importance of regular maintenance on this simple yet critical component of your parachute. Regulations call for a 180-day repack cycle. It is your responsibility to get your parachute serviced by a rigger who has all the replacement parts your parachute might need, like those vital rubber bands on the diaper. If they deteriorate and break between repacks due to improper care and long intervals between servicing, you could get an out-of-sequence opening. This could cause serious problems. Make sure your rigger has the proper tools and a clean area to pack your expensive cushion should go without saying.

Until next time, fly safe!

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